Brief

THE CAPITAL REGION FACES A HUGE TECH TALENT SHORTAGE

Without expanding access to the tech talent pipeline, almost 60,000 annual positions will go unfilled by 2025.

JULY 2020

GREATER WASHINGTON PARTNERSHIP
FROM BALTIMORE TO RICHMOND.
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CAPITAL CoLAB

Acknowledgements

The Greater Washington Partnership would like to thank our knowledge partner, McKinsey & Company, for its contributions to our tech talent market diagnostic of the Capital Region. McKinsey helped identify labor market imbalances among tech and tech adjacent occupations (defined in the Methodology section) and skills to support the Capital CoLAB in developing strategies to address those imbalances. In particular, we are grateful for the support of Nora Gardner, managing partner of McKinsey's Washington, DC office; Brooke Weddle and Wan-Lae Cheng, partners in McKinsey's Washington, DC office; and Davis Carlin, associate partner in McKinsey's New York office, for assisting with our analysis.

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EXECUTIVE SUMMARY

Access to the opportunities that enable skills development and lifelong career mobility is too often limited to the populations that can afford it in terms of cost, time, or both. Uncertainties around the economic and public health impacts of COVID-19 compound these inequities.

The Capital Region (defined as the metro areas of Baltimore, MD; Washington, DC; and Richmond, VA) is the nation's second largest tech hub. The region's unique mix of industries—including the federal government, defense, healthcare, IT, and professional services—offers ample opportunities for workers with in-demand skillsets to both specialize and apply their knowledge across different fields. However, access to the opportunities that enable skills development and lifelong career mobility is too often limited to the populations that can afford it in terms of cost, time, or both. Uncertainties around the economic and public health impacts of COVID-19 compound these inequities.

Workforce system stakeholders not only need clarity on high-demand jobs and skills that offer a family sustaining wage, the capacity constraints that educators face in preparing learners for those roles, and barriers that keep learners from accessing relevant training and jobs; they need data to support decision making around those activities. These types of analyses, while often available at the local or state level, do not always capture the regional nature of the labor market—one that, at least in the Capital Region, crosses multiple county and state boundaries.

Recognizing the geographic and economic mobility that many tech jobs provide, Greater Washington Partnership's Capital CoLAB partnered with McKinsey & Co. on a tech talent market diagnostic of the Capital Region. The goals of the analysis were to refresh CoLAB's definition of tech talent, use that definition to assess the supply-demand gap of the regional workforce between now and 2025, and identify implications that will guide CoLAB programs in their focus on building digital literacy through an equity lens.

The following report elaborates on the findings below:

1. By 2025, the forecasted supply gap is about 50% for tech talent and about 67% for tech adjacent talent

2. Tech talent demand is concentrated among a few occupations

3. Workers need to improve their digital literacy to execute the same tasks as before, and automation will enhance this need

4. Though the Capital Region's tech and tech adjacent workforce is more diverse than that of our peers, Black and African American and Hispanic and Latino tech workers are underrepresented compared with the region's workforce overall

5. There is likely a greater share of small employers hiring for tech roles in Baltimore and Richmond, indicating a need to consider regional variation as we craft a talent strategy

INTRODUCTION

The Greater Washington Partnership ("the Partnership") is a first-of-its-kind civic alliance of CEOs, drawing from the leading employers and entrepreneurs committed to making the Capital Region—from Baltimore to Richmond—one of the world's best places to live, work and build a business. Founded in 2016, the Partnership prioritized two workstreams: regional mobility and talent and skills, the latter of which evolved into the Capital CoLAB ("CoLAB"). The CoLAB is an action-oriented partnership of business and academic institutions focused on developing the talent needed for the jobs of today and tomorrow. The CoLAB's vision is to build a future in which:

- Learners of all backgrounds have access to the education needed to work in an increasingly digital world
- Educators have access to employer insights and resources
- Employers in the Capital Region can find the talent locally needed to compete globally
- The Capital Region is the destination for the nation's best and most diverse digital and technology talent

With a home base in one of the nation's top hubs for digital tech talent,[1] and recognizing that there is strong competition for the best talent, the CoLAB's mission is to bring together educators and employers to grow the Capital Region's diverse tech talent ecosystem. Digital tech skills span virtually all industries, offer economic mobility to underrepresented groups,[2] and are expected to remain in demand amid the development and deployment of automation-related technologies.[3] For these reasons and more, CoLAB promotes digital literacy, inclusive growth, and scalability across all its programs—from high school, to post-secondary education, and beyond.

At the core of this work is the CoLAB's Employer Signaling System (ESS), a process that combines labor market data with employer insights on the knowledge, skills, abilities, and credentials (KSACs) needed to succeed in digital tech and tech adjacent roles. The ESS provides a structured format of gaining employer consensus on the priority KSACs across multiple industries. This employer consensus is crucial as education partners refine curricula to align with career opportunities in the region, which will be more important than ever given the economic uncertainties surrounding COVID-19.

