

Department of Commerce
CITY OF PHILADELPHIA

PHILADELPHIA TECH INDUSTRY STUDY

Key Drivers and Trends

Research, Employment, and Economic Opportunity

2025

Produced by ESI Econsult Solutions, Inc.
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Image Sources: Rahman Shahadat and Josh Rose for Unplash.com

DIVERSITY IS THE PHILLY TECH ECOSYSTEM'S SUPERPOWER

MISSION

Philadelphia is actively establishing itself as a leader in the tech industry, with a focus on diversity and inclusion that sets it apart from other cities. The City's Department of Commerce is committed to fostering the growth of the city's innovation economy by creating opportunities that benefit all Philadelphians. One of the key initiatives driving this mission is the Philadelphia Most Diverse Tech Hub (MDTH), which aims to position the city as one of the top—and most diverse—tech hubs in the country. The Philadelphia Department of Commerce has invested in partner organizations focused on enhancing skills for the future tech talent pipeline, supporting historically disadvantaged startups, and helping minority-owned businesses grow.

Philadelphia's diversity is one of its greatest strengths, especially within the tech sector. However, its diversity also requires intentional investment and strategic initiatives, with an ongoing imperative to ensure the tech industry fully reflects Philadelphia's rich diversity. As the tech sector becomes an increasingly crucial part of the global economy, Philadelphia must prioritize expanding its tech workforce and growing tech-based companies while maintaining a strong focus on diversity and representation. This report presents highlights of key findings regarding the state of the tech ecosystem in Philadelphia, including an outlook on the skills and needs of current and future tech job opportunities.



HIGHLIGHTS OF KEY FINDINGS

Philadelphia boasts a potent tech ecosystem with impactful companies, a talented workforce, and robust training opportunities, but it's clear there is room to grow. Building on the strength of its population and existing ecosystem, the city has the potential to create a pipeline to high-wage tech jobs for more Philadelphians. As it stands, the diversity within the tech ecosystem is not consistent with the demographics of the city or its workforce, so a focus on taking advantage of Philadelphia's diversity will ensure the potent economic impact generated by these occupations is spread throughout the city.

41,600

Total Employed in the Philadelphia Tech Ecosystem

representing 5.5% of the city's population

$109,700

Annual Median Wage for Tech Occupations in Philadelphia

19,300

Tech Job Postings
2023-2024

45% Hiring Rate from Postings

Top Skills Sought by Employers

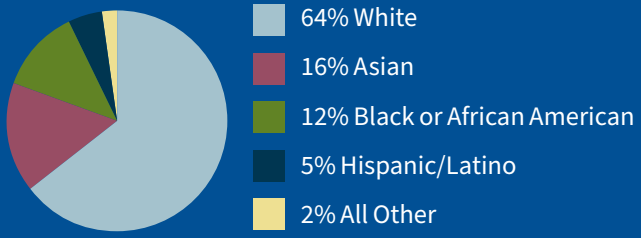
- → Data Analysis
- → Programming Languages
- → Project Management (with a specific emphasis on Agile methodologies)

A Robust Pipeline of New Talent in Philadelphia

- → **75** Tech-Related Degree Programs producing new talent for the industry
- → **3,600** Total Completions in Tech Academic Programs (2023)
- → **34%** of Philadelphia Tech Graduates work in Philadelphia

Diversity is a Work in Progress

Tech remains disproportionately white and male



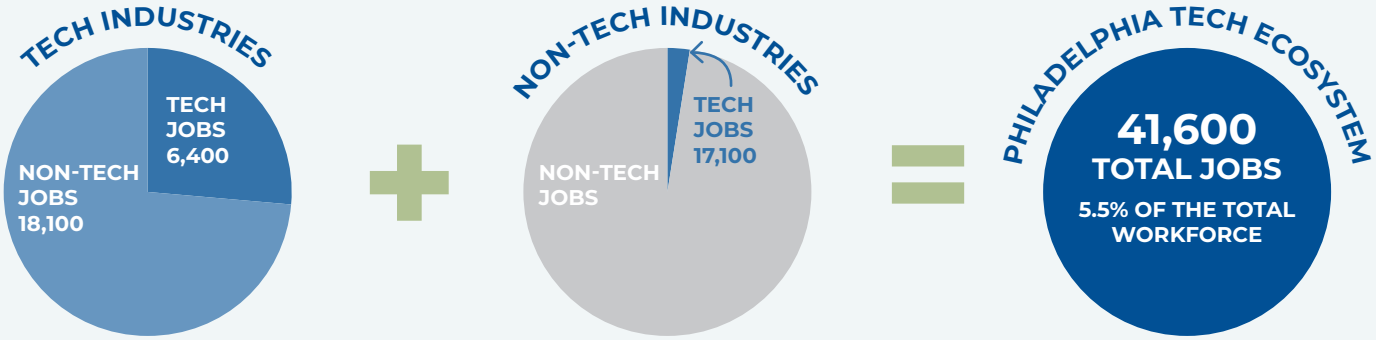
Source: Lightcast (2024)

WHAT IS THE TECH ECOSYSTEM?

Philadelphia's tech ecosystem employs nearly 42,000 people across tech and non-tech sectors annually—approximately 5.5 percent of the total workforce. The ecosystem includes tech industries, which encompass workers in tech jobs (for example a software engineer at Odessa) and non-tech roles (e.g., an accountant working for Guru), as well as tech occupations working within non-tech industries (e.g., a software engineer at Houwzer). Nearly 60 percent of jobs in Philadelphia's tech ecosystem are within the tech-specific industries—subsectors ranging from information technology and software development to certain portions of manufacturing and research and development subsectors. Other industries, such as higher education, financial services, and engineering also have tech-specific occupations. These jobs are equally significant in the Philadelphia tech ecosystem, representing a variety of occupations ranging from IT support to data science and research, web development, software development, and hardware engineering.

The tech ecosystem includes both tech industries, which encompass workers in technical and non-technical roles, as well as tech occupations within non-tech industries.

