

2020 EXECUTIVE WORKFORCE STUDY

A nationwide survey of large U.S. employers
assessing the scale, impact and urgency of
labor shortages

Nicholas J New
Charles F Cornish
American Apprenticeships Work

EXECUTIVE SUMMARY

THE TECH SKILLS CRISIS IN THE U.S.

For the past decade traditional tech and eCommerce companies like Google, IBM, Microsoft, and Amazon have led the growth of jobs in IT, Data and AI. As technology progressed these companies were forced to compete with thousands of startups for the best and brightest talent, drawing from an increasingly shrinking labor pool.

Today, that pool has dried up. In 2020 there are only 134k new and sufficiently skilled IT and tech workers entering the U.S. job market and over 918k¹ open IT and tech jobs. The gap between hiring need and available talent has created a skills crisis for the U.S. workforce.

This skills crisis becomes even more severe as thousands of large US employers outside of the traditional tech & ecommerce world join the competition for limited talent. These recently digitally transformed businesses are a wave of **New Tech** employers who are adding extra pressure on the labor market.

The 2020 Executive Workforce Study aimed to quantify the increase in tech talent demand, and measure the business impact for New Tech companies over the next three years. We surveyed senior HR and business leaders on common issues, recruitment practices, challenges, and awareness of Apprenticeships as a training solution when hiring tech talent. In total we had contributions from over 10% of the Fortune 1000.

Our research found that **New Tech organizations intend to hire over 200k newly created tech and IT related roles per year**, between now and 2022, adding tremendous demand pressure on the already short supply of talent.

The survey was broken into three sections **Scale, Impact, and How Employers are Reacting**. Our data revealed that the the skills crisis is already being felt by U.S. companies across all industries and is creating significant challenges, including:

- ❑ 100% of companies will experience critical HR issues hiring for tech roles
- ❑ 97% expect to find talent recruitment a problem
- ❑ 9 out of 10 employers have issues retaining tech talent
- ❑ Employers are hiring candidates who do not have the right skills
- ❑ 91% will experience wage inflation hiring tech talent
- ❑ 46% have projects that do not start, 31% have had to stop projects
- ❑ 1 in 3 U.S. businesses freelance talent overseas

The following sections include excerpts from our full report, highlighting data and insights on how:

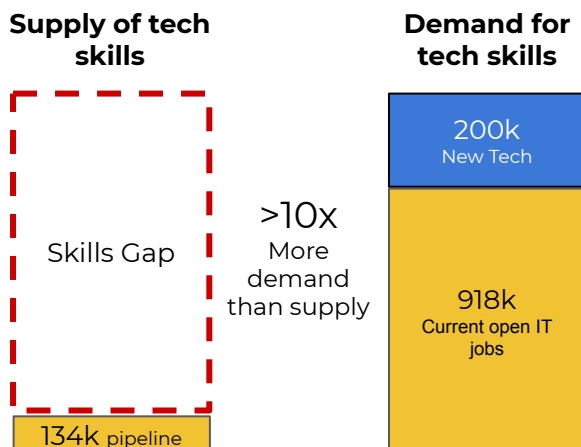
- ❑ The supply of talent will not meet demand
- ❑ Ways of working have changed
- ❑ Employers plan to hire over 200k New Tech roles
- ❑ Hiring for specific tech skills will get harder
- ❑ HR is experiencing costly issues
- ❑ Projects slow, stop, and increase in cost
- ❑ Traditional HR recruitment methods do not increase the supply of talent
- ❑ Apprenticeships create a skilled workforce that solves the skills gap

Despite significant efforts by HR teams to attract new talent, employers are not going to be able to buy the talent they need, they are going to have to build it.

This will involve some different but achievable changes in approach to reskilling existing and future talent.

How can companies rapidly address this growing concern? Modern apprenticeships are a viable, scalable, and well supported solution that can solve the skills crisis.

Quantifying the US Skills Gap



SCALE OF THE TECH CRISIS

The supply of talent will not meet demand

Digital transformation disrupts jobs and productivity

Trends in AI and automation are going to rapidly expand the skills gap by displacing current jobs. It is estimated by 2030 up to 50m U.S. workers may need to change their occupation to find work due to automation². If companies do not adequately prepare for the impact of new technology the U.S. could miss out on \$1.748tn in productivity from labor shortages, or roughly 6% of the entire economy by 2030³.

Unemployed workers require training

At the beginning of 2020 unemployment was at a record low of 6m. During this time there were 6.7m open jobs in the U.S., most requiring some level of technical skill. For jobs related to IT the vast majority of these potential candidates were not yet qualified to fill open tech positions and required additional levels of training and certification.