In February 2020, the CoLAB team partnered with McKinsey & Co. on a tech talent market diagnostic of the Capital Region. McKinsey built on previous work to identify labor market imbalances among tech and tech adjacent occupations (defined in the Methodology section) and skills to support the CoLAB in developing strategies to address those imbalances.

We focused the analysis on a supply-demand gap of tech and tech adjacent roles through 2025. This allowed the team to factor in the amount of time it takes students to move through their education and graduate into the workforce. It also explains why the supply-demand gaps discussed later in this report do not dip below 50% until 2025. McKinsey identified the following takeaways for the Capital Region:

1. By 2025, the forecasted supply gap is about 50% for tech talent and about 67% for tech adjacent talent

2. Tech talent demand is concentrated among a few occupations

3. Workers need to improve their digital literacy to execute the same tasks as before, and automation will enhance this need

4. Though the Capital Region's tech and tech adjacent workforce is more diverse than that of our peers, Black and African American and Hispanic and Latino tech workers are underrepresented compared with the region's workforce overall

5. There is likely a greater share of small employers hiring for tech roles in Baltimore and Richmond, indicating a need to consider regional variation as we craft a talent strategy

METHODOLOGY

The geographic boundaries for the Capital Region analysis include three metropolitan statistical areas (MSAs): Baltimore-Columbia-Towson, MD; Washington-Arlington-Alexandria, DC-VA-MD-WV; and Richmond, VA.

As we think about the digital tech workforce, we divided occupations into two categories: "tech" (occupations that develop technology) and "tech adjacent" (occupations that use technology extensively). The tech adjacent category also captures occupations that represent "emerging" tech users, which means that those roles are changing and will evolve to use technology more extensively. The occupations indicated in Figure A use the Bureau of Labor Statistics' Standard Occupational Classification (SOC) coding system to show the division of tech and tech adjacent roles.

To estimate the gap of tech and tech adjacent occupations by 2025, McKinsey set a series of assumptions around demand and supply. From a supply perspective, the team assumed baseline graduate growth as 50% of the compound annual growth rate (CAGR) from 2013-2018. Next, they modeled in new job demand growth aligned to Emsi assumptions.[4] Based on insights from McKinsey Global Institute's ongoing research on the future of work, the team assumed that automation would create demand for both tech and tech adjacent roles in the year ahead. Finally, the team projected a linear ramp-up of 2,500 jobs per year through 2025 to account for the impacts of Amazon's HQ2 on regional hiring.

McKinsey utilized completions data for all post-secondary education levels (including certificates and associate's, bachelor's, master's, and doctoral degrees) to capture talent supply. Recognizing that students and workers regularly move in and out of the region, the team considered previous McKinsey talent migration analyses to estimate that 21% of graduates would depart the Capital Region each year. Additionally, McKinsey factored in the potential impacts of COVID-19 on talent supply in 2020 and beyond, estimating that new student enrollment would decrease by 10% in 2020 and 5% in 2021 while enrollment due to students not returning to their academic programs would decrease by 7% in 2020 and 3.5% in 2021.

FIGURE A: TECH AND TECH ADJACENT OCCUPATIONS

TECH OCCUPATION LIST

Definition: occupations that develop technology

- 11-3021: Computer and Information Systems Managers
- 15-1111: Computer and Information Research Scientists
- 15-1121: Computer Systems Analysts
- 15-1122: Information Security Analysts
- 15-1131: Computer Programmers
- 15-1132: Software Developers, Applications
- 15-1133: Software Developers, Systems Software
- 15-1134: Web Developers
- 15-1141: Database Administrators
- 15-1142: Network and Computer Systems Administrators
- 15-1143: Computer Network Architects
- 15-1151: Computer User Support Specialists
- 15-1152: Computer Network Support Specialists
- 15-1199: Computer Occupations, All Other
- 17-2061: Computer Hardware Engineers
- 17-2071: Electrical Engineers
- 17-2072: Electronics Engineers, Except Computer
- 17-3012: Electrical and Electronics Drafters
- 17-3023: Electrical and Electronic Engineering Technicians
- 17-3024: Electro-Mechanical Technicians

TECH ADJACENT OCCUPATION LIST

Definition: occupations that use technology extensively

SUPER USERS

Definition: occupations that se technology extensively

15-0000 Computer and Mathematical Occupations [selection below]

- 15-2011: Actuaries
- 15-2021: Mathematicians
- 15-2031: Operations Research Analysts
- 15-2041: Statisticians
- 15-2091: Mathematical Technicians1

17-0000 Architecture and Engineering Occupations [All except those included in 'tech occupation list']

19-0000 Life, Physical, and Social Science Occupations [All]

25-0000 Educational Instruction and Library Occupations [selection below]

- 25-1021: Computer Science Teachers, Postsecondary[1]

43-0000 Office and Administrative Support Occupations [selection below]

- 43-9011: Computer Operators
- 43-9111: Statistical Assistants

51-0000 Production Occupations [selection below]

