Building Tomorrow's Tech Workforce in Northern Virginia

Sarah Edwards, CERP Presentation

November 19, 2025

Project Overview & Methods

Project Description

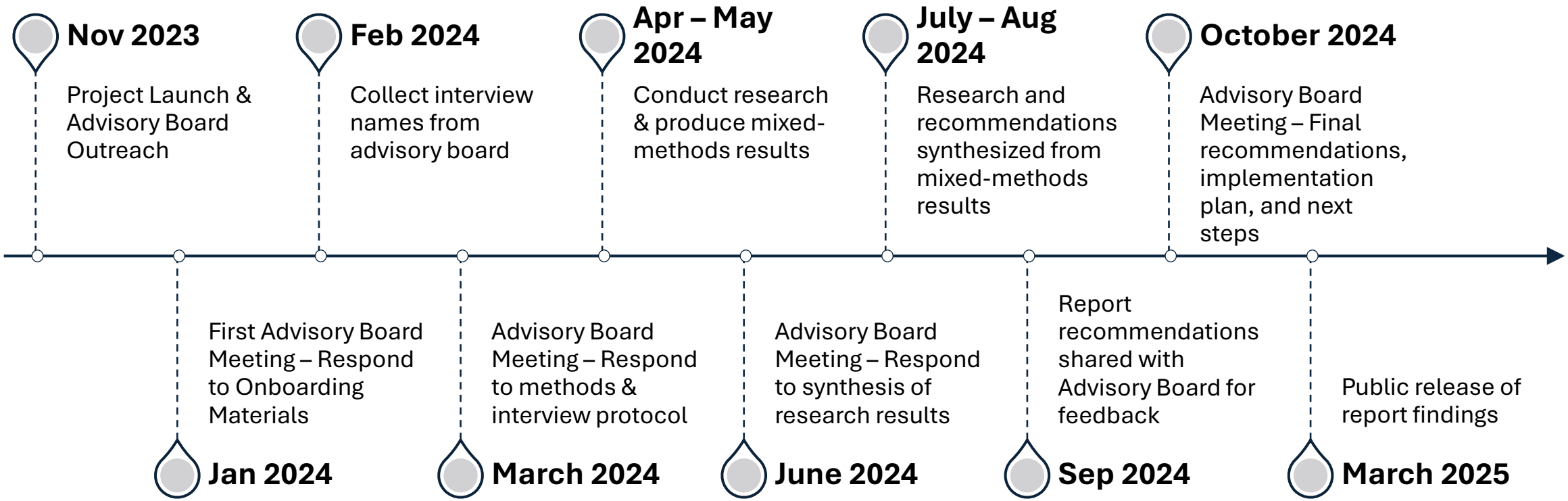
- GO Virginia Talent Pipeline Initiative (GoVA-TPI) was launched by the Governor in 2022 to examine the workforce needs in targeted industry clusters across the state
- GO Virginia Region 7 (Northern Virginia) chose to focus on three industry clusters based on their Growth & Diversification Plan: cybersecurity, computer services, and emerging technology

Problem Statement

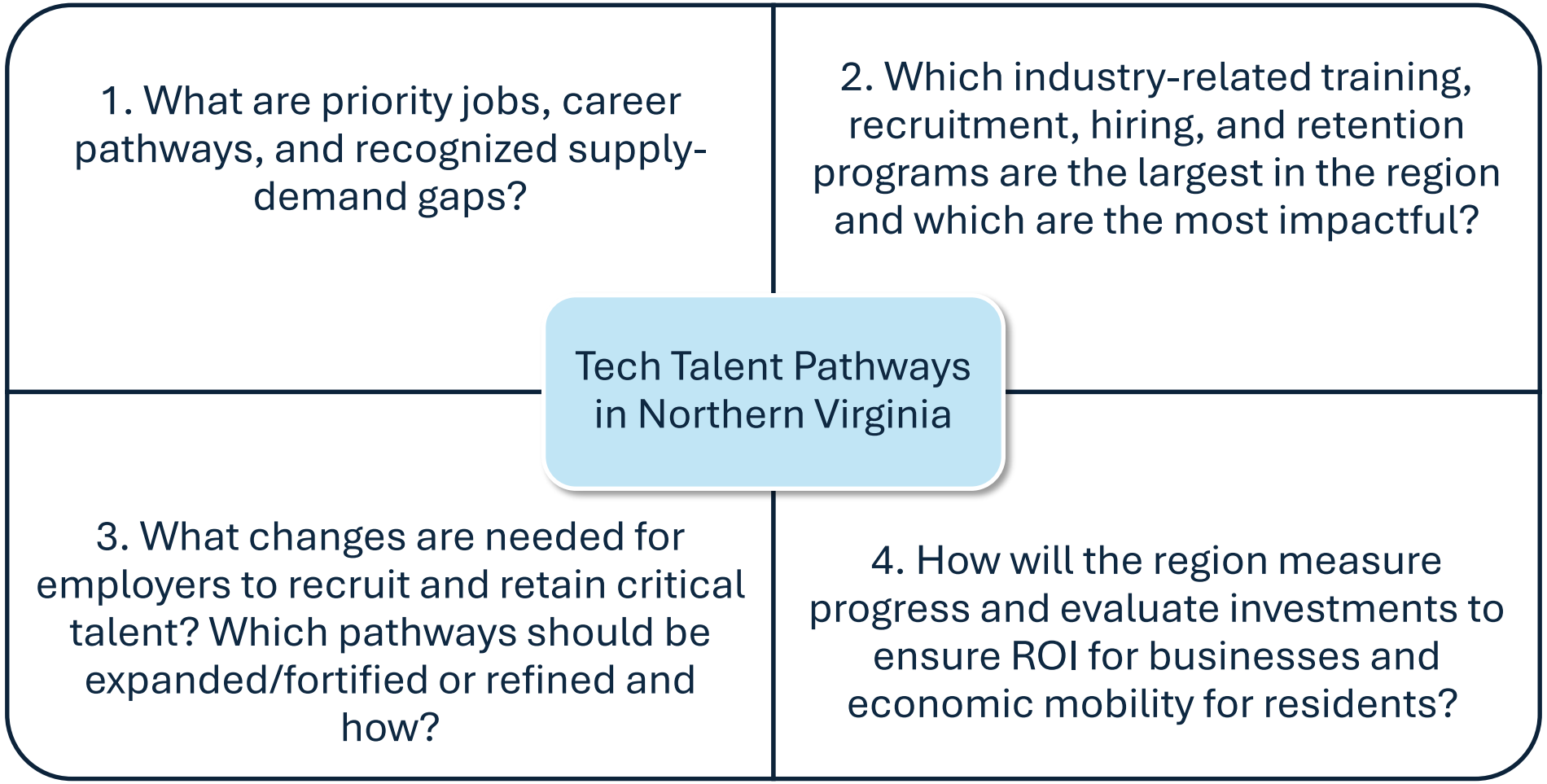
Without investment and action, **Region 7 risks losing a generation of the workforce to a series of disruptions** from the COVID-19 pandemic, tech layoffs, remote work arrangements, and the restructuring of job roles that diminish rather than enhance area capabilities/resilience.