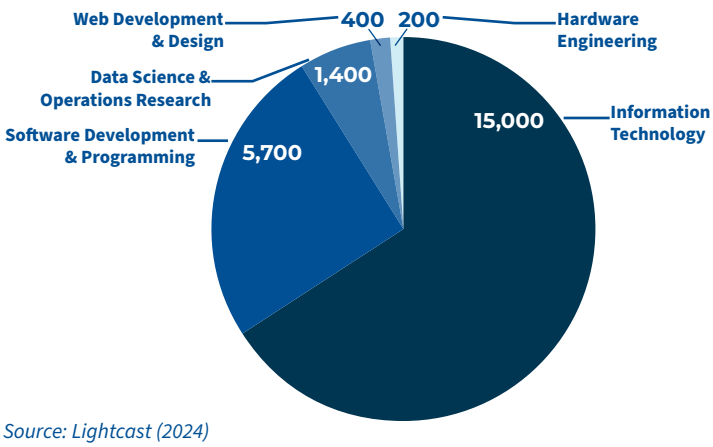
COMPOSITION OF THE TECH ECOSYSTEM



Source: Lightcast (2024)

Tech industries are defined in terms of 6-digit NAICS codes from the Bureau of Labor Statistics (BLS). Occupations are defined in terms of BLS 6-digit SOC codes. See the appendix for more information on the definitions of industries and occupations used in this study.

TOP TECH OCCUPATIONS SUBCATEGORIES IN PHILADELPHIA



Source: Lightcast (2024)



Source: CDC for Unsplash.com

THE COMPETITIVE LANDSCAPE OF THE PHILADELPHIA TECH ECOSYSTEM

Philadelphia's tech industry is less concentrated compared to the national average. This is reflected in its Location Quotient (LQ)—a metric used to identify industries or occupations that are uniquely concentrated in a specific regional economy compared to the national average. It is calculated by comparing the share of regional employment in an industry to its share of national employment. A LQ of 1.0 represents the national average, while Philadelphia's LQ of 0.8 indicates a lower relative concentration of tech employment. Despite some challenges in the city's competitiveness in the tech sector, there are some notable bright spots in the industry—demonstrating comparatively higher concentrations of Telecommunications and Research and Development jobs in contrast to the national proportion of these jobs. These areas of the tech ecosystem are opportunities for Philadelphia and its workforce to reinforce its competitive positioning. They represent opportunities for innovation and new businesses to spin out of existing operations and present a strong case for inbound companies to understand the depth of talent in these niches of the tech industry. Growth in Philadelphia's tech industry—through new or expanded businesses in any of the tech industry subsectors—would lead to increased employment, concentration of the tech ecosystem in Philadelphia, and relative strength compared to other cities.

Philadelphia Tech Industry

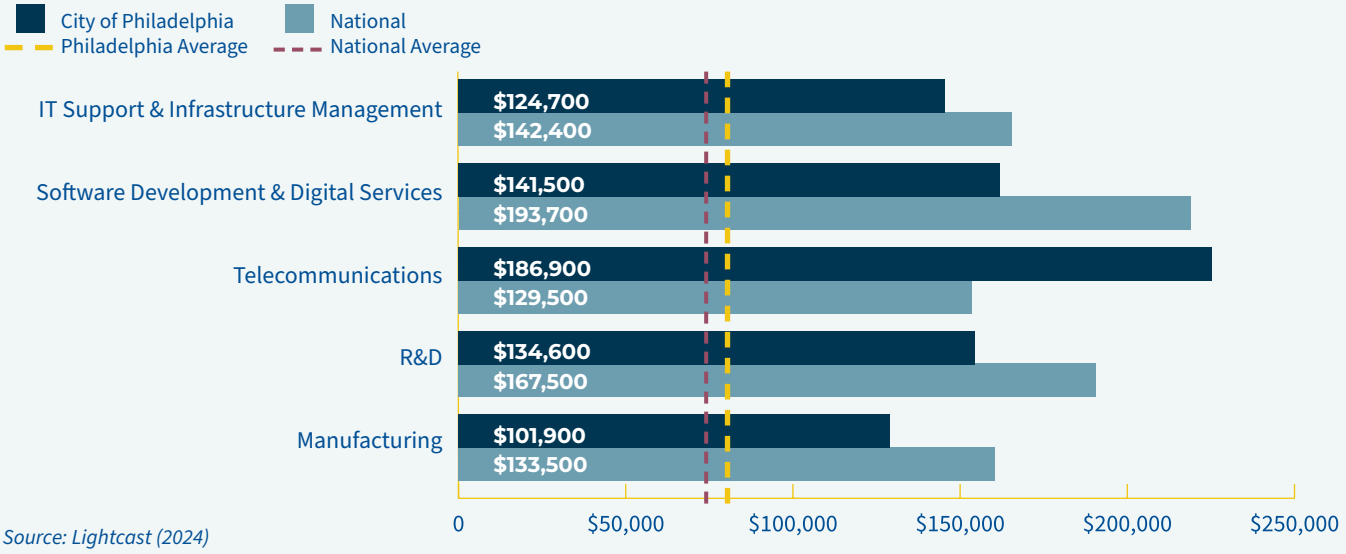
- → 24,500 Total Jobs
- → 0.8 LQ Overall

TECH ECOSYSTEM SUBSECTOR DISTRIBUTION

Subsector	Percent of Jobs in Philadelphia Tech Ecosystem	Philadelphia Location Quotient	Percent of Jobs in National Tech Ecosystem
Telecommunications	18%	1.5	11%
R&D	17%	2.4	7%
Software Development & Digital Services	12%	0.8	14%
IT Support & Infrastructure Management	8%	0.6	14%
Manufacturing	3%	0.2	19%
Non-Tech Sectors	41%	-	35%

Source: Lightcast (2024)

