

The Chicago Tech Effect

Conducted by

CHICAGOLAND
CHAMBER OF COMMERCE

HR&A

Supported by
Google

JUNE 2022

LETTER FROM THE PRESIDENT

As technology continues to permeate nearly every aspect of our daily lives, our notion of what it means to be a part of the tech community has expanded exponentially. From manufacturing, to finance, to healthcare, every industry is a part of this new tech community, and as emergent technologies empower and enable new growth opportunities for every business, we have all come to see ourselves as a part of a technology-enabled ecosystem.

With the lines between tech and non-tech continually blurred, the success of the Chicago technology sector is a key part of the success of our overall economy, as we see in the Chamberland Chamber of Commerce's *Chicago Tech Effect* study.

The study, conducted by the Chicagoland Chamber of Commerce and HR&A Advisors with the support of our member Google, represents the most comprehensive analysis of the impact of the Chicago tech ecosystem to-date, establishing several key economic indicators that point to the overall growth of the city's tech sector.

But at its core, the findings paint a clear and definitive picture: Chicago is one of America's leading tech hubs. Given the strength and size of our booming tech sector, it is time that we, as a city, fully embrace this identity as a world-leading technology destination.

Yet, it's important that we remember that the success of the Chicago tech sector didn't happen by accident. Strong, pro-growth public policy frameworks helped to differentiate our city and state.

To ensure that Chicago remains a friendly place for tech companies – both large and small – to do business, our advocacy work is far from over. We at the Chamber are leading the charge to support policies that drive the continued success of the Chicago tech ecosystem and oppose those that will stifle growth and job creation.

Today, as we look to the future of a growing Chicago economy and thriving local community, we ask you to join us in our advocacy efforts, as we push for an even brighter future for our city's tech ecosystem and our overall economy.

- Jack Lavin
President and CEO, Chicagoland Chamber of Commerce

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AT A GLANCE

Chicago is one of America's leading tech hubs with 18% growth in the tech workforce in the last decade.



106K

DIRECT TECH JOBS



\$73.8B

ECONOMIC OUTPUT



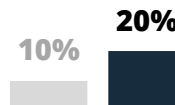
\$651M

TOTAL FISCAL IMPACT

Tech Ecosystem Growth

Pre-COVID
2011-2019

Post-COVID
2019-2021



10%

20%

■ Tech Ecosystem
■ Overall Economy

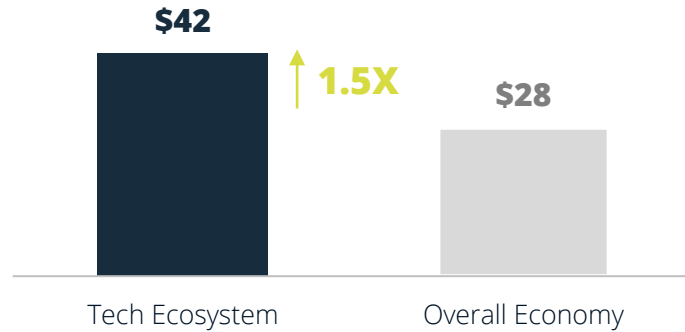


-8%

-2%

- **Chicago's tech ecosystem is essential to the city's economy**, employing over 106,000 people – 8% of the Chicago workforce – and spurring significant economic activity and hundreds of millions of dollars in tax revenues for our state and local governments.
- **The tech ecosystem grew 18% in Chicago over the past decade compared to the overall economy**, which saw growth of just 1%. Tech has also demonstrated greater resilience and supported Chicago's recovery during the COVID-19 pandemic.
- The growth is due in part to new start-ups, but also because **tech cuts across every industry** in Chicago, from government to healthcare, Fortune 500 and small and mid-sized businesses.
- Drawing people to Chicago are the region's **deep bench of talent from local universities, a diverse workforce pipeline, central location, and affordable cost of living**.

*Tech Ecosystem vs. Overall Economy Median
Hourly Wage (2021)*



- **The median wage in the tech ecosystem is \$42/hour – 1.5X higher than the \$28/hour for the overall economy.** Even jobs that have an educational attainment below a bachelor's degrees experience higher wages on average.
- Of the ten largest tech occupations in Chicago, **half are accessible to those without a college degree.**
- **Tech opportunities cut across Chicago's diverse economy – close to 50% of tech ecosystem jobs are in industries not traditionally considered tech.** In today's ever-evolving world, digital skills and jobs that leverage technology will only continue to grow in importance in every sector.

AT A GLANCE

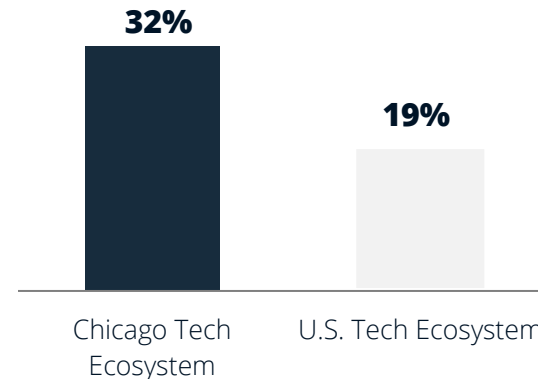
Widespread tech growth in Chicago is fueling upward mobility and greater economic equality.

AT A GLANCE

Chicago outperforms national averages for diversity in tech and must continue to invest in efforts to support equity.

- **Chicago boasts the highest share of female founders of any of the top 20 tech hubs in the world** with 34% of startups being founded by women, over two times the global average.
- **The city's diversity supports greater inclusion in tech.** Chicago's tech ecosystem sees greater Black and Latino participation than the national average, with 32% of diverse participation compared to the national U.S. average of 19%. More must be done to close the representation gap.

Black & Latinx Representation



34%

Founders are women
Highest among global tech hubs

RECOMMENDATIONS TO FUEL GREATER TECH GROWTH IN CHICAGO:

- 1. Promote Chicago as a leading tech and innovation hub nationally and globally.**
- 2. Expand efforts to strengthen our diverse tech talent pipeline – and help Chicago achieve its goals towards inclusive prosperity.**
- 3. Ensure a positive public policy environment that allows Chicago's tech ecosystem to continue to grow and produce positive impacts on our local economy.**

POLICY CONSIDERATIONS

- 1. Lean into Chicago's assets and create marketing avenues to sell Chicago's strengths and successes.** Chicago needs to tout its core strengths – talent, diversity, affordability, connectivity, and its strong startup and corporate presence – to remain competitive with other markets.
- 2. Advocate for policies and initiatives that will advance high-tech and deep-tech innovation in Chicago and not hinder the tech ecosystem's momentum.** Chicago can leverage tax credits to offer additional incentives to spur innovation and development in the future of sectors like autonomous vehicles or quantum.
- 3. Develop policies to address current gaps in Chicago's tech talent pipeline.** More can be done to strengthen the tech talent pipeline starting from the K-12 level to creating more apprenticeship and mentorship programs to connect students with employers.
- 4. Bring greater awareness to all tech opportunities across Chicago's economy by changing how tech is discussed.** Roughly half of Chicago's tech jobs are in non-tech industries – by expanding the definition of tech, Chicago can promote the true scale of the tech ecosystem and improve talent attraction and retention.
- 5. Lead with equity.** Chicago's diverse workforce puts the city in a unique position to build the most equitable tech ecosystem in the country. The ecosystem should leverage its existing diverse local talent and continue to invest in efforts and initiatives to increase Black, Latinx, and female participation in tech. City and state governments can also increase pathways to tech by closing the digital gap and expanding broadband access across the region.

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Economic & Fiscal Impact

Drivers of Growth

ECOSYSTEM OVERVIEW

From the invention of the vacuum in 1869, to the wireless remote control in 1950, and later the first smartphone in 1999, Chicago has a long history and culture of innovation. This rich history, paired with significant public and private investments in the last decade, have been instrumental in shaping Chicago's tech ecosystem to the scale it is today.

Chicago's tech ecosystem plays a large role in the overall economy – the ecosystem's 106,000 jobs represent 8% of Chicago's workforce, a significant figure considering no industry in Chicago makes up more than 13% of the economy. Tech ecosystem jobs are relatively evenly split between tech industries (54K jobs) and non-tech industries (52K jobs).

Strong growth in the past decade has cemented tech's importance within the broader economy. The Chicago tech ecosystem added 15,000 new jobs between 2011 and 2021, 87% of which are in tech industries. Chicago's tech growth has also driven the growth of the tech ecosystem at a state level – the 15,000 jobs added in Chicago represent 43% of Illinois' tech ecosystem growth in the past decade.

Chicago's tech ecosystem supported the city in its recovery from the pandemic. Over the last decade, the tech ecosystem grew 18% compared to just 1% for the overall economy. Between 2019-2021, the city of Chicago lost 8% of its jobs while the tech ecosystem only lost 2%, demonstrating great resilience during the COVID-19 pandemic. This growth has been largely led by tech industries. Between 2011 and 2021, tech and non-tech jobs in tech industries jobs grew 68% and 17% respectively. By comparison, tech occupations within non-tech industries grew 5%.

Chicago's tech growth has been driven by both expansions within the city, as well as relocations to the city – Chicago's low cost of living and strong talent base has encouraged large tech companies to expand their footprint within the city. Salesforce, Google, LinkedIn, Meta, and Yelp have all added offices or increased office size within the past 3 years. Meanwhile, Chicago's strengths as a tech hub are also attracting younger tech companies to relocate from Silicon Valley. In recent years, BlueCrew, Uber Freights, Tegus, and G2 have all moved their offices to Chicago.

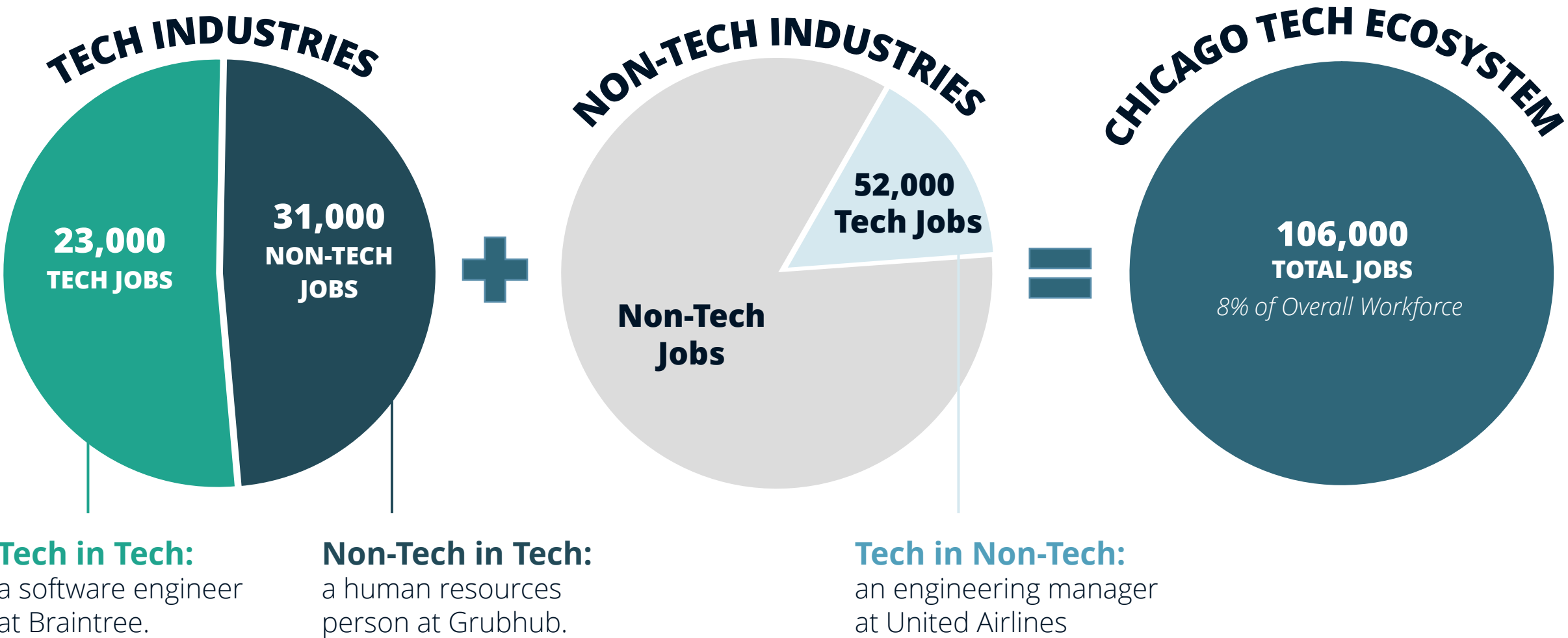
An economic “ecosystem” is a network of organizations that enables the provision of goods or services. Chicago's tech ecosystem jobs are distributed throughout tech and non-tech industries and occupations, incorporating a broad range of jobs that rely on tech and require tech talent. Tech ecosystem jobs fall into three broad categories:

- 1. Tech Occupations in Tech Industries** – for example, a software engineer at Braintree.
- 2. Non-Tech Occupations in Tech Industries** – for example, a human resources manager at Meta.
- 3. Tech Occupations in Non-Tech Industries** – for example, an engineering manager at United Airlines.

In 2021, Chicago's tech ecosystem consisted of **106,000 jobs**. Across tech industries, there were 23,00 tech workers and 31,000 non-tech workers. The non-tech industry held 52,000 additional jobs.

CITY OF CHICAGO TECH ECOSYSTEM, 2021

Over **106K people** work in Chicago's tech ecosystem, with half in industries not traditionally considered tech.



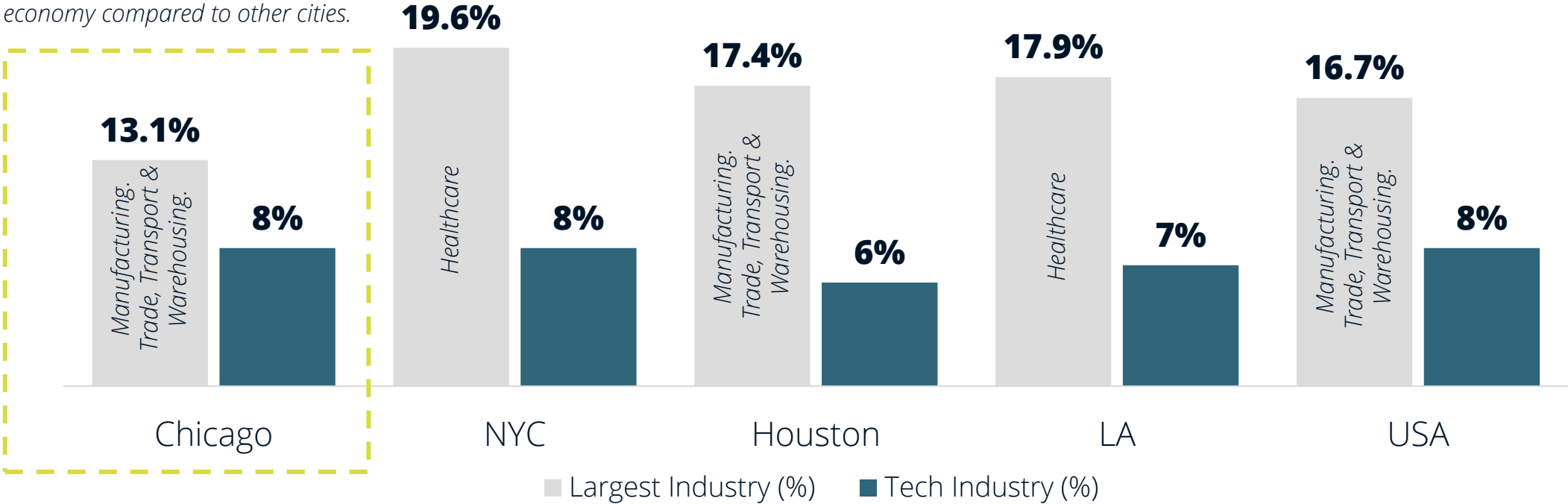
Source: HR&A analysis of EMSI data.

THE NATION'S MOST ECONOMICALLY INTEGRATED TECH ECOSYSTEM

Chicago's tech ecosystem is essential to the city's economy, employing **8% of the workforce** across Chicago's diverse industries. No other city has such an integrated relationship with its tech ecosystem.

Largest Industry vs. Tech Industry by City (2021)

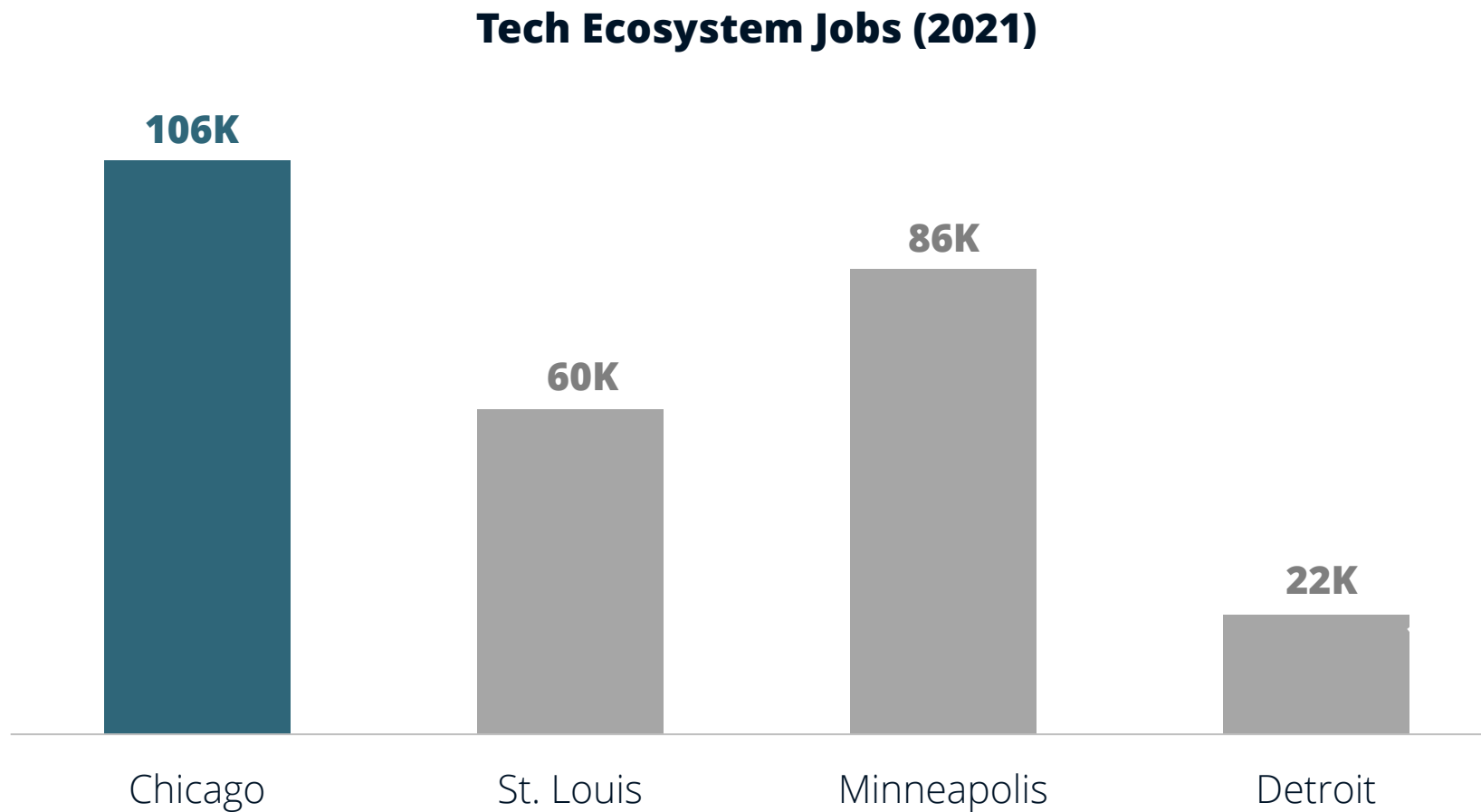
A difference of only 5% signifies how deeply intertwined the tech ecosystem is within Chicago's economy compared to other cities.



Source: HR&A analysis of EMSI data.

TECH ECOSYSTEM REGIONAL COMPARISON

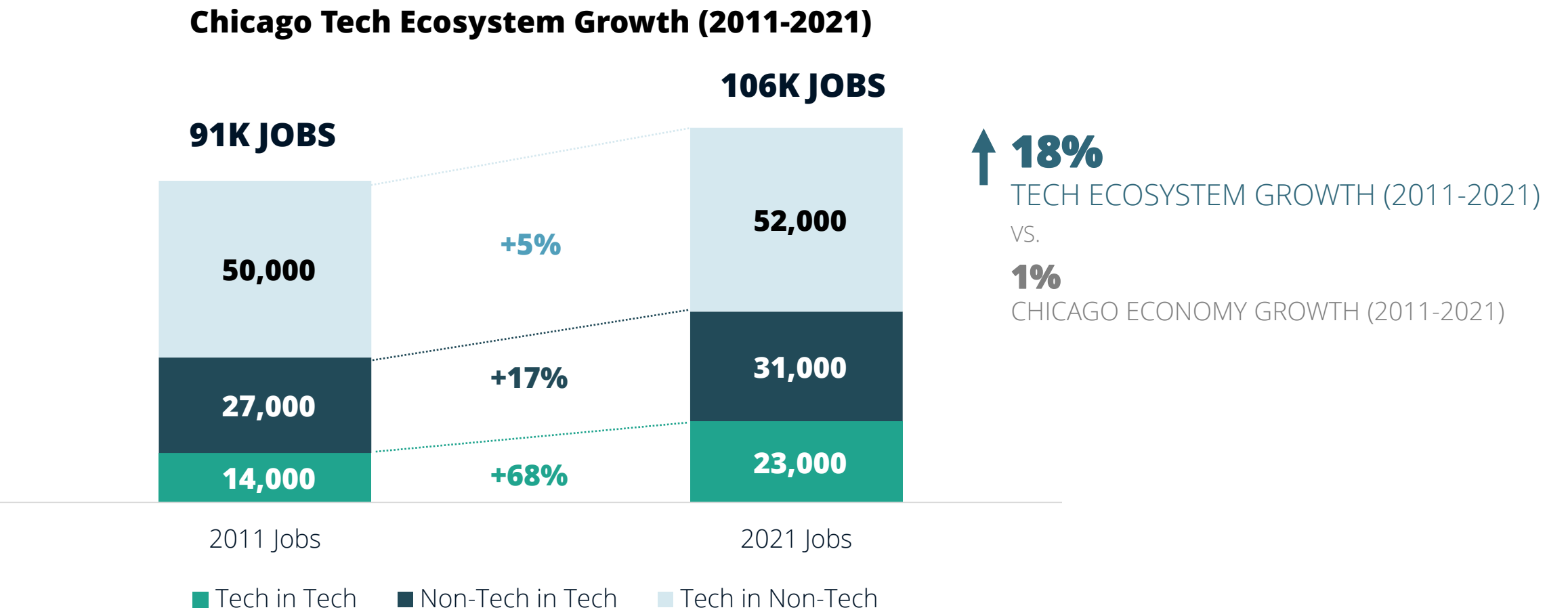
Compared to other midwestern cities, Chicago's tech ecosystem is significantly larger.



Source: HR&A analysis of EMSI data.

CHICAGO TECH ECOSYSTEM GROWTH

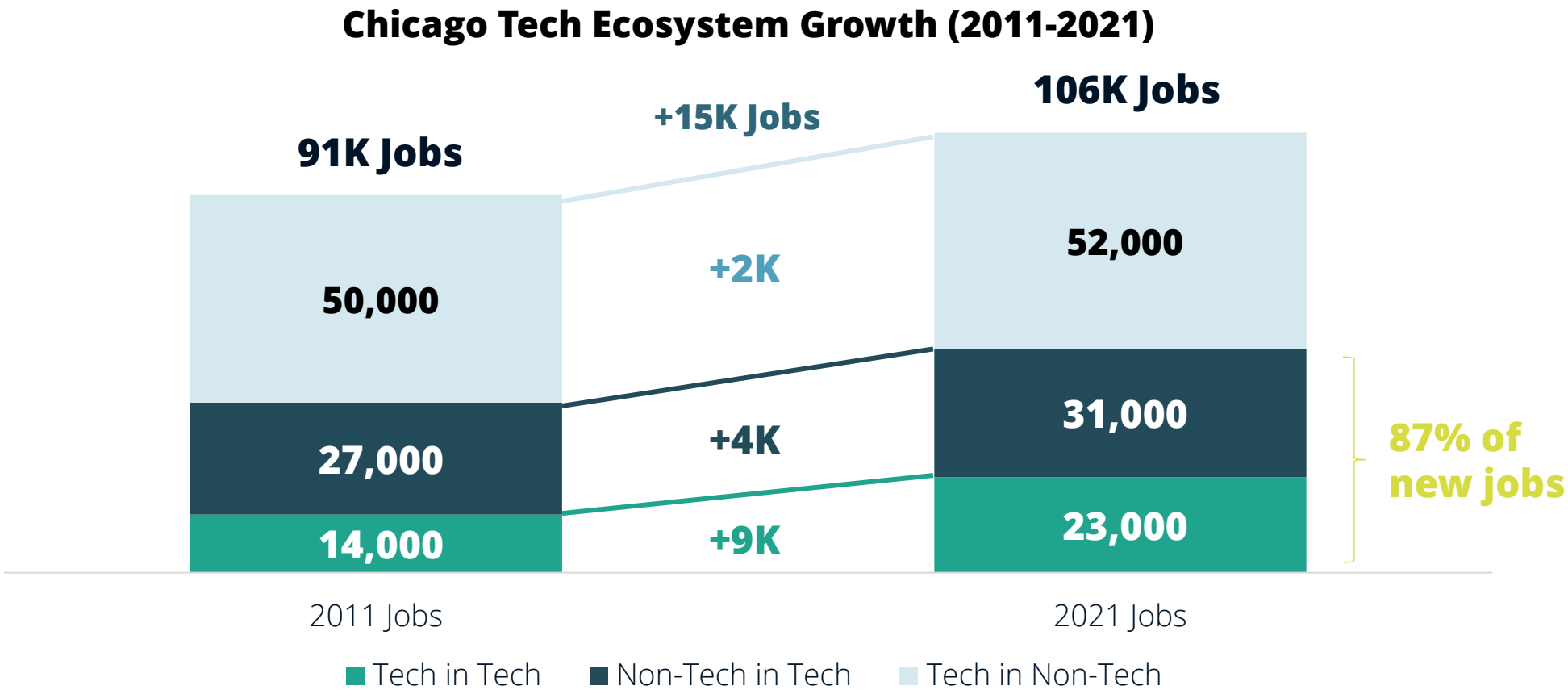
The Chicago tech ecosystem has grown rapidly in the past decade – increasing by **18% compared to the overall economy, which only grew by 1%.**



Source: HR&A analysis of EMSI data.