With the current COVID crisis there are now 4x as many unemployed workers than there were in February, approximately two thirds of this increase coming from the hospitality and leisure industries. For companies not on hiring freezes it may be a challenge to find sufficient 'plug and play' candidates from this pool without having to provide additional training and certification programs.

The education pipeline is insufficient

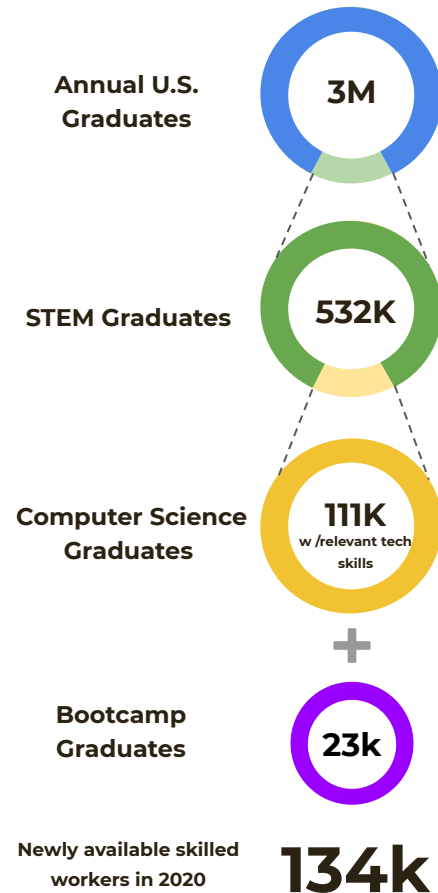
Policy makers, HR and IT leaders pay close attention to the STEM pipeline as an indicator of how domestic talent can fuel future economic growth and fulfil hiring needs. To understand the impact of the next five to ten years of business we need to understand what is coming down the STEM pipeline.

In 2019 three million graduates obtained an Associates Degree or higher in STEM related fields. The most relevant field, Computer Science (CS) had only 111k graduates.

Assuming every CS graduate took a job in the U.S. this would barely begin to fill the 918k open tech jobs in tech, or the additional 200k positions forecast from the New Tech Employers.

Troublingly, farther down the pipeline, 78% of high school graduates do not meet benchmark readiness for one or more college courses in mathematics, reading, or English⁴. This does not improve the prospects of adding more qualified STEM graduates in the future.

U.S. Graduation Rates Associate's Degree or Higher



Only 134k sufficiently skilled workers

Recently recruiters and HR have loosened the traditional four-year graduate degree requirement and have begun hiring candidates who obtain qualifications through alternative pathways like coding bootcamps. However, even though the number of bootcamp graduates grew 49% from 2018 to 2019, the total number of 2019 graduates was only 23k⁵. Adding this pool to the 111k CS graduates⁶ we only have 134k skilled workers available on the market. This pipeline is nowhere near the growth required to address labor market needs.

The current education system is not going to provide the required volume of workers anytime soon.

Next we look at our 2020 Executive Workforce study data and see how large organizations are reacting to these challenges.

SCALE OF THE TECH CRISIS

Ways of working have changed

Large employers agree technology has disrupted business and created a need for skilled tech labor

In order to establish a clear foundation for our data we asked two questions:

- Has technology changed your business & created a need for more technical skills?
- How much of an impact have recent changes in technology had on the skills your employees need to be successful?

We segmented and analyzed the data by:

- Goods and Service Producing Industries
- Company Sectors

Across the total sample **9 out of 10 senior executives agreed their businesses have been disrupted and that there is a need for new skills**. The remaining 10% responded that they expect this to be a problem in the future.

Ranking their level of disruption on a scale of 1 to 10, with ten being the most impacted, the average response was 7.5, indicating a widespread and serious challenge affecting organizations right now.

By Industry

The Goods Producing employers in Figure 1 claim a higher level of disruption compared to the Service Producing employers, yet in Figure 2 have a lower % of employers experiencing the problem now vs the future.

By Sector

Looking at ten large Industry sectors in Figure 3 we see that Manufacturing, Finance & Health sectors claim to be the least impacted by technology. However, in Figure 4, over 80% of companies in those sectors report the impact of technology as being a problem now.

All other industries report that technology has changed their business and created a need for more technical skills.

Technology has changed how business is done and how jobs are defined. Next we look at data on how many roles are needed to address this impact.