- 51-4011: Computer-Controlled Machine Tool Operators
- 51-4012: Computer-Controlled Machine Tool Programmer

EMERGING USERS

Definition: occupations that are changing and will use technology ever more extensively

13-0000 Business and Financial Operations Occupations [All]

- 13-1071 Human Resources Specialists
- 13-1199 Business Operations Specialists, All Other
- 13-1081 Logisticians
- 13-1082 Project Management Specialists
- 13-1161 Market Research Analysts and Marketing Specialists

All other

33-0000 Protective Service Occupations [selection below]

- 33-3021: Detectives and Criminal Investigators

41-0000 Sales and Related Occupations [selection below]

- 41-3031: Securities, Commodities, and Financial Services Sales Agents
- 41-4011: Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products
- 41-9031: Sales Engineers

1. *Occupation-specific data not available on Economic Modeling Specialists International (Emsi);*
2. *These occupation typically require a high school degree or postsecondary nondegree award for entry.*
   Potential supply is not determined by graduates of specific postsecondary programs but for available unemployed population with high-school education

FINDINGS

If left unaddressed, the tech skills gap could cause almost

60,000

annual positions to go unfulfilled in 2025

1 By 2025, the forecasted supply gap is about 50% for tech talent and about 67% for tech adjacent talent.

By 2025, we expect a supply gap of 17,037 tech occupations annually in the Capital Region. This translates to just under 50% of unmet demand for these roles. The supply gap of tech adjacent occupations is even greater: by 2025, we estimate an annual gap of 51,893 tech adjacent roles, which is around 67% unmet demand. Figure B summarizes the projected tech and tech adjacent talent gaps over the next five years.

FIGURE B: ANNUAL TECH AND TECH ADJACENT TALENT GAPS THROUGH 2025

	2018*	2019	2020	2021	2022	2023	2024	2025
Tech Gap	18,897	21,811	20,153	20,711	20,647	19,016	19,901	17,037
Tech Percent Gap	58%	60%	57%	59%	59%	56%	57%	49%
Tech Adjacent Gap	36,156	43,802	42,030	43,640	44,287	42,821	44,620	41,893
Tech Adjacent Percent Gap	65%	69%	68%	70%	71%	70%	72%	67%

2 Tech talent demand is concentrated among a few occupations.

When we look closer at the demand for tech and tech adjacent occupations by 2025, we see that demand is not distributed evenly across all occupations. This is an important consideration for educators and training providers looking to align curricula with high-demand skillsets in the region. Adjusted for automation and job creation as a result of Amazon's HQ2, Figures C and D highlight which occupations are on track to be in the most demand by 2025. The demand for tech occupations will be greatest for Software Developers (applications and systems software) and Computer Systems Analysts. The occupation titled "Computer Occupations, All Other" is a combination of miscellaneous computer occupations; so, though demand is high at 4,387, it likely is not concentrated in one occupation. The greatest tech adjacent demand will be for Management Analysts, Business Operations Specialists, Market Research Analysts and Specialists, and Human Resources Specialists.

FIGURE C: DEMAND FOR TECH OCCUPATIONS

TECH OCCUPATIONS	LABOR DEMAND[2] 2025 job openings, adjusted for HQ2 and automation
Software Developers, Applications	7,006
Computer Systems Analysts	4,144
Software Developers, Systems Software	4,160
Information Security Analysts	1,926
Network and Computer Systems Administrators	2,186
Web Developers	867
Computer Network Support Specialists	1,064
Computer Programmers	1,074
Computer Occupations, All Other	4,387
Computer Hardware Engineers	564
Electrical Engineers	800
Electrical and Electronic Engineering Technician	712
Electronics Engineers, Except Computer	559
Electrical and Electronics Drafters	114
Computer and Information Research Scientists	598
Computer Network Architects	991
Electro-Mechanical Technicians	70
Database Administrators	752
Computer and Information Systems Managers	2,684
TOTAL FOR ALL TECH OCCUPATIONS	**34,658**

FIGURE D: DEMAND FOR TECH ADJACENT OCCUPATIONS

TECH OCCUPATIONS	LABOR DEMAND[2] 2025 job openings, adjusted for HQ2 and automation
Software Developers, Applications	7,006
Computer Systems Analysts	4,144
Software Developers, Systems Software	4,160
Information Security Analysts	1,926
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Electronics Engineers, Except Computer	559
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Computer and Information Research Scientists	598
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TOTAL FOR ALL TECH OCCUPATIONS	**34,658**

3 Workers need to improve their digital literacy to execute the same tasks as before, and automation will enhance this need.

McKinsey Global Institute previously conducted research on displacement rates due to automation and how we can expect those trends to impact different job categories. The McKinsey team considered these findings as part of their tech talent diagnostic of the Capital Region, as these job categories encompass many of the tech and tech adjacent occupations we use in this report. As we see in Figure E, estimates show that office support and food services work will decline (note the unit of "Net job growth" is thousands of jobs), while jobs in STEM will grow across the Capital Region over the next 10 years: 36,000 jobs in Baltimore, 35,000 in Richmond, and 37,000 jobs in Washington, DC.