CHICAGO TECH ECOSYSTEM GROWTH

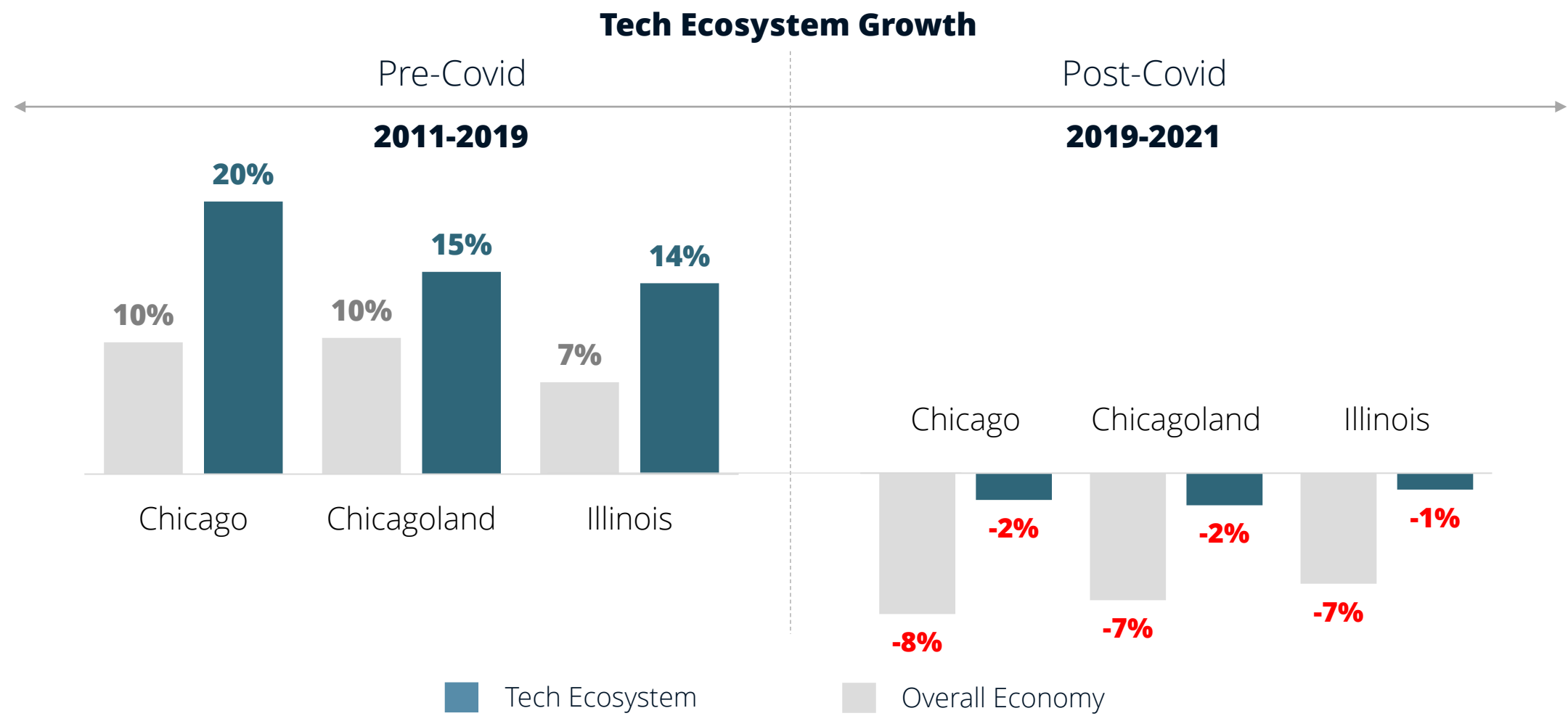
Tech companies are fueling Chicago's growth, accounting for **87%** of new jobs in the last decade.



Source: HR&A analysis of EMSI data.

CHICAGO TECH ECOSYSTEM RESILIENCE

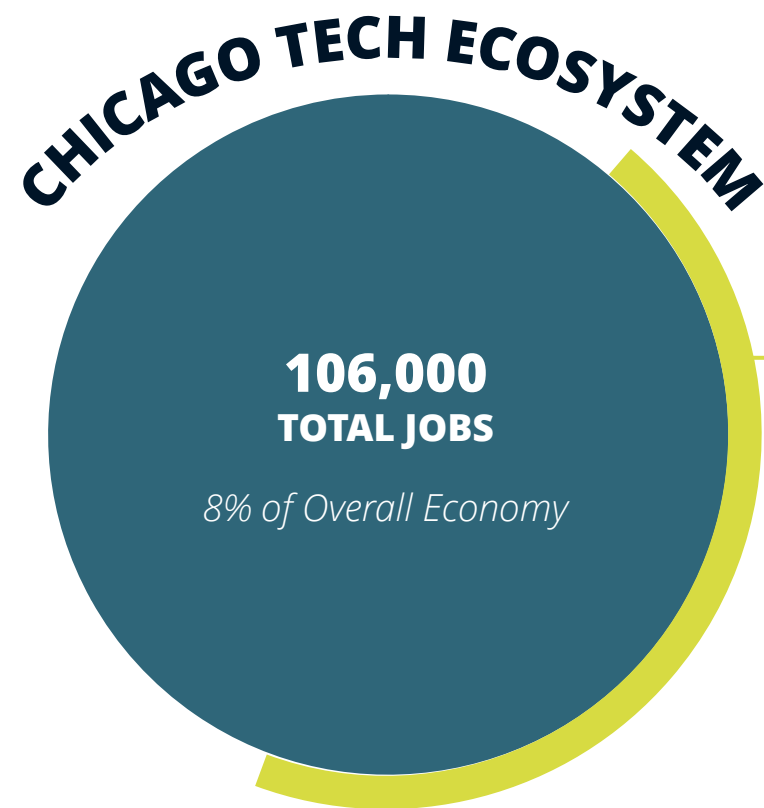
Regardless of geography, **tech is driving the region's growth** and helped to stabilize it during COVID.



Source: HR&A analysis of EMSI data.

HIGH-TECH OCCUPATIONS

High tech jobs make up roughly **46%** of the Chicago tech ecosystem. This proportion is similar across the region and State.



49K HIGH-TECH JOBS (46%)

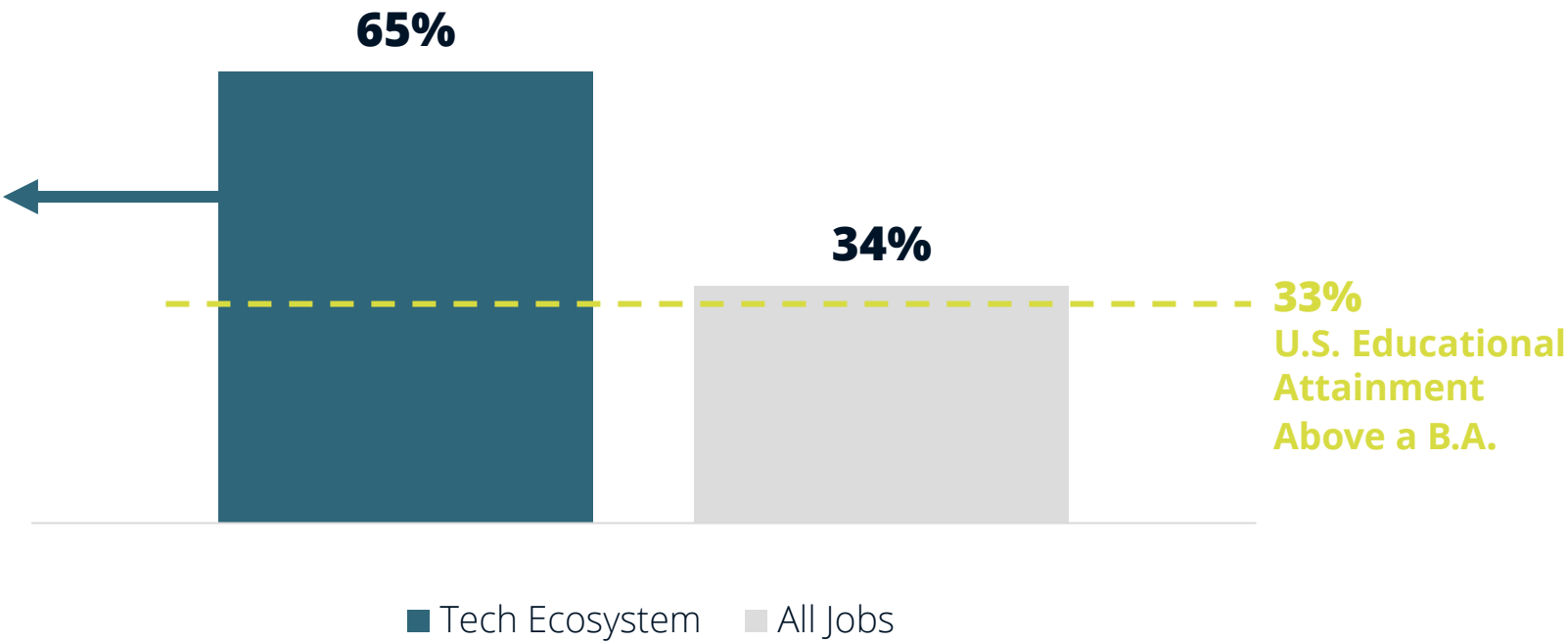
High-tech jobs are those focused on the creation and management of high-tech tools, products, systems, and support services. Within Chicago’s tech ecosystem, these jobs are at the forefront of technology and are typically concerned with the application of technical and digital skills across a range of industries and activities. They are distinct from other tech jobs that focus on low-tech activities such as the operation of hardware or jobs that make use of basic digital skills. These jobs have also shown strong growth in Chicago in the past decade – 7 out of the top 10 fastest growing, tech occupations were high-tech. Additionally, the largest tech occupation in Chicago, software developers, is classified as a high-tech occupation and accounts for over **16,000 jobs** in the city.

Source: HR&A analysis of EMSI data.

EDUCATIONAL ATTAINMENT

Tech ecosystem jobs are far more likely to have an average educational attainment of a B.A. or above. **65%** of tech ecosystem jobs have an average attainment of a B.A. or above compared to just **34%** of all jobs in Chicago.

Share of Chicago Tech Ecosystem with Average Educational Attainment Above a Bachelor's Degree (2021)



In Chicago, 65% of tech jobs have an average educational attainment of a B.A. or above compared to just 34% for the overall economy (and 33% for all jobs in the United States).

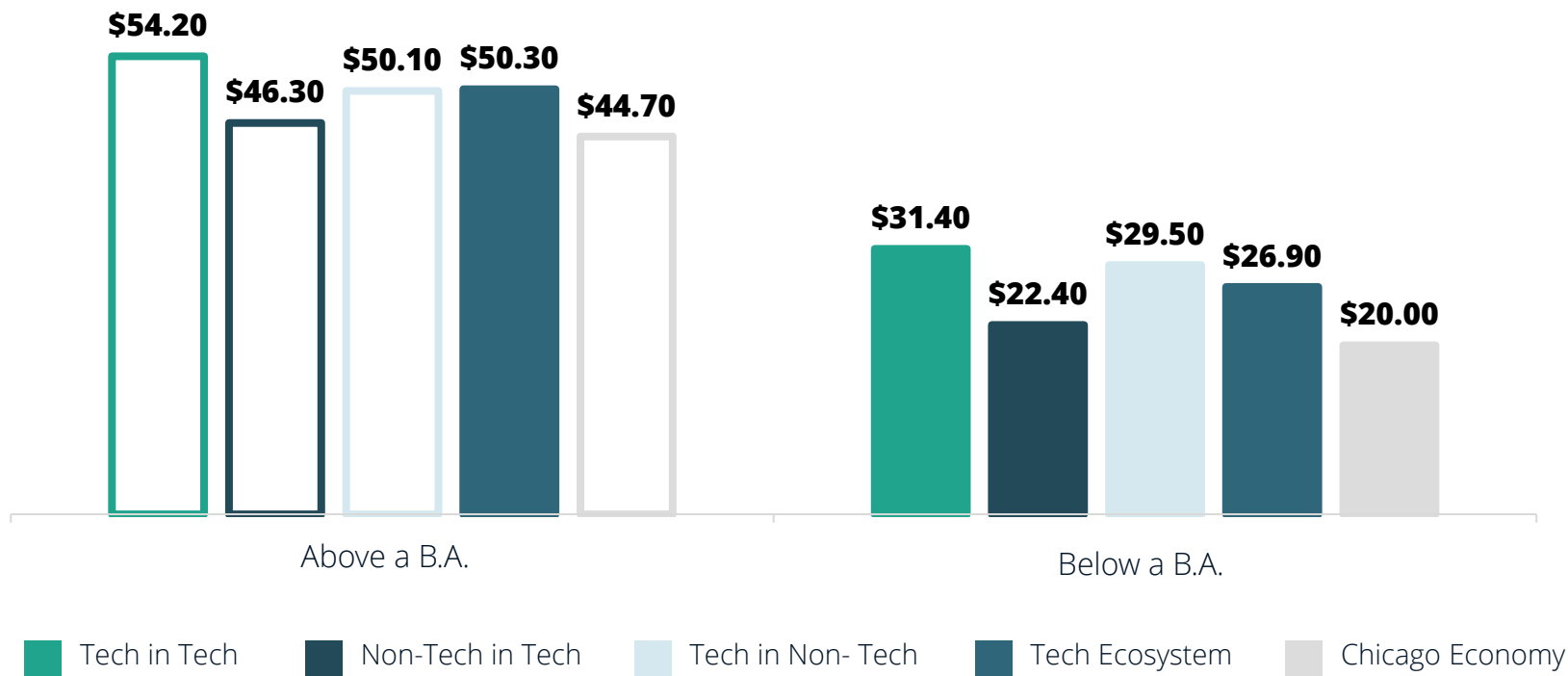
This is driven primarily by tech jobs in tech and non-tech industries. **76%** of tech in tech jobs and **68%** of tech in non-tech jobs have an average educational attainment of a B.A. or above. Meanwhile, only **51%** of non-tech in tech jobs have an average educational attainment of a B.A. or above, which represents a significant opportunity for people with non-technical skills to find a career in tech.

Source: HR&A analysis of EMSI data, U.S. Census Bureau

EDUCATIONAL ATTAINMENT & WAGES

The tech ecosystem offers meaningful economic opportunities, even for jobs that have an average educational attainment below a bachelor’s degree.

Median Hourly Wage by Educational Attainment (2021)



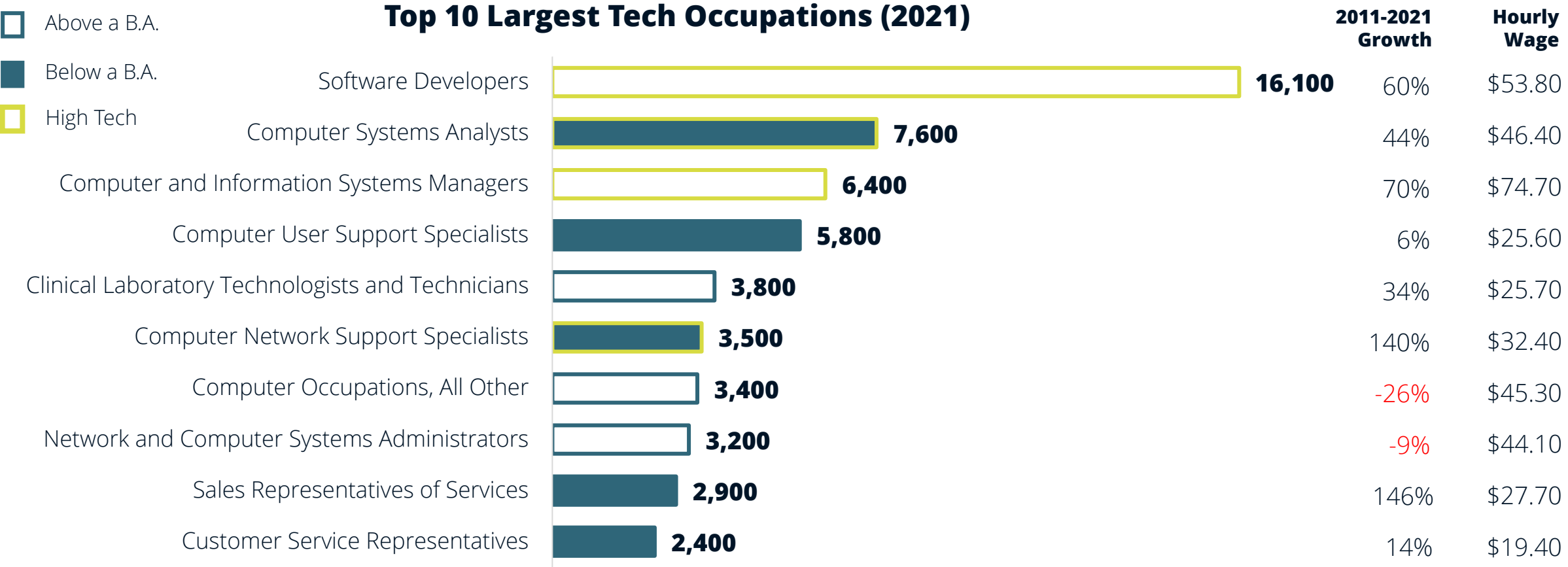
Tech jobs offer higher earning opportunities and potential for economic mobility for individuals of varying education levels. The median wage for tech ecosystem jobs is \$42 – **1.5X higher** than the \$28 median wage for the overall economy. Across the ecosystem, the highest wages are concentrated in tech jobs (both in tech and non-tech industries), although non-tech in tech jobs still pay more than the Chicago overall economy.

Even jobs that have an average educational attainment below a bachelor’s degrees experience higher wages on average. For those without a bachelor’s degree, the median hourly wage in Chicago’s tech ecosystem is **\$26.90/hour** compared to \$20.00/hour in the overall economy.

Source: HR&A analysis of EMSI data.

TECH OCCUPATIONS BY EDUCATIONAL ATTAINMENT

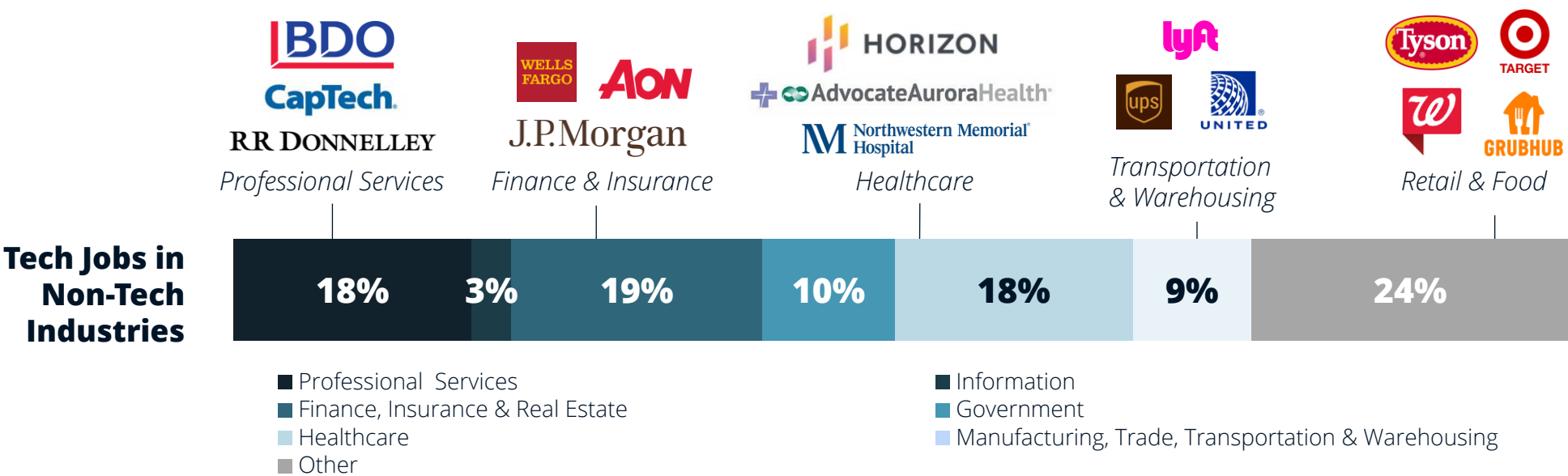
Software Developers account for the largest number of tech jobs in Chicago with **16,100** jobs in 2021. Of the 10 largest tech occupations in Chicago, **half** are accessible to those without a B.A.



Source: HR&A analysis of EMSI data.

MULTI-SECTORAL TECH ECOSYSTEM

Tech permeates throughout Chicago’s economy – tech jobs in non-tech industries make up close to half of Chicago’s tech ecosystem and are spread relatively evenly across a wide range of industries.



Tech jobs span a wide range of industries, reflecting diverse job opportunities and work environments. Nearly half (**49%**) of all tech jobs are found in non-tech industries, including professional services, finance, healthcare, transportation & warehousing, retail, and more. Companies such as United Airlines, Walgreens, Target, and others with large presence in Chicago are continuing to see higher need for tech talent. In today’s ever-evolving technological world, digital skills and jobs that leverage technology will only continue to grow in importance. In turn, the need to provide access to tech training and skill development is ever more critical for workers and businesses of all sizes, no matter the industry.

Source: HR&A analysis of EMSI data.

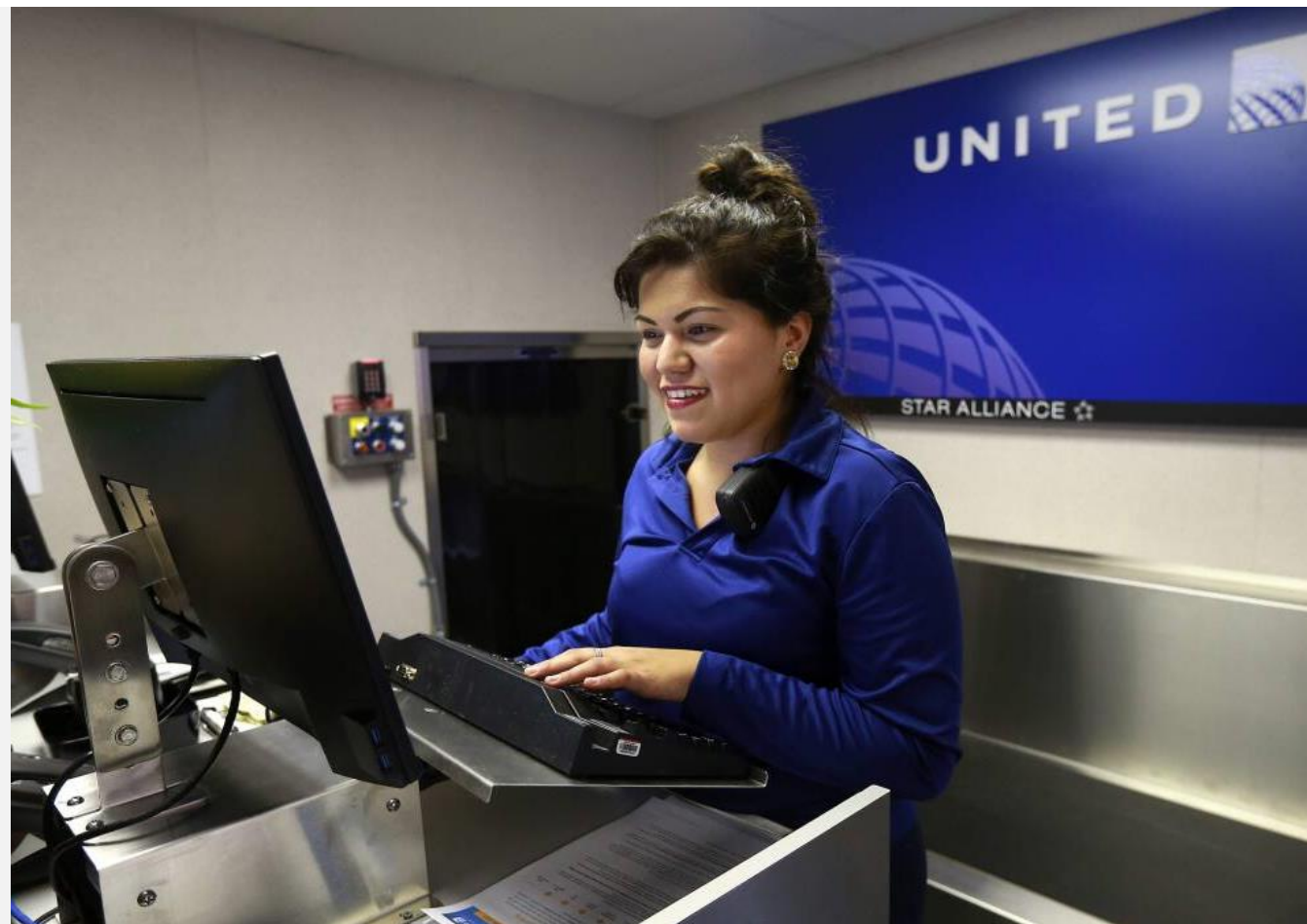
SPOTLIGHT: UNITED AIRLINES

United Airlines brings attention to the company's robust tech employment opportunities through partnerships that can reach diverse talent.

Headquartered in Chicago, United Airlines is one of the city's largest companies, employing roughly 1,500 high-tech jobs out of its 95,000-employee workforce. Some of United's tech operations includes traditional aerospace engineering, web app development, and digital products management, such as e-commerce.

Strategic partnerships have been key to United Airlines' recruiting and hiring efforts. United has worked with organizations, such as **P33, Hispanic IT Executive Council,** and **Black Women in Science and Engineering** to bring greater awareness to United's vast tech opportunities, which otherwise may be lesser known.

United also runs a nationwide 2-year tech apprenticeship program called **The Early Career in Digital Leadership Program** (ECDLP). ECDLP offers STEM graduates from neighboring universities a variety of leadership and training opportunities across the entirety of United's Digital Technology team. As a result of this program, the airline has supported the matriculation of graduates into senior- and junior-level staff positions.



Source: Crain Chicago Business, Michelle Brown, VP of Digital Products and Analytics at United Airlines, United Airlines. Photo: The Press Democrat.

TECH COMPANIES MOVING TO CHICAGO

In recent years, the Chicago area has attracted both well established and newer tech companies from Silicon Valley.

RECENT EXPANSIONS:



Salesforce plans to add 1,000 jobs by 2024



Google expanded finance division in Chicago (2019-2021)



LinkedIn expanded into a 46K SF HQ in 2019



Meta added 260K SF of office in 2018



Yelp added a Chicago office in 2015

RECENT RELOCATIONS:



BlueCrew relocated in 2019



Tegus relocated in 2019



G2 relocated in 2019



Uber Freights relocated in 2019

Illinois' Data Center Investment Program has also led to expansions and relocations of **data centers** to the region.



Meta plans to expand its \$1B DeKalb data center campus to 2.4M SF in 2022



CloudHQ announced \$2.5B data center in Mount Prospect in 2021



DIGITAL REALTY

Digital Realty launched Franklin Park data center in 2017

Sources: Built in Chicago, Chicago Business Journal, RE Journals, Crain's Chicago Business

BUILT ON STRONG FOUNDATIONS

Chicago’s deep talent pool, diverse population, relatively low cost of living, strong corporate and startup presence, and connectivity continue to attract and retain businesses and workers to the city and region.