Figure 1: How disrupted is your business? (score out of 10)
By Industry

Group	Disruption Score
Goods Producing Industries	7.7
Sample Average	7.5
Service-Producing Industries	7.4

Figure 2: Is this a problem? Now or in the future
By Industry

Group	Problem Now	Problem In Future
Goods Producing Industries	85%	15%
Sample Average	90%	10%
Service-Producing Industries	94%	6%

Figure 3: How disrupted is your business? (score out of 10)
By Sector

Sector	Disruption Score
Utilities	6.7
Finance and Insurance	6.8
Health Services	7.3
Retail Trade	7.3
Transportation and Warehousing	7.3
Sample Average	7.5
Leisure and Hospitality	7.7
Professional, Scientific, and Technical Services	7.8
Manufacturing	7.9
Information	8
Construction	9

Figure 4: Is this a problem? No, now, or in the future
By Sector

Sector	Problem Now	Problem In Future
Manufacturing	81%	19%
Finance and Insurance	86%	14%
Health Services	86%	14%
Sample Average	90%	10%
Construction	100%	0%
Information	100%	0%
Leisure and Hospitality	100%	0%
Professional, Scientific, and Technical Services	100%	0%
Retail Trade	100%	0%
Transportation and Warehousing	100%	0%
Utilities	100%	0%

SCALE OF THE TECH CRISIS

Employers plan to hire over 200k new tech roles

U.S. employers plan to hire significant numbers of skilled tech workers in 2020, and more in 2021 & 2022

To quantify the volume of hiring we asked how many roles executives plan to hire for in 2020, and then annually in 2021 / 2022.

The results are very encouraging from a job-creation perspective, but they are indicative of an imminent and severe skills gap crisis for large U.S. employers.

Averaging across three years :

- **50% of companies plan to hire 100 or more new roles each year**
- **25% of companies plan to hire more than 500 or more roles each year**

Looking at the data by company size the volume is unsurprisingly driven by very large employers (10,000+), but not exclusively.

Analysis by Industry sector reveals the major reason behind forecast hiring over the next few years.

Service Providing Industries (SPI) report planning to hire significantly more than Goods Producing Industries (GPI) - almost 2x as many.

28% of SPI plan to hire more than 500 people per year over the next three years, vs 20% of GPI.

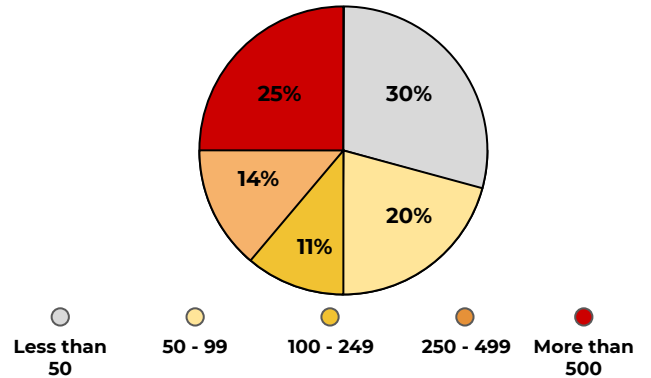
This SPI growth is driven by industry sectors of Retail, Finance, Health and Professional, Scientific & Technical Services.

These sectors have invested heavily in digital transformation over the last 5 years. Transformation projects that have had time to mature often result in periods of rapid hiring to build capability and realize the business potential of their investment.

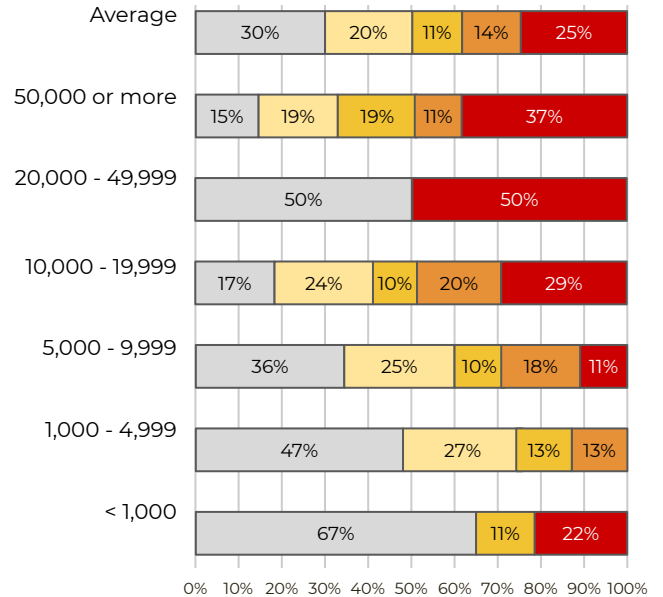
Extrapolating our numbers to Fortune 1000, we estimate over 200,000 new jobs being created across New Tech companies, adding to the 918k currently open positions in traditional tech.