This report aims to **highlight opportunities for Region 7 residents to advance** via tech talent pathways, address the **limited representation** of women and people of color in higher education and higher wage roles, and **address acute employer pain points.**

Timeline


Nov 2023
Project Launch & Advisory Board Outreach
Jan 2024
First Advisory Board Meeting – Respond to Onboarding Materials
Feb 2024
Collect interview names from advisory board
March 2024
Advisory Board Meeting – Respond to methods & interview protocol
Apr – May 2024
Conduct research & produce mixed-methods results
June 2024
Advisory Board Meeting – Respond to synthesis of research results
July – Aug 2024
Research and recommendations synthesized from mixed-methods results
Sep 2024
Report recommendations shared with Advisory Board for feedback
October 2024
Advisory Board Meeting – Final recommendations, implementation plan, and next steps
March 2025
Public release of report findings

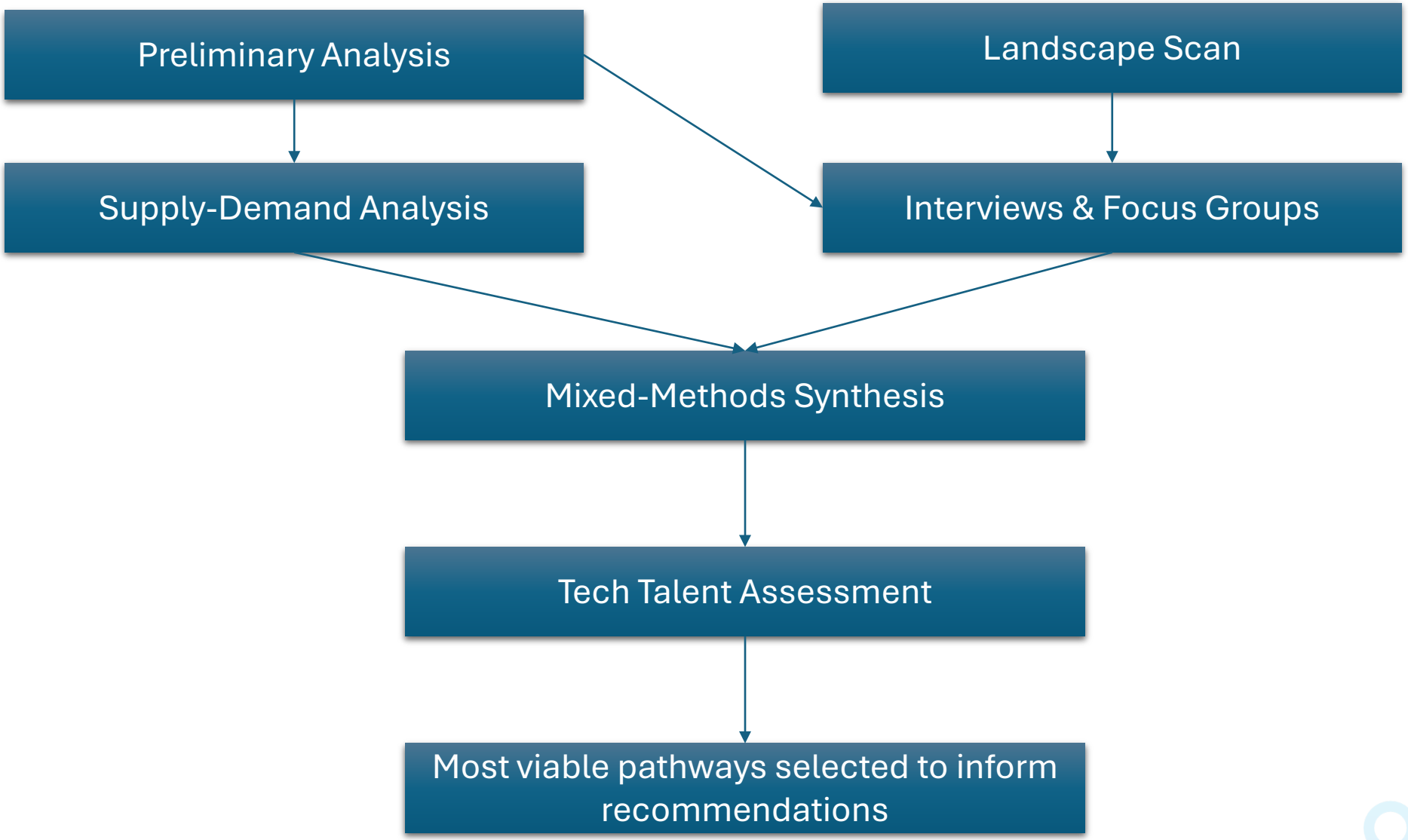
Research Questions



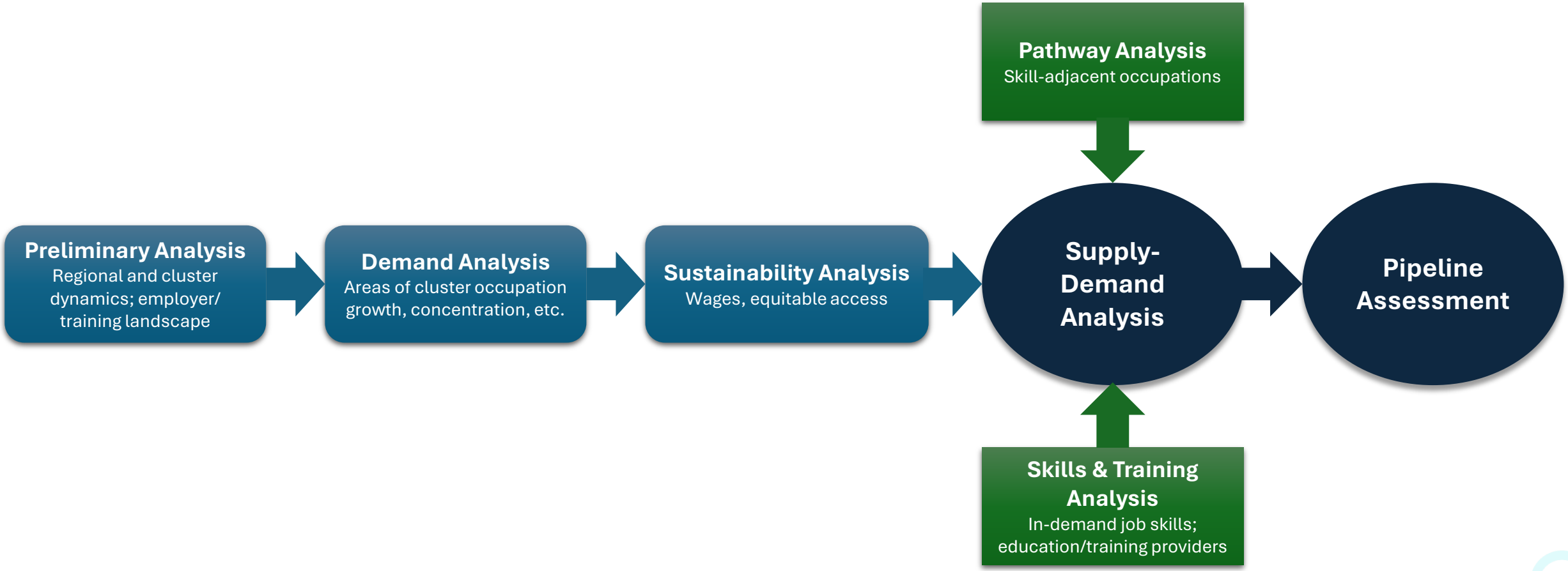
Industry Clusters

Computer Services (Industry-Based)	Emerging Technologies (Industry-Based)	Cybersecurity (Occupation-Based)
518210 Data Proc., Hosting, & Related Svcs	**541713** R&D in Nanotechnology	**15-1211** Computer Systems Analysts
541511 Custom Computer Programming Svcs.	**541714** R&D in Biotechnology	**15-1212** Information Security Analysts
541512 Computer Systems Design Services	**541715** R&D in Phys., Eng., and Life Sci.	**15-1241** Computer Network Architects
541513 Computer Facilities Mgmt Svcs		**15-1244** Network & Computer Sys Admins
541519 Other Computer Related Services		**15-1245** Database Admins/Architects