AVERAGE ANNUAL WAGES OF TECH INDUSTRY JOBS BY SUBSECTOR



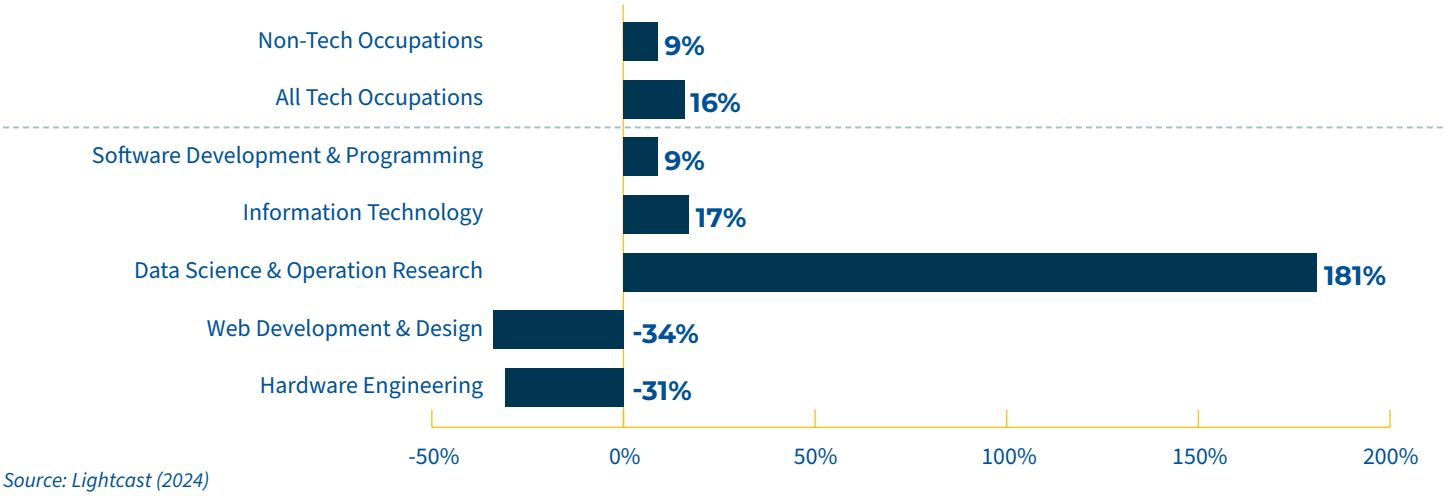
Source: Lightcast (2024)

Wages across the tech industry are some of the most competitive in the market. With the city's average salary being closer to $78,000 a year, the premium for tech jobs is significant, especially in industries like Telecommunication and R&D, which commanded average salaries of $187,000 and $135,000, respectively, in 2022.

JOBS
IN THE PHILADELPHIA TECH LANDSCAPE

Over the last 10 years, job growth among Philadelphia's tech occupations outpaced jobs in non-tech occupations by nearly double. Within tech occupations, the fastest growing occupations were within the Data Science & Operations category, which includes jobs such as Data Analyst, Machine Learning Engineer, and Operations Research Analyst. While overall tech jobs are increasing in Philadelphia, jobs within Web Development and Design and Hardware Engineering have seen a decrease in demand over the last decade.

PERCENT CHANGE IN TOTAL TECH JOBS 2014-2024



Source: Lightcast (2024)

MEDIAN ANNUAL WAGES FOR TECH INDUSTRY JOBS BY OCCUPATION

$109.3K
Information Technology

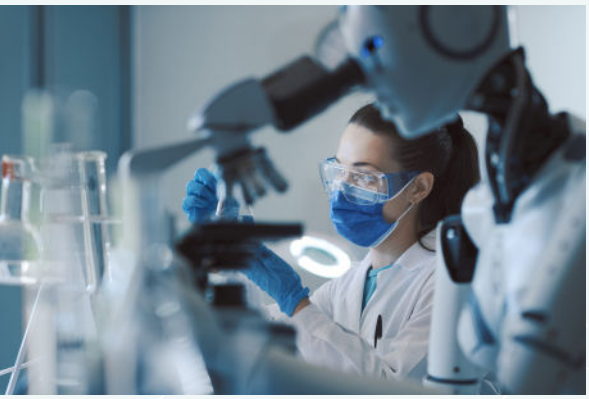
$91.2K
Hardware Engineering

$97.6K
Web Development & Design

$100.4K
Data Science & Operations Research

$114.4K
Software Development & Programming

Source: Lightcast (2024)



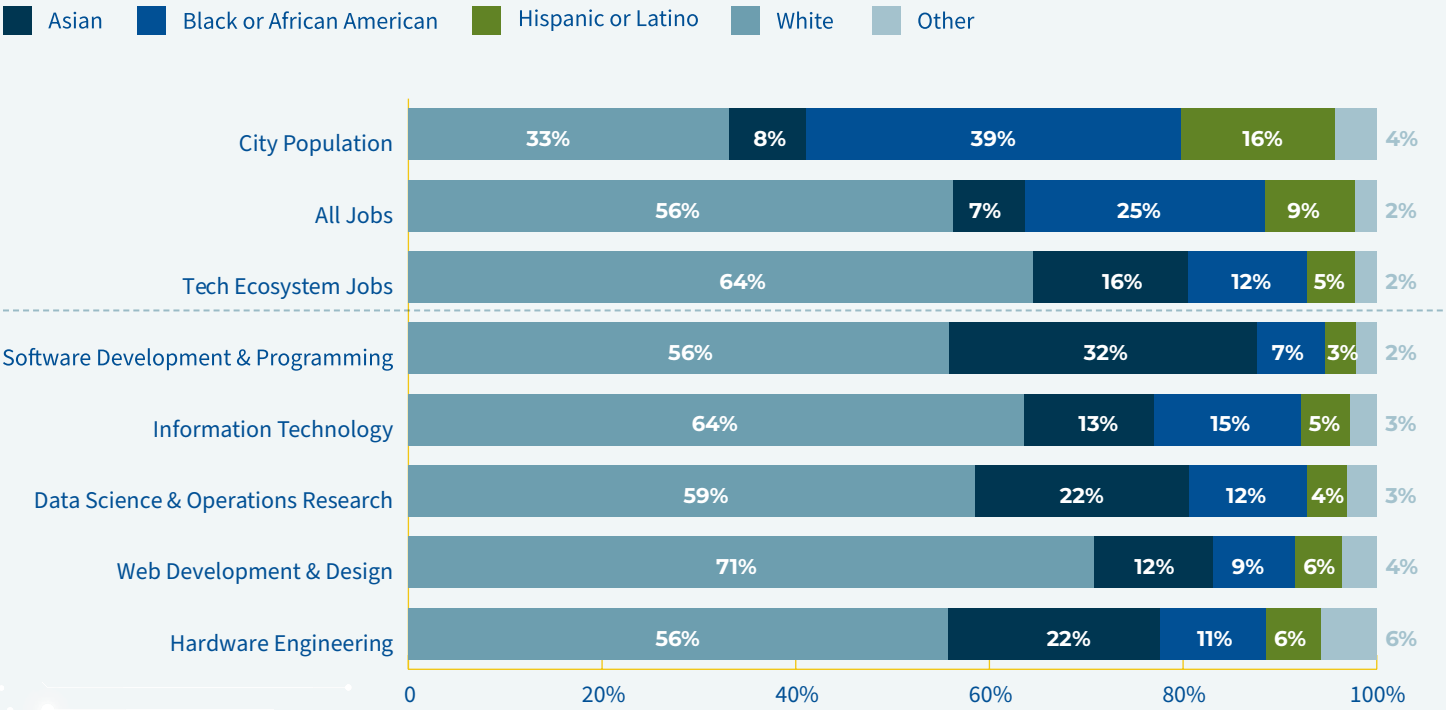
Because of the unique skill sets required and high demand for tech occupations, average wages for these jobs ($109,700) are notably higher than average wages across all jobs in Philadelphia ($78,000), whether supporting the tech industry or an adjacent industry. Jobs in Software Development & Programming, which require a high level of specialized knowledge and fluency in programming languages, are paid the highest across the ecosystem. Wages for all tech ecosystem occupations increased by 12 percent from 2019, the last full year before the COVID-19 pandemic, to 2023, the most recent year for which data is available.