FIGURE E: GROWTH RATES AFTER AUTOMATION BY JOB CATEGORY AND METRO AREA

NET JOB GROWTH BY OCCUPATION, BALTIMORE

Occupational category	Net job growth, 2017-30	Share of jobs (2017)
Health professionals	46	5
STEM professionals	36	6
Health aides, technicians, and wellness	27	7
Managers	19	6
Creatives and arts management	19	2
Business/legal professionals	19	10
Educator and workforce training	15	7
Customer service and sales	8	10
Property maintenance and agriculture	6	4
Builders	4	4
Transportation services	1	3
Mechanical installation & repair	-3	4
Production work	-4	5
Community services	-4	5
Food services	-9	8
Office support	-10	14

NET JOB GROWTH BY OCCUPATION, RICHMOND

Occupational category	Net job growth, 2017-30	Share of jobs (2017)
Health professionals	48	4
STEM professionals	35	5
Health aides, technicians, and wellness	29	7
Creatives and arts management	21	2
Business/legal professionals	19	11
Managers	19	4
Educator and workforce training	16	6
Customer service and sales	9	11
Property maintenance and agriculture	8	4
Builders	5	4
Transportation services	3	4
Mechanical installation & repair	-1	4
Food services	-3	8
Production work	-5	6
Community services	-5	5
Office support	-12	14

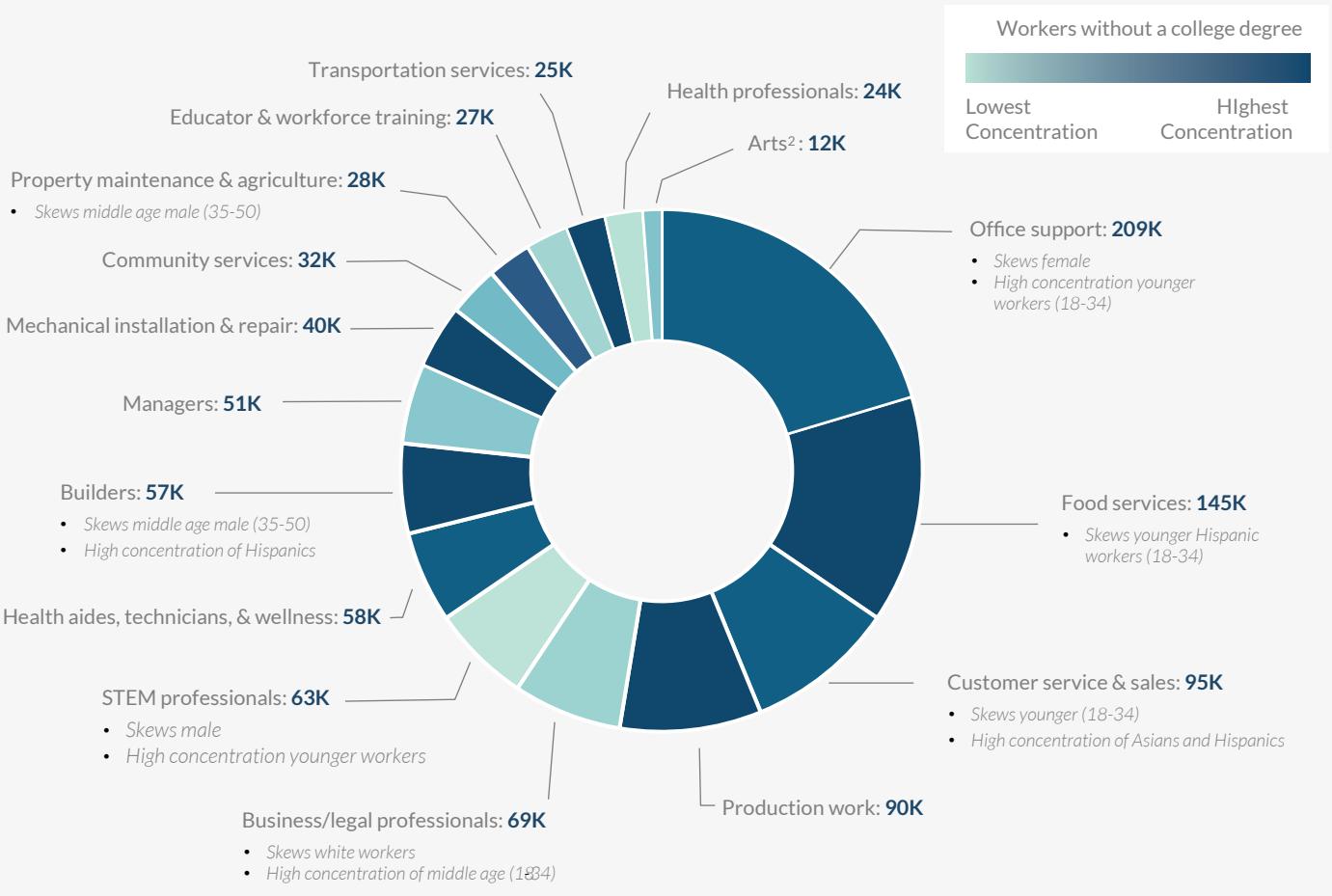
NET JOB GROWTH BY OCCUPATION, WASHINGTON, DC