TALENT	DIVERSITY	AFFORDABILITY	STARTUP & CORPORATE PRESENCE	CONNECTIVITY
Chicago’s concentration of top universities and educational institutions produces quality STEM talent for the tech ecosystem. Chicago produces the 4th most engineering graduates in the U.S. Chicago has the second highest number of college grads among the five largest U.S. cities. Between 2014-2019, the number of tech degrees completed in the city grew 50%.	Not only do nonwhites make up 60% of the overall workforce, but Chicago is also home to some of the largest immigrant populations across the nation. This diversity is a major asset to the city. Chicago is also home to the highest share of female founders, among the top 20 tech hubs in the world at 34%, over 2X the global average.	Chicago offers much lower cost of living compared to coastal tech hubs like San Francisco or New York. Cost of living in Chicago is 78% lower than San Francisco and 28% lower than New York City. Operating a tech office also costs 50% more in San Francisco than in Chicago.	Not only is it home to 27 Fortune 500 companies, such as Walgreens, Chicago is ranked as the number one city in the U.S. for corporate relocations and foreign direct investment. Chicago has a strong and growing entrepreneurial sector. Over 65 incubators and accelerators are fueling Chicago’s start-up scene, including 1871, the #1 incubator in the world.	Chicago is uniquely connected regionally and internationally. Chicago is a gateway to the rest of the world, compared to other growing tech hubs such as Austin or Denver. O’Hare is the 3rd busiest airport in the U.S. with around 80M passengers per year. The city’s urban transportation system is also ranked 7th in the world. Programs like Connect Illinois and Chicago Connected continue to expand broadband access.

Source: World Business Chicago, US Census, CBRE, Built in Chicago, TaskRabbit, Fortune 500, Site Selection Magazine, FDI Intelligence, McKinsey, World Atlas

Chicago's Tech Ecosystem Today

Ecosystem Overview

Economic & Fiscal Impact

Drivers of Growth

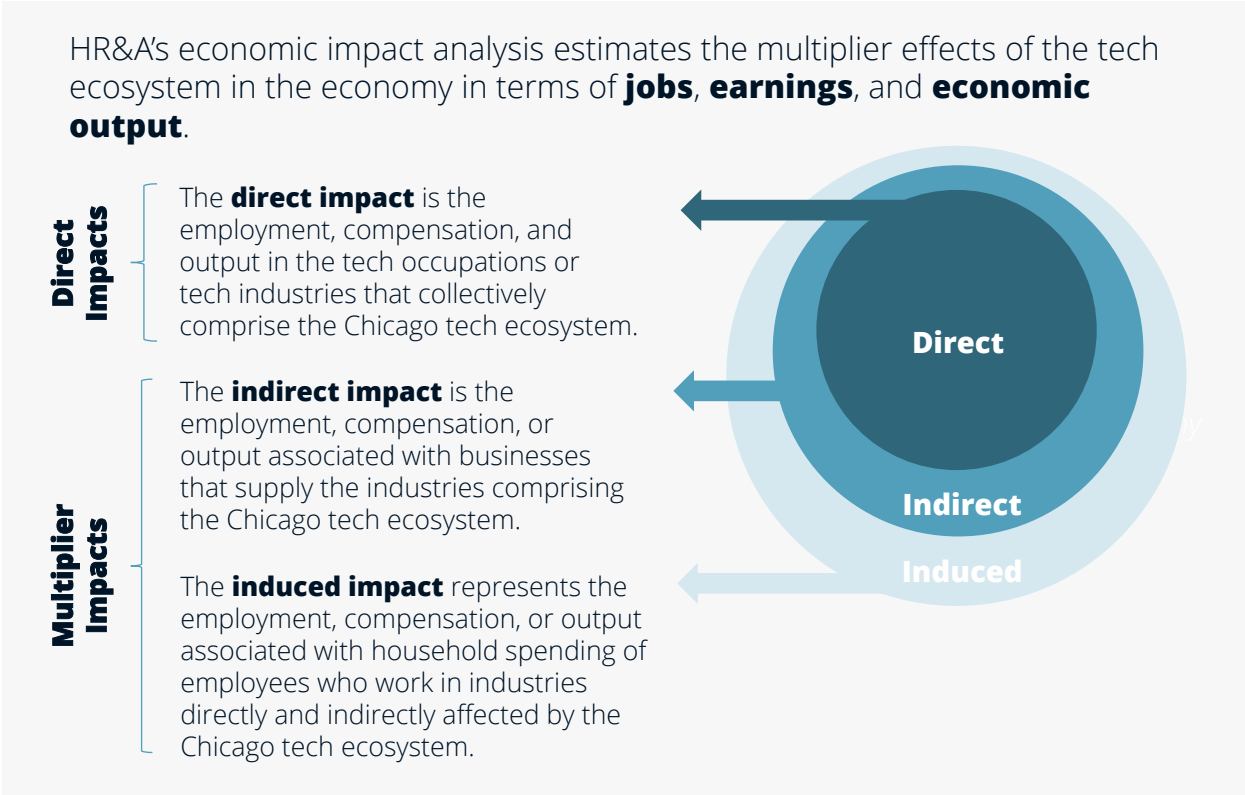
ECONOMIC AND FISCAL IMPACT

Chicago’s tech ecosystem creates significant jobs, earnings, and economic output for the city. The direct, indirect, and induced impacts of the tech ecosystem account for a total of 253,000 jobs, \$23.5B in earnings, and \$73.8B in economic output annually.

Tech jobs create a disproportionately large number of multiplier jobs compared to other industries. For every tech job created in Chicago, 1.4 additional indirect and induced jobs are created. This means that the 106,000 tech ecosystem jobs are responsible for the creation of an additional 147,000 jobs in Chicago, collectively accounting for 18% of Chicago’s overall workforce. This is the second highest multiplier of any industry in Chicago, trailing only finance & insurance. By growing the tech industry, Chicago can greatly increase the rate of growth for the rest of the economy due to the large job multiplier of tech.

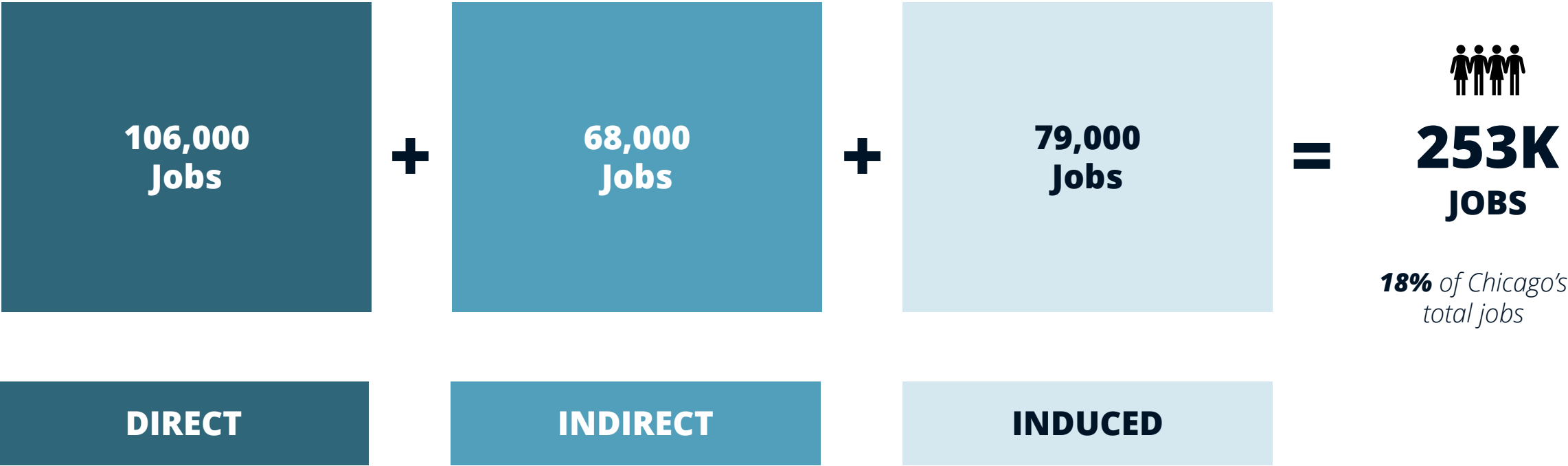
Earnings created by the tech ecosystem make up 18% of the city’s total earnings. The \$13.5B of earnings collected by workers in the tech ecosystem generates an additional \$10.0B for a total of \$23.5B. In other words, for every dollar of earnings within the tech industry, an additional \$0.74 in earnings is created.

Economic output from the tech industry accounts for 17% of the city’s overall output. The \$41.6B of economic output created directly by the tech ecosystem spurs a total of \$73.8B within the city. This means that for every dollar spent in the tech ecosystem, an additional \$0.77 in spending is generated. This multiplier is relatively large compared to other major industries in Chicago, such as Manufacturing, Trade, Transportation & Warehousing (0.69 multiplier).



CHICAGO TECH ECOSYSTEM ECONOMIC IMPACT: JOBS

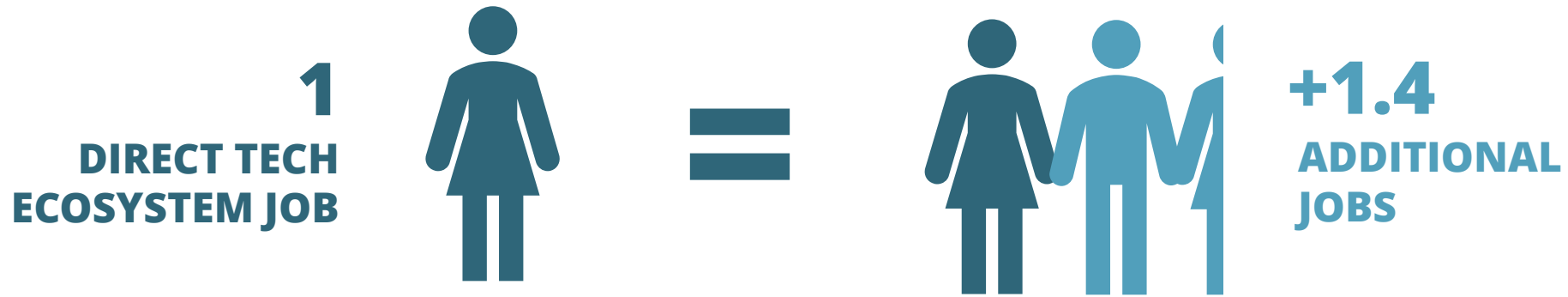
The **106K direct jobs** in the tech ecosystem contributes **147K additional multiplier jobs** in Chicago.



Source: HR&A analysis of EMSI data. HR&A's economic impact analysis estimates the multiplier effects of the tech ecosystem in the economy in terms of jobs, earnings, and economic output. Multiplier impacts include indirect and induced impacts associated with businesses that supply the industries comprising the Chicago tech ecosystem, as well as household spending of employees who work in industries directly and indirectly affected by the Chicago tech ecosystem.

CHICAGO TECH ECOSYSTEM ECONOMIC IMPACT: JOBS

Every **1** direct job hired in the tech ecosystem supports **1.4** additional jobs in the City of Chicago.



With the exception of Finance & Insurance, the tech ecosystem has the highest job multiplier in Chicago. In comparison, for every 1 job:

- Finance and Insurance **+2.0 jobs**
- Real Estate **+1.1 jobs**
- Government **+1.0 jobs**
- Professional Services **+1.0 jobs**
- Manufacturing, Trade, Transportation & Warehousing **+0.9 jobs**
- Healthcare **+0.5 jobs**

Source: HR&A analysis of EMSI data.

CHICAGO TECH ECOSYSTEM ECONOMIC IMPACT: EARNINGS

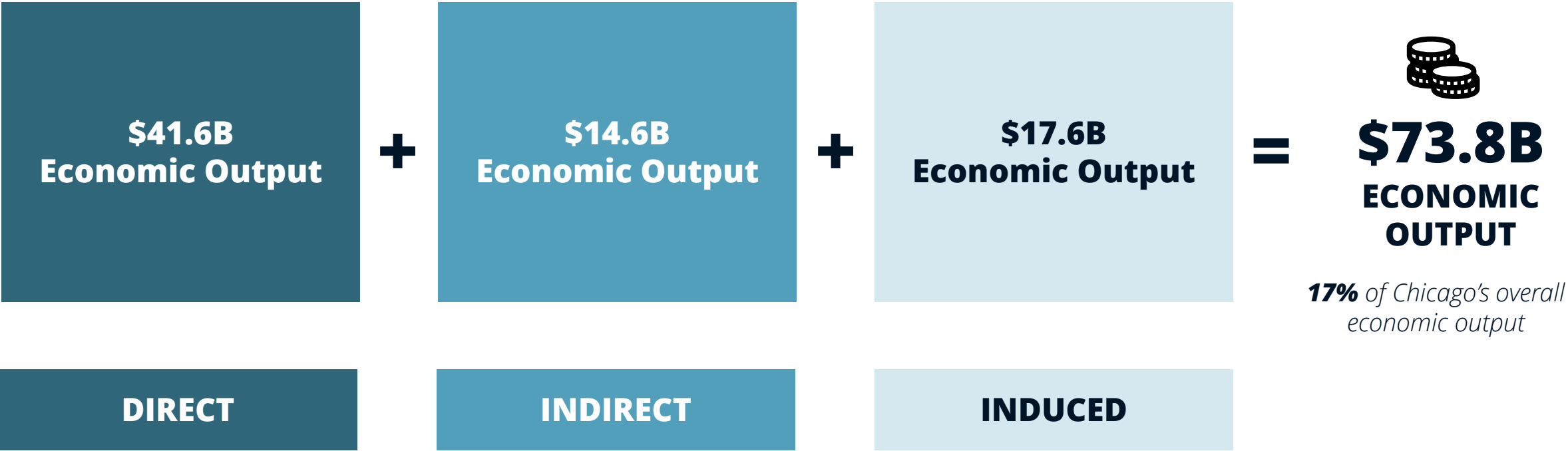
Chicago's tech ecosystem generates **\$23.5B** in total earnings for workers directly and indirectly employed by the ecosystem.



Source: HR&A analysis of EMSI data.

CHICAGO TECH ECOSYSTEM ECONOMIC OUTPUT

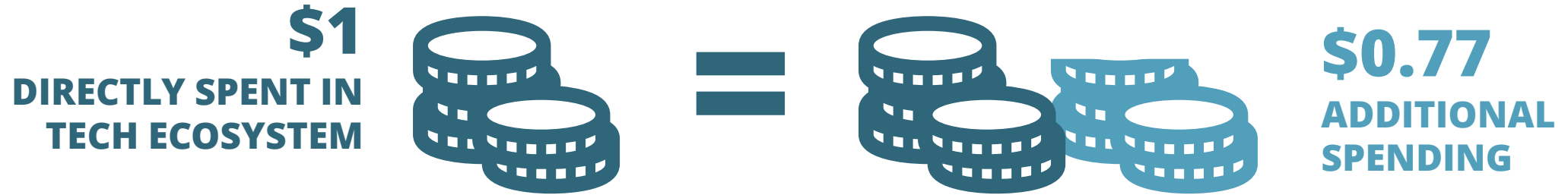
The city's tech ecosystem's **\$41.6B in direct economic output** contributes **\$32.2B additional output**.



Source: HR&A analysis of EMSI data.

CHICAGO TECH ECOSYSTEM ECONOMIC OUTPUT

Tech investments drive additional spending. Every **\$1** spent in the tech ecosystem supports **\$0.77** in additional economic output.



Tech industries have a particularly high economic output multiplier. For every 1 dollar spent in tech industries, **\$0.77** of additional spending is generated. In comparison, for every 1 dollar spent:

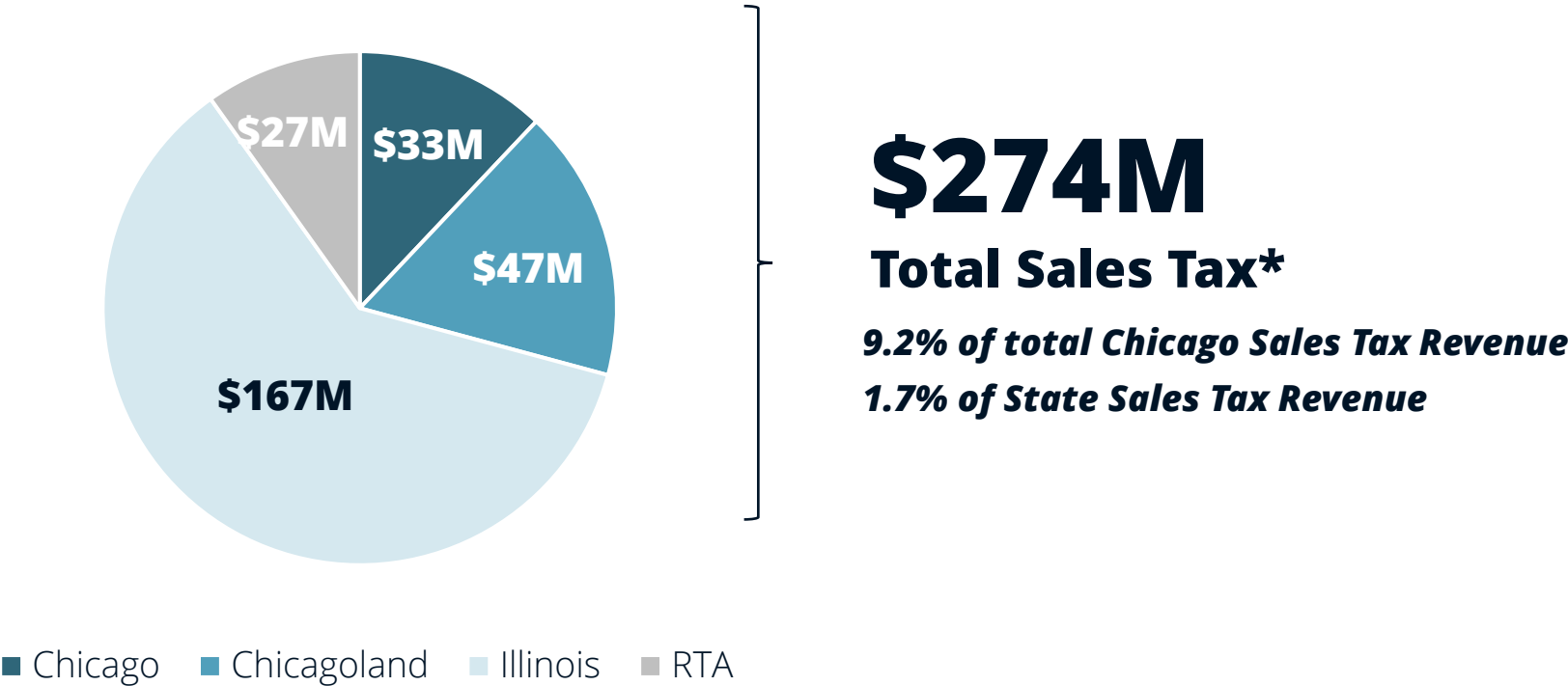
- *Government* **+\$0.47**
- *Manufacturing, Trade, Transportation & Warehousing* **+\$0.69**
- *Professional, Scientific, and Technical Services* **+\$0.83**
- *Health Care and Social Assistance* **+\$0.84**
- *Finance and Insurance* **+\$0.96**
- *Real Estate and Rental and Leasing* **+\$0.98**

Source: HR&A analysis of EMSI data.

CHICAGO TECH ECOSYSTEM'S FISCAL IMPACT: SALES TAX

Chicago's tech ecosystem contributes **\$274M** in total sales tax.

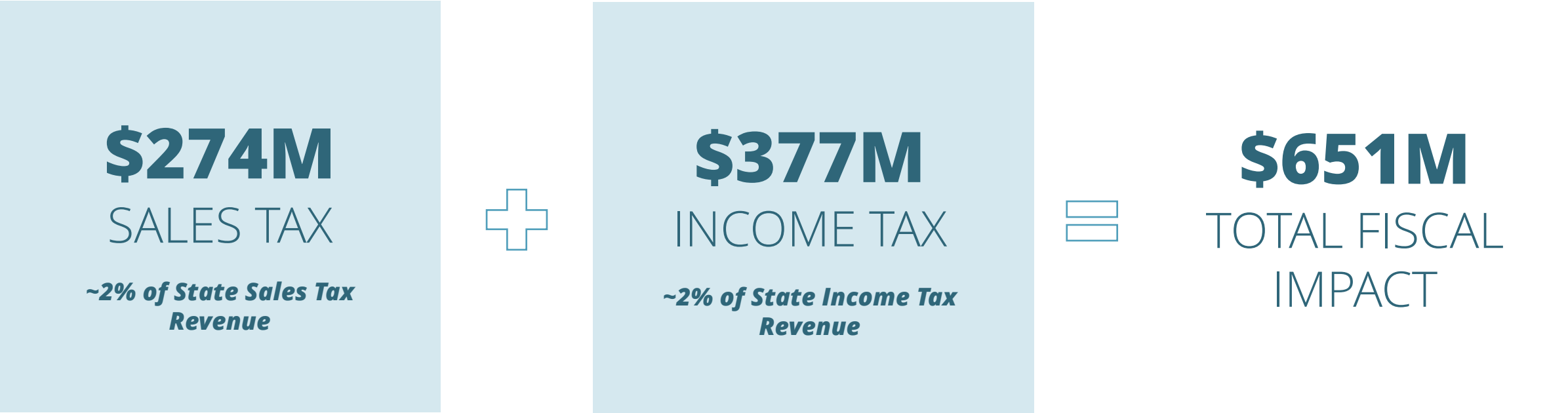
Chicago Tech Ecosystem Sales Tax Revenue Collected by Governmental Entity (2021)



Source: HR&A analysis of EMSI data. *HR&A calculated the sales tax generated by the Chicago tech ecosystem based on worker spending estimates.

CHICAGO TECH ECOSYSTEM'S FISCAL IMPACT

Chicago's tech ecosystem contributes **\$274M** in sales tax and **\$377M** in income tax for a combined total fiscal impact of **\$651M** across the city, region, and state.



Chicago sales taxes are paid at the city, county, and state-level, in addition to a Regional Transit Authority tax. Between these four tax-collecting entities, the total sales tax rate in Chicago is 10.25% and results in \$274M in total sales taxes. This represents 9.2% of the total sales tax collected by Chicago and 1.7% of the total sales tax collected by Illinois. Income tax is only paid at the state-level and the Chicago tech ecosystem contributes roughly \$377M in income tax to Illinois annually.

Source: HR&A analysis of EMSI data.

Chicago's Tech Ecosystem Today

Ecosystem Overview

Economic & Fiscal Impact

Drivers of Growth

DRIVERS OF GROWTH



KEY INVESTMENTS



ENTREPRENEURSHIP



TALENT

Chicago's thriving tech ecosystem stems **from intentional public and private commitments**, a robust **incubator network and entrepreneurial culture**, and a **deep talent bench**. The following section explores each of these assets that distinguishes Chicago from other tech hubs and continues to propel the ecosystem forward.

DRIVERS OF GROWTH



KEY INVESTMENTS

Since the early 2000s, the city of Chicago and state of Illinois have been closely invested in the success of the tech ecosystem. Through programs like the Illinois Angel Investment Tax Credit (2010), the Illinois Growth and Innovation Fund (2015), and the Data Center Investment Program (2019), both local and state governments have helped to facilitate the flow of capital to tech companies through tax incentives and direct investment. The Data Center Investment Program has resulted in the creation of over 60 data centers in Chicago and has made the city the 4th largest data center market in the world. The Chicagoland Chamber of Commerce has also been influential in the growth of the tech ecosystem by advocating for policies that support tech, creating the Tech Council to develop the tech network in Chicagoland, and incubating 1871 which has widely been considered the #1 incubator in the world.





PUBLIC INVESTMENTS

For nearly a decade, both local and federal governments have made serious investments to bolster Chicago's tech economy and workforce.

2013 Mayor Rahm Emanuel commits to doubling Chicago's tech economy in ten years.

2013 The Mayor's office releases the City's first technology plan.

2017 Mayor Emanuel and Mayor Huldai sign an economic partnership agreement that promotes collaboration between Chicago and Tel Aviv, particularly around technology and innovation.

2019 The Department of Defense commits to funding MxD, a digital manufacturing institute on Goose Island, with up to \$60 million over the next five years.

2021 Mayor Lightfoot And Kennedy-King College announces Tech Launchpad, an initiative that offers easily-accessible training courses co-developed by leading tech companies.

2021 The Discovery Partners Institute and healthcare startup incubator Matter receive \$2.8M in grants from the U.S. Economic Development Administration's "Build to Scale" Program.

2021 The Pritzker administration secures \$500M through the Rebuild Illinois Capital Grant to fund critical infrastructure needs in Illinois

Source: Chicago Tribune, Mayor Office of Chicago, City Colleges of Chicago, World Business Chicago the U.S. Economic Development Administration



RECENT POLICY INITIATIVES

Specific state-level initiatives have also increased funding, incentives, and investments to growing Chicago’s tech ecosystem.

POLICY

IMPACT

Illinois Angel Investment Tax Credit Program (2010)
\$10M in tax credits allocated annually to provide investors of qualified early-stage companies a 25% tax credit. \$500K is set aside for MWBEs and other underserved business owners.

→

Since 2011, the program has provided **\$325M** in total funding to early-stage companies. In 2020, 67 businesses were funded and nearly 30% of these businesses were from underserved backgrounds. Notably, the percentage of investments to new minority-owned businesses increased by 267%. In the same year, minority-owned and women owned investors received a total of **\$2.4M** in tax credits from the program.

Illinois Growth and Innovation Fund (2015)
\$1B evergreen fund to invest in ways to attract, assist, and retain tech companies in Illinois.

→

As of 2016, the fund has attracted **\$9.2B** in private investment across 213 Illinois-based companies. This past year, the fund has committed **\$500M** across 49 offices, of which **\$211M** was invested in MWBE funds. Furthermore, since 2020, the fund helped support 110 businesses owned by underserved groups, including women, minorities, veteran, and disabled persons.

Illinois Data Center Investment Program (2019)
Provides sales and use tax exemption, and tax credits for projects located in underserved areas, to attract large-scale data centers.

→

The program has generated more than **\$6B** in committed investment in Illinois since 2019 with many more projects in the pipeline. In 2020, the program executed agreements with 6 new data centers in the state (3 of which are in underserved areas). The Chicagoland Chamber of Commerce has continued to support the growth of Illinois’ burgeoning data center industry, now recognized as the 4th best data center market in the world.

Source: Illinois Department of Commerce , Illinois Growth and Innovation Fund, U.S Chamber of Commerce, Cushman & Wakefield



CHICAGOLAND CHAMBER OF COMMERCE INITIATIVES

The Chicagoland Chamber of Commerce has invested in numerous efforts to support emerging technologies and strengthen the region's tech ecosystem.