WHO WORKS IN TECH IN PHILADELPHIA?

While the demographic composition of Philadelphia's tech workforce is more diverse than the ownership of its companies, it still has a higher share of white and male workers than the city's overall population or workforce. While representation varies across specific tech occupations, the overall trends remain consistent.

Despite these disparities in current representation, Philadelphia's tech ecosystem is positioned to leverage its assets to address the need for more diversity and inclusion in the industry. Opportunities in tech jobs are ripe for eager prospective workers who have received skill-specific training in targeted areas. Many of these jobs do not necessarily require extensive schooling but rather the development of key tools and systems used across many industries that seek a currently limited pool of tech talent.

RACIAL REPRESENTATION IN THE PHILADELPHIA TECH WORKFORCE BY OCCUPATION CATEGORY



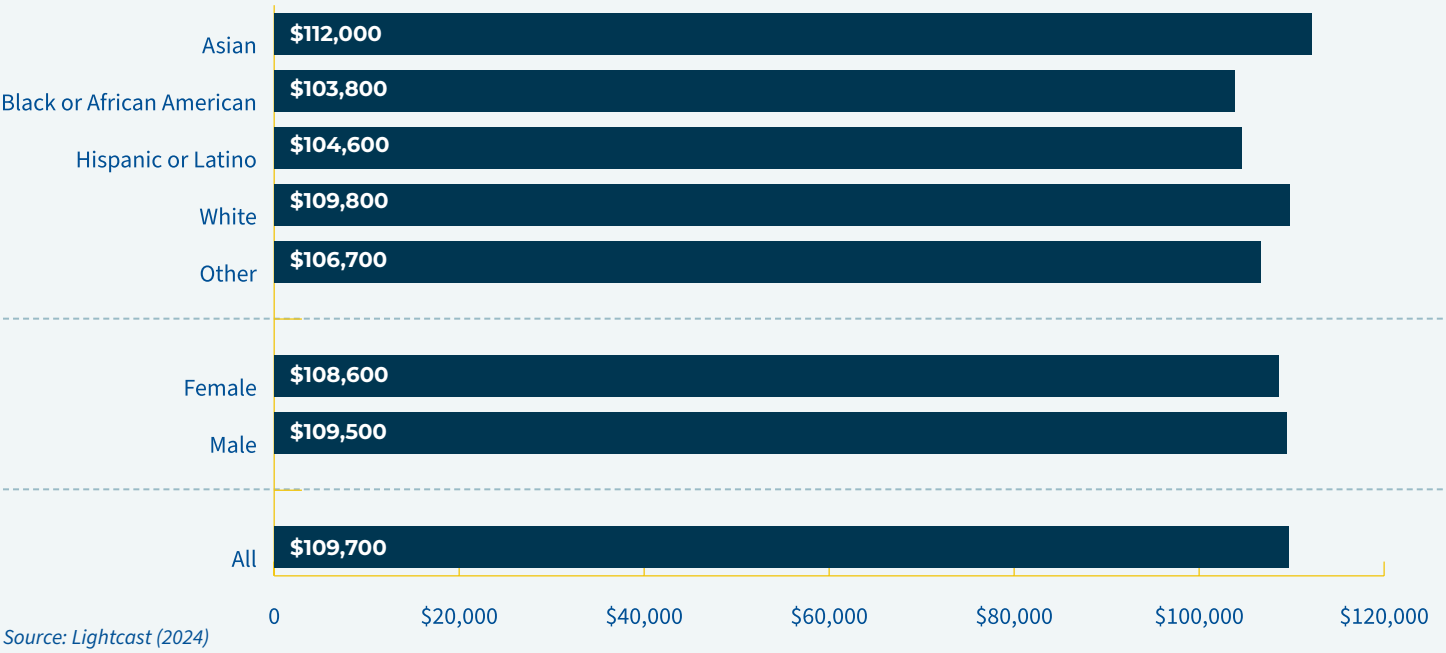
Source: Lightcast (2024), American Community Survey (2023)

WHO WORKS IN TECH IN PHILADELPHIA?

Significant wage disparities among different racial groups and genders are present in the city's tech ecosystem, matching pay gaps in other industries and the nation more generally. White and Asian individuals and males generally earn higher median wages compared to their Black, Hispanic or Latino, and female counterparts.