Process Slide: Tech Talent Assessment



Quantitative Analysis Process



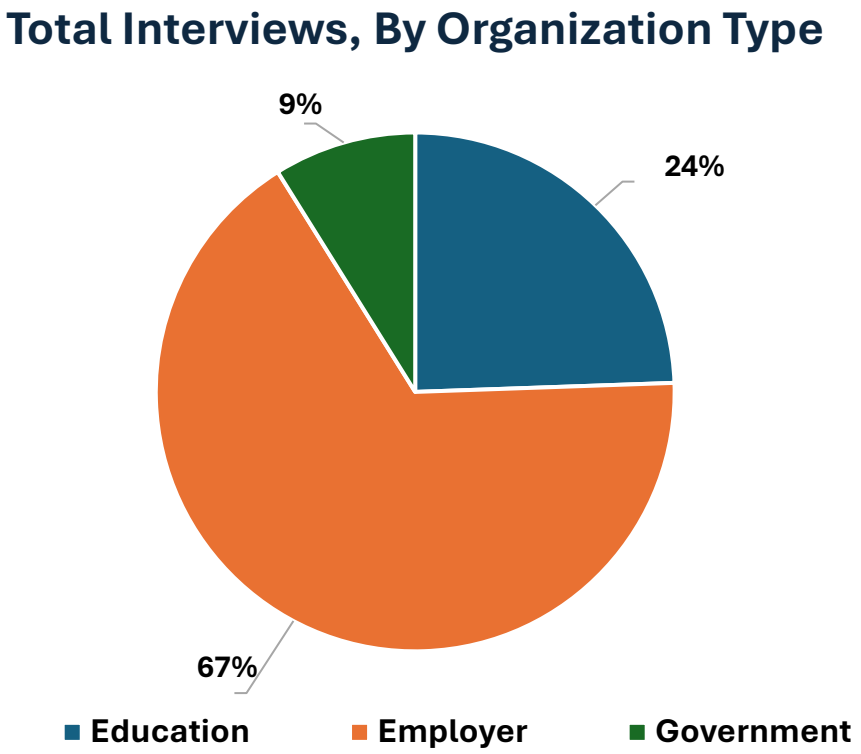
Qualitative Analysis: Interview Stats

Individual Interviews: 35 organizations

- 7 Large Employers (250+)
- 11 Medium Employers (50-250)
- 1 Small Employer (1-50)
- 12 Education & Training Providers
- 4 Government Entities

Focus Groups: 2 groups

- CIOs – 5 individuals
- Small Businesses (10-50) – 6 individuals



Key Takeaways

The Big Picture: Region 7

48,124
total projected job growth for target occupations in the next 10 years

30
related education and training providers in D.C. MSA

33%
of workers in selected occupations are female compared to ~50% of the population

17%
of workers in selected occupations are Black or Hispanic compared to ~30% of the population

82%
of Region 7 tech workers have a Bachelor's or above compared to ~60% of all workers

20%
of job postings for selected occupations are "entry-level" positions (no BA, <2 years exp)

Tech Talent Assessment: Key Takeaways

What are priority jobs, career pathways, and recognized supply-demand gaps?

Software Developers and Information Security Analysts are top in-demand occupations in the region.

A bachelor's degree is frequently, but not universally, requested for "entry-level" positions in the region.

"Mid-level" roles are in high demand and finding "mid-level" talent is a key pain point for employers in the region.

Tech Talent Assessment: Key Takeaways

Which programs are the largest in the region and which are the most impactful?

Public postsecondary providers in Maryland, as well as private institutions in Washington D.C., heavily supplement the talent pool for technology occupations being produced by institutions in Virginia.

Security clearances are the most in-demand credential in the region, regardless of occupation. Security-related certifications are also prominent across occupations.

Work-based learning (WBL) opportunities such as internships were cited as key sources of entry-level talent.

Tech Talent Assessment: Key Takeaways

What changes are needed for employers to recruit and retain talent?

Women and people of color are under-represented in advanced technical and management roles.

The region's high cost of living limits options for workers to earn and learn, especially if they have student debt.

Career Pathways: Key Takeaways

- **Software Development**
  - High projected demand
  - Prominence in employer interviews
  - Potential for accessible entry point (user support/help desk)

- **Data Infrastructure**
  - Importance of data centers and related infrastructure to the region (especially based on interviews)
  - Accessible entry points: data center technicians, electrical/electronics technicians
  - Less emphasis on bachelor's requirement at the entry-level

- **Cybersecurity**
  - High projected demand
  - Relevance to the region
  - Potential for accessible entry point (network support/systems admin)

Detailed Findings

Demand Analysis – Staffing Patterns

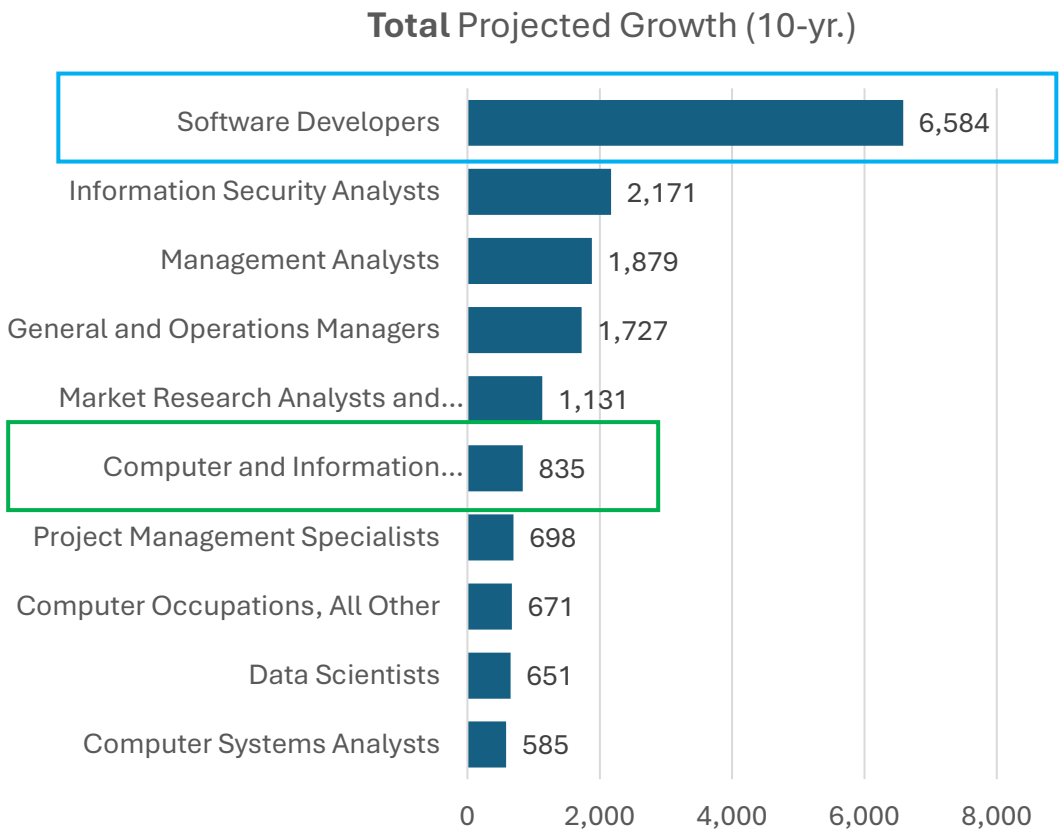
Software Developers are a key technology occupation, making up over a quarter of regional employment in the **Computer Services cluster**.