1871 Tech Incubator: Chicagoland Chamber of Commerce incubated the now world-famous 1871 incubator in the early 2000s.

Tech Council: Convenes over 50 tech industry leaders to discuss emerging technologies such as AI, 5G, IoT, blockchain, AR/VR, and more, and share best practices and resources to advance tech in Chicago.

Policy Advocacy: The Chamber has successfully advocated for policies that improve the region's technology and entrepreneurial infrastructure, supports economic and workforce development, and advances diverse, equitable, and inclusive opportunities, including:

- The **2019 Data Center Investment Program** which provides tax credits and exemptions to attract large-scale data centers and has led to significant investments to the region.
- An extension of the **Small Wireless Facilities Deployment Act**, which helps phone companies build small-scale 5G networks faster by limiting how much local governments can regulate the installation and maintenance of the equipment.
- A state-match grant program for the federal **Small Business Innovation Research (SBIR) Program** to support small businesses in tech.
- The newly-established **Illinois Innovation Voucher Program**, which awards up to \$25K to manufacturers looking to incorporate technology in their products to improve productivity and sustain a competitive edge.
- A five-year extension of the **EDGE tax credit program** and additional provisions to make the program refundable for start-ups, particularly in tech, to ensure they have the capital to advance their project and business.
- Supported a coalition with mHub to secure \$25M for the **Build Back Better Regional Challenge** application that, if won, will leverage \$100 million in federal funds to support clean tech projects across Illinois.
- Most recently, the Chamber has been leading the fight to reform the **Biometric Information Privacy Act (BIPA)**, which has especially targeted and burdened smaller businesses.

Source: Chicagoland Chamber of Commerce



INVESTMENTS IN EMERGING SECTORS: DATA CENTERS

The Chicagoland Chamber of Commerce has been a champion of the Illinois' Data Center Investment Program, which has fostered the growth of data centers in Chicago. The city now boasts the 4th best data center market in world.

4TH BEST DATA CENTER MARKET GLOBALLY

60+

TOTAL DATA CENTERS (2022)

+400 MW

TOTAL INVENTORY (2022)

Chicago's data center market benefits the overall economy in the following ways:

INNOVATIONS IN ENERGY

Data center owners have been involved in public energy efficiency and renewable energy development to lower power costs, their largest expenditure.

UPGRADED INFRASTRUCTURE

Building data centers in underdeveloped areas creates a demand for the expansion of public roads, power, water, and sewer systems.

ADJACENT BUSINESS ATTRACTION

Data centers attract other companies that provide services to the data center industry, such as power and energy monitoring companies.

INCREASED TALENT POOL

Data centers rely on skilled workers, such as building architects, engineers, and technicians. This available concentration of talent allows local communities to also attract other data centers and industries.

Source: U.S Chamber of Commerce, Cushman & Wakefield, Patch, Datacenters.com. Cushman Wakefield ranked Chicago fourth based on its market size, cloud availability, and fiber connectivity. In comparison, Northern Virginia's market size (#1) is 1.7GW, while Singapore and the Bay Area (tied for #2) is ~600 MW.



INVESTMENTS IN EMERGING SECTORS: QUANTUM

Investments by Chicago's academic institutions, national laboratories, and businesses have created foundational infrastructure to transform Chicago into a hub for quantum innovation.

Chicago Quantum Exchange (2017)

Premier quantum intellectual hub that connects academia, top scientific facilities, corporations, and nonprofit to advance quantum research and innovation. The exchange organizes events such as the annual Chicago Quantum Summit which centers discussions on how to grow the quantum ecosystem.

Quantum Research Centers at Argonne and Fermilab (2020)

2 of the 5 U.S. Department of Energy quantum research centers are in Chicagoland's national labs. Fermilab's Superconducting Quantum Materials and Systems Center aims to build a top-tier quantum computer using superconducting technologies, while Argonne leads Q-Next, which convenes leading researchers to develop the science and technology to distribute quantum information.

National Science Foundation QuBBE Quantum Leap Challenge Institute (2021)

Led by UChicago, the \$25M institute is one of five funded by the NSF that will investigate quantum sensing in biophysics and bioengineering and bring quantum curricula to Chicago's K-12 Public school students. Planned activities include the creation of a certificate program in quantum science and pairing students with both academic and industry partners to prepare them for success in this growing workforce.

Duality (2021)

The nation's 1st quantum startup accelerator program is based in Chicago. The 12-month program provides startups with business and entrepreneurship training from the Booth School of Business and the Polsky Center, along with engagement opportunities from the Chicago Quantum Exchange, the University of Illinois Urbana-Champaign, Argonne, and P33.

P33 Quantum Cohort (2021)

A venue that will facilitate interactions between experts and companies, so that companies can make connections with quantum researchers, understand how quantum will affect financial services and FinTech business, and make informed investments in the sector.

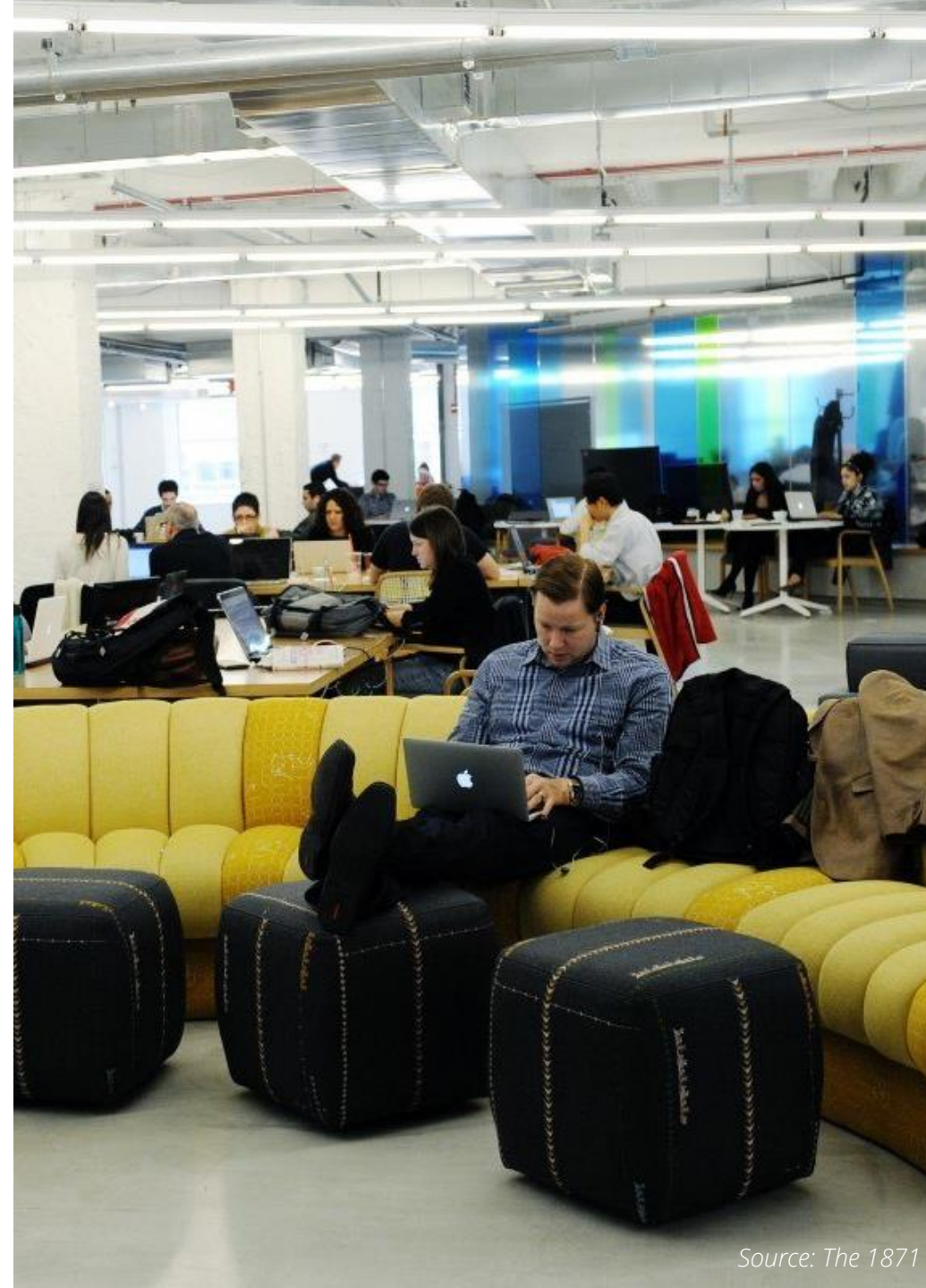
Source: UChicago News, NSF, P33, The Polsky Center

DRIVERS OF GROWTH



ENTREPRENEURSHIP

Chicago is home to a large network of incubators and accelerators, including top programs such as 1871, the Polsky Center, mHUB, and MATTER. Chicago's incubators have different specializations, allowing the city to cater to startups in software, hardware, manufacturing, retail, healthcare, and many other fields. Highly successful tech companies including Braintree, Grubhub, Tovala, Groupon, and Cameo were born in Chicago. Since COVID-19, startups have shown even more growth and success. In 2021, Chicago saw 12 new unicorns, a record for the city. The success of Chicago's startups is due in part to the growth of venture capital in the city, which deployed a record \$5.5B in 2021. The entrepreneurial environment in Chicago is also much more diverse than other tech hubs, due in part to the city's diverse workforce. 34% of founders in Chicago are female which is over 2X the global average.





INCUBATORS & ACCELERATOR NETWORK

Chicago's strong entrepreneurial and startup environment can be partially attributed to a robust network of over 65 tech incubators and accelerators.



- Founded in 2012, 1871 now supports early stage, growth stage, and corporate innovators and is named the #1 incubator in the world.
- **Total capital raised by alumni:** \$3.5B
- **Notable Startups:** Cameo, Spot Hero



- Founded in 1998 at the University of Chicago, the Polsky Center provides venture support for students, faculty, and alumni.
- **Total capital raised by alumni:** \$1.2B
- **Notable Startups:** Braintree, GrubHub, Tovala



- Founded in 2017, mHUB offers incubation space for hard-tech and manufacturing startups.
- **Total capital raised by alumni:** \$544M
- **Notable Startups:** Amber Agriculture, NuCurrent



- Founded in 2014, Matter serves as a non-profit startup incubator for healthcare tech.
- **Total capital raised by alumni:** \$1.7B
- **Notable Startups:** Siris Medical, AskBio, Alterive Healthcare

Source: 1871, Polsky Center, mHUB, Matter, Built in Chicago

SPOTLIGHT: 1871

1871's tailored resources, quality programming, and highly collaborative space, supports entrepreneurs through every stage of their development.

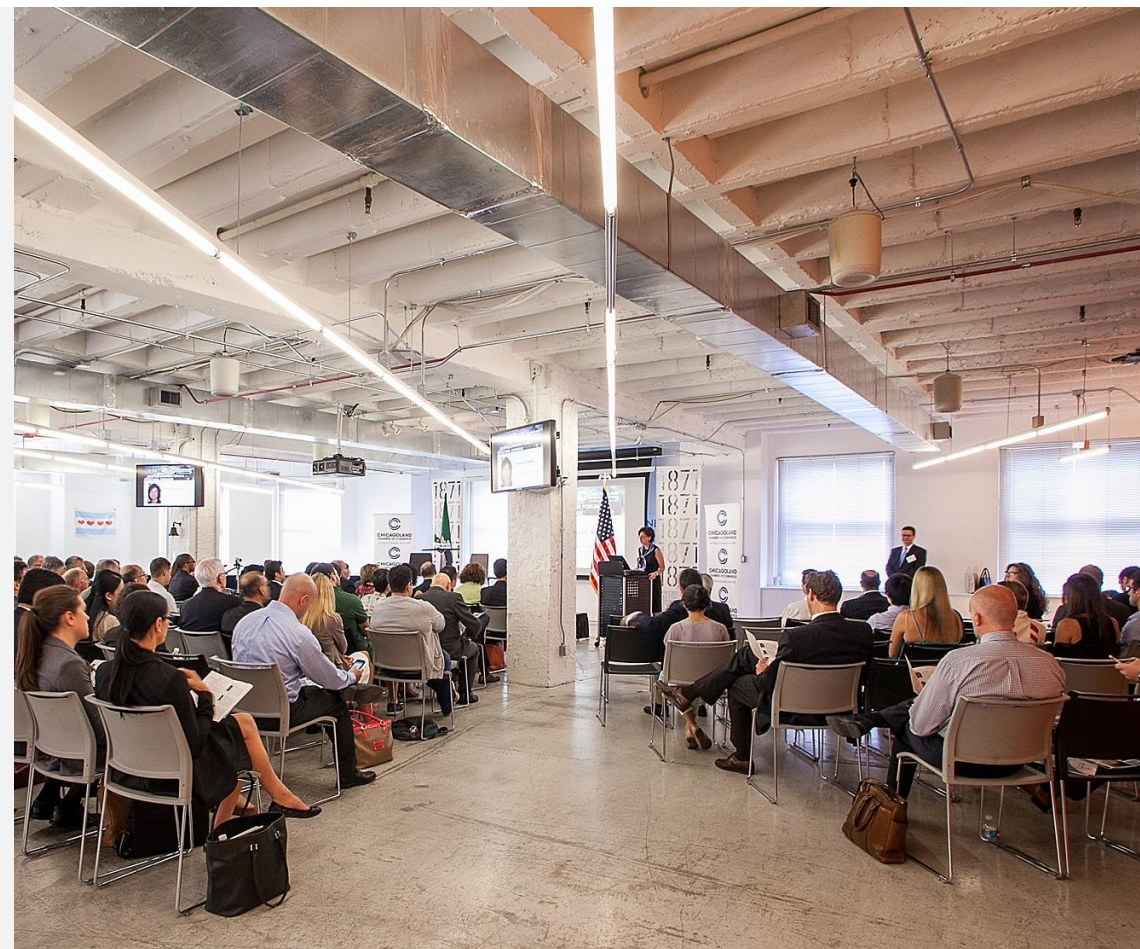
Located in the iconic Merchandise Mart in the heart of Chicago, 1871 serves as one of the leading hubs for the city's thriving technology and entrepreneurial ecosystem.

Incubated in 2012 by the Chicagoland Chamber of Commerce, 1871 exists to inspire, equip, and empower founders, growth teams, and innovators building extraordinary businesses across the maturity curve from idea to Fortune 50.

Over the last ten years, the nonprofit has supported nearly 14,500 jobs and \$3.5B in capital raised. Many of its programs focus on inclusion and equity, including: **WMN- Fintech**, an accelerator for women in fintech, **BLK-Tech** an accelerator for black entrepreneurs, and **PYROS**, a world-class curriculum for early-stage founders.

Pre-pandemic, 1871 also hosts 1,000+ events per year and continues to offer in-person and virtual events that are open to the public and centered on fostering inclusion in innovation and entrepreneurship. **ScaleUp** is a signature event that allows leaders to connect with peers, discuss best practices for scaling their business, and learn from Chicago entrepreneurs who have been able to effectively grow.

1871's network now includes over **400** early-stage startups, **200** growth stage companies, **200** corporate innovation partners, **850** alumni startups still scaling, venture capital firms, universities, and hundreds of mentors.



Source: 1871



ENTREPRENEURSHIP SUCCESS STORIES

Chicago's incubators have seen success with the launch of several well-known companies prior to COVID-19.

GRUBHUB™

Status: Public (NASDAQ)
Total Funding: \$284M
Employees: 2,700
Founded: 2004
Chicago Incubator: Polsky Center



Status: Private
Total Funding: \$68.6M
Employees: 125
Founded: 2015
Chicago Incubator: Polsky Center

Braintree

Status: Acquired by PayPal (\$800M)
Total Funding: \$69M
Employees: 366
Founded: 2007
Chicago Incubator: Polsky Center



Status: Private
Total Funding: \$165M
Employees: 425
Founded: 2017
Chicago Incubator: 1871

The Polsky Center New Venture Challenge (NVC) at the University of Chicago is consistently ranked as **the top university-based accelerator in the country**. Alumni have collectively raised over **\$1.2B** in capital and companies like Grubhub, Braintree, and Tovalla were all founded by MBA students at the University of Chicago. Grubhub won the NVC in 2006, Braintree won in 2007, and Tovalla won in 2015 before going on to raise millions in venture capital funding.

Cameo was founded in 2015 and raised roughly \$65M before the pandemic. The company is an 1871 alum and won the 1871 Momentum Award in 2019 for achieving significant growth and making a "substantial impact on Chicago's tech and startup community."

Source: Crunchbase, LinkedIn, The Polsky Center, 1871, Chicago Business Journal



ENTREPRENEURSHIP SUCCESS STORIES POST COVID

In 2021, **12** additional Chicago tech companies gained “unicorn” status, valuing at over **\$1 billion**. These companies reflect Chicago’s strengths in FinTech and Logistics & Transportation.

ActiveCampaign >

InfoTech

 **COPADO**

InfoTech

 **M1 Finance**

FinTech

 **AMOUNT**

FinTech

 enfusion

FinTech

project44

Logistics & Transportation

 **BRINGG**

Logistics & Transportation

NATURE'S Fynd

AgTech

 **Relativity®**

InfoTech

 **cameo**

Media

 **G2**

InfoTech

 **ShipBob**

Logistics & Transportation

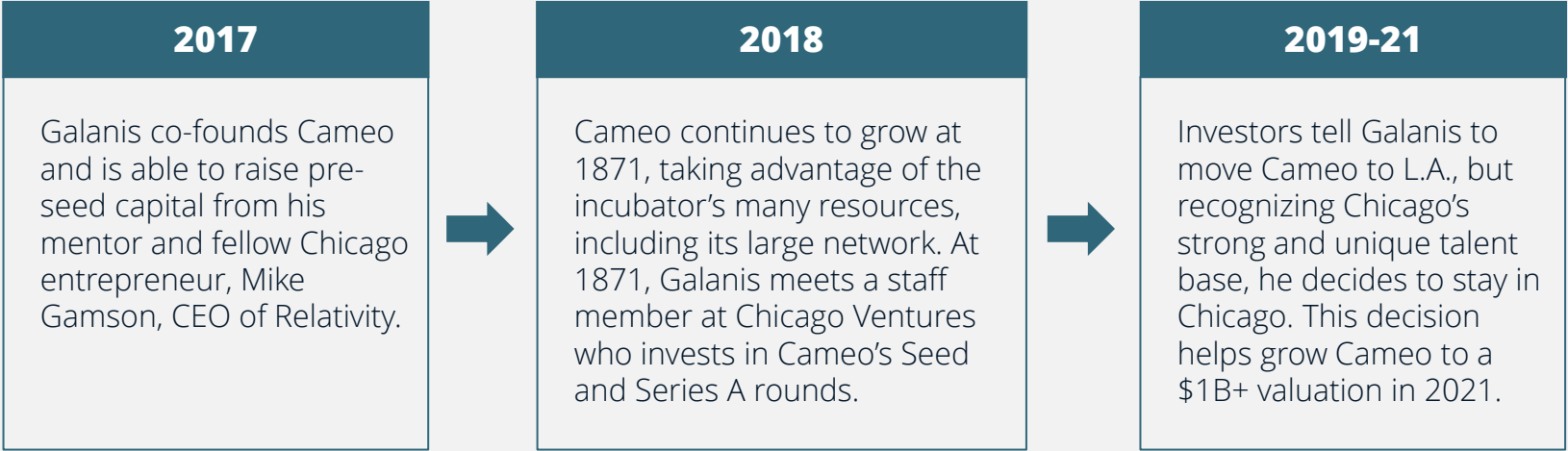


SPOTLIGHT: CAMEO

Unicorn startup Cameo found tremendous opportunities in Chicago, but more can be done to strengthen Chicago's tech ecosystem to enable other entrepreneurs to find similar paths of success.

Founded in 2016 by Steven Galanis, Cameo is one of Chicago's fastest growing startups with funding totaling more than \$165 million. Like many Chicago startups, Cameo's story began at a small office desk in the 1871 incubator. Despite an initial lack of support, Galanis was able to get pre-seed capital through his mentor. In 2018, a chance meeting with a staff member from Chicago Ventures at 1871 allowed Galanis to secure a \$100,000 investment from the VC firm, and from there, Cameo's investors continued to grow. Today, Cameo is a roughly 400-employee media-tech business connecting people and celebrities through its app platform.

Chicago supported Cameo on its path to unicorn status:



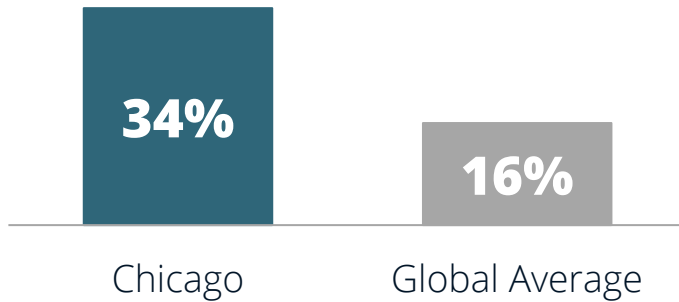
Source: Steven Galanis, CEO and Co-founder of Cameo, Chicago Tribune, 1871



ENTREPRENEURSHIP: FEMALE FOUNDERS

Chicago's entrepreneurial environment has extended opportunities to women – Chicago has the highest share of female founders among the top 20 tech hubs in the world at **34%**, over 2X the global average.

Share of Female Startup Founders



Chicago's diverse economy potentially offers lower barriers to entry for women joining the startup scene. Stakeholders interviewed for this study observed that women often enter tech with a corporate background or demonstrated prior business experience from working in one of Chicago's many industries. This experience may position women well to start their own businesses.

Chicago has invested in incubator programs and resources that intentionally invest in women-led ventures, such as **1871's WMNtech** founder program (formerly WiStem) and **WMNfintech** program, **InvestHER**, an early-stage investment firm focused on investing in female entrepreneurs, as well as **GET Cities** ongoing work to close the gender gap in tech.

With that said, much more still needs to be done to achieve gender equity among entrepreneurs. In 2020, only **2.3%** of venture funds went to women-led startups nationally, down from 2.8% in 2019. With the highest share of female founders globally, Chicago can lead the way to change the narrative.

Notable Chicago Female Founders:

- **Genevieve Thiers** is considered one of the first female disruptors in Chicago tech when she sold a majority stake in her company, Sittercity, in 2019. Today she is an investor of women tech CEO's and female political candidates.
- **Melissa Bodford** founded **uBack**, a platform supporting nonprofits, in 2014 and raised \$1.6M and 11,000 volunteer hours for local nonprofits. uBack was part of 1871's WiStem cohort.
- **Kristi Zuhlke** co-founded **KnowledgeHound** in 2013 to make consumer data more accessible and has since raised \$3.9M to date.
- **Arena Pay**, **Caribou**, **HomeZada**, **Indie Tech**, and **Trustate** are all women-led companies that were invited to participate in WMN-Fintech's 2021 cohort.
- 1871 WiStem's celebrated seven female founders from its cohort 10 and 11 showcase, including **Jill Dillingham** (Tight Ship), **Kim Michelson** (Honest Game), **Dana Todd** (Balodana), **Ali Briggs** (LifeWeb 360), **Meenakshi Lakshmanan** (Manifest Ledger), **Tiffany Griffin** (LeveledPro), and **Kati Deutsche** (EmBorrow)

Sources: Built in Chicago, Crunchbase, GET Cities, InvestHer, Startup Genome



TECH STARTUPS EXPANDING IN CHICAGO

Illinois-based tech startups have grown rapidly in recent years in terms of headcount, office space, and funding.



Relativity was founded in 2001 by Andrew Sieja and originally focused on solving knowledge management problems before switching to legal software. The company has raised \$125M to date and made 300 new hires in 2019 to reach a headcount of over 1,500 employees.



Truss is a real estate tech platform that helps small office tenants find space and sign a lease. The company was founded in 2016. Truss raised \$15M and made 100 new hires in 2019 and was acquired by Avison Young in 2020.



Matt Elenjickal founded FourKites in 2014 to improve supply chain visibility for the logistics industry. The company has raised \$150M since 2019 and doubled its headcount to 720 employees in 2020.



Vistex, an enterprise resource planning platform, was founded in 1999 by Sanjay Shah. The company now has over 1,500 employees and provides software to some of the largest companies in the world. Vistex raised \$105M and added 300 new employees in 2019.

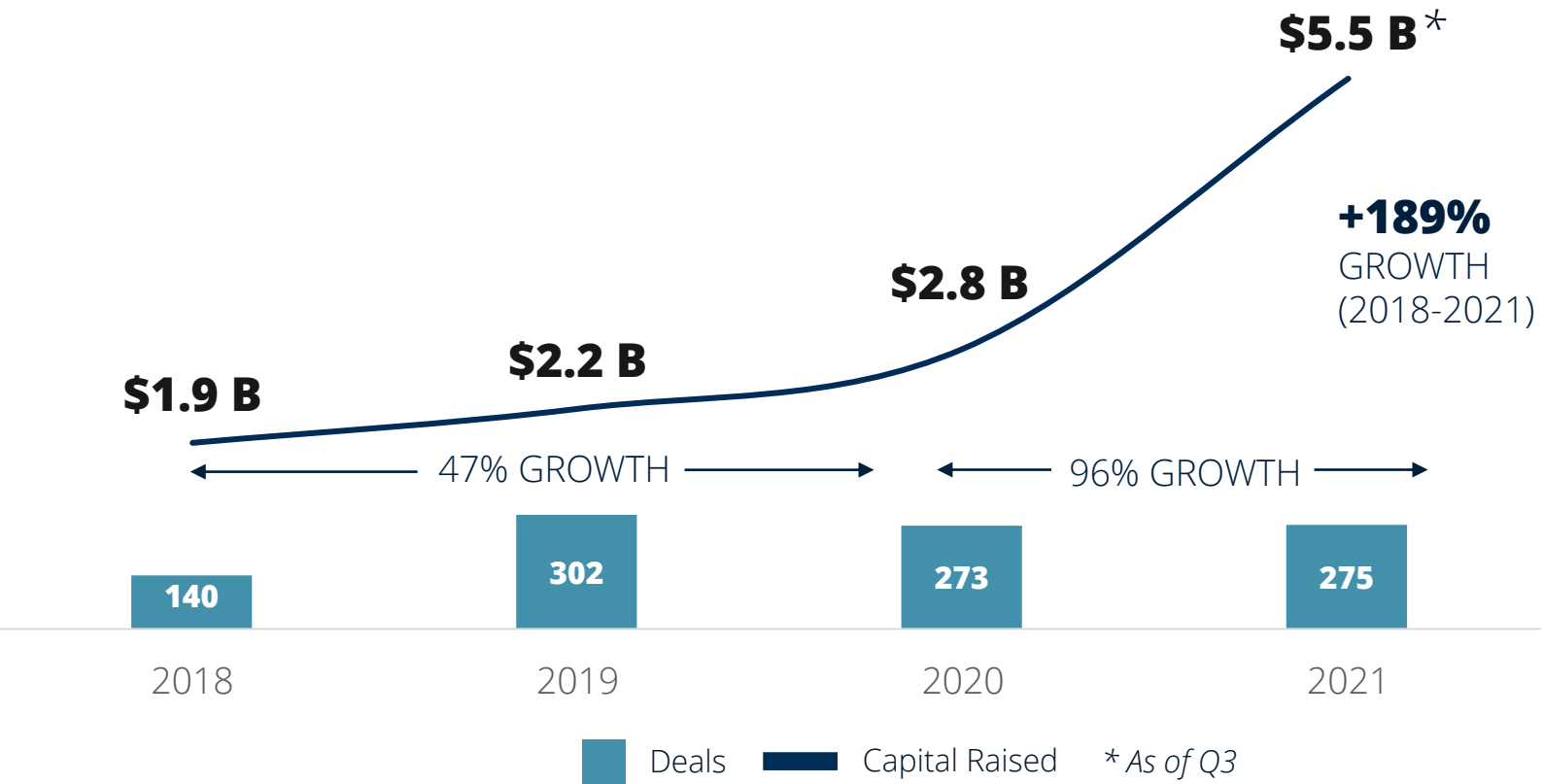
Source: Built in Chicago, Techweek, FourKites, Hyde Park Angels, Avison Young, Vistex



VENTURE CAPITAL GROWTH

Chicago has seen a steady rise in venture capital investment. In 2021, Chicago saw a **96%** year over year increase in VC investment across 275 deals.