MEDIAN WAGES BY DEMOGRAPHIC GROUP



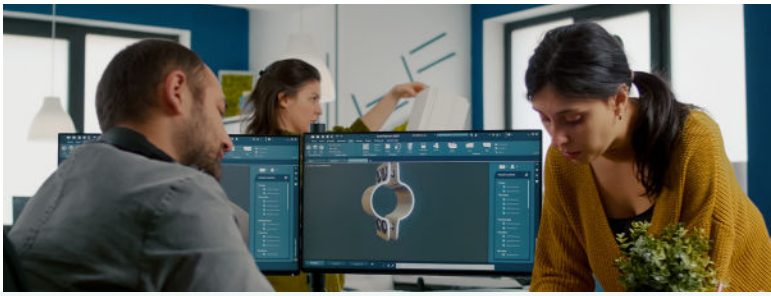
Source: Lightcast (2024)



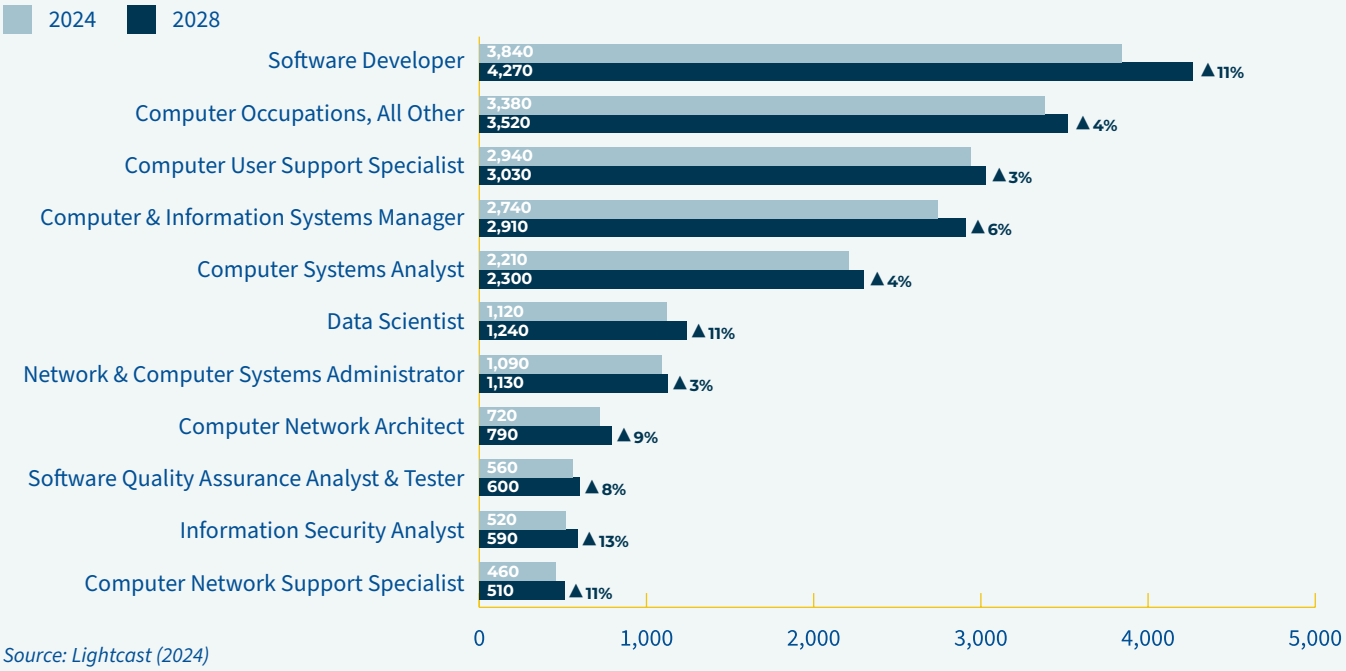
These disparities suggest that certain high-paying tech occupations and roles may be concentrated in certain demographic groups. Asian employees, for instance, are most highly represented in software development and programming jobs, the highest paid of the occupation categories. Addressing imbalance of diversity broadly within the ecosystem—across occupations and levels—will likely combat these pay gaps, though equity in pay practices must also be included a part of the conversation and a priority for HR professionals within the ecosystem.

TECH JOB OPPORTUNITIES IN PHILADELPHIA

The demand for tech workers in Philadelphia remains strong, with a robust pipeline of job opportunities posted over the past year and significant projected growth in demand in the next five years across the range of tech occupations.



CURRENT AND PROJECTED JOB DEMAND OVER THE NEXT FIVE YEARS



Source: Lightcast (2024)

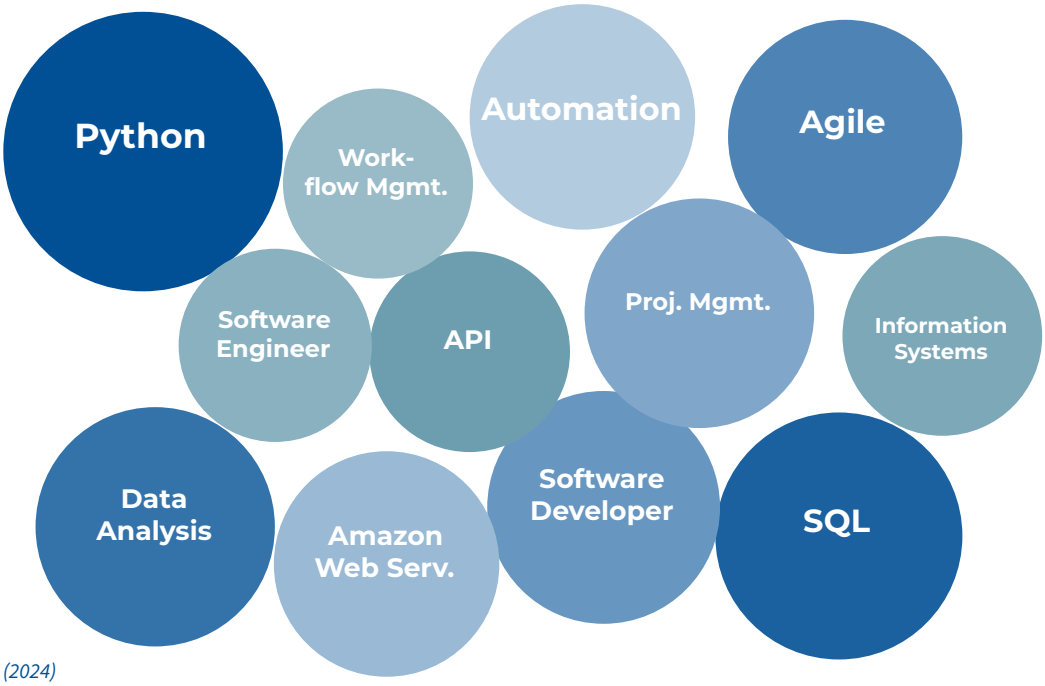


As of 2024, employers sought out talent for Software Developer positions the most, followed by positions that fall under the general "Computer Occupations, All Other" category, which includes a diverse set of positions not otherwise captured in the defined occupation categories (examples include but are not limited to information security engineers, blockchain engineers, information systems technologists, and more). These positions and others anticipate ongoing demand for new talent in the coming years.