Organizations need these critical roles filled, but how difficult is it to fill them?

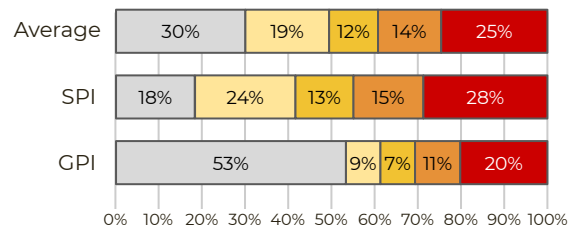
Hiring forecast: average number of new roles per year 2020 - 2022
Total Sample



Hiring forecast: average number of new roles per year 2020 - 2022
Company Size



Hiring forecast: average number of new roles per year 2020 - 2022
Industry



SCALE OF THE TECH CRISIS

Hiring tech talent will get harder

U.S. Employers expect hiring in-demand tech roles to be more of a challenge in the near future

The need for tech skills will continue to expand over the next few years, placing more demand pressure on the limited supply. Employers are already experiencing major hiring issues and a shortage in supply of talent from traditional sources.

We asked employers if they thought hiring would get easier or harder in the future for six in-demand tech skills:

- Data Analytics
- IT & Software Development
- Cybersecurity
- Blockchain
- Advanced Manufacturing, Robotics & Automation
- AI & Machine Learning

Data skills are rated hardest to hire today

Data Analytics, AI & Machine Learning, IT & Software Development, and Cybersecurity were rated the top four as hardest to hire today, and in the future.

Data skills were rated hardest to hire for today, but overall employers believed Cybersecurity and AI & Machine Learning would be more difficult to hire for in the future.

Service Industries found Data and Analytics to be the most challenging hires today, and Cybersecurity to be the biggest challenge to hire for in the future. The Service Industry is responsible for the large uptick in Blockchain, which still rated as the least challenging to hire for now and in the future. This could be attributed to it being a new and largely unadopted technology with perceived future utility.

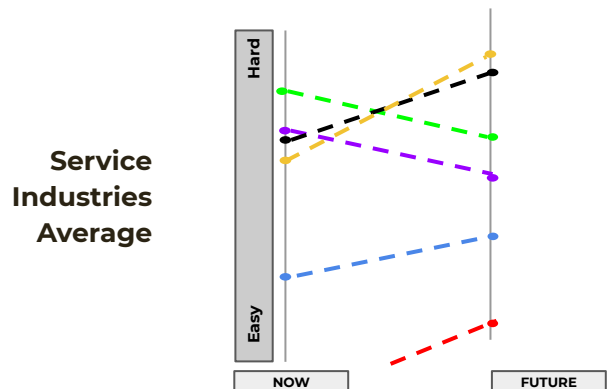
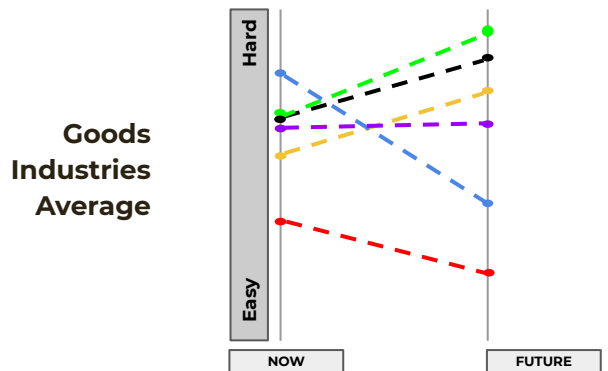
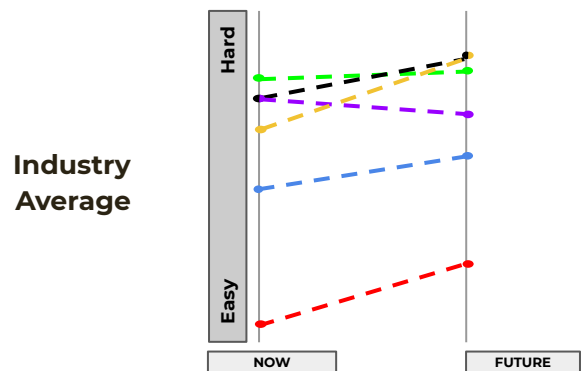
Apprenticeships investment