Chicago's Total Venture Capital Investment (2018-2021)



Biggest Deals in 2021

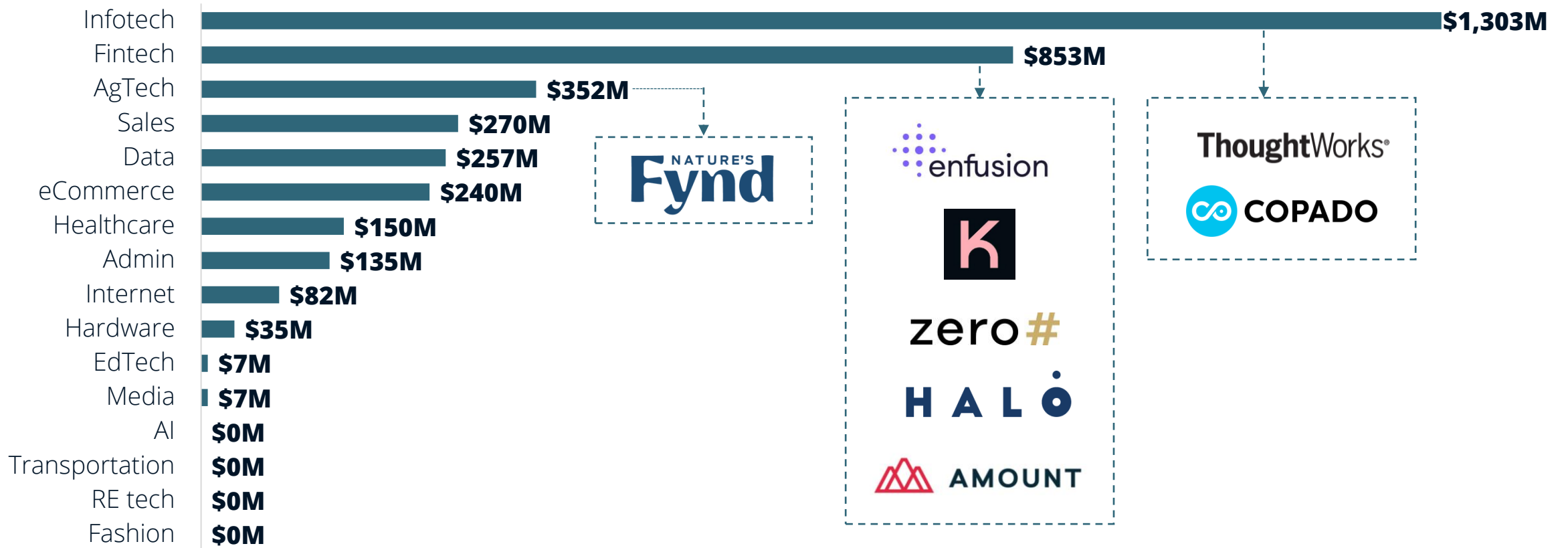
- \$720M ThoughtWorks®
- \$350M NATURE'S Fynd
- \$240M [ActiveCampaign >](#)
- \$236M COPADO
- \$202M project44
- \$200M ShipBob
- \$200M Clearcover



VENTURE CAPITAL BY INDUSTRY

Chicago's VC funding is reflective of the tech ecosystem's concentration in Finance and Information sectors. Of the top 50 tech companies in Chicago, Infotech, Infotech, Fintech, and AgTech companies raised the most funding in 2021.

2021 Funding by Category



Source: Crunchbase

DRIVERS OF GROWTH



TALENT

Chicago is home to some of the top academic institutions in the country which have been producing more tech talent in recent years.

The city has the 2nd highest number of college graduates of the top 5 largest cities in the U.S., and the 4th most engineering graduates of any city in the country. Between 2014 and 2019, the number of tech degrees increased by 50%, demonstrating the success of initiatives across the full educational continuum. From CS4All to programs offered by the Discovery Partners Institute, to training programs such as I.C. Stars and Year Up, Chicago has continued to see investment in its tech talent pipeline, especially for those who have been historically underrepresented and underinvested in.





TALENT PIPELINE

Chicago's high concentration of top universities and educational institutions produces quality STEM talent for the tech ecosystem.

4th

Most engineering graduates in the U.S

2nd

Highest number of college grads among the five largest U.S cities

50%+

Increase in tech degrees completed in Chicago between 2014-2019

The state has a high concentration of top academic institutions:



University of Chicago



Northwestern University



Loyola University



DePaul University



University of Illinois Chicago



University of Illinois-- Urbana-Champaign



Illinois Institute of Technology



TALENT PIPELINE INITIATIVES

Public, private, and non-profit actors have launched several programs to increase and develop home-grown tech talent, particularly in the last decade.

K-12	Post-Secondary Students	Reskilling & Upskilling
CS4All 2014 ISTI STEM Challenges 2014 DPI & UIC Digital Scholars 2020 DPI's Discover Computing Program 2021	ThinkChicago's Lollapalooza 2010 DPI City Scholars Program 2018 DPI's Digital Bridge Program 2021 P33's Strong Start 2021	I.C. Stars 1999 Year Up Chicago 2010 DPI's TechReady Illinois 2020 Accelerate Chicago 2021

Sources: Illinois 2020 Innovation Index, Year Up, I.C Stars, CS4All, University of Illinois Discovery Partners Institute (DPI), Microsoft



TALENT PIPELINE INITIATIVES: K-12

K-12

CS4All

Launched in 2014, CS4All made Chicago the first urban district to offer K-8 computer science pathways. CS4All has increased students' access to computer science courses, but quality instruction remains a key pipeline issue.

ISTI STEM Challenges

The Illinois Science & Technology Coalition's STEM Challenges provide high schoolers with the opportunity to work with STEM professionals for 6 months to build solutions to real-world problems.

DPI & UIC Digital Scholars

Digital Scholars is a summer program for high school and college students to build computing skills, increase college and career-readiness, and make connections in Chicago's tech community. This program is run by the University of Illinois Discovery Partners Institute.

DPI's Discover Computing Program

The Discovery Partners Institute's Discover Computing is designed to build a deeper and more diverse pool of students pursuing computer science and tech-related fields of study in Illinois.

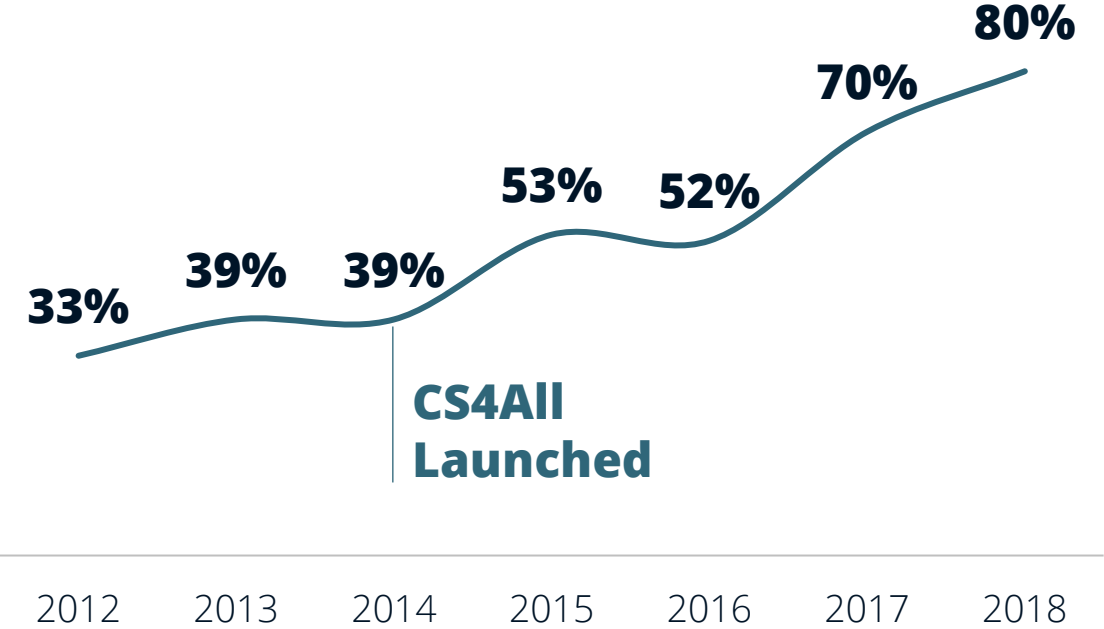
Sources: CS4All, ISTI, DPI Illinois



SPOTLIGHT: Chicago Public Schools CS4All

CS4All has increased students' access to computer science courses across Chicago Public Schools, but quality instruction remains a key pipeline issue.

Percentage of Chicago Public High Schools Offering at least one CS course



Launched in 2014 by Mayor Emanuel and former **Chicago Public Schools** (CPS) CEO Barbara Byrd-Bennett, CS4All made Chicago the first urban district to offer K-8, science pathways. The initiative makes computer science a high school graduation requirement. Within a year of the policy taking effect, the percent of students enrolled in at least one CS course by the end of their ninth-grade **doubled**. CS4All also led to a full-fledged Office of Computer Science (OCS) at the Chicago Public School. As of 2019, OCS has trained 1,000 new teachers and put computer science in over **300 schools**. OCS is dedicated to support communities that have been historically underrepresented in the field of computer science.

“Recruiting, training, and retaining skilled teachers may be one of the main challenges which are likely prevalent in high schools that face difficulties in staffing teachers due to small overall enrollment or shortages of teachers in particular areas of study.”

- UChicago Consortium on School Research

Source: UChicago Consortium on School Research, Tech Crunch



TALENT PIPELINE INITIATIVES: POST-SECONDARY STUDENTS

Post-secondary students

ThinkChicago's Lollapalooza

ThinkChicago's Lollapalooza takes place in the week leading up to Chicago's famous music festival with the goal of attracting and retaining tech talent to Chicago.

DPI City Scholars Program

The Discovery Partners Institute's City Scholars Program exposes exceptional college students to Chicago tech companies and executives and places students in semester-long internships in Chicago.

DPI's Digital Bridge Program

The Discovery Partners Institute's Digital Bridge Program sets aside \$2M for Local Education Agencies in response to Covid and the resulting digital learning gap.

P33's Strong Start

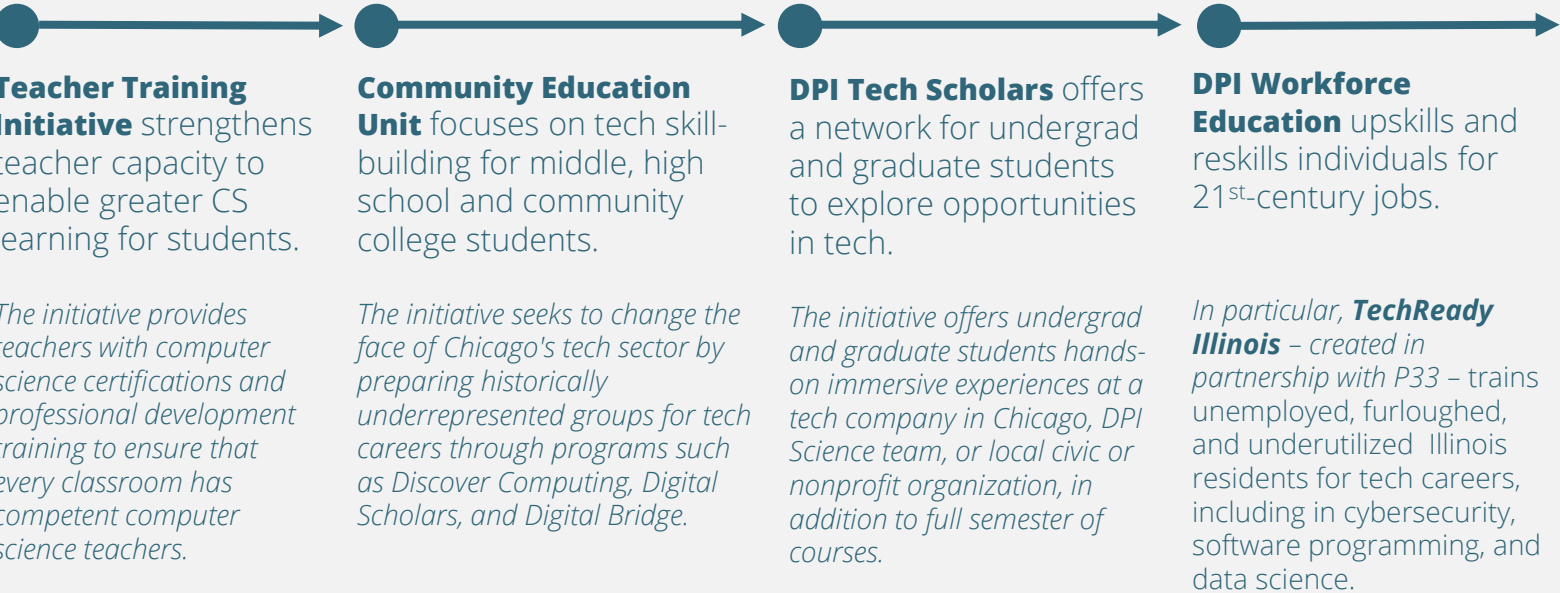
P33's Coalition members speak at universities, become mentors for students, and provide internships with the goal of helping students of color earn tech degrees to find careers in tech.



SPOTLIGHT: Discovery Partners Institute (DPI)

With a strong commitment to DEI, DPI offers multiple programs and initiatives to ensure that every resident can access and thrive in Illinois’ tech community.

Part of the University of Illinois System, Discovery Partners Institute (DPI) is a coordinated partnership among the state’s top research universities and facilities to develop, attract, and retain tech talent in Illinois. With \$230M taxpayer funding, DPI serves as the state’s innovation hub, devoting resources to applied R&D and talent development, such as through Pritzker Tech Talent Labs. DPI’s **Pritzker Tech Talent Labs** are a systemic approach fostering diverse tech talent, particularly among women and people of color, at every stage of a person’s education journey.



Source: DPI



TALENT PIPELINE INITIATIVES: RESKILLING & UPSKILLING

Reskilling & Upskilling

I.C. Stars

I.C. Stars is a tech training provider focused on skilling underserved young adults. The 4-month program provides on-the-job experience to develop business, tech, and leaderships skills and has seen an 82% job placement rate.

Year Up Chicago

Year Up is a nonprofit workforce development organization dedicated to closing the tech opportunity divide by ensuring young adults gain the skills, experiences, and support to empower them to reach their potential through careers and higher education.

DPI's TechReady Illinois

Founded by DPI and P33, TechReady Illinois was created to help Illinois residents impacted by COVID-19 gain new digital skills. The program now helps professionals as well as those looking to switch to a tech career by providing training programs in tech.

Accelerate Chicago

Accelerate Chicago is a Microsoft program that works with local community leaders and businesses to increase access to in-demand careers and support job placement by providing upskilling and cross-skilling digital courses.

Chicagoland Chamber of Commerce Employee Training Program

The Chamber offers workforce training at up to 50% off the cost to support job seekers with greater access to expanding skill sets. Since 2019, over 100 companies and 5,200 employees have participated in the program.

Sources: I.C. Stars, Year Up, DPI, Microsoft



SPOTLIGHT: GOOGLE CAREER CERTIFICATES

Google Career Certificates offer flexible online training designed to put learners on the fast track to jobs in high-growth fields, with no experience or degree necessary.

Google Career Certificates provide job seekers with access to more than 1.5 million in-demand jobs without the need for a college degree or prior experience in the fields of data analytics, digital marketing & e-commerce, IT support, project management, and user experience design. These certificates are taught and developed by Google employees and can be completed in three to six months of part-time study. The program has helped more than 70,000 people in the U.S. acquire new skills for in-demand jobs. 75% of program graduates report an improvement in their career trajectory (e.g., new job, promotion, or raise) within 6 months of program completion.*

Key to the success of the program is the Google Career Certificate Employer Consortium, which convenes over 150 employers across multiple sectors who are committed to considering graduates for entry-level jobs. Consortium members hiring in Chicago include Accenture, Crate & Barrel, Salesforce, Nasdaq, Google and others. Google Career Certificates provide no-cost resources including mock interviews, resume building tools, and career coaching services to prepare graduates for their job search. Google also partners with non-profit organizations, community colleges, and universities to provide learners with wraparound services.

Google has devoted resources to serving individuals from traditionally underrepresented groups Google has funded 130,000 scholarships in the U.S. for need-based learners to complete any certificate. Most recently, Google announced a \$100M Google Certificates Fund with nonprofit Social Finance with the goal of driving \$1B in aggregate wage gains for more than 20,000 Americans. Under this model, participants receive training at no upfront cost, and graduates only make low, no-interest monthly payments if they land a job earning at least \$40K a year. Across Chicagoland, Google has also partnered with the City Colleges of Colleges, workforce boards, and other community organizations to reach underserved talent. Currently, 55% of graduates across the U.S. identified as Asian, Black, or Latino, and 38% came from the lowest income strata, earning under \$30K annually.*

Google also offers opportunities for businesses to upskill or reskill its existing workforce. Every U.S. business can receive up to 500 Google Career Certificate scholarships to help upskill their employees.



"I took it, and it ended up being one of the best decisions of my life," - Alex C.

Alex Corral spent years managing restaurants on Chicago's South Side. He couldn't afford to finish college; then a work injury and the pandemic forced him to rethink his future. He found Google Career Certificates program and completed a certificate in IT Support through a scholarship with the City Colleges of Chicago. He now works as an Information Security Analyst at TEKSystems.

Source: Google, *Based on the program graduates survey responses, US 2021

At a Glance

Chicago's Tech Ecosystem Today

Strengthening Chicago's Tech Ecosystem for the Future

Technical Appendix

Strengthening Chicago's Tech Ecosystem for the Future

Opportunities for Equity

Talent Retention

Policy Considerations

OPPORTUNITIES FOR EQUITY

Chicago needs to lean into and invest much more into diversity and equity efforts to close the racial and gender gaps within Chicago's tech ecosystem.

As this report demonstrates the strengths and importance of tech to the overall Chicago and regional economy, it would be remiss to not discuss the tremendous opportunity tech has to closing generational racial and gender wealth disparities.

The national reality is that Black and Latinx workers only make up 19% of the U.S. tech ecosystem despite representing 29% of the country's workforce. Women make up 34% of the ecosystem despite representing half of all jobs across the U.S. Given this landscape, Chicago's highly diverse workforce is a major asset for addressing equity in tech. Not only do nonwhites make up 60% of the overall workforce, but Chicago is also home to some of the largest immigrant populations across the nation.

Chicago's tech ecosystem sees greater Black and Latinx participation than the national average – 32% compared to the US average of 19%. With continued investments, Chicago could become the most diverse tech hub in the country.

Today, Black and Latinx workers make up 32% of the tech ecosystem despite representing 52% of the Chicago workforce. Public, private and civic leaders of Chicago are working together to close the gap and ensure that there are accessible pathways into tech for communities and populations that have traditionally been underinvested in or underrepresented. At venture capital firms, Black and Latinx employees grew from 100% to 328%, respectively from 2018 to 2021 thanks to organizations like Chicago:Blend which aims to measure and increase diversity, equity, and inclusion in venture

capital firms. Black participation in VCs at 6% is outpacing the rest of the country where only 4% of the national VC workforce is Black. Programs working to increase racial equity include 1871's BLKtech and LTNtech incubators which are designed to increase founders of color in tech, P33's Strong Start, and Break Through Tech, which focus on expanding diversity across Chicago's tech talent pipeline, as well as funds such as Cleveland Avenue's State Treasurer Urban Success Initiative and Founders First CDC 2022, which are created to invest in companies founded by underrepresented founders.

Chicago is well-positioned to close the gender gap that exists in every tech hub around the world.

Women make up 35% of the Chicago tech ecosystem, 39% of jobs at tech startups, and 16% of board positions at tech startups. At venture capital firms, female representation grew 21% between 2018 and 2021. Although Chicago is outperforming other cities when it comes to share of female founders in tech, there is still an opportunity to close the gender gap. 52% of Chicago's workforce is female, representing the potential to significantly increase female representation in tech and improve economic mobility for women while growing the tech ecosystem. Multiple organizations in Chicago are already working to address the gender gap, such as GET Cities (Gender Equality in Tech) and the Pritzker Tech Talent Labs, which are investing in programs to increase gender representation in tech. 1871 and mHUB also offer incubator programs designed specifically for female founders.

EXISTING EFFORTS TO ADDRESS GENDER DIVERSITY

Chicago has built great momentum to improving diversity, equity, and inclusion in the tech ecosystem. And the outcomes are promising. Today, Chicago has the highest share of women founders across all tech hubs globally.



GET Cities: GET Cities’ Tech Equity Working Group convenes multiple organizations around the city to address gender representation in tech and provides \$150K in seed funding per year for initiatives that increase representation. Its Venture Fellowship Program also uses Venture Scouts to help women and BIPOC-led companies get started.



Pritzker Tech Talent Labs: Programs aimed at helping women and people of color secure tech jobs, including programs for high schoolers that teaches them how to code and connects them to internships.



WMNtech Founders: 12-week program and mentoring initiative at 1871 designed for women-identifying tech founders.



WMN-FINTECH: 12-week program and mentoring initiative at 1871, powered by BMO Financial Group, designed for women-identifying founders of FinTech startups.



mPOWER by mHUB: 6-month membership to mHUB for companies founded by women and people of color.



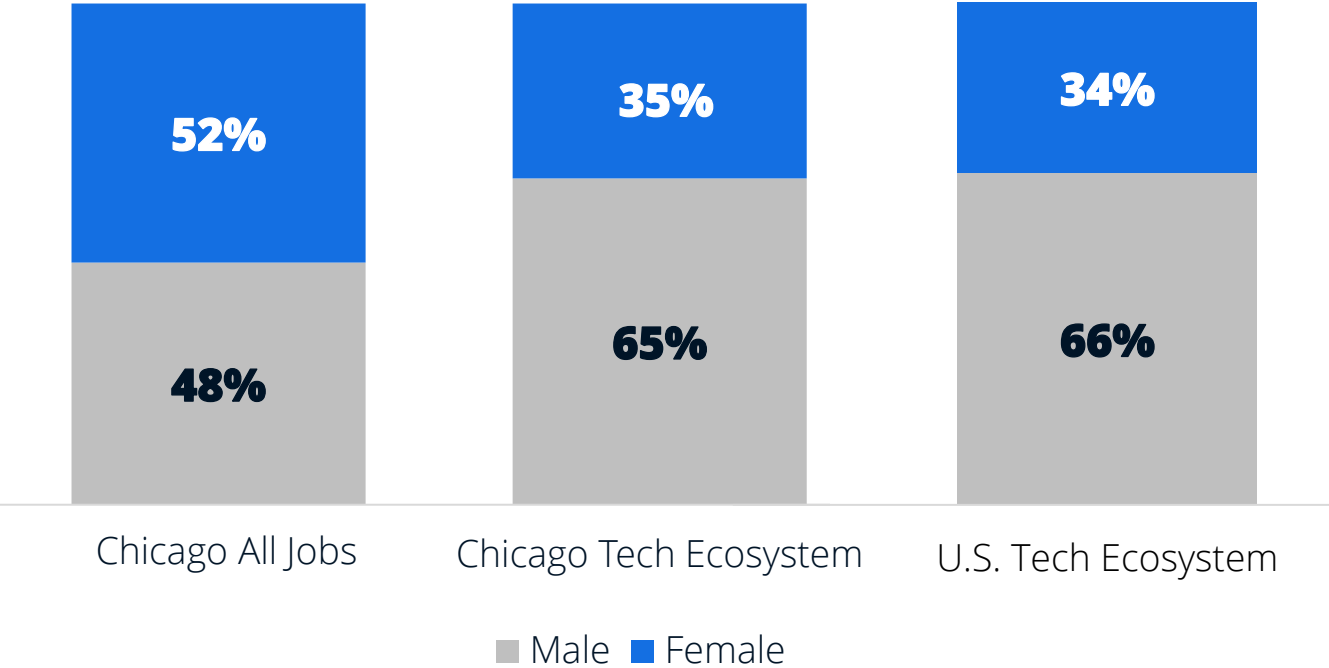
ChicagoBlend: Launched in 2018, ChicagoBlend is a collaborative effort of Chicago VCs to increase and measure DEI in VC firms and startups.

Source: 1871, Chicago Business Journal

OPPORTUNITIES FOR GENDER EQUITY IN THE WORKFORCE

In Chicago women hold 35% of tech ecosystem jobs (37K), a share that is on par with the nation’s tech ecosystem. In comparison women represent 52% of Chicago’s workforce.

Gender Distribution (2021)



While Chicago’s entrepreneurial environment has extended opportunities to women – Chicago has the highest share of female founders among the top 20 tech hubs in the world at **34%**, over **2X the global average** – more needs to be done to reach gender equity, especially in the overall tech workforce where women only hold **35% of jobs**. Among startups, women represent 39% of employees and only 16% of startup boards.