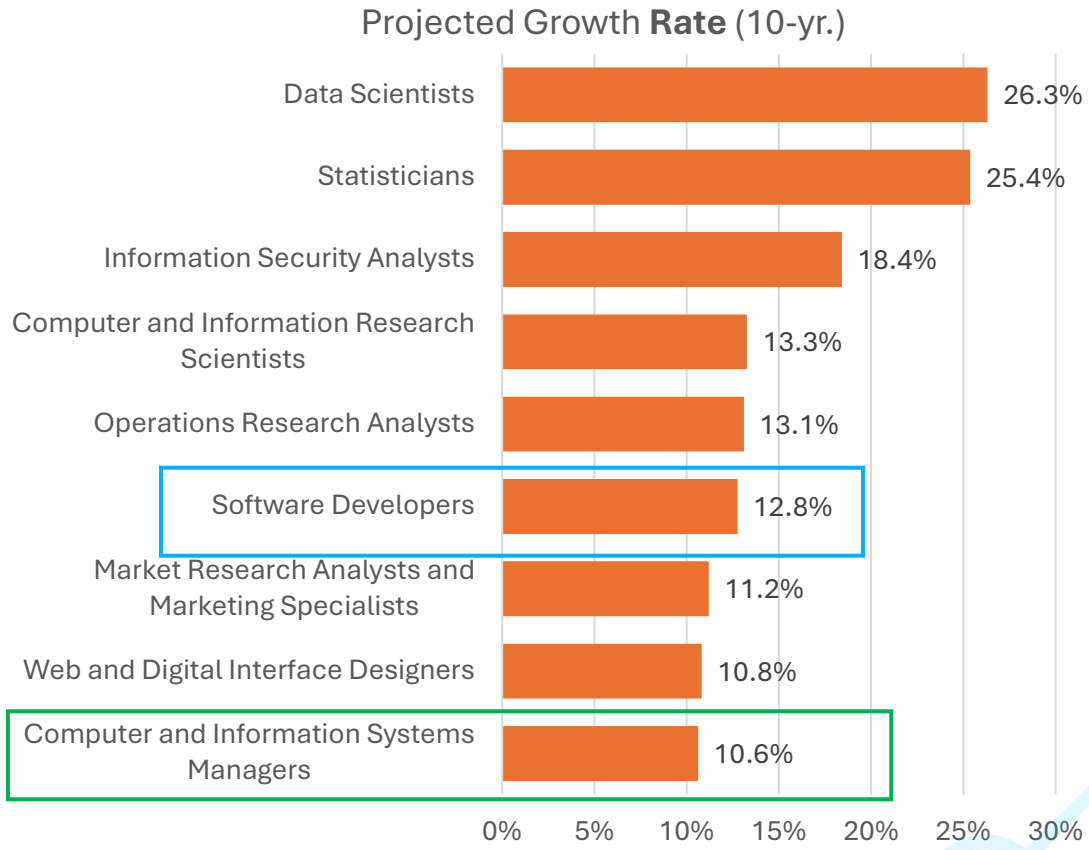
Description	Cluster Empl	% of Cluster	USA Rank
Software Developers and Software Quality Assurance Analysts/Testers	38,444	26.0%	1
Computer Systems Analysts	8,492	5.8%	3
Network and Computer Systems Administrators	6,768	4.6%	12
Information Security Analysts	6,571	4.5%	16
Management Analysts	6,036	4.1%	11
Computer User Support Specialists	5,807	3.9%	2
Computer and Information Systems Managers	4,886	13.3%	4
General and Operations Managers	4,783	3.2%	6
Sales Representatives of Services	4,335	2.9%	5
Project Management Specialists and Business Operations Specialists	4,021	2.7%	9

Source: Virginia Employment Commission

Quantitative Analysis - Demand

Software Developers and Computer Information Systems Managers are among the most in-demand technology occupations in the region based on projected growth.