SKILLS AND CREDENTIALS IN DEMAND

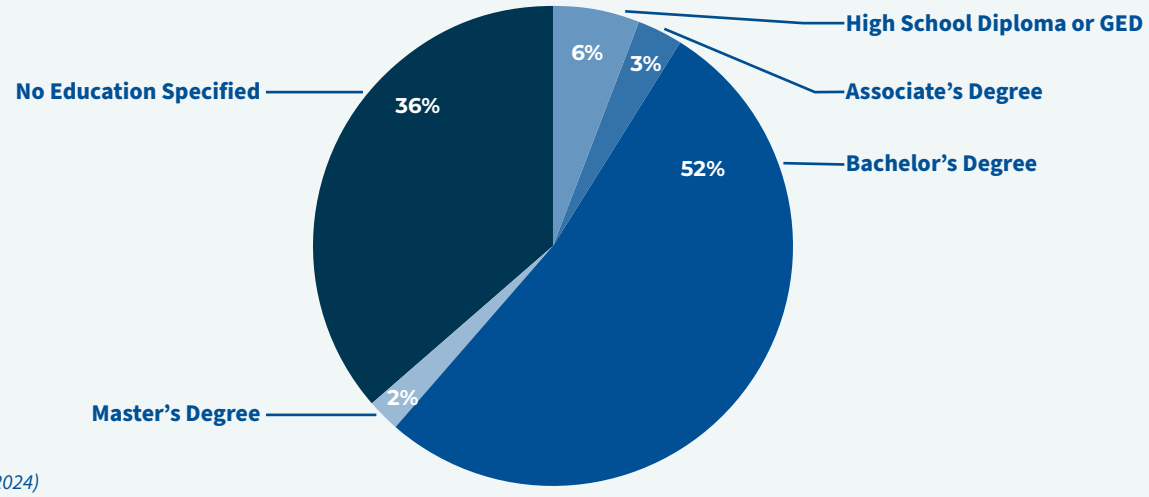
Many tech jobs still require a degree, with 58 percent of postings over the past year in Philadelphia requiring some higher education. The remaining 42 percent either require a high school diploma or do not specify educational requirements, opening the door for applicants who acquired their skills through bootcamps or short-term classes. These alternative education paths are popular for positions such as web development, UX/UI design, and certain IT support roles. Nevertheless, degree requirements remain a significant factor in hiring, shaping who has access to many tech careers. Understanding where non-degree training aligns with employer needs can help workforce professionals develop targeted strategies to expand opportunities in the tech ecosystem for Philadelphians from marginalized backgrounds.

TOP TECH SKILLS AND CREDENTIALS THAT ARE IN DEMAND



Source: Lightcast (2024)

EDUCATIONAL LEVEL REQUIRED BY TECH JOB POSTINGS



Source: Lightcast (2024)

THE PATHWAYS TO TECH

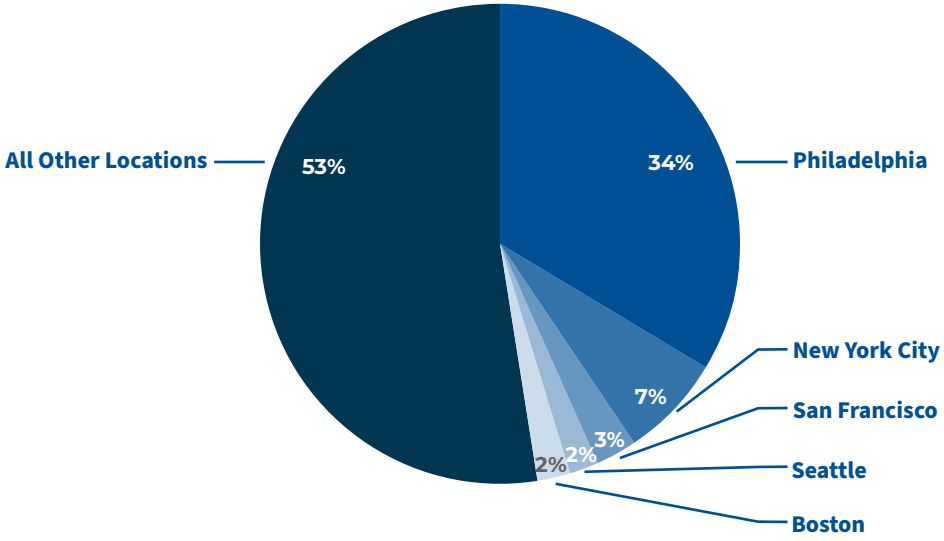
For job opportunities that do require some level of higher education, Philadelphia's strong academic landscape provides ample opportunities to develop specialized skills and credentialing. An opportunity for the city to grow, however, is in its retention of tech graduates—currently, only a third of Philadelphia's tech graduates are employed in the city. As the tech industry grows, student retention could be improved through programming that encourages students to engage with Philadelphia beyond their campuses, exposing them to the city's professional opportunities, cultural amenities, and overall quality of life. By fostering stronger connections between students and the city, Philadelphia can better position itself as a place its graduates want to stay and build their careers.

3,600
Total Completions in Tech Academic Programs
2023

75
Total Tech-Related Academic Programs Offered in Philadelphia

36%
Growth in Number of Completions
2019-2023

WHERE TECH GRADUATES OF PHILADELPHIA UNIVERSITIES ARE EMPLOYED



Source: Lightcast (2024)



WORKFORCE DEVELOPMENT PROGRAMS
IN PHILADELPHIA

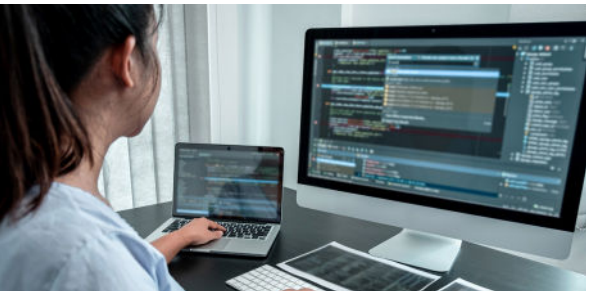
Philadelphia's workforce development programs provide a conduit for building an inclusive and innovative city. At their core, these initiatives prioritize equity by creating pathways for individuals from underrepresented backgrounds and communities to access high-demand careers, including those in tech. By addressing skills gaps, these programs provide technical resources and a toolkit for individuals to obtain sustainable employment. A hallmark of these programs is their emphasis on apprenticeships, blending hands-on experience with technical training to ensure participants are job ready. The ripple effects of a more skilled workforce fuels advancement within the region's industries, which bolsters Philadelphia's overall economic landscape and has positive spillover effects for all.