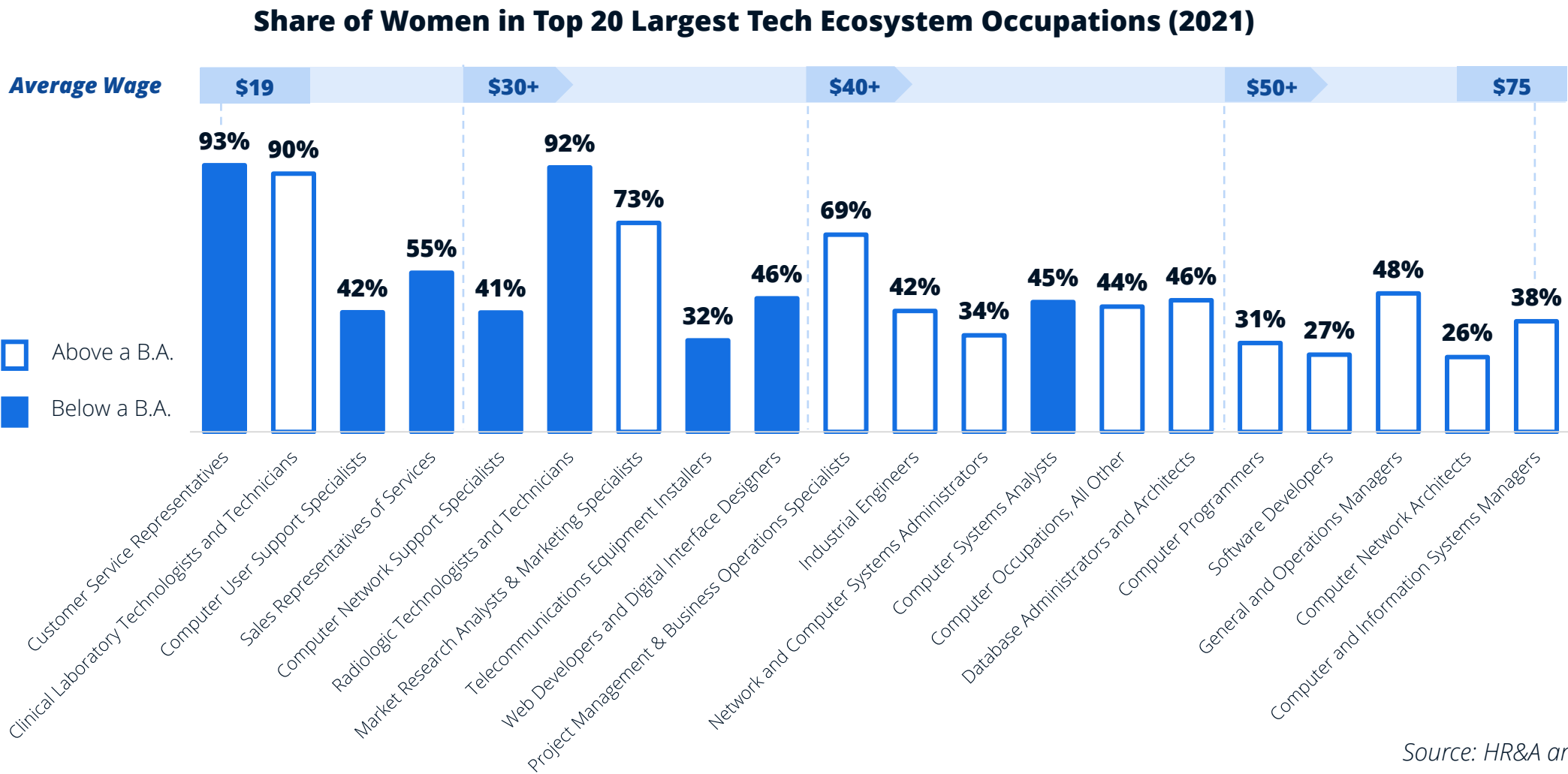
Continuing to invest in policies and programs to close the gender gap by creating more pathways into tech jobs can potentially support 17K women earn \$25K more annually in Chicago.

Greater investments are needed especially efforts focused on training women in software development, computer networks, computer programming, and information systems – these occupations offer higher-paying opportunities yet see some of the lowest female representation today.

Source: HR&A analysis of EMSI data, Chicago:Blend.

OPPORTUNITIES FOR INCREASED ECONOMIC MOBILITY

Of the top 20 largest tech ecosystem occupations, women tend to make up a smaller percentage of the highest paying occupations. Expanding access into higher-paying roles could generate \$9K more in annual earnings.



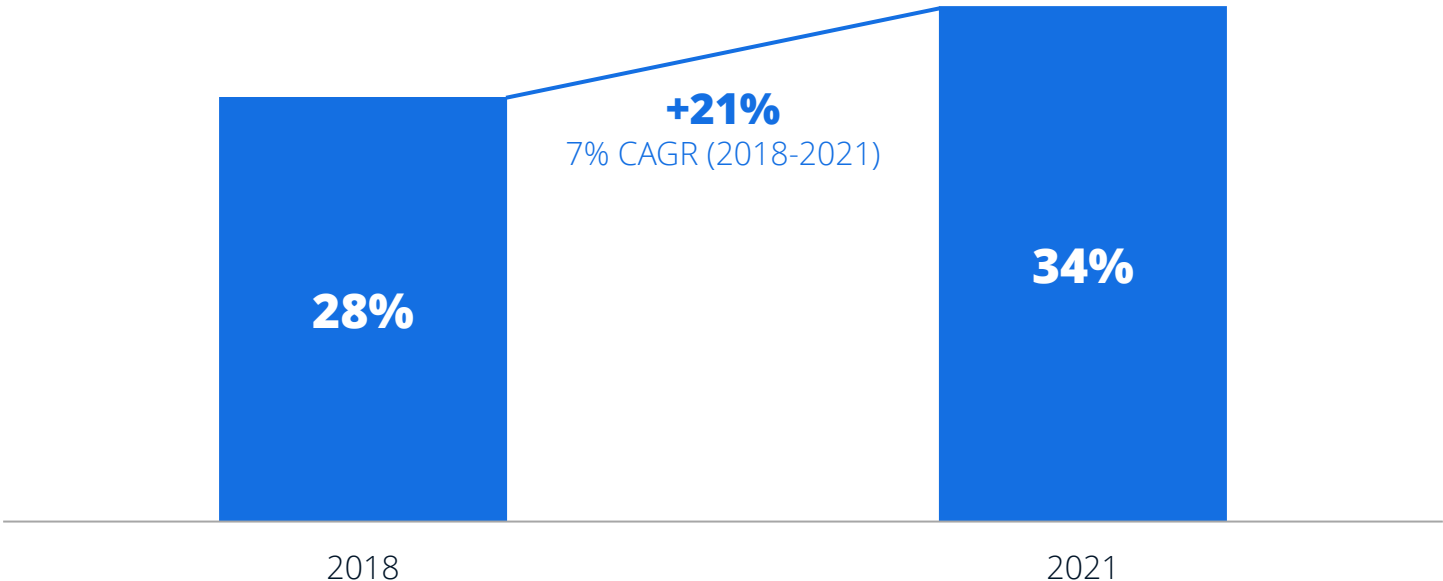
OPPORTUNITIES FOR GENDER EQUITY IN VENTURE CAPITAL

Venture capital in Chicago is rapidly growing and although the industry is largely male dominated, female participation has increased by 21% between 2018 and 2021.

While the industry is still predominately male (68%), women are making up an increasingly large share of the industry. Between 2018 and 2021, Chicago saw a **21%** increase in female representation in venture capital firms, a 7% annual increase. This positive trend was particularly felt within First-Time Funds, where women make up **43% of first-time fund** employees (up **8.5% year over year** from 2020).

While this is positive, more needs to be done to increase opportunities for women to participate in venture capital in Chicago. Women at Chicago-area VCs still make up a smaller share when compared to the rest of the country where women make up 45% of the overall VC workforce. Women are also less likely to get promoted – in 2021, 60% of promotions went to men.

Gender Breakdown of Chicago’s VC Employees



Source: Chicago:Blend. This data was collected by Chicago:Blend in July and August of 2021 and includes 771 employees from 114 firms with a Chicago office that have made at least one venture investment within the past two years. These firms include venture funds that are \$5M+, family offices, angel investment networks, and a handful of other investors that do venture deals.

EXISTING EFFORTS TO ADDRESS RACIAL DIVERSITY

Public and private initiatives have also driven improvements in increasing racial diversity. Between 2018-2021, Black and Latinx participation in VCs grew two- and four-fold respectively.



P33 Talent Coalition & Tech Rise: P33 has convened 39 companies dedicated to improving Chicago’s tech talent pipeline through programs such as Strong Start and Tech Pass. P33’s \$5M Tech Rise fund also distributes grants to Black and Latinx founders who win weekly pitch competitions at P33.



Break Through Tech: Works at the intersection of academia and industry to help increase the number of women and people from underrepresented backgrounds in tech careers. The initiative is a partnership with the University of Chicago and Pivotal Ventures.



LTNtech Founders: 12-week program and mentoring initiative created by IHCC and 1871 to equip Latin tech founders.



BLKtech Founders: 12-week program and mentoring initiative at 1871 designed to equip Black founders.



Chicago:Blend: Launched in 2018, ChicagoBlend is a collaborative effort of Chicago VCs to increase and measure DEI in VC firms and startups.



Founders First CDC 2022: Awards 30 grants for a total of \$100K to small companies in Chicago run by people from underrepresented groups.

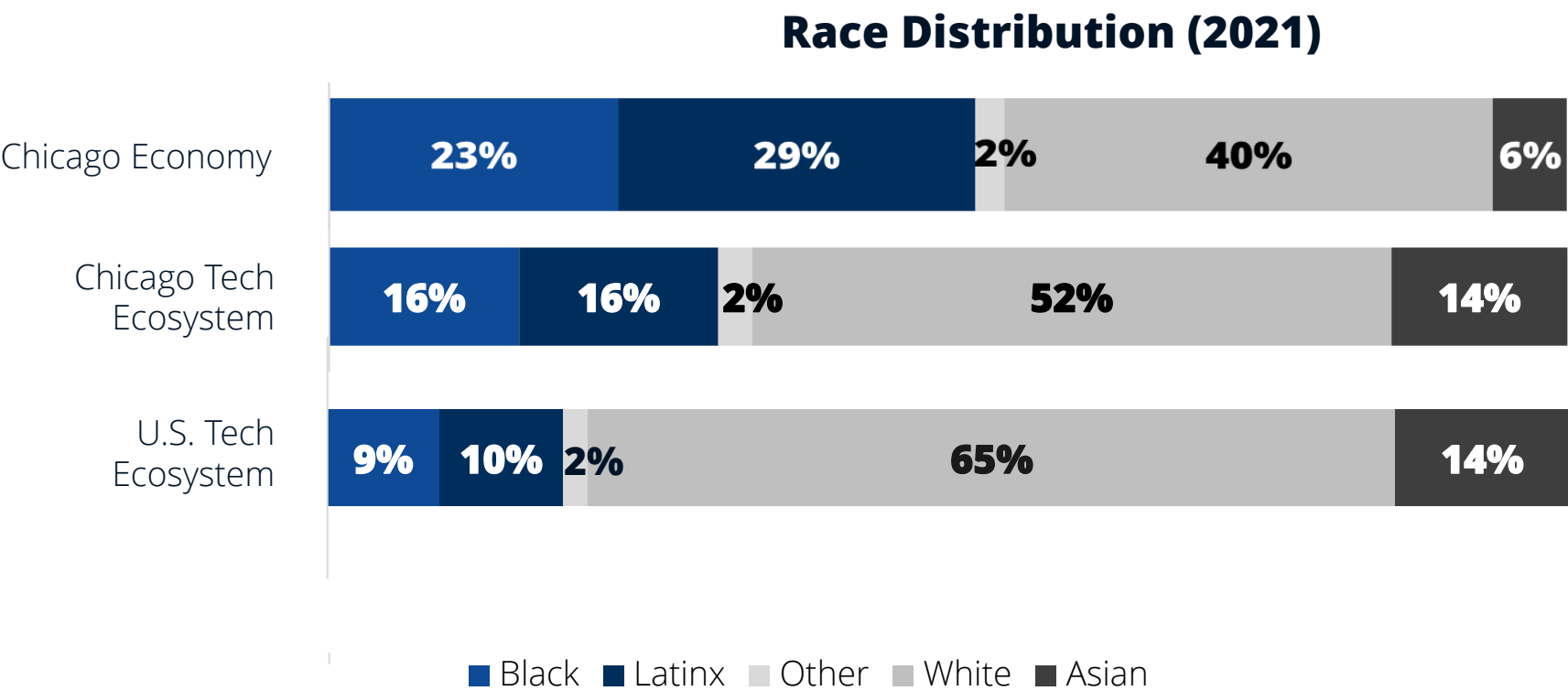


Cleveland Avenue State Treasurer Urban Success Initiative: \$70M fund to invest in companies owned by Black, Latinx, and female entrepreneurs.

Sources: Black Enterprise, Chicago:Blend, GET Cities, Chicago Business Journal

OPPORTUNITIES FOR RACIAL EQUITY IN THE WORKFORCE

Chicago has a more racially diverse tech ecosystem as compared to the nation, with Black and Latinx workers holding 32% (34,000 jobs), vs only 19% nationally.



The endless work of Chicago’s many equity-focused tech organizations and intentional state and local policies has helped Chicago lead in forming a more diverse tech workforce.

Continuing to invest in policies and programs to close the **20% racial gap** by creating more pathways into tech jobs can potentially support 22K Black and Latinx workers earn \$24K more annually.

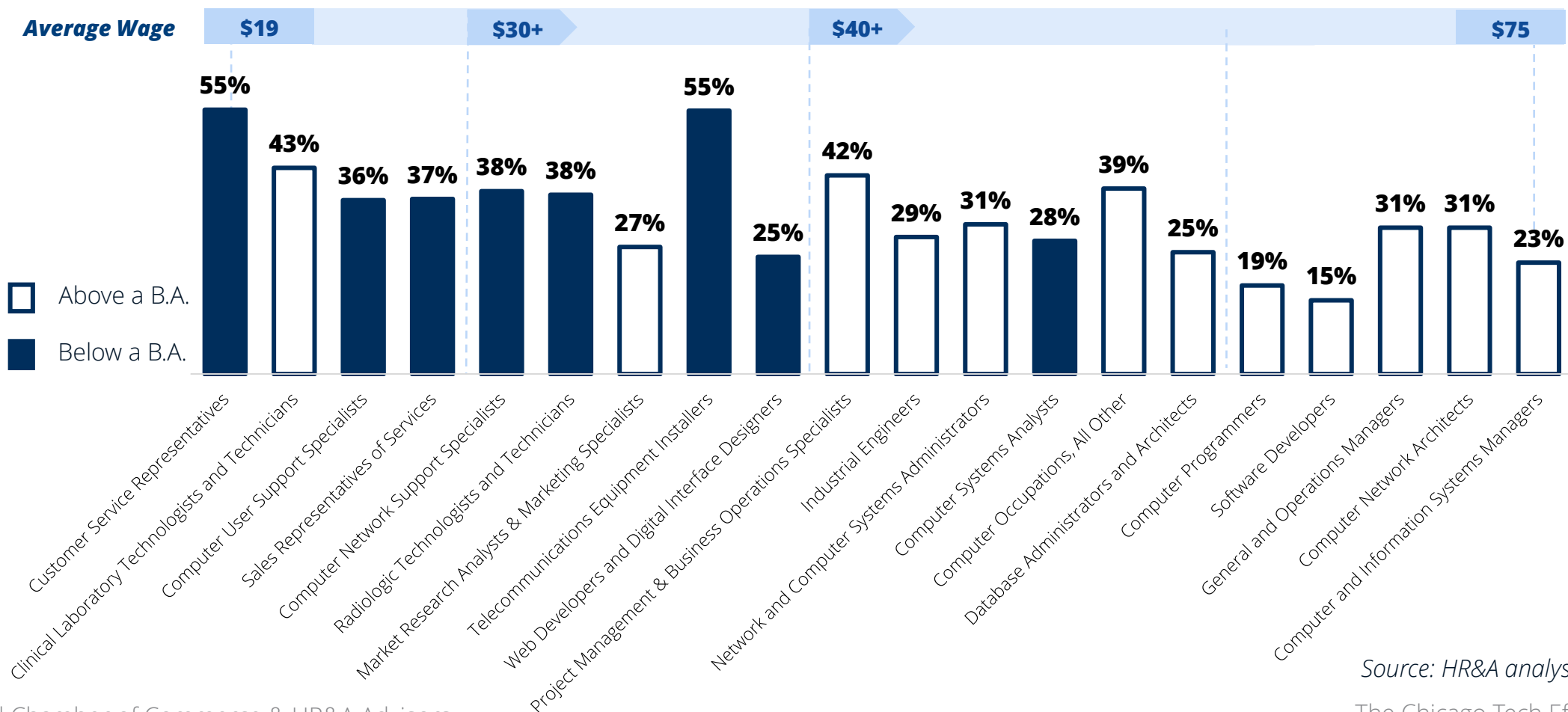
Efforts that remove barriers to entry for Black & Latinx workers to tech jobs, particularly in computer programming, software development, and computer network architecture, would be especially impactful, given that these are higher-paying opportunities.

Source: HR&A analysis of EMSI data.

OPPORTUNITIES FOR INCREASED ECONOMIC MOBILITY

Among the tech ecosystem’s largest occupations, Black and Latinx workers tend to make up a smaller share of the highest-paying occupations. Creating more equitable pathways into occupations could potentially generate \$10K in additional annual earnings for every Black and Latinx worker in the tech ecosystem.

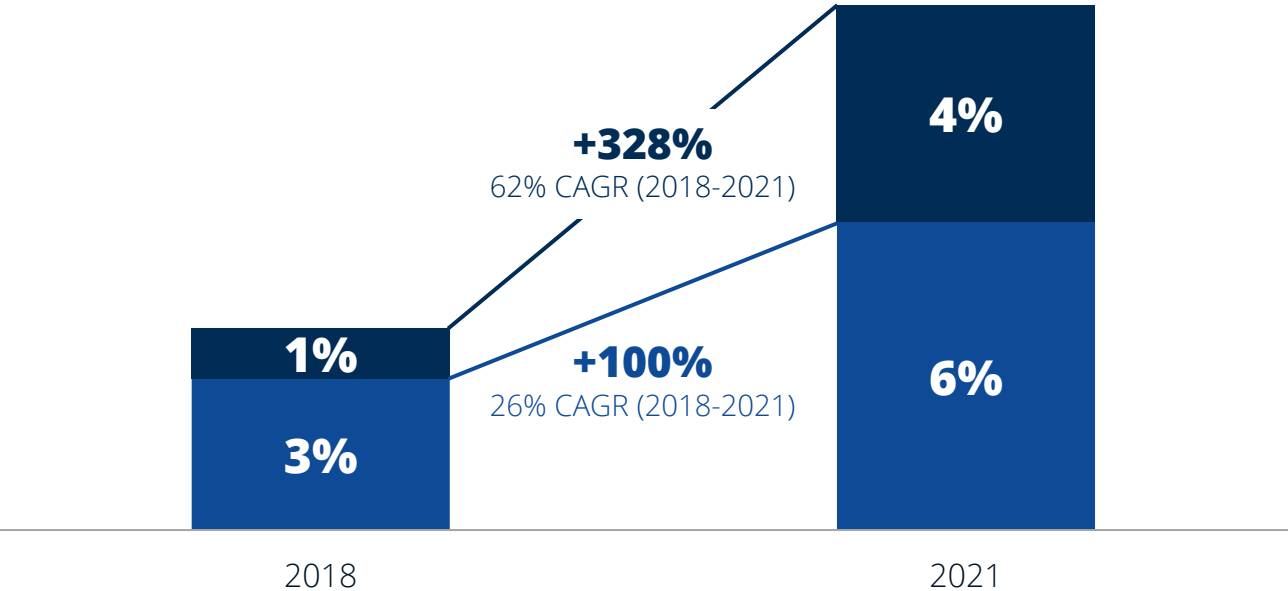
Share of Black & Latinx Workers in Top 20 Largest Tech Ecosystem Occupations (2021)



OPPORTUNITIES FOR RACIAL EQUITY IN VENTURE CAPITAL

Latinx and Black participation in venture capital firms has grown 328% and 100% respectively between 2018-2021, demonstrating the active work of many organizations that are investing in increasing racial equity in VC.

Racial Breakdown of Chicago’s VC Employees



While the venture capital ecosystem is still predominately white, Chicago has seen meaningful improvements in recent years. Black and Latinx professionals working in venture capital grew **100%** and **328%** between 2018 and 2021.

In the last year, Latinx representation saw the biggest gains – 80% year over year increase from 2020, and this group now represents 4.3% of the region’s VC workforce. Representation among Latinx women were also particularly pronounced – 168% YOY increase.

Black workers now represent 6% of Chicago’s VCs, growing 26% annually since 2018. **Black participation in VCs is outpacing the rest of the country where only 4% of the national VC workforce is Black.**

Organizations such as ChicagoBlend are working to improve diversity by measuring representation in the industry and making that data more readily available. Continued work in this area will help to make VC more diverse which in turn will make it easier for startups with diverse founders to access capital.

Source: ChicagoBlend, Crunchbase

SPOTLIGHT: P33 TECH TALENT ALLIANCE

P33's Tech Talent Alliance convenes employers to shape the future of Chicago's workforce with an emphasis on high quality, diverse, tech talent.

P33's Tech Talent Alliance aims to make big, long-term bets to transform the city's workforce through a powerful network, novel programming, and actionable insights centered on its demand-driven perspective of the tech talent ecosystem.

The **50 member companies** range from Fortune 100 companies to high-growth startups and include Aon, Accenture, Allstate, Microsoft, Google, Relativity, Salesforce, and United Airlines. In total, this group represents over **100,000** local employees.

P33 is a nonprofit focused on driving inclusive, global tech and innovation leadership for Chicagoland. Its work is anchored in creating equitable access to digital careers, talent retention, deep science commercialization, and addressing gaps in the region's growth stage startup ecosystem.

Key Initiatives:

Strong Start

Connects member companies with universities to provide real-world projects to students during freshman and sophomore introductory computer science classes.

Tech Pass

App-based solution that provides students from underrepresented backgrounds a guided roadmap into Chicago tech companies to help diversify the tech workforce.

The State of Chicago Tech Talent Report

Report that identifies tech employers' hiring needs and strategizes ways to equitably meet this demand.



TechReady Illinois

Program launched in response to Covid-19 in partnership with the Discovery Partners Institute to provide courses in data and analytics, cloud computing, cybersecurity, and software development to Illinois residents for a 50-75% discount.



Source: P33

Strengthening Chicago's Tech Ecosystem for the Future

Opportunities for Equity

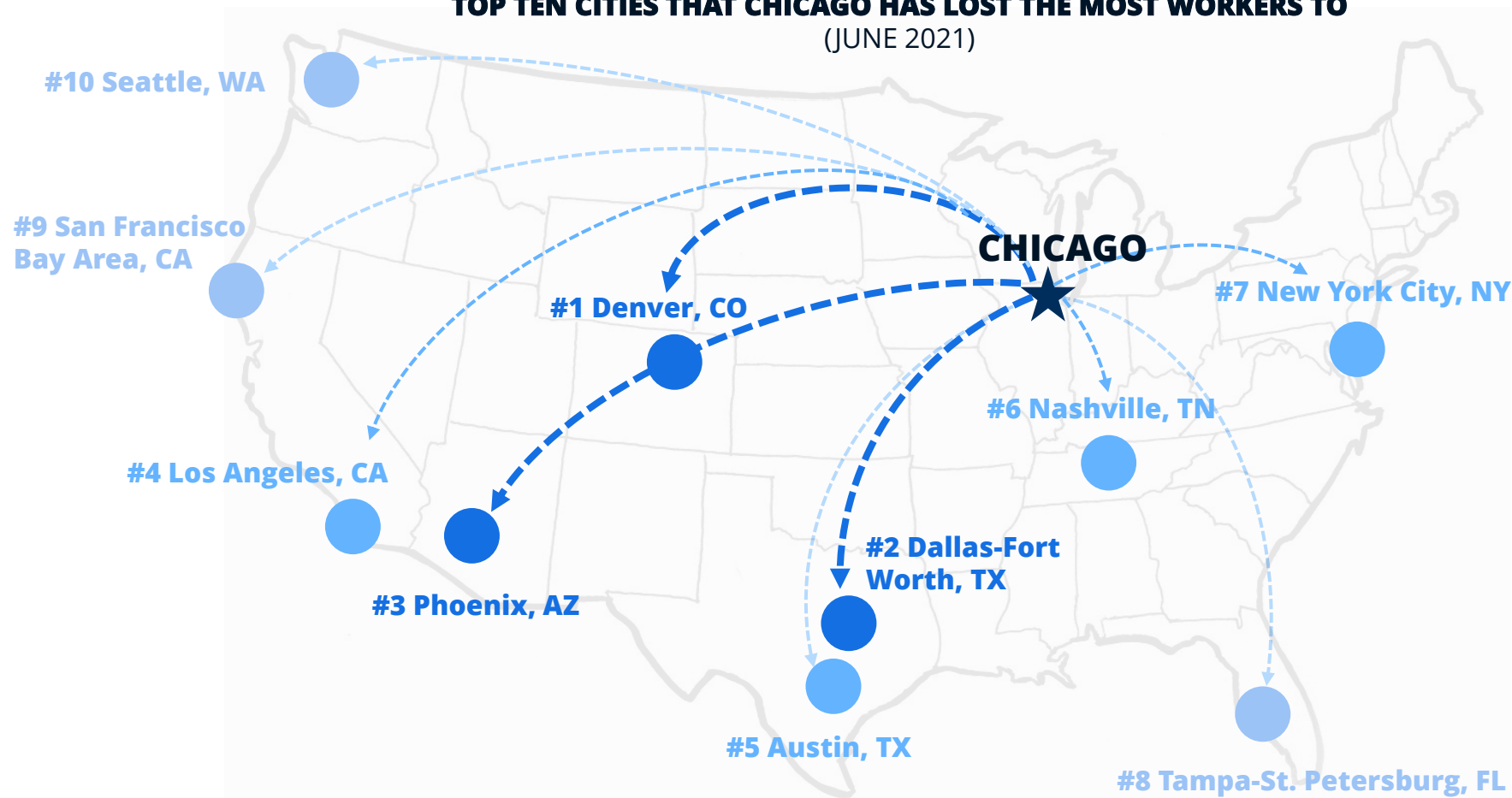
Talent Retention & Attraction

Policy Considerations

TALENT RETENTION IN A REMOTE WORLD

Migration patterns have shifted during the COVID-19 pandemic. Most notably, movement to San Francisco has declined.

TOP TEN CITIES THAT CHICAGO HAS LOST THE MOST WORKERS TO
(JUNE 2021)



Despite a strong production of tech talent from top-tier academic institutions, prior to COVID-19, many graduates chose to leave Chicago after school to work in other tech hubs. **San Francisco, Denver, and Los Angeles** were among the top three cities that Chicago lost workers to in 2019.

COVID-19 and remote work has changed where tech workers are choosing to live and work. Since the pandemic, migration patterns have shifted. Graduates are now choosing to move to more southern cities like **Phoenix, Dallas, and Austin** while traditional tech hubs like San Francisco and Seattle have seen a decline in talent migration from Chicago.

Source: LinkedIn Workforce Report, Chicago 2020

Chicagoland Chamber of Commerce & HR&A Advisors

TALENT RETENTION IN A REMOTE WORLD

The shift to remote work due to the pandemic has profound implications for how Chicago-based companies recruit and retain talent.