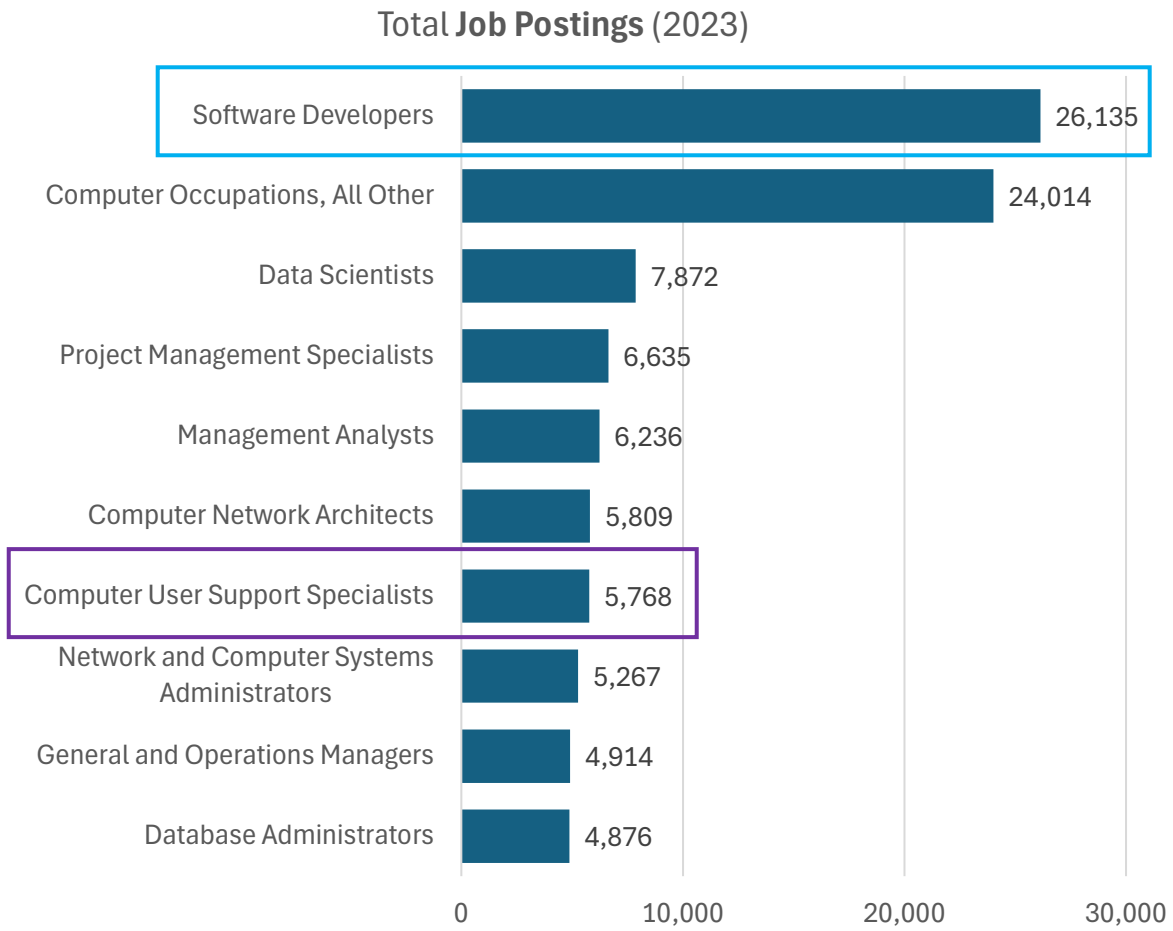


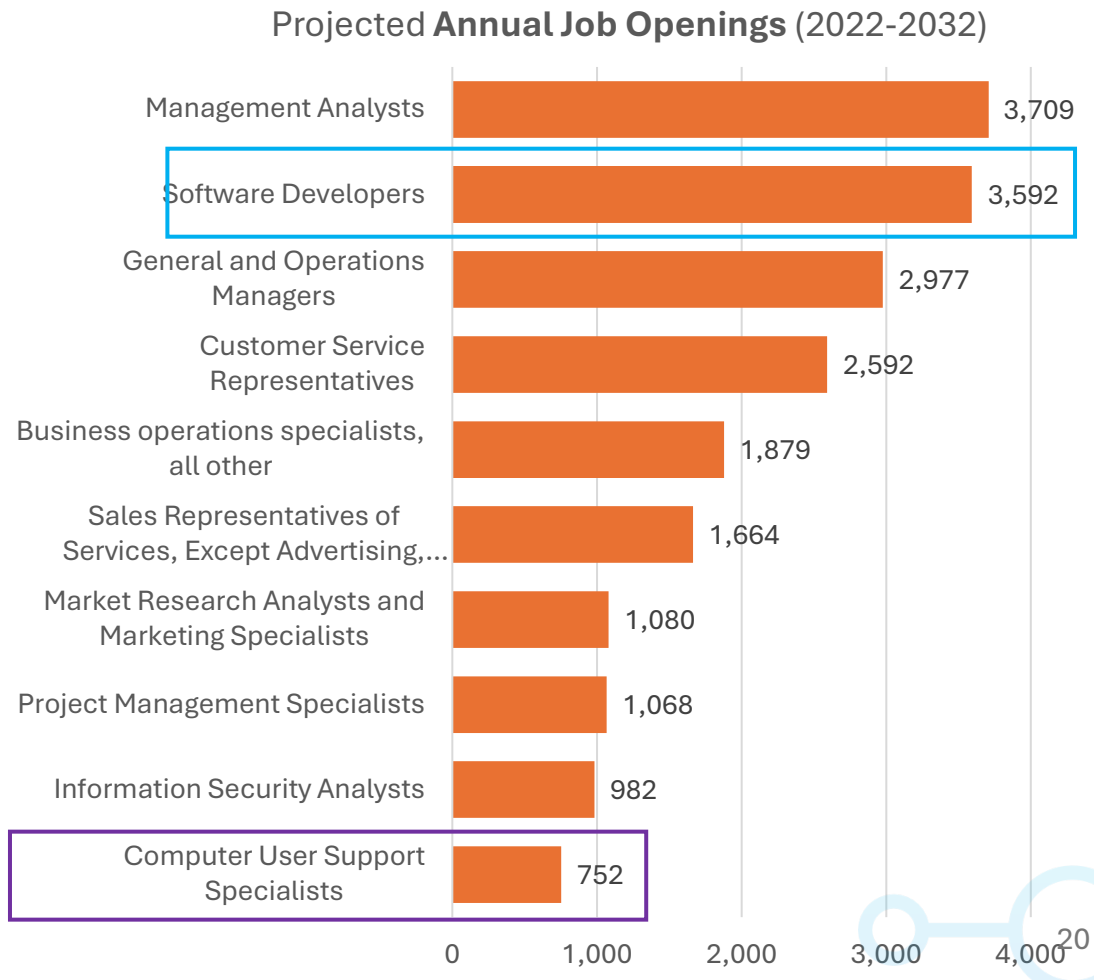


Source: Lightcast, 2021.4 Datarun.

Quantitative Analysis - Demand

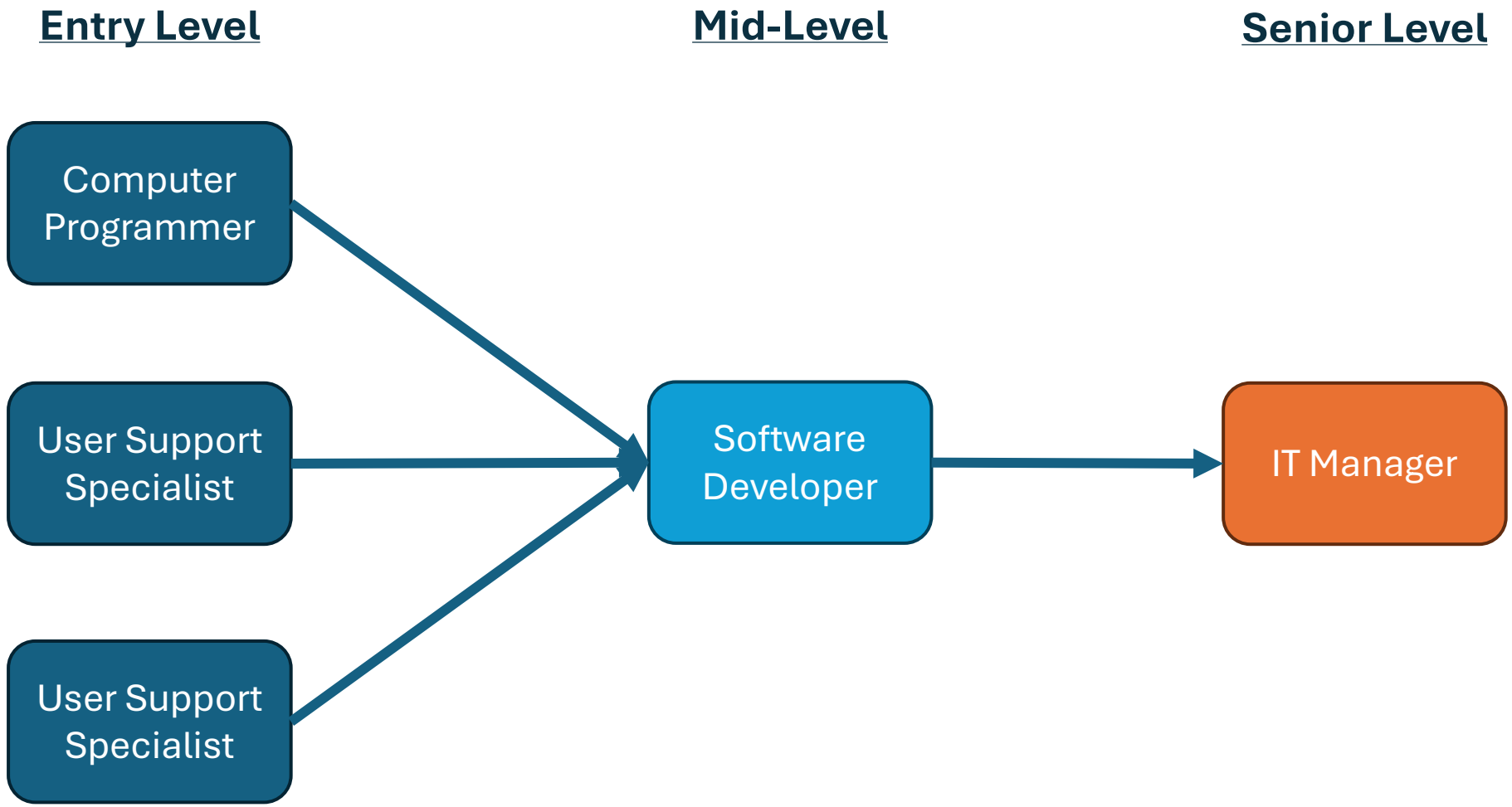
Substantial demand for Software Developers is also evident in high job postings and projected job openings. Computer User Support Specialists also rank highly.





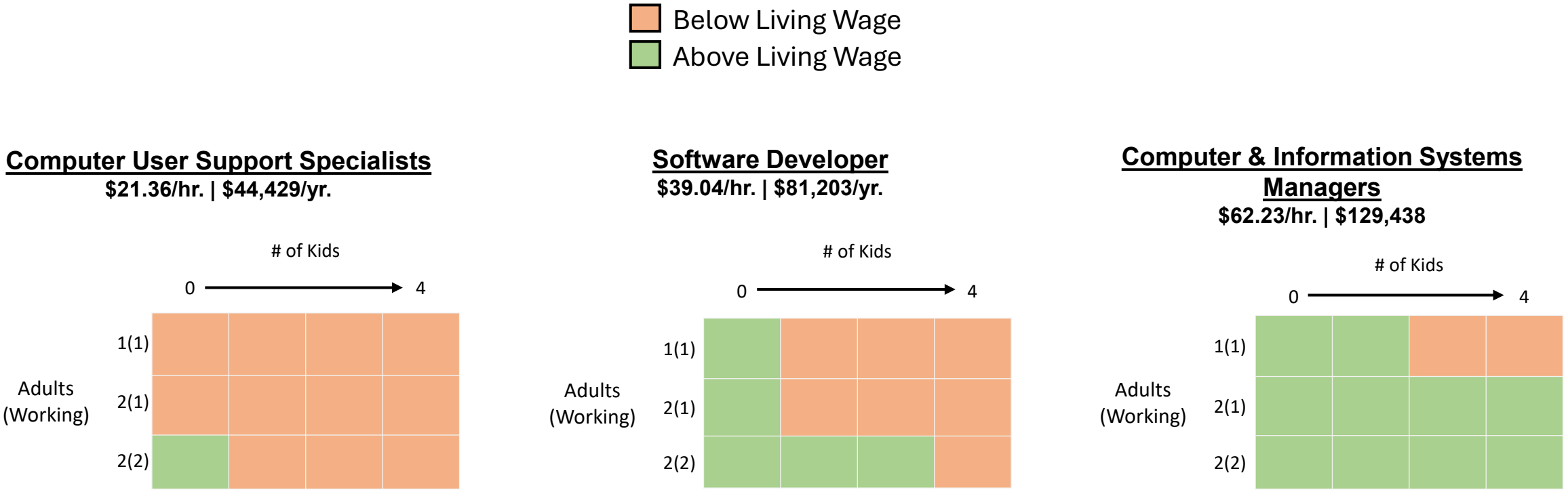
Source: Lightcast, 2021.4 Datarun.