PHILADELPHIA WORKS

Philadelphia Works (PhilaWorks) pilots a wide menu of programs that improve worker skills.* PhilaWorks powers ApprenticeshipPHL, which matches job seekers to Registered and Pre-Apprenticeship programs across multiple industries, such as tech. Interested tech firms have the option of partnering with PhilaWorks, which will assist the firm in developing apprenticeship programs that provide hands-on learning in areas like coding, IT support, and data analytics. PhilaWorks also funds and coordinates programs that teach in-demand tech skills, such as one for public transit programming to prepare candidates for a potential career within the industry. The organization helps secure funding for tech training programs through local, state, and federal grants, to develop programs that train workers and up-skill them into more technical careers in a shifting job landscape.

ACHIEVEABILITY

ACHIEVEability is dedicated to breaking the cycle of poverty for low-income and disadvantaged families through education, supportive services, and housing assistance. One of ACHIEVEability's programs WorkSmart West Philly operates TechUp, which is a workforce development program dedicated to lifting Black workers out of poverty by giving them a pathway to higher-wage tech jobs. TechUp provides paid training to the program participants, in an effort to break down barriers to access to these desirable careers.



HOPEWORKS

Hopeworks' model prioritizes real-world work experience in addition to their professional training. First, Hopeworks trains primarily unemployed young adults in desirable skills such as front end web development, Geographic Information Systems (GIS), and data visualization.† Hopeworks will hire these newly trained individuals to work internships in either web design, GIS, or trauma training.‡ These internships provide applicable experience so that the individual is prepared and ready for permanent positions. Upon completion of the program, participants make on average $43,000 annually.

SCHOOL DISTRICT OF PHILADELPHIA

The School District of Philadelphia has partnered with the non-profit organization Launch of Philadelphia to facilitate the Urban Technology Project (UTP), which offers three apprenticeship programs for individuals who have acquired a high school diploma or GED.§ The project's mission is to provide on-the-job training to less-privileged career-seekers who are interested in working in tech.

CODED BY:

The development of Philadelphia's tech workforce pipeline not only depends on investment in adults, but also with kids. Coded by: is a nonprofit that focuses on preparing young people for entrepreneurship and leadership roles within the tech and startup space. The organization offers free courses and competitions, as well as a paid Tech & Innovation internship for high school and college students, which gives them an opportunity to develop their own startup and acquire relevant experience.

* https://pacareerlinkphl.org/wp-content/uploads/sites/4/2022/12/About-PhilaWorks.pdf
† https://hopeworks.org/our-services/train-with-us/
‡ https://hopeworks.org/our-services/hire-us/
§ https://utp-philly.org/

STRENGTHS ...
FOR TECH IN PHILADELPHIA

Based on extensive listening sessions with tech industry leaders—including investors, business leaders, technologists, workforce development experts, and other key stakeholders—Philadelphia's tech ecosystem exhibits significant strengths that position it for growth. However, the city faces persistent barriers that must be addressed to realize its potential as a leading national tech hub. These strengths and barriers provide critical context for understanding both the foundation upon which the city can build and the obstacles it must overcome to foster a more vibrant, inclusive, and competitive tech ecosystem.

LOCATION, QUALITY OF LIFE, AND COST EFFICIENCY

Philadelphia's prime location along the Northeast Corridor, situated between Washington, D.C. and New York City, provides tech businesses with strategic access to key markets, policymakers, and investors. From Philadelphia, 40 percent of the population of the U.S. is reachable within a day's drive. The city itself stands out for its compelling business value proposition: investment capital and operational budgets go further here than in competing tech hubs, with lower burn rates enabling startups to accomplish more with less funding. This operational efficiency combines with Philadelphia's dense, walkable layout and high quality of life to create an attractive destination for the skilled workforce that Tech companies aim to recruit.

EDUCATION AND TALENT

There is a dense concentration of universities in and around Philadelphia, including 4 R-1 research institutions.* This provides the city with a strong "Eds and Meds" foundation and a steady supply of skilled graduates. The city has been steadily increasing the share of these graduates who stay in the city, highlighting the strong quality of life factors that allow the city to attract and retain talent.†

LEADERSHIP IN STRATEGIC TECH SECTORS

Philadelphia is a recognized life sciences hub, known for its dense network of research institutions, teaching hospitals, and biotech companies, which drive innovation in cell and gene therapy, pharmaceuticals, and healthcare delivery. The city is also home to Comcast, one of the largest telecommunications companies in the world and the provider of America's largest converged network. These existing assets create a strong foundation for Philadelphia's tech sector, positioning the city to lead in areas such as digital healthcare delivery and the expansion of broadband access.

PHILADELPHIA IS CENTRALLY LOCATED IN THE MID-ATLANTIC REGION




Source: Dan Mall for Unsplash.com

* https://www.bizjournals.com/philadelphia/news/2022/02/25/philadelphia-area-colleges-plan-spend-millions.html
† https://billypenn.com/2023/10/09/philadelphia-retain-college-graduates-campus-philly/

... AND BARRIERS
TO TECH IN PHILADELPHIA

NATIONAL PERCEPTION MISSES THE MARK

The growth of Philadelphia's tech sector is hindered by outdated perceptions that portray the city as gritty and unsafe. Instead of being recognized for its world-class museums, thriving innovation hubs, and rich urban fabric, Philadelphia is too often reduced to pop culture clichés like Rocky and cheesesteaks. This perception issue is partially self-inflicted as the city has historically been too modest in promoting its strengths.

LACK OF INVESTMENT IN MIDDLE FUNDING ROUNDS

The investment landscape in Philadelphia exhibits a notable gap in mid-stage funding, specifically for Series A and B rounds. While early-stage capital from angel investors and seed funds is reasonably accessible and later-stage funding for mature ventures is well-established, the critical bridge financing necessary to scale promising startups remains insufficient. This imbalance poses a challenge for companies transitioning from initial proof of concept to sustainable growth, as the lack of middle-round investors limits their ability to attract the resources required to compete effectively.