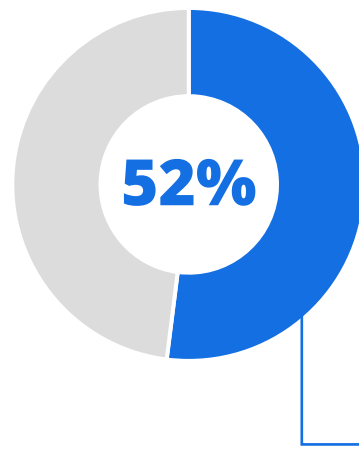
The implications of today's "work from anywhere" culture remain unclear.

While **companies now have access to a national talent pool**, the benefits of national hiring may not be equally felt across different companies. Smaller, lesser-known companies may have difficulty attracting this national talent.

In addition, local workers can pursue job opportunities on the national market, but also face increased competition given the widened talent pool.

There is still great uncertainty in terms of how remote work will affect job or business growth and retention in the long run.

A survey conducted by P33 of its coalition companies revealed:



Of companies say they no longer care whether a hire lives in Chicago or intends to move to Chicago.

Nearly 100% of startups say this vs. 30% of more established companies

46% of the companies who are agnostic to location estimated that **more than half of their digital workforce hires in 2021 are located outside of the Chicago area.**

Source: P33, HR&A stakeholder interviews.

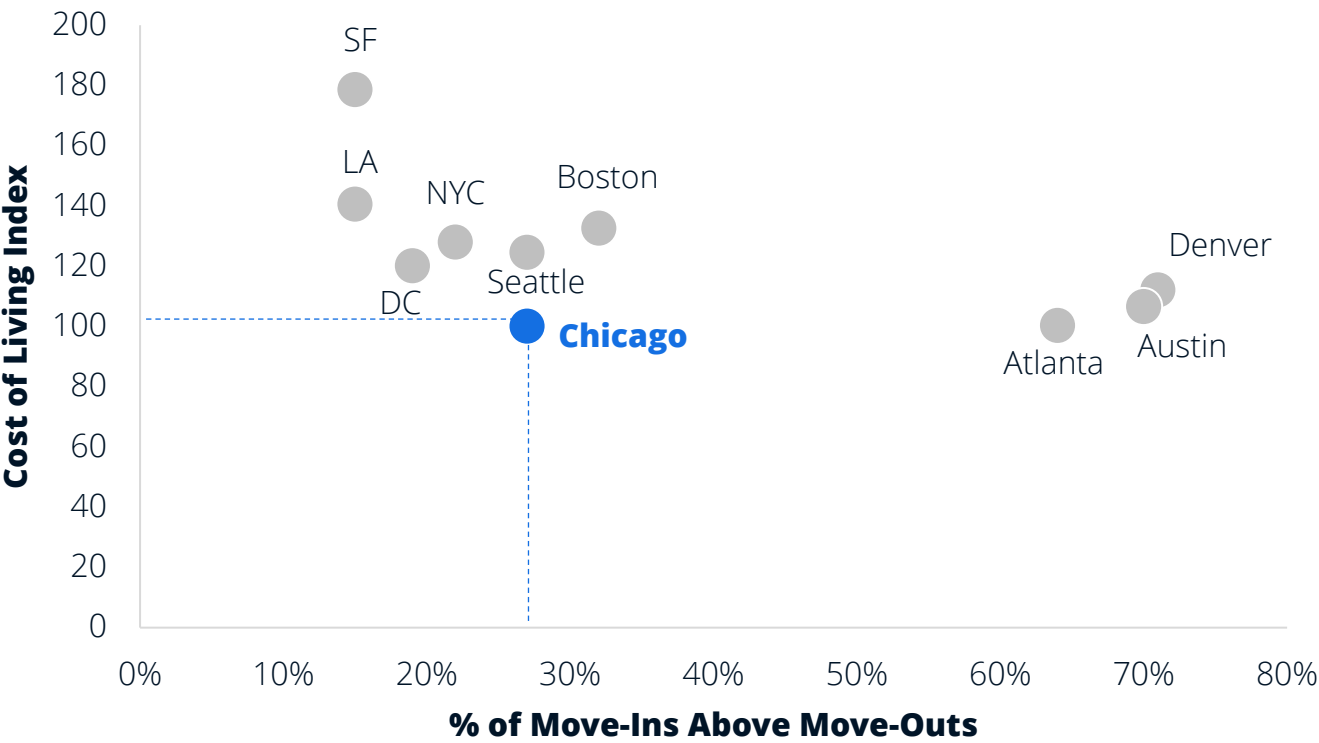
TALENT ATTRACTION IN A REMOTE WORK WORLD

Chicago saw higher move-in rates in the last year, outperforming more established tech hubs like San Francisco and New York City. Chicago should continue to position itself as an attractive place to live and work.

Chicago is well-situated to attract tech talent in an increasingly remote work environment. Chicago has several key advantages when it comes to attracting tech companies and talent in the era of remote work, especially its lower cost of living. Chicago's cost of living is **78% lower than San Francisco and 28% lower than New York City.**

A 2021 study from TaskRabbit showed a strong correlation between move-in activity and cost of living – cities with a lower cost of living saw a higher percentage of move-ins in 2021. In 2021, Chicago had significantly more move-in activity than more expensive tech hubs like San Francisco, Los Angeles, and D.C. However, a low cost of living alone isn't enough to attract and retain talent, as cities with slightly higher costs like Austin and Denver outperformed Chicago. Chicago needs to increase awareness around the size and strength of its tech ecosystem, as well as city amenities like the lakefront, museums, and sports teams to compete with tech hubs that are attracting more talent despite having fewer opportunities in tech.

Move-In Activity vs. Cost of Living, 2021



Source: TaskRabbit, Advisor Smith. TaskRabbit is an online platform that connects people with freelance service providers. The company tracked the number of move-in and move-out tasks across major cities to estimate the net flow of people into or out of a city. Advisor Smith calculated the cost of living in 509 metropolitan areas across the U.S. based on the cost of food, housing, utilities, transportation, healthcare, and consumer discretionary spending. Each category was weighted based on Consumer Expenditure Surveys, and the weighted values were summed to get a value normalized to 100.

Strengthening Chicago's Tech Ecosystem for the Future

Opportunities for Equity

Talent Retention

Policy Considerations

POLICY CONSIDERATIONS

There is consensus among Chicago's tech ecosystem actors that more needs to be done to boost Chicago's image as a thriving tech hub that will continue to attract, grow, and retain tech talent and businesses.

1. Lean into Chicago's assets and create marketing avenues to sell Chicago's strengths and successes. Chicago companies are revolutionizing tech in various ways, but these successes aren't publicized at a national or global scale. The city needs to build upon the work that P33, World Business Chicago, and others are heralding to identify avenues to market Chicago's tech innovations. Moreover, Chicago needs to tout its core strengths – talent, diversity, affordability, connectivity, and its strong startup and corporate presence – to remain competitive with other markets.

2. Advocate for policies and initiatives that will advance high-tech and deep-tech innovation in Chicago and not hinder the tech ecosystem's momentum. Building off its strengths in manufacturing, transportation, and logistics, the State can leverage federal tax credits to offer additional incentives to spur innovation and development in the future of auto. Quantum is another high-tech area where, if supported by effective policy, could be a differentiating factor for Chicago and lead to new jobs and more economic output. Currently, researchers at Chicago universities are national leaders in studying quantum. In general, city and state government needs to be careful about creating prohibitive regulatory laws that would limit growth and momentum for tech in the region.

3. Develop policies to address current gaps in Chicago's tech talent pipeline. While there are many top-tier universities in Chicago, more can be done to strengthen the tech talent pipeline at the K-12 level with better proficiency standards and programs to develop computer science teachers. There is also room to improve talent retention by creating more

apprenticeship and mentorship programs to connect students with employers. Scholarships and loan forgiveness can incentivize students to stay in Chicago after program completion.

4. Bring greater awareness to all tech opportunities across Chicago's economy by changing how tech is discussed. Despite the strength of the tech ecosystem, many students in Chicago are unaware of the career opportunities available to them after graduation. This is partly due to the fact that roughly half of Chicago tech jobs are in non-tech industries. By expanding the definition of tech, Chicago can promote the true scale of the tech ecosystem and improve talent retention. Chicago can also expand the number of academic institutions and students who are included in the tech conversation. Colleges with large numbers of Black and Latinx students in tech have historically been overlooked by employers looking for tech talent. By increasing awareness around these schools and students, employers will have access to a larger pool of talent and more tech degree graduates will find careers in tech.

5. Lead with equity. Chicago's diverse workforce puts the city in a unique position to build the most equitable tech ecosystem in the country. Not only will this differentiate Chicago from other tech hubs, but it will also leverage the existing talent in the city to grow the tech ecosystem from within. The ecosystem should continue to invest in efforts and initiatives to increase Black, Latinx, and female participation in tech. City and state governments can also increase pathways to tech by closing the digital gap and expanding broadband adoption across the region.

POLICY CONSIDERATIONS

Lean into Chicago's assets and create marketing avenues to sell Chicago's strengths and successes.

Chicago companies are revolutionizing tech in various ways, but these successes aren't publicized at a national or global scale. The city needs to build upon the work that P33, World Business Chicago, and others are heralding to identify avenues to market Chicago's tech innovations, because Chicago has much to offer:



World Class Universities and Talent

Of the five largest cities in the U.S., Chicago has the 2nd most college graduates and the number of tech degrees awarded has risen 50% in the last five years. Retaining this talent will be key to fueling the growth of Chicago's tech ecosystem.



Diverse, multi-sectoral economy

No single industry makes up more than 13% of Chicago's workforce. Tech can serve as a blanket industry to tie together the diverse Chicago economy.



Strong Corporate Presence

Chicago is home to 27 Fortune 500 Companies, creating opportunities for startups to partner with large corporations and providing a large, local customer base for B2B tech companies.



Connectivity

With two international airports and the second largest public transit system in the U.S. (after New York City), Chicago is uniquely connected locally, regionally, and globally. In 2020, Governor Pritzker passed the \$45B ReBuild Illinois capital funding initiative to improve infrastructure in communities across the state over the next 6 years, ensuring that Chicago's infrastructure will remain a strong asset for years to come.



Low Cost of Living

Chicago's cost of living is 78% lower than San Francisco and 28% lower than NYC, making it much more affordable to start and operate a tech company in Chicago than other tech hubs.

Source: P33

Chicagoland Chamber of Commerce & HR&A Advisors

*In May 2021, P33 and World Business Chicago launched the **Come Back to Move Forward** campaign targeting 100K tech workers around the country with the goal of bringing 10K to Chicago. Chicago's tech ecosystem actors need to rally around these efforts to promote Chicago as a tech hub.*



POLICY CONSIDERATIONS

Advocate for policies and initiatives that will advance high-tech and deep-tech innovation in Chicago and not hinder the tech ecosystem's momentum.

Angel Investment Tax Credit

There is currently a \$10M cap on tax credits awarded through this program, which provides investors of qualified early-stage companies a 25% tax credit. Increasing that cap will improve the ability of startups to raise capital and will spur growth in the tech ecosystem. Moreover, the program needs to be “right-sized” to target tax credits to Series B and earlier companies.

AV/EV Framework

Chicago's strengths in the automobile, manufacturing, and transportation industries make it an ideal city for autonomous vehicle and electric vehicle innovation. Chicago can support AV development and research by passing an AV framework or enact legislation modeled off states like Michigan. Chicago can build upon state and federal electric vehicle tax incentives and support the buildout of infrastructure and supply chains to help transform the auto industry.

Quantum

Chicago universities are national leaders in quantum research and innovation. Chicago can work to commercialize these innovations to create high-paying jobs and boost economic output. Extending and modernizing the R&D tax credit will also enable even more innovation in this field.

Incubators

Between 1871, mHUB, MATTER, and many more, Chicago has a strong startup incubation ecosystem. The city can work with these incubators to help scale innovative products and bring them to market.

Revolving Loan Funds and Early-Stage Capital Investment Funds

Despite the city's robust incubator network, early-stage startups still have difficult access to capital. Chicago can create or expand revolving loan programs, such as the State's Advantage Illinois program, to close the risk gap for small businesses seeking loans from banks. The state of Illinois is set to receive over \$300 million for its SSBCI program and can utilize those dollars as discretionary funds for programs supporting small businesses. Additionally, the State and City can establish early-stage capital investment funds to support start-ups with up-front capital to spur their projects.

BIPA Reform

The Biometric Information Privacy Act heavily burdens small businesses and limits the growth of the tech ecosystem in Chicago.

POLICY CONSIDERATIONS

Develop policies to address current gaps in Chicago's tech talent pipeline, such as:

Strengthen Math Proficiency Standards

Create upper-level math graduation requirements and dedicate additional resources to help students from underserved schools qualify for CS courses.

Develop Quality K-12 Computer Science Teachers

Provide affordable and accessible teacher training for all levels of CS Curriculum similar to DPI's Teacher Training Program.

Incentivize Local Talent Retention & Retain Foreign Talent

Establish a fund for scholarships or loan forgiveness to graduates from local institutions who are employed in-state. Advocate for policy that provides pathways to citizenship for immigrant scholars & entrepreneurs who are trained and work in-state.

Create Subsidized and Seamless Pathways with Wraparound Services

Greater collaboration between community colleges, universities, and other training providers can help individuals maximize training opportunities by allowing full credit transfers, offering scholarships, and providing wraparound support services, particularly to non-traditional students.

Tech Apprenticeships

Build off the Chicago Apprenticeship Network and prioritize apprenticeship programs in the tech sector and partner with institutions like the City Colleges. Increase the cap on the \$5M Apprenticeship Tax Credit which provides enhanced credits for students from underserved communities.

Develop Collaborative Programs Between Employers and Educational Institutions

Build upon the work being done by IBHE and fund new and existing programs that encourage private sector and academic collaboration to influence curriculum that responds to rapidly evolving business needs.

Spotlight: DeVry University's Transfer Advantage60 and Care Engine Program

DeVry University has developed targeted programs to address gaps experienced by students, particularly those pursuing nontraditional educational pathways, by streamlining processes and providing wraparound supports to help individuals advance their careers and find opportunities in growing fields such as tech.

Devry's Transfer Advantage60 allows associate degree students from partner community colleges to transfer up to 60 credit hours, saving students both time and money to complete their degrees, including in tech. Students are also automatically qualified for DeVry's Future-Ready Transfer Scholarship program.

Through its **Digital Care Engine Program**, DeVry also provides students with holistic resources – access to child support services, tutoring, career guidance, counseling- so that they can effectively focus on their studies.

Source: DeVry University

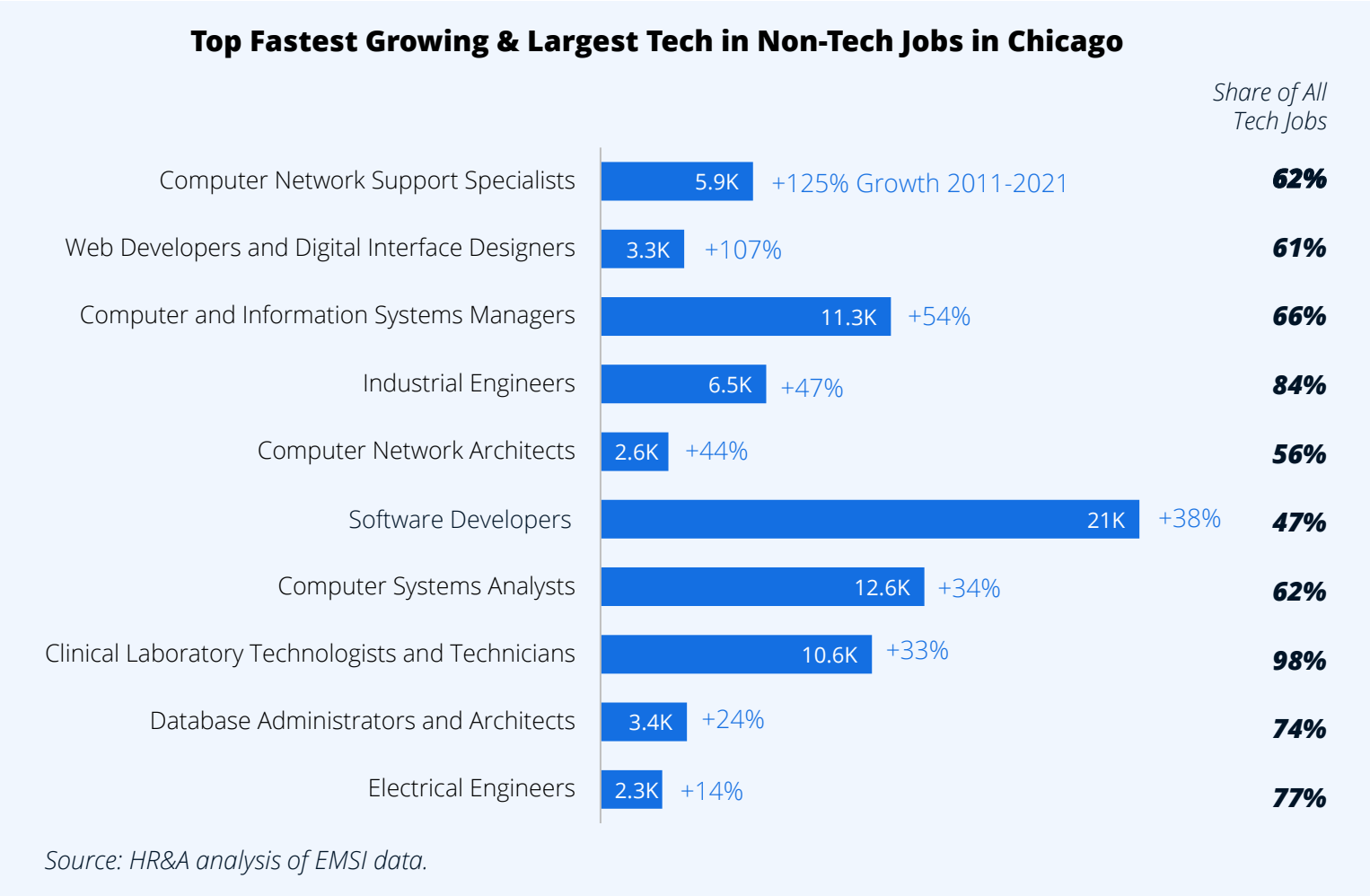
POLICY CONSIDERATIONS

Bring greater awareness to all tech opportunities across Chicago’s economy by changing how tech is discussed.

Promote greater cross-industry collaboration & partnerships to market tech opportunities.

Tech opportunities permeate all industries across Chicago’s economy – in fact, some of Chicago’s fastest growing tech jobs are primarily in non-tech industries – however, they are often not well known. Despite being home to one of the largest student populations, the city continues to lose talent to other tech hubs. Most notably, CS majors who are women of color are less likely to pursue a job in tech after graduation. Chicago’s educational institutions can partner with employers and businesses to conduct outreach and better market tech job opportunities, especially in non-tech industries. United, for example, employs a high volume of software developers and data scientists. This broader understanding of tech needs to be more widespread.

Expand the number of academic institutions and students who are included in the tech conversation. Colleges with large numbers of Black and Latinx students in tech have historically been overlooked by employers looking for tech talent. By increasing awareness around these schools and students, employers will have access to a larger pool of talent and more students receiving tech degrees will find careers in tech.



POSITIONING CHICAGO NATIONALLY & GLOBALLY

Lead with Equity.

Chicago must lean into the opportunity to improve diversity and equity in tech by leveraging and doubling down on existing initiatives and resources that break barriers to entry and close the digital gap. Chicago should aim to become the most equitable tech ecosystem in the world.

Advocate for strengthening tech equity in public spending, including in education, broadband, workforce development and entrepreneurship.

Encourage industry commitments to diversity, equity, and inclusion, and push for progress to be measured and published regularly.

Lift up and increase funding to incubators and accelerators that support divers, local founders, including BLK-TECH, the Latinx Accelerator, Wi-Stem and more.

Close the digital gap by expanding access to affordable broadband region-wide, especially to areas that have been historically underrepresented and excluded.

SPOTLIGHT ON DEI INITIATIVES AND INVESTMENTS



United Airlines: United Airlines has partnered with tech training providers such as Year Up and I.C. Stars to recruit and train individuals particularly those from underrepresented backgrounds. United has also built strategic partnerships with P33, the Hispanic IT Executive Council, and Black Women in Science and Engineering to create greater awareness of the vast tech opportunities within United.



Google: In 2020, Google announced plans to hire 10,000 new employees across Chicago and a few other U.S. cities with a special focus on hiring black talent to diversify its workforce. The tech giant also admitted 4Degrees, a Chicago startup, into its inaugural accelerator for Black founders and support diverse entrepreneurs through grants such as its \$5 million U.S. Black Founders Fund.



Comcast: Comcast has dedicated work to closing the digital equity gap. Its Lift Zone initiative provides free Wi-Fi service at 20 community centers in the Chicago area, and access to digital training labs at 11 Chicago Public Library branches. In 2020, Comcast also announced a \$1 million commitment to national tech training nonprofit Per Scholas to help close the tech opportunity gap for residents from underserved backgrounds. In Chicago, this commitment would enable Per Scholas to provide 80 individuals with access to tech careers.

Source: HR&A Advisors Stakeholder Interviews, Chicago Tribune, Built in Chicago, Comcast, CSRwire

At a Glance

Chicago's Tech Ecosystem Today

Strengthening Chicago's Tech Ecosystem for the Future

Technical Appendix

Technical Appendix

Methodology

Stakeholder Interview List

ABOUT THE STUDY

From the invention of the vacuum in 1869, to the wireless remote control in 1950, and later the first smartphone in 1999, Chicago has a long history and culture of innovation. This rich history, paired with significant public and private investments in the last decade, have been instrumental in shaping Chicago's tech ecosystem to the scale it is today. However, Chicago has not been widely recognized as major tech hub nationally or globally. This report aims to demonstrate the size and impact of the Chicago tech ecosystem, understand its interconnectedness with the broader Chicago and regional economy, and identify opportunities for all Chicago residents to benefit from the tech ecosystem.

About The Chicagoland Chamber of Commerce

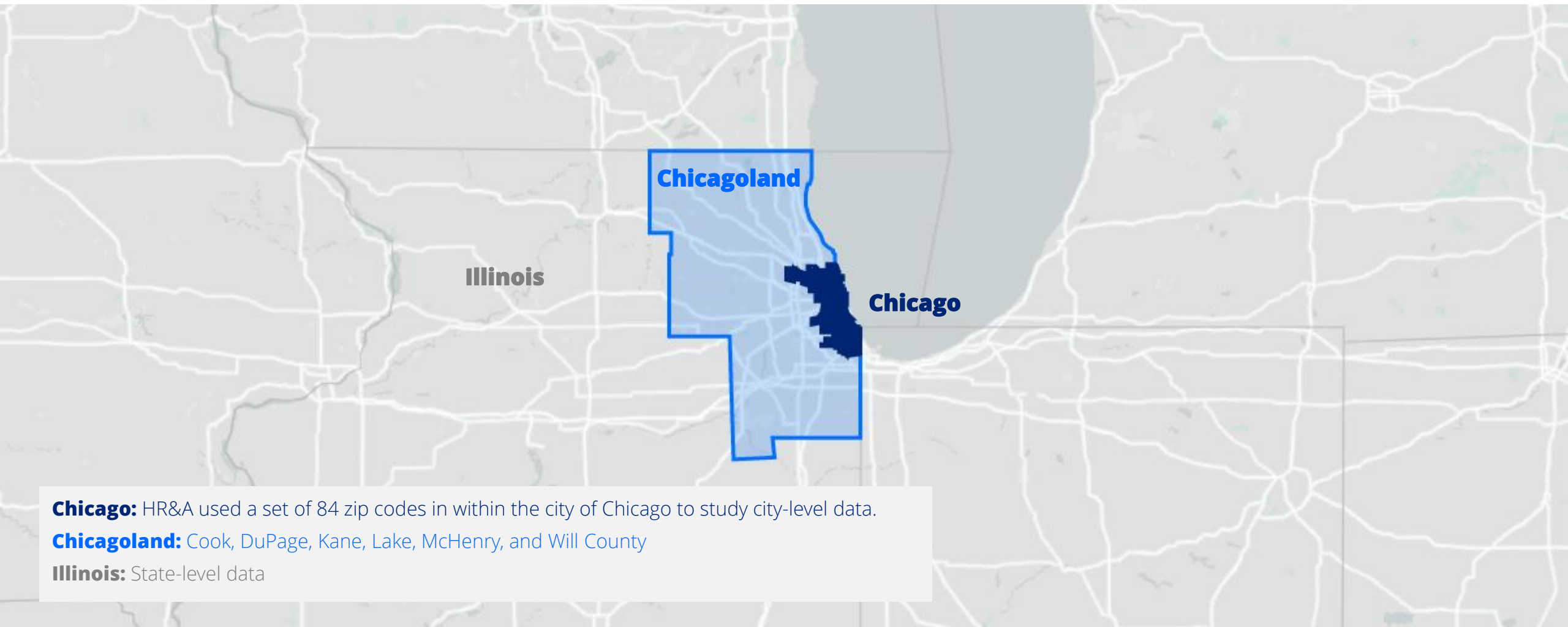
The Chicagoland Chamber of Commerce is a nonprofit organization representing over 1,000 businesses across major industries in the Chicago metropolitan area. The Chamber combines the power of people with a legacy of leadership and business advocacy to drive a dynamic economy by curating events and programming, facilitating networking among Chicago's businesses and civic leaders, and creating and advocating pro-business policies.

About HR&A Advisors

HR&A has over 40 years of experience advising on complex economic development and real estate projects in cities across the world. HR&A's Urban Tech & Innovation Practice works with governments, technology companies, institutions, advocates, and developers to leverage the technology and innovation economy to increase economic competitiveness, improve quality of life, and broaden economic opportunity in cities. The firm's urban tech clients include Google, Sidewalk Labs, Airbnb, WeWork, Audible, and the Cities of New York and Washington DC, as well as innovation districts and research parks across the U.S.

TECH STUDY GEOGRAPHIES

While this study focuses on the City of Chicago's tech ecosystem, it also examines Chicagoland and Illinois.



DEFINING CHICAGO'S TECH ECOSYSTEM

HR&A developed an analytical methodology to capture the entirety of Chicago's tech ecosystem in both tech and non-tech industries.

Unlike most industries that are neatly defined by the North American Industrial Classification System (NAICS), tech jobs are embedded in industries throughout the economy, requiring a careful methodology for accurate measurement.

A guiding principle of HR&A's definitional process is that the tech ecosystem should be defined based on both industry and occupational data. There are tech jobs present in industries that should not be wholly classified as "tech," such as finance or healthcare. Accounting for these tech jobs requires a definition that captures tech jobs using **occupational data**. Similarly, there are non-tech jobs at tech industry firms, such as a sales associate working at a software company. Although such jobs are not "tech" jobs themselves, they provide necessary support to tech employers, and thus are directly enabled by tech. Accounting for these jobs requires a definition that captures tech-enabled jobs using **industry data**.

HR&A developed and refined a list of tech industries and tech occupations in conjunction with industry experts. HR&A first held a methodological discussion with a working group composed of experts in labor and economic data analysis. HR&A subsequently convened thought leaders drawn from firms and organizations in the tech ecosystem to test the working definition. These discussions allowed HR&A to develop the final definitions used in the report.