Pathway Example



Sustainability Analysis - Wages

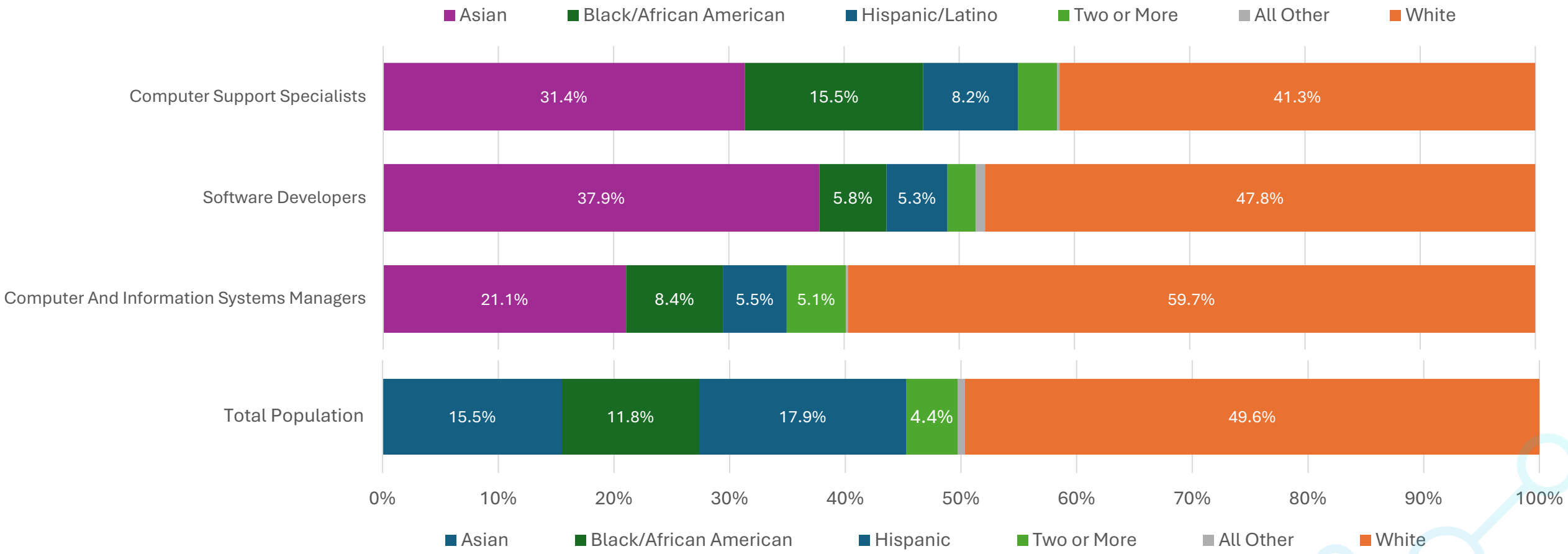
Entry-level wages for entry point occupations are high compared to all other occupations, but still fall below a living wage for most family sizes.



Sources: Lightcast 2021.4 Data Run. MIT Living Wage Calculator.

Sustainability Analysis – Racial Equity

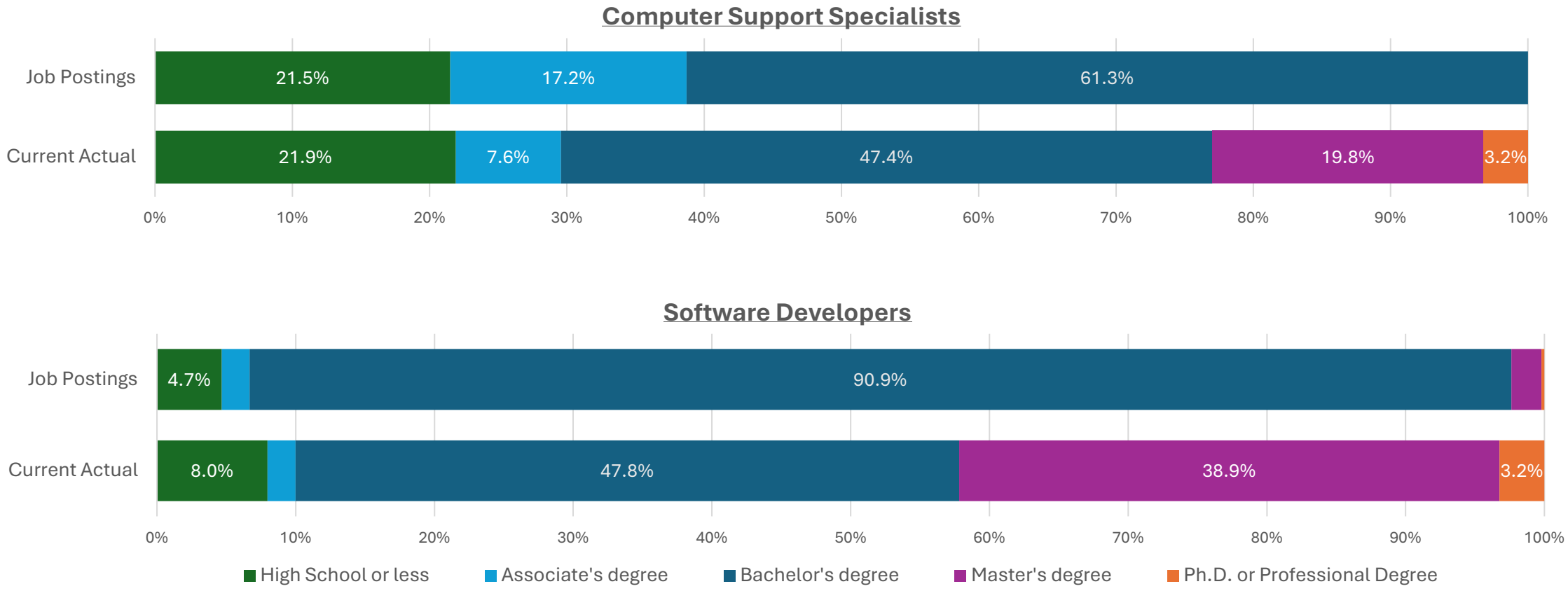
Workers in this pathway are more likely to be from underrepresented groups compared to the region's population, except for in management roles.



Source: ACS 2017-2021 5-yr Microdata.

Supply Analysis – Education Requirements

Job posting requirements tend to overrepresent Bachelor's degrees and underrepresent both sub-baccalaureate and graduate level credentials, especially for mid-level roles like Software Developers.

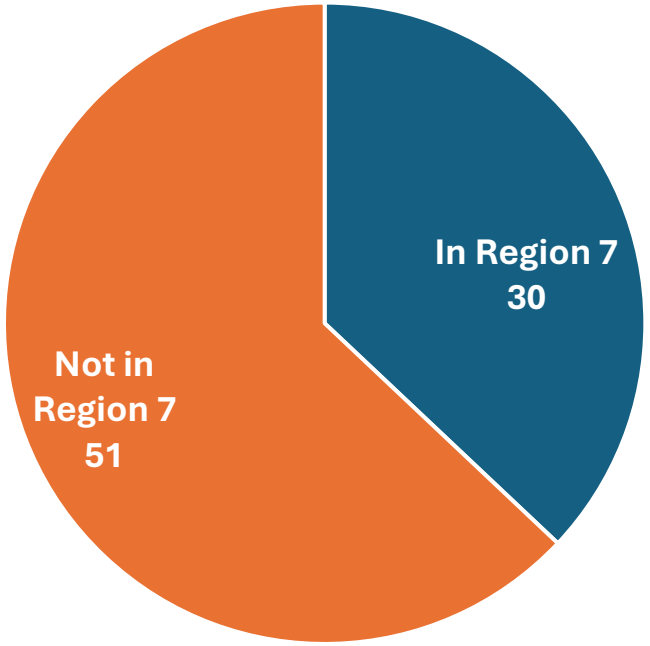


Sources: ACS 2017-2021 5-yr Microdata; Lightcast 2021.4 Data Run.