DISCONNECT BETWEEN WORKFORCE DEVELOPMENT PROGRAMS AND JOBS

A significant gap exists between Philadelphia's workforce development program success stories and their placement into local tech jobs. While workforce development organizations and programs for high school students are producing qualified candidates, there is insufficient cooperation with local tech companies to create direct hiring pathways outside of universities. Companies report being consistently surprised by the depth of local talent, particularly from underrepresented communities, yet struggle to tap into these talent pools effectively. This disconnect is compounded by a shortage of mid-career tech talent, which may give tech companies pause when considering expanding in Philadelphia.

LIMITED INSTITUTIONS TO CONVENE TALENT AND RESOURCES

The growth of a thriving tech ecosystem in Philadelphia is held back by a lack of consistent conveners—a critical role that organizes and fosters connections across stakeholders in the ecosystem to enable awareness of resources, proliferation of ideas and opportunities, and general attractiveness to talent and business. This role has been filled by various organizations at different moments in the history of Philadelphia's tech scene, though it can demand significant investment of resources. If there are not enough players involved leaving a single point of failure, then disruption can leave a vacuum. While community-serving organizations can host events to fill this role, in other leading tech hubs across the U.S., the largest tech companies, incubators, and dedicated convening spaces serve as conveners of the tech community. The limited number of incubators and large tech companies puts pressure on the ecosystem to attract tech talent to the city and facilitate knowledge spillovers.

STRATEGIC RECOMMENDATIONS

Outlined below are strategic recommendations based on ESI research to address key challenges to Philadelphia's tech ecosystem and to leverage the city's existing strengths. These recommendations aim to strengthen the city's position as a hub for innovation and growth, ensuring that its tech ecosystem can thrive in a competitive landscape.



IMPROVE THE CITY'S BRAND AND GLOBAL REPUTATION

To address the perception challenges hindering Philadelphia's tech sector, the city must address the misalignment between reality and how it is perceived. By implementing an effective content strategy–incorporating regular storytelling, influencer engagement, and highlighting the experiences of local tech entrepreneurs–the city can not only attract new businesses and talent but also reinforce Philadelphia's appeal to those already working and studying here. Targeted messaging should distinguish between attraction efforts, which emphasize Philadelphia's affordability, cultural richness, and expanding tech ecosystem, and retention efforts, which highlight professional growth opportunities, community support, and long-term career pathways. Local stakeholders and organizations like the Convention and Visitors Bureau, Chamber of Commerce for Greater Philadelphia, and Visit Philly should be engaged to support the development and distribution of unified messaging that emphasizes the city's existing strengths in the tech space.



CLOSE THE INVESTMENT GAP

Philadelphia's gap in mid-stage funding requires coordinated action across government, institutions, and industry. The City should strengthen collaboration with the Commonwealth to create an investor-friendly environment, including leveraging existing resources such as the Ben Franklin Technology Development Authority. Public-private partnerships—as demonstrated by successful models like Chicago's 1871 Entrepreneurial Hub—can provide the space and programming needed for a thriving investment ecosystem.* Additionally, streamlining the regulatory environment to reduce complexity in licensing, inspections, and other processes, as well as offering tax-incentives for emerging technology companies, would make Philadelphia more attractive to investors and the businesses they seek to fund. Capitalizing on the city's academic landscape, the City should collaborate with universities to explore the potential for university-backed venture funds.† These complementary strategies can help Philadelphia build the support infrastructure and business-friendly environment needed to address its investment gap.



STRENGTHEN THE PIPELINE BETWEEN WORKFORCE AND BUSINESSES

To address the disconnect between trainees and potential employers, leaders across Philadelphia should encourage a culture of collaboration between workforce programs, staffing agencies, and businesses. This may include developing talent-matching programs to connect graduates from the workforce training programs directly with tech employers, creating feedback loops to ensure alignment of workforce development efforts with business needs, or developing pipeline initiatives with organizations like Campus Philly. Creating clear pathways to tech careers for both traditional and non-traditional candidates, Philadelphia can build a more diverse and inclusive tech workforce that leverages talent from all parts of its population.



DEVELOP A DECENTRALIZED ECOSYSTEM OF RESOURCES AND SUPPORT

City government can capitalize on its resources and networks to serve as an initial catalyst by creating a program that both provides funding and facilitation for convenings and industry events, as well as connect startups and other businesses to municipal resources. While the City can play an important role as an accelerator, stakeholders in the ecosystem should avoid relying upon a single organization as the permanent convener. Rather, a distributed network of conveners across different domains and scales is warranted that can initiate technical meetups and serve as a 'navigator network' to support those in search of resources and opportunities. This distributed approach reduces single points of failure while still providing the ecosystem with needed coordination and connections, with the City's role focused on initiating and connecting these various convening nodes rather than centralizing the function, ultimately stepping back as the ecosystem becomes self-sustaining.

* https://www.startupgrind.com/blog/chicagos-1871-tech-incubator-a-model-for-innovation/
† https://globalventuring.com/university/us-research-universities-venture-fund/



Department of Commerce
CITY OF PHILADELPHIA

This report was commissioned by the City of Philadelphia Department of Commerce. The Department of Commerce is the economic catalyst for the City of Philadelphia. Commerce helps businesses thrive and increases economic opportunity for all. We envision Philadelphia with a globally competitive economy that benefits all people who live, work, and do business in our city.

Our strategic priorities include:

- Attract and retain businesses through customized support and incentives.
- Build workforce development strategies that connect talent to growth industries and to jobs that pay family-sustaining wages.
- Leverage partnerships and research to drive policy, strategy and ease of doing business.

Find out more: phila.gov/commerce

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economics | strategy | insight

This report was produced by Econsult Solutions, Inc. (ESI). ESI provides businesses and public policy makers with consulting and thought leadership services in urban economics, real estate, transportation, public infrastructure, economic development, public policy and finance, strategic planning, as well as expert witness services for litigation support.

ESI combines robust quantitative analysis with trusted expert insights to create sustainable solutions. The firm works collaboratively with its clients, and draws in expertise, when necessary, from its network of experts and partners across industries, regions, and management practices. Based in Philadelphia, the firm supports clients nationwide.

Image Sources: Rahman Shahadat and Josh Rose for Unplash.com