Occupational category	Net job growth, 2017-30	Share of jobs (2017)
Health professionals	49	3
STEM professionals	37	9
Health aides, technicians, and wellness	30	6
Business/legal professionals	22	14
Creatives and arts management	20	3
Managers	19	9
Educator and workforce training	19	7
Customer service and sales	10	9
Property maintenance and agriculture	10	4
Builders	9	4
Transportation services	4	2
Mechanical installation & repair	-1	3
Production work	-2	3
Community services	-3	5
Food services	-5	8
Office support	-9	12

Source: McKinsey Global Institute Analysis 2019

On the other hand, McKinsey Global Institute found that the top professions at risk of job loss due to automation by 2030 include office support, food services, customer service and sales, and production work (Figure F). Upon overlaying demographic, wage, and education data, we see that the jobs most vulnerable to automation skew toward women, minority populations, and workers without a college degree.

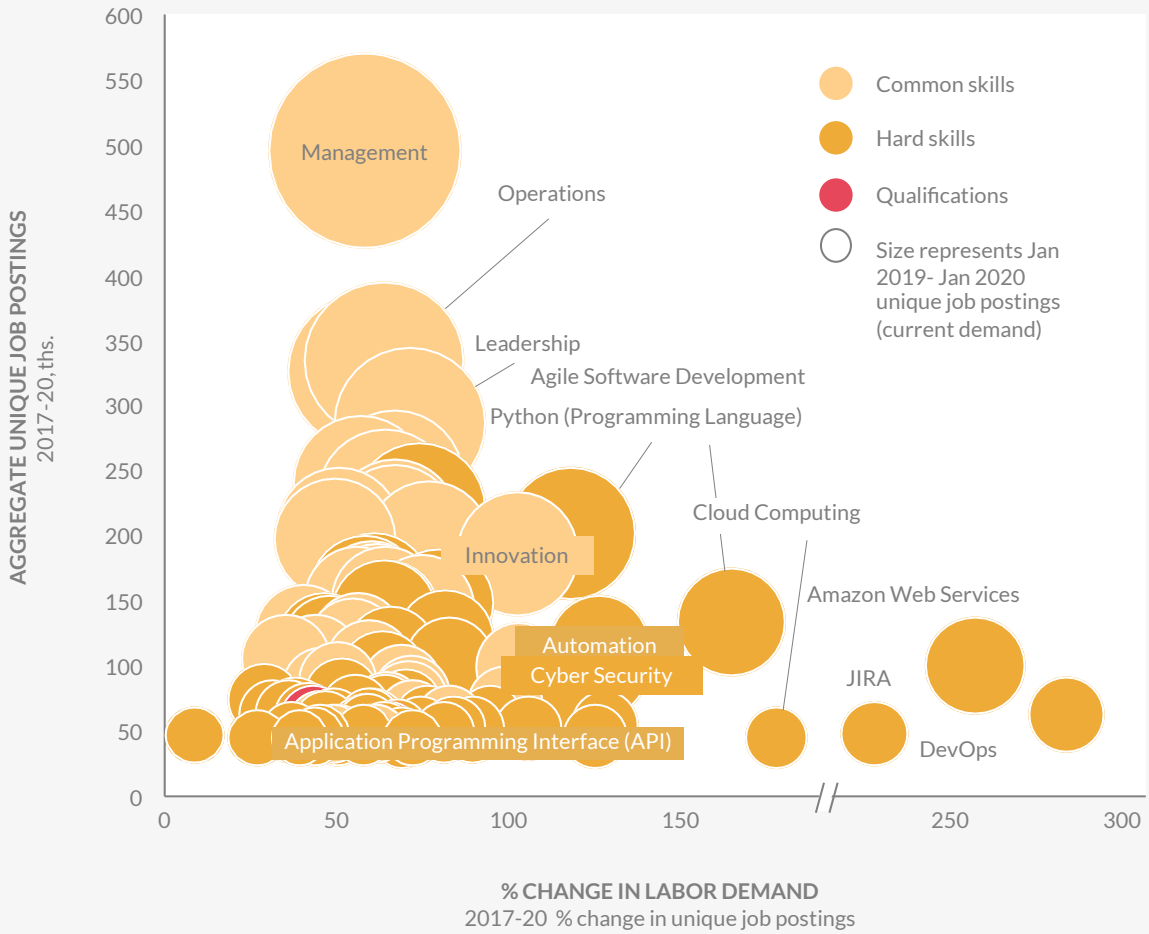
FIGURE F: TOTAL FORECASTED JOBS LOST BY 2030



1. Based on midpoint automation estimate
2. Creatives and arts management

For tech and tech adjacent roles requiring at least an associate's degree, we also learned that digital skills experienced the highest change in-demand since 2017. Figure G provides a snapshot of the broad skills requested for tech roles in job ads over the last three years. In terms of absolute numbers, Management is the most in-demand skill advertised in jobs postings linked to both tech roles and all roles. The fastest growing skills are hard skills, including DevOps, Amazon Web Services, JIRA, and Cloud Computing.

FIGURE G: TOP 100 IN-DEMAND SKILLS BY GROWTH IN-DEMAND FOR TECH AND TECH ADJACENT OCCUPATIONS (JAN 2017 - JAN 2020)



1. Based on analysis of job postings in the Capital Region between January 2017 and January 2020. Includes job postings requiring an associate's degree or higher
Source: Economic Modeling Specialists International (Emsi)

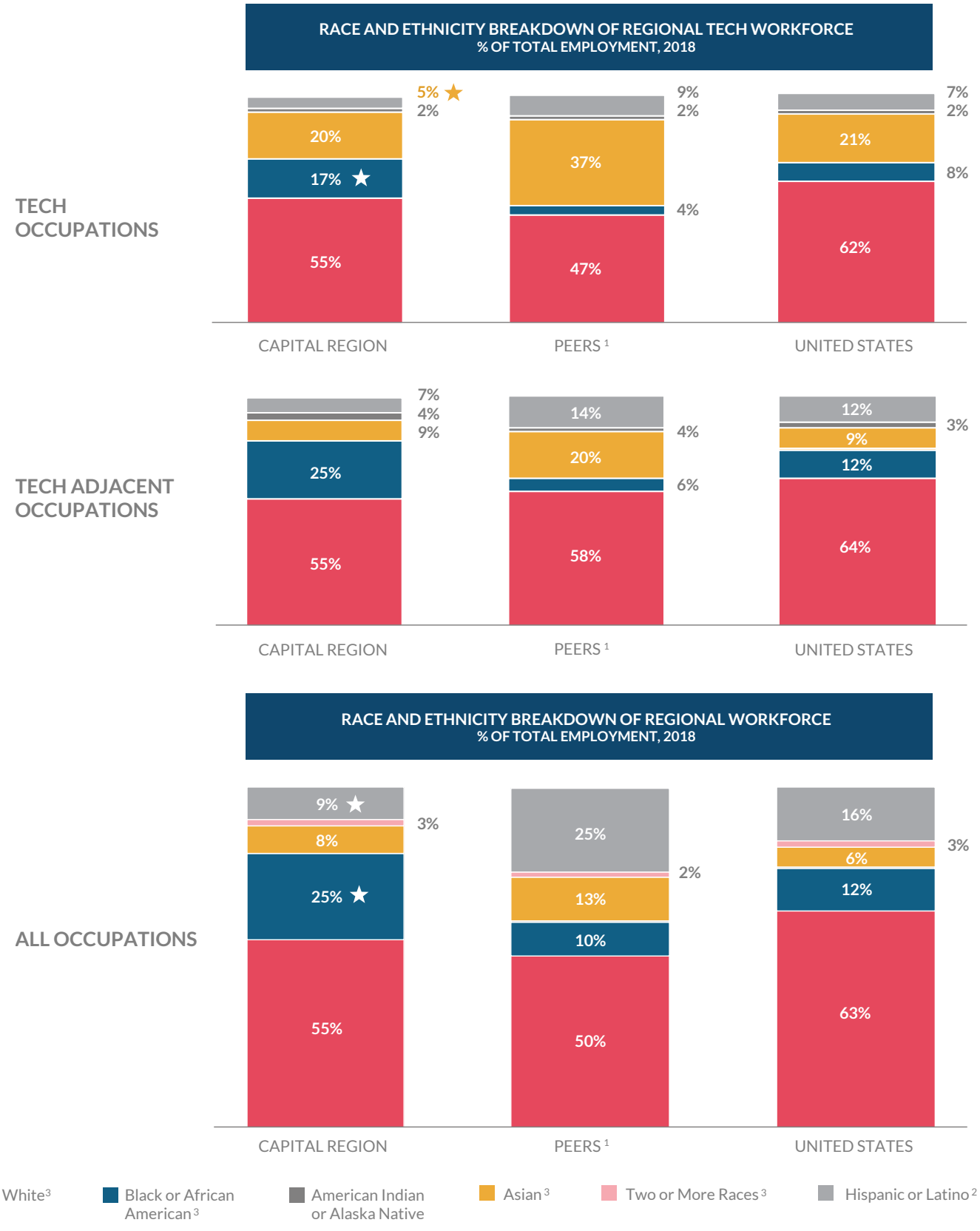
Lack of diversity is acute in our region's tech workforce,

as participation by Black and African American and Hispanic and Latino workers is underrepresented compared to regional workforce proportions.

4 Though the Capital Region's tech and tech adjacent workforce is more diverse than that of our peers, Black and African American and Hispanic and Latino tech workers are underrepresented compared with the region's workforce overall.

The CoLAB wants to ensure that the region has enough workers to meet projected demand. Moreover, we envision a digital tech workforce that mirrors the diversity of the Capital Region, bolstering Greater Washington Partnership's efforts to make this the best region to live, work, and build a business. However, the lack of diversity is acute in our region's tech workforce, as participation by Black and African American and Hispanic and Latino workers is underrepresented compared to regional workforce proportions. As we see in Figure H, only 17% of tech workers are Black or African American and only 5% of workers are Hispanic or Latino; but, respectively, they make up 25% and 9% of the total workforce. At the same time, the Capital Region's tech and tech adjacent workforce is more diverse than that of our peers and the U.S. as a whole.

FIGURE H: RACE AND ETHNICITY OF REGIONAL TECH WORKFORCE AND TOTAL WORKFORCE



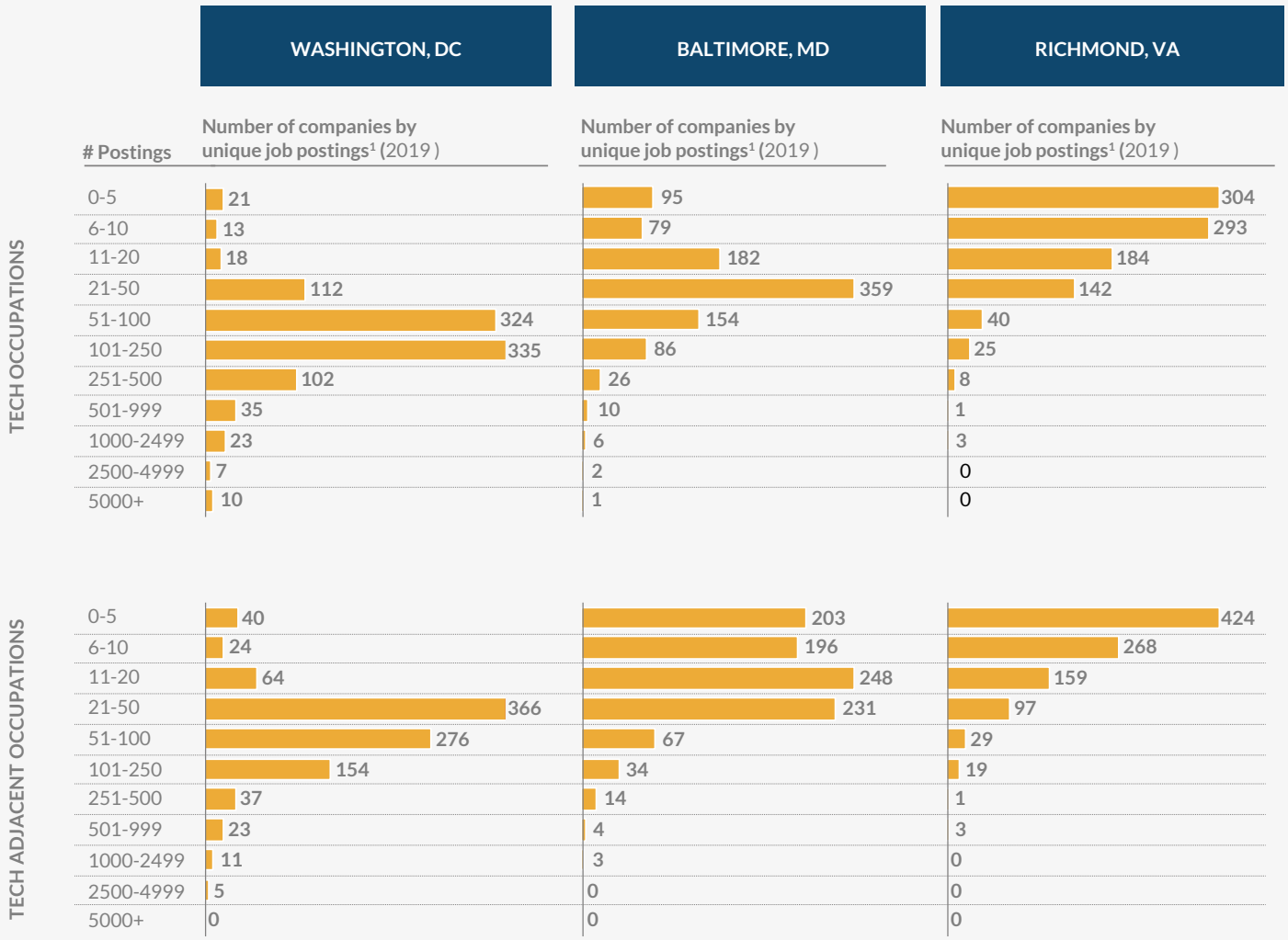
1. *Peers include: Boston-Cambridge-Newton, MA-NH; Greater Los Angeles; New York-Newark-Jersey City, NY-NJ-PA; Philadelphia-Camden-Wilmington, PA-NJ-DE-MD; San Francisco Bay Area; 2 Includes Hispanic population of all races; 3 Excludes Hispanic or Latino population*

Source: Economic Modeling Specialists International (Emsi)

5 There is likely a greater share of small employers hiring for tech roles in Baltimore and Richmond, indicating a need to consider regional variation as we craft a talent strategy.