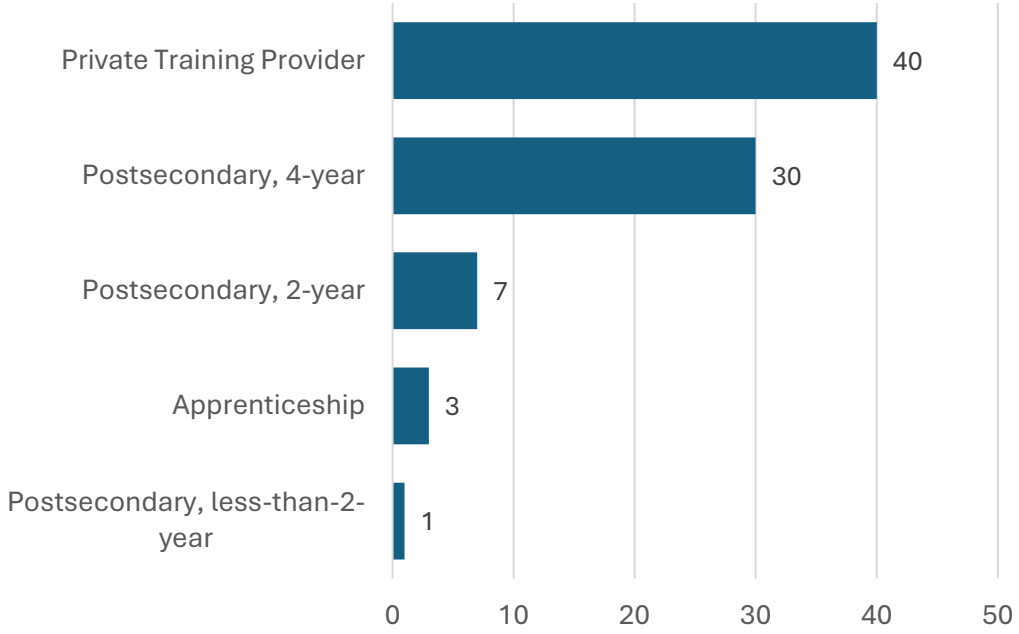
Supply Analysis – Education/Training Providers

There are a substantial number of private training providers offering related training in the region; most of the region's suppliers are outside Region 7.

Share of Related D.C. MSA Education/Training Providers in Region 7



Number of Education and Training Providers by Type



Sources: NCES IPEDS.

Supply Analysis – Postsecondary Completions

Completions metro-wide in programs related to Software Developer roles are high, with UMD producing the highest number of related grads.

Completions by Related CIP Program (D.C. MSA)

CIP Program	Completions
Information Science/Studies	3,365
Computer and Information Sciences, General	1,804
Computer Science	1,745
Information Technology	1,573
Systems Engineering	200
Computer Engineering, General	189
Computer and Information Sciences and Support Services, Other	85
Bioinformatics	58
Medical Informatics	48
Computer Software Engineering	34
All Other	*111*
Total Completions	**9,212**

Completions by Institution (D.C.MSA)

Institution	Completions
University of Maryland Global Campus	3,063
University of Maryland-College Park	1,844
George Mason University	1,098
Northern Virginia Community College	948
George Washington University	445
Montgomery College	281
American Public University System	254
Strayer University-Virginia	154
Strayer University-Global Region	108
Marymount University	107

Sources: NCES IPEDS ; Lightcast 2021.4 Data Run.

Qualitative Analysis: Key Roles and Certifications

Interview Grouping	CIOs	Small Businesses	Medium Businesses	Big Businesses	Education & Training Providers
Key Roles	**Software Developers** Cybersecurity Analysts Security Analysts **Data Engineer** **Project/Program Managers** Help Desk/Service Analyst	SharePoint Developers **Cloud/Data Engineers** Data Architects **Project/Program Managers** Data Analysts Development Operations	Java Developers DevSecOps Data/Business Analysts Consultants **Software Developers** Appian Developers Network Engineers Information Security Analysts **Project Managers** Technical/Help Desk Analysts	**Cleared Software Developers/Engineers** Information Systems Engineers Technical Service Specialists **Cloud Engineers** Full Stack Developer **Project Managers** Data Center Infrastructure Managers Support Engineers Help Desk Operations Service Center	Cybersecurity Analysts Cloud Computing **Software Engineers** Data Analysts Help Desk
Certifications	AWS Security Clearances Salesforce	AWS PMP Microsoft Certifications Power Apps Professional Engineering License	AWS Security Clearances Security Plus CISSP PMP Scrum Master Agile Appian Network Plus Red Hat Linus Six Sigma	AWS Security Plus CISSP PMP Scrum Master Java Python Network Plus CISCO	AWS Security Plus CISSP PMP Scrum Master CISCO CCNA Google IT support Python Google Data Analytics

Career Pathways

Which pathways should be expanded/fortified or refined and how?

Evaluation Criteria:

- Education/experience
- Credential requirements
- Skill transferability
- Wage progression
- Equity and representation

Recommendations & Next Steps

Career Pathways: From Issue to Action

Career Pathway Issue	Pathway Development Options	Tool/Structure/Program
Demand exceeds supply	• Expand the talent pool • Reduce turnover and ensure new talent is retained • Redesign roles that are in demand	• Community partnerships • New on-ramps • Retention programs • Job redesign
Lack of accessible entry points	• Assess if entry points are desirable • Reduce requirements and increase training • Connect entry points to advancement	• Requirements revision process • Wage progression adjustments
Degree requirement does not reflect employer needs	• Create scaffolding for degree attainment while working • Recognize and promote other credentials and training	• Skills-based hiring/evaluation • Community college programming • Credit for prior learning
Unable to attract/find middle-skill talent	• Upskill existing talent • Reskill adjacent talent • Fortify onboarding and path to advancement	• Onboarding and advancement training

Pathway On-ramps for Targeted Career Opportunities

Software Development

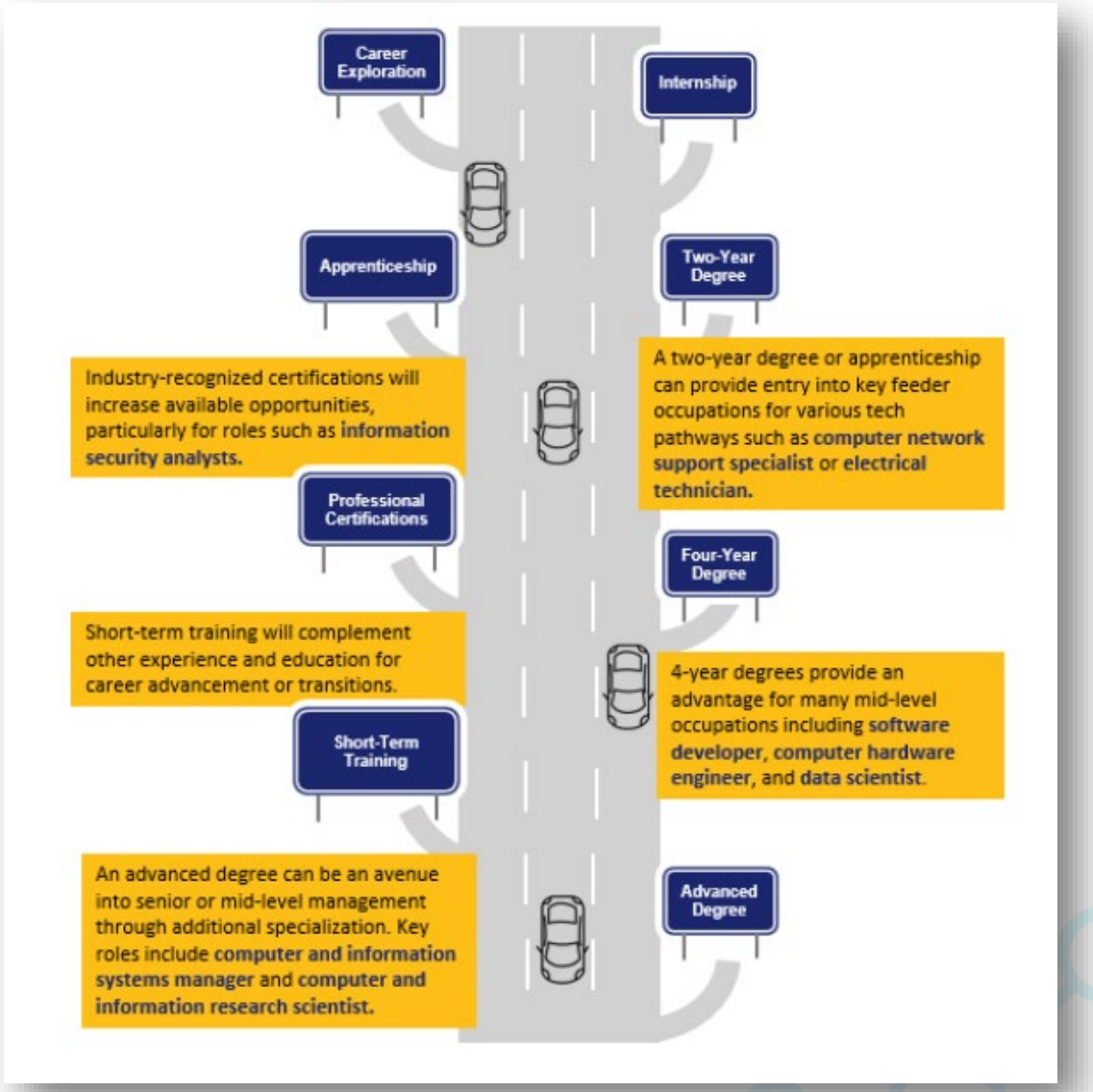
- High projected demand / accessible entry point (e.g., user support/help desk)
- Software QA and web developer pathways are more diverse (by gender and race)
- **Scale onboarding and upskilling programs** with small tech companies focused on ***mid-career talent***