Industries are based on the 2017 NAICS codes as defined by the U.S. Census Bureau. Industries were selected based on whether the industry 1) is enabled by tech, or 2) primarily produces tech.

Occupations are based on the Standard Occupational Classification (SOC) codes as defined by the Bureau of Labor Statistics and the Occupational Information Network (O*NET), a comprehensive database of occupational attributes and characteristics which uses questionnaires to collect data on the educational levels and skills required to effectively perform a job. Tech occupations are selected based on whether the occupation 1) directly produces tech, 2) facilitates the use of tech by others, 3) would cease to exist without the presence of tech.

The following two pages detail the tech industries and occupations included in this study.

TECH ECOSYSTEM DEFINITIONS

Tech industries span Information, Professional Services, Manufacturing, and Retail Trade.

Tech Industries

NAICS	Description
3364	Aerospace Products and Parts Manufacturing
3342	Communications Equipment Manufacturing
3341	Computer and Peripheral Equipment Manufacturing
5415	Computer Systems Design and Related Services
5182	Data Processing, Hosting, and Related Services
4541	Electronic Shopping and Mail-Order Houses
3345	Navigational, Measuring, Electromedical, and Control Instruments Manufacturing
5191	Other Information Services
5179	Other Telecommunications
5174	Satellite Telecommunications
5417	Scientific Research and Development Services
3344	Semiconductor and Other Electronic Component Manufacturing
5112	Software Publishers
5173	Wired and Wireless Telecommunications

TECH ECOSYSTEM DEFINITIONS

High Tech occupations are a subset of tech jobs which directly create or manage digital products, systems, and services.

High Tech Occupations

15-1111	Computer and Information Research Scientists
17-2061	Computer Hardware Engineers
15-1143	Computer Network Architects
15-1152	Computer Network Support Specialists
15-1199	Computer Occupations, All Other
15-1131	Computer Programmers
15-1151	Computer User Support Specialists
15-1141	Database Administrators
15-1122	Information Security Analysts
15-1142	Network and Computer Systems Administrators
41-9031	Sales Engineers
15-1132	Software Developers, Applications
15-1133	Software Developers, Systems Software
15-1134	Web Developers

Other Tech Occupations

17-3021	Aerospace Engineering and Operations Technicians	17-1021	Cartographers and Photogrammetrists
17-2011	Aerospace Engineers	17-2041	Chemical Engineers
27-4011	Audio and Video Equipment Technicians	29-2018	Clinical Laboratory Technologists and Technicians
49-2091	Avionics Technicians	49-2011	Computer, Automated Teller, and Office Machine Repairers
17-2031	Biomedical Engineers	29-2032	Diagnostic Medical Sonographers
27-4012	Broadcast Technicians	17-3012	Electrical and Electronics Drafters
29-2031	Cardiovascular Technologists and Technicians	17-3023	Electrical and Electronics Engineering Technicians
		49-2093	Electrical and Electronics Installers and Repairers, Transportation Equipment
		49-2094	Electrical and Electronics Repairers, Commercial and Industrial Equipment
		49-2095	Electrical and Electronics Repairers, Powerhouse, Substation, and Relay
		17-2071	Electrical Engineers
		17-3024	Electro-Mechanical Technicians
		49-2096	Electronic Equipment Installers and Repairers, Motor Vehicles
		49-2097	Electronic Home Entertainment Equipment Installers and Repairers
		17-2072	Electronics Engineers, Except Computer
		27-4032	Film and Video Editors
		17-3026	Industrial Engineering Technicians
		17-2112	Industrial Engineers
		29-2035	Magnetic Resonance Imaging Technologists
		29-2033	Nuclear Medicine Technologists
		15-2031	Operations Research Analysts
		29-2034	Radiologic Technologists
		27-4014	Sound Engineering Technicians
		15-2041	Statisticians
		29-2055	Surgical Technologists
		49-2022	Telecommunications Equipment Installers and Repairers, Except Line Installers

LABOR DATA

In analyzing the characteristics of the tech ecosystem, HR&A relied on employment data provided by Economic Modeling Specialists Intl. (EMSI).

A CareerBuilder company, EMSI is a leading national provider of employment data and economic impact analysis. EMSI clients include the New York State Department of Labor, North Carolina Department of Commerce, and Oklahoma Department of Commerce. HR&A utilized EMSI's Analyst tool in estimating the size of the Chicago tech ecosystem and its associated wages, educational requirements, and demographics.

EMSI gathers and integrates labor market data from a wide array of sources, including the U.S. Bureau of Labor Statistics Quarterly Census of Employment and Wages (QCEW) and Occupational Employment Statistics (OES), U.S. Bureau of Economic Analysis, O*NET, U.S. Census Bureau American Community Survey (ACS) and County Business Patterns (CBP), and state departments of labor.

Integrating data from multiple sources allows EMSI to provide a broad accounting of employment that is unavailable from any one traditional source. To fully account for the Chicago tech ecosystem, HR&A relied on EMSI data pertaining to three classes of workers:

1. **QCEW/UI employees:** All jobs covered by federal/state unemployment insurance.
2. **Non-QCEW employees:** Jobs except from unemployment insurance coverage including the military, railroads, and small non-profits.
3. **Self-Employed:** Jobs held by people who consider self-employment a significant part of their income.

EMSI's proprietary estimation process enables it to accurately report detailed data for every county in the United States, and even employment data which is undisclosed by government sources due to confidentiality issues. EMSI reports industry level data to the six-digit NAICS code, and occupational data to the five-digit SOC code. Moreover, EMSI provides a "cross-walk" between industry and employment data (staffing patterns and reverse staffing patterns) that enabled HR&A to account for tech jobs in tech industries, tech jobs in non-tech industries, and non-tech jobs in tech industries. EMSI also reports the most common educational or training requirements for each of the 800+ SOC codes based upon data from the U.S. Bureau of Labor Statistics.

ECONOMIC IMPACT ANALYSIS

HR&A's economic impact analysis estimates the multiplier effects of the tech ecosystem in the economy in terms of **jobs**, **earnings**, and **economic output**.

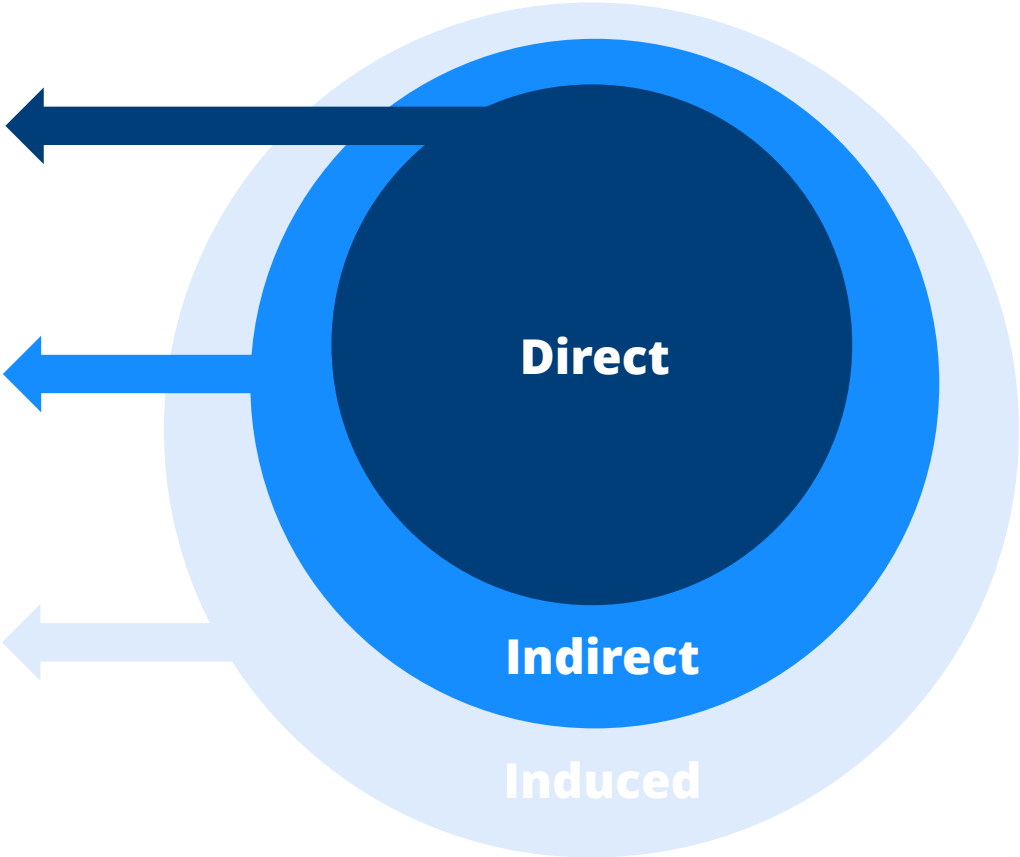
Direct Impacts

The **direct impact** is the employment, compensation, and output in the tech occupations or tech industries that collectively comprise the Chicago tech ecosystem.

Multiplier Impacts

The **indirect impact** is the employment, compensation, or output associated with businesses that supply the industries comprising the Chicago tech ecosystem.

The **induced impact** represents the employment, compensation, or output associated with household spending of employees who work in industries directly and indirectly affected by the Chicago tech ecosystem.



ECONOMIC IMPACT ANALYSIS

HR&A used the EMSI input-output model to estimate the economic impacts of the tech ecosystem in Chicago, Chicagoland, and Illinois.

The EMSI Input-Output (I-O) model represents the flow of money in an economy, primarily along industries. The I-O model is based on the premise that interactions among industries within an economy can be quantified, with a portion of the output of one industry appearing as the input of other industries.

EMSI's I-O model uses Industry Economic Accounts produced by the Bureau of Economic Analysis (BEA) as the primary source of data. The data provides a summary of how industries produce and consume commodities and is customized for smaller regions of the country, using each region's unique industry mix and spending patterns. The model uses this data to produce direct, indirect, and induced multipliers for employment, earnings, and sales. The model also outputs jobs to sales and earnings to sales ratios which allowed HR&A to use tech jobs as a singular input to generate total economic impact across jobs, earnings, and economic output (sales).

HR&A utilized the 2020 EMSI I-O model which is the most recent year available. HR&A conducted this analysis three times using three different study areas: Chicago, Chicagoland, and Illinois, and got the following results:

Chicago: 106K direct jobs created 253K total jobs, \$23.5B in earnings, and \$73.8B in economic output.

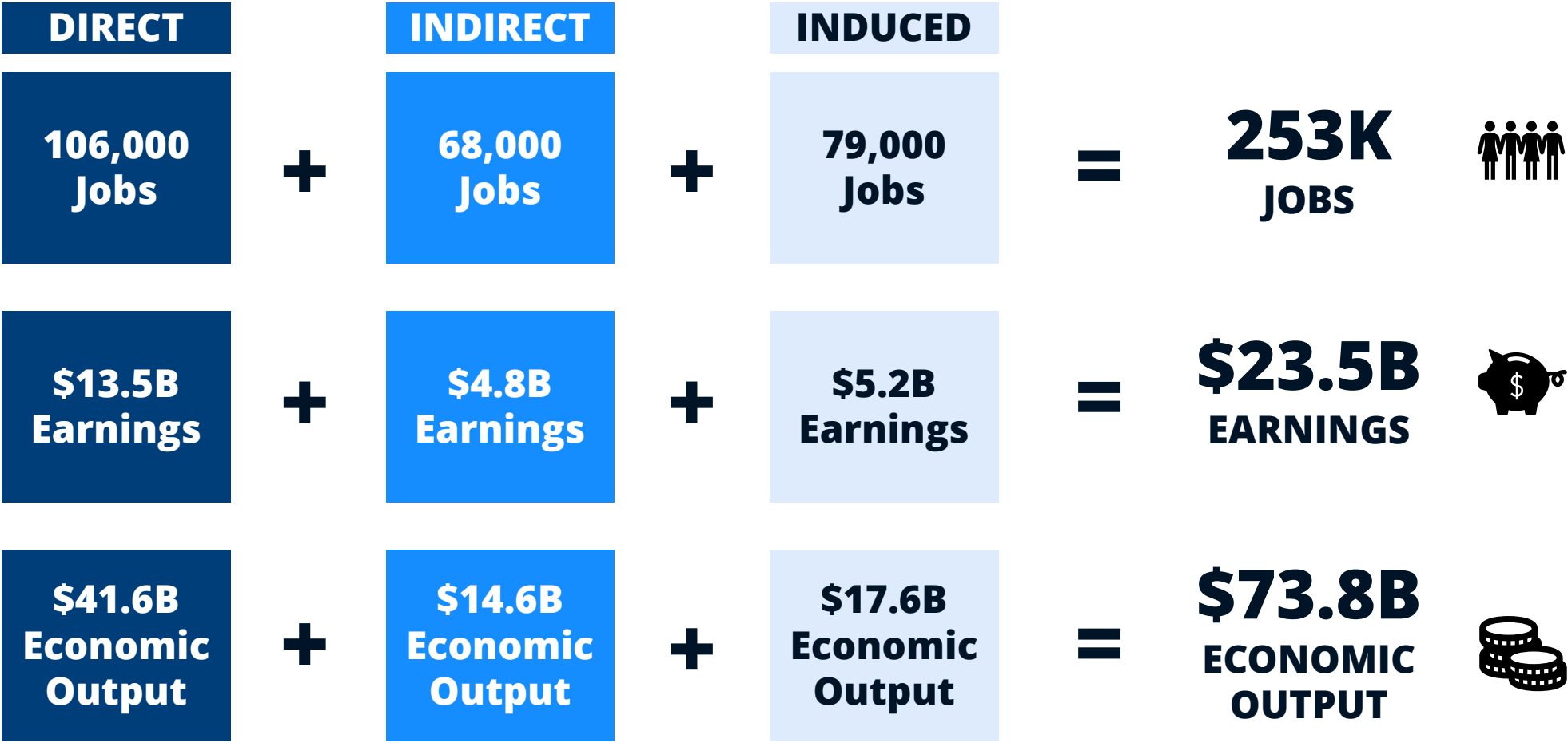
Chicagoland: 310K direct jobs created 851K total jobs, \$72.7B in earnings, and \$202.5B in economic output.

Illinois: 430K direct jobs created 838K total jobs, \$74.4B in earnings, and \$224.4B in economic output.

To prevent double-counting of tech employment, HR&A subtracted multiplier impacts reported in tech industries, as 100% of tech employment was already accounted for by direct impacts of the tech ecosystem. This subtraction prevented approximately 2.5K jobs in tech industries from being double-counted as both direct and multiplier jobs.

ECONOMIC IMPACT: CITY OF CHICAGO

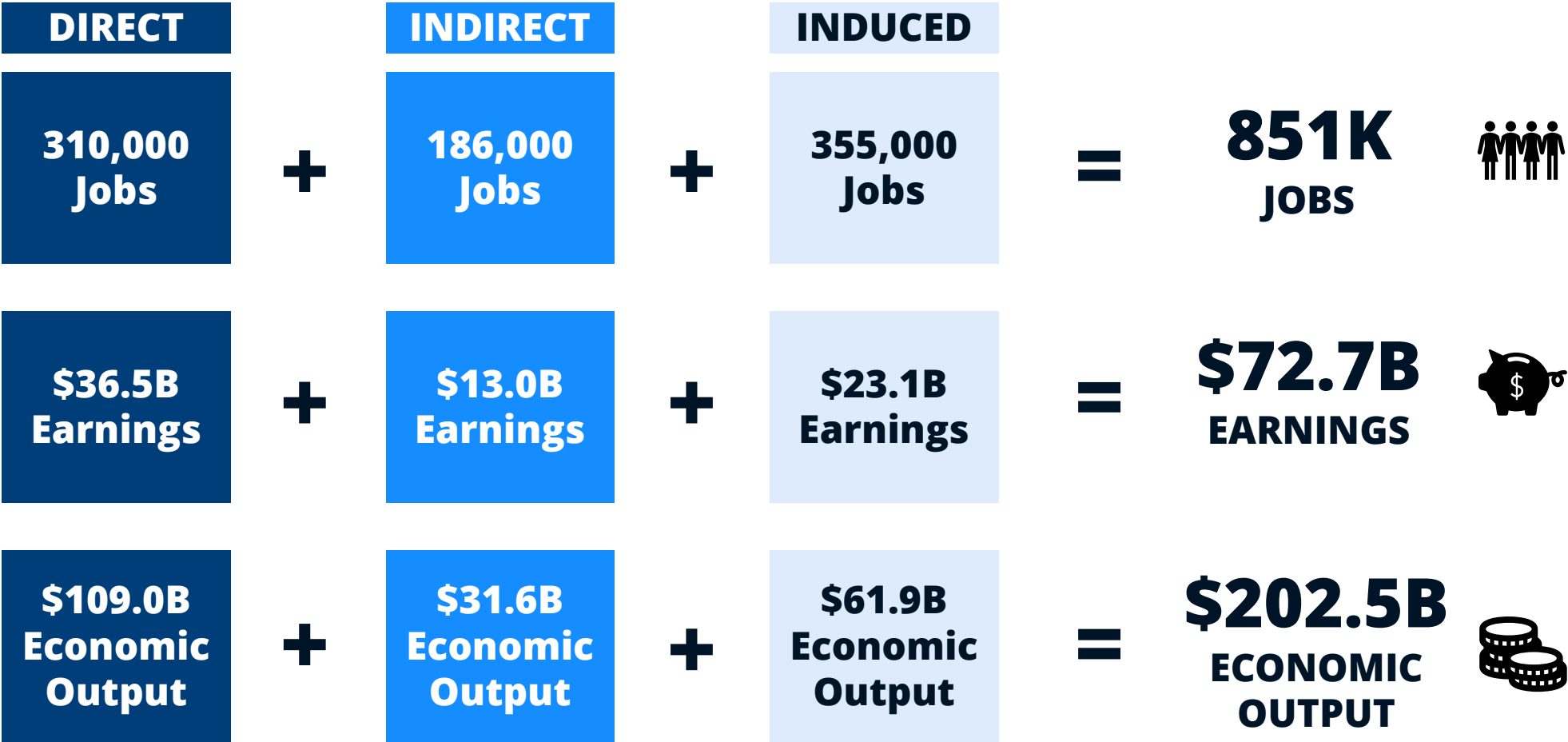
The **106K direct jobs** in the tech ecosystem creates **253K jobs**, **\$23.5B in earnings**, and **\$73.8B in economic output**.



Source: HR&A analysis of EMSI data.

ECONOMIC IMPACT: CHICAGOLAND

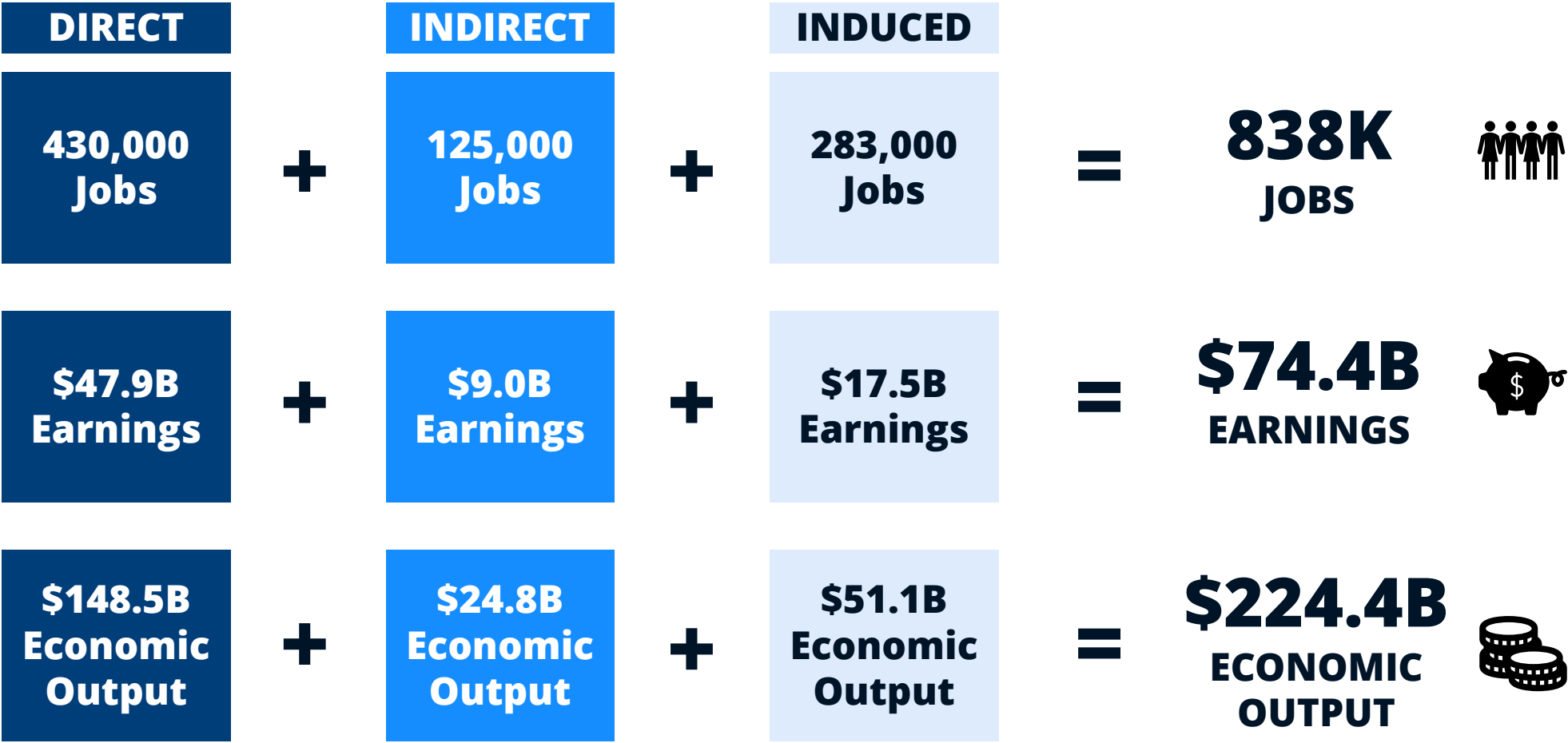
The **310K direct jobs** in the tech ecosystem creates **851K jobs**, **\$72.7B in earnings**, and **\$202.5B in economic output**.



Source: HR&A analysis of EMSI data.

ECONOMIC IMPACT: STATE OF ILLINOIS

The **430K direct jobs** in the tech ecosystem creates **838K jobs**, **\$74.4B in earnings**, and **\$224.4B in economic output**.



Source: HR&A analysis of EMSI data.

FISCAL IMPACT ANALYSIS

HR&A looked at Income Tax and Sales Tax generated by the tech ecosystem to determine the overall fiscal impact.

Income Tax

Because Chicago has no Local or County income tax, HR&A calculated the income tax generated at the state level, based on a tax rate of 4.95%. HR&A calculated the total number of workers in the tech ecosystem and the average salary per worker to determine the total annual income within the ecosystem. This value was multiplied by the state income tax rate to get total income tax generated by the tech ecosystem. This analysis concluded that the total income tax generated by the Chicago tech ecosystem was \$377M in 2021, which represented roughly 2% of the state total.

Sales Tax

HR&A used the Consumer Expenditure Survey from the U.S. Bureau of Labor Statistics to determine the proportion of income spent on taxable goods. Income was broken into 5 quintiles to get more specified spending data across the population. The number of tech workers and average income within each quintile were multiplied together to get the total income, which was multiplied by the proportion of income spent per category to get total spending on taxable goods. This value was multiplied by the Chicago, Cook County, Illinois, and Regional Transit Authority (RTA) sales tax rates of 1.25%, 1.75%, 6.25%, and 1.00% respectively to find the total sales tax generated by workers in the tech ecosystem. The analysis concluded that the Chicago tech ecosystem generates \$274M in annual sales tax with \$33M going to the city, \$47M to the county, \$167M to the state, and \$27M to the RTA. The total sales tax generated represented roughly 2% of the state total.

Appendix

Methodology

Stakeholder Interview List

STAKEHOLDER INTERVIEWS

HR&A engaged 19 stakeholders and the Chicagoland Chamber's Tech Council that represent different facets of Chicago's tech ecosystem.

Tech Ecosystem Stakeholders

- Chicagoland Chamber of Commerce, Tech Council
- Abin Kuriakose, Executive Vice President of Innovation and Venture Strategy, World Business Chicago
- Alya Woods, Vice President of Business Development in Chicago, Cooley LLP
- Austin Green, Data & Policy Intern, Illinois Science and Technology Coalition
- Brad Henderson, CEO, P33
- Colleen Daley, Director, State Government Affairs, Midwest Region, Internet Association
- Colleen Egan, President & CEO, Illinois Science and Technology Coalition
- Elle Ramel, Director, GET Cities
- Ginger Ostro, Executive Director, Illinois Board of Higher Education
- Joey Mak, Executive Director, Chicago:Blend
- John Conrad, President and CEO, Illinois Biotechnology Innovation Organization
- Kristi Dula, Deputy Director, Office of Entrepreneurship, Innovation & Technology, Illinois Department of Commerce & Economic Opportunity
- Mandy Yoh, Vice President of Community, 1871
- Mark Harris, Director of Community Education, Discovery Partner Institute-University of Illinois
- Matthew Summy, Vice President of Strategic Planning for Impact & Inclusion, Comcast
- Michelle Brown, Vice President of Digital Products and Analytics, United Airlines
- Patrick Devanney, Market Development Leader, Tech Elevator
- Scarlett Howery, Vice President of Campus & University Partnerships, DeVry University
- Steven Galanis, CEO, Cameo
- Tyler Diers, Executive Director, TechNet's Illinois and the Midwest Region

Chicagoland Chamber of Commerce's Tech Council

The Chicagoland Chamber's Tech Council consists of a diverse group of industry leaders that were engaged in the process of this study.

- ACRE
- Advocate Aurora Health
- Aon
- AQL Technologies
- Barnes & Thornburg, LLP
- BDO USA, LLP
- BMO Harris Bank
- CapTech Consulting
- Catalyte
- Comcast Business
- CompTIA
- Cooley
- Creospan
- Crown Castle Corporation
- DeVry University
- Dialogue Theory
- ELEKS
- Eligo Energy
- Ensono
- entara
- Expedia Group
- Experis
- Facebook
- Fifth Third Bank
- Geneca
- Google
- Graham Spencer
- Hahn Loeser & Parks LLP
- HERE Technologies
- International Legal and Business Services Group
- IPAC - USA
- Lopp Mathias Law
- Mayer Brown LLP
- National Louis University
- Northwestern Memorial Hospital
- Orkin Pest Control
- Prison Fellowship
- Protiviti Incorporated
- PSG Energy Group
- Relativity
- Rightsize Facility
- SenecaGlobal, Inc.
- Signature Bank
- Spookphish
- Tech Elevator
- The Boeing Company
- UIC
- United Airlines
- UPS
- Walgreen Co.
- Wells Fargo Bank N.A.

The Chicago Tech Effect

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