Finally, we found that hiring trends vary across the three metro areas that make up the Capital Region. For instance, Figure I shows that 10 employers posted over 5,000 job ads representing tech occupations in the Washington, DC region in 2019 compared with only one employer in the Baltimore region and zero employers in the Richmond region. And, across the entire region, we rarely see employers post more than 1,000 tech adjacent roles. On the flipside, a greater share of employers in Baltimore and Richmond posted up to only five job ads for tech and tech adjacent roles during that same timeframe. While number of job ads is not always a proxy for employer size (i.e. a large employer may have only one or two job openings annually), we considered hiring practices for government contracts and new cohorts—common practices among large regional employers—as context to understand who would advertise just a small handful of jobs each year.

FIGURE I: VARIATION IN JOB POSTINGS BY METRO AREA



1. Data for top 1000 companies by number of unique job postings. Includes unique job postings for non-staffing companies between Jan 2019- Dec 2019
Source: Economic Modeling Specialists International (Emsi)

CONCLUSION

With the additional backdrop of automation, the CoLAB believes that building capacity to communicate, teach, and acquire digital skills will best prime students and workers in the Capital Region for in-demand careers that offer economic opportunity and stability.

The Capital Region is ripe for a tech talent ecosystem that encourages connections between employers, educators, and students to provide transparency into digital skills development. With the additional backdrop of automation, the CoLAB believes that building capacity to communicate, teach, and acquire digital skills will best prime students and workers in the Capital Region for in-demand careers that offer economic opportunity and stability. This is especially timely given how swiftly COVID-19 disrupted the economy, leaving some populations extra vulnerable to economic change. The findings in this report also point us to where we can be more thoughtful about applying an equity lens to talent and skills work, addressing employers' workforce priorities while creating pathways for students and workers into meaningful careers.

It is critical that regional stakeholders come together and act soon to address these supply gaps. Although it is difficult to predict future conditions with certainty, we anticipate feeling the economic impacts of COVID-19 for years to come. On top of the challenges that come with a rapid shift to remote learning, it may be even more difficult for educators to fully assess impacts on educational pipelines. This is because of the time it takes students to move through a program—which, in the case of post-secondary education, can be at least four years.

To close the supply-demand gaps in our region, the CoLAB will continue its call for coordinated action and awareness across employers and academic institutions. The CoLAB believes that gaining employer consensus around skills needs, being transparent about those needs, and designing and linking programs to support lifelong learning will help expand access to tech and tech adjacent careers. We aim for transparency through the ESS process, website, and annual data refresh, which together are the foundation of CoLAB programs. Furthermore, the CoLAB designed its programs—K-12 Pathways Initiative, Digital Tech Credential, and Upskilling—to scale continuous learning

opportunities for high school students, post-secondary students, and incumbent workers.

We also recognize that demographic disparities in tech fields will not naturally resolve themselves, as major feeder schools face the same diversity challenges in tech programs that we see in the workforce. And, without making deliberate connections between tech pathways and diverse learners, we risk creating a workforce that can neither fill demand nor innovate to meet the most pressing needs of the Capital Region and beyond. Between now and 2025, the CoLAB commits to applying an equity lens to our success metrics and strategies that underpin our programs. We will strive to think holistically about our approaches to develop and retain tech talent, bringing together stakeholders to discuss challenges and go-forward strategies, and partnering to scale programs that strengthen the Capital Region's tech talent ecosystem.

ENDNOTES

1. "Partnering to Strengthen Tech Talent in the Capital Region." Greater Washington Partnership. Dec. 2017.
2. "Applying a racial equity lens to digital literacy." National Skills Coalition. Mar. 2020.
3. "Jobs Lost, Jobs Gained: Workforce Transitions in a Time of Automation." McKinsey Global Institute. Dec. 2017.
4. McKinsey analysis of Emsi projections. Feb. 2020.

ABOUT

The Greater Washington Partnership is a first-of-its-kind civic alliance of CEOs in the region, drawing from the leading employers and entrepreneurs committed to making the Capital Region—from Baltimore to Richmond—one of the world's best places to live, work and build a business.

The Capital CoLAB (Collaborative of Leaders in Academia and Business) is a first-of-its-kind alliance of university and business leaders who have come together to take action to strengthen the Capital Region. The CoLAB is currently working to enhance digital technology education through development and expansion of the Partnership's Digital Technology Credentials.

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