Data Infrastructure

- Most accessible and diverse entry points: data center techs, electrical/electronics techs
- Less emphasis on bachelor's requirement at the entry-level
- **Support earn-and-learn model** for ***multi-skilled data infrastructure technicians***

Cybersecurity

- High projected demand and relevant to national interests
- Potential for accessible entry point (network support/systems admin)
- **Promote programming and cybersecurity centers of excellence** to support talent and other needs of small firms



Final Recommendations

Expand the number of multi-skilled technicians in data infrastructure pathway

Boost worker retention for small- to mid-sized tech companies with robust upskilling support programs

Develop lab-based, paid work experiences sponsored by local employers

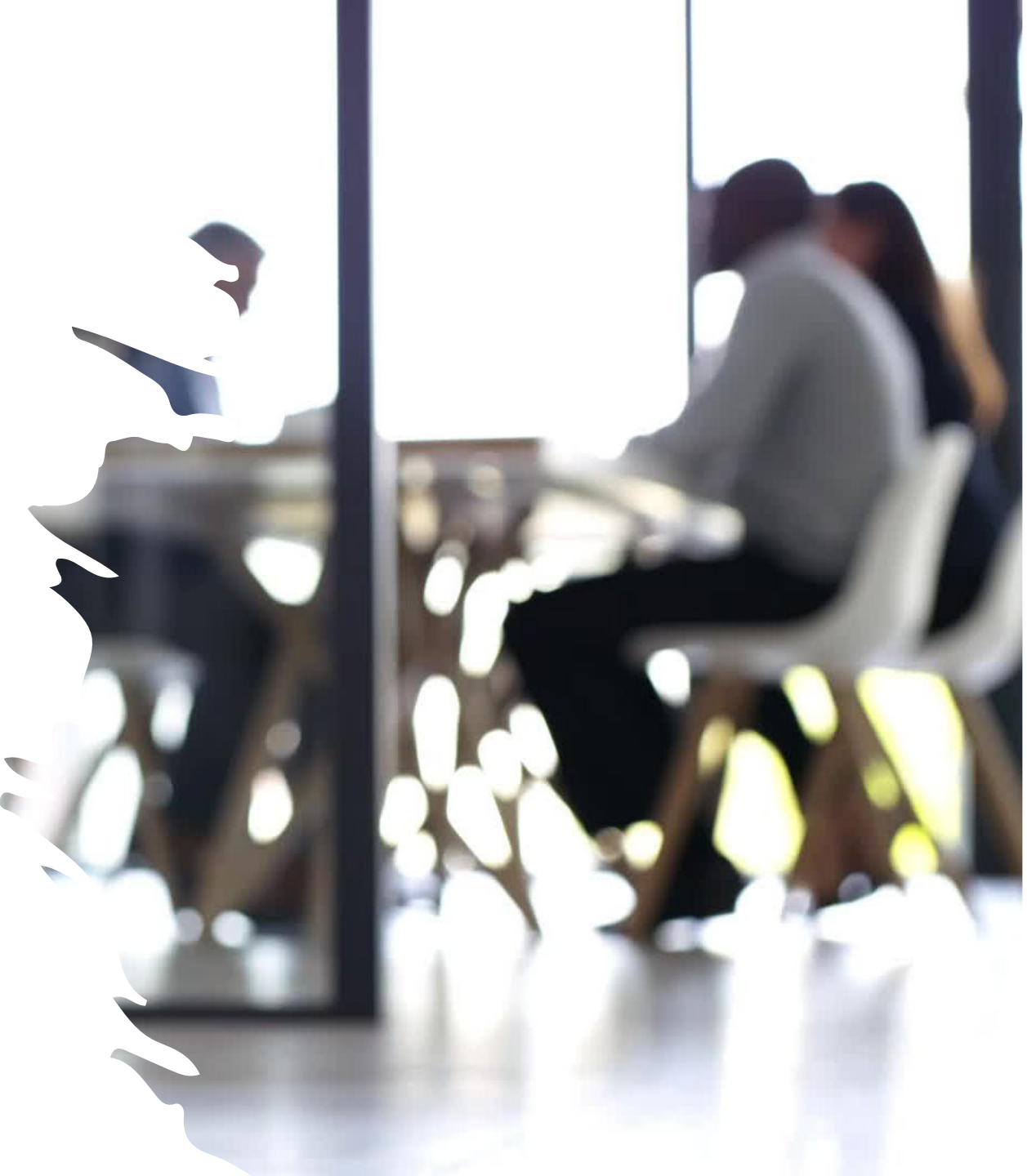
The Role of AI

- Occupations **that typically require higher education and offer higher pay are more prone to technological disruption by AI**. However, it is still unknown to what degree these occupations may be impacted and **there is still a lot to learn**. Some employers are expecting job decline due to AI, and **others are expecting job growth** (NC Department of Commerce, 2024).

- Amongst the selected technology occupations, the **portion of job postings requiring any AI skill is 2 percentage points higher in Region 7 than for the nation** at large (Lightcast, 2024).

- **New women entrants** to the data, analytics, and AI field are at a **16-year low** relative to men entrants (KPMG & Revelio, 2024).

Bottom Line: Region 7 should be responsive to these dynamics, focusing on projects that fortify resilient and diverse talent pathways that can be adapted as the field evolves.



Regional Coordination

Currently, there **is no one in the region who has the capacity to organize employers of tech talent to address their persistent pain points**. Companies are not tracking or evaluating their investments. They are not aware of leading programs and how to support them.

A regional coordinating entity is needed to support small and medium sized companies that invest in talent retention programs as part of a growth and innovation strategy -- celebrate these champions and promote the programs that deliver ROI at scale.

Implementation Planning

Low-Hanging Fruit	Near-Term	Long-Term
Publicize regional training and upskilling efforts with ROI information about work-based learning	Create a **forum for small- and medium-sized businesses** to collaborate on challenges and solutions	Establish a new **regional anchor organization** to coalesce tech talent efforts
Support and **celebrate homegrown tech companies** that champion homegrown talent	In response to issues raised, **conduct regional workshops and training that address employer pain points**, sponsored by larger companies, for smaller companies	Sustain momentum by **engaging stakeholders in reviewing results** and coordinating responses
Promote NOVA programming and cybersecurity centers of excellence as a continuum of services for small- and medium-sized businesses	Identify **corporate and philanthropic support to launch programming** and begin to track progress towards delivering ROI for employers and employees across the region	Continuously **report on expected and actual ROI for employers and employees**—connect to VOEE and establish a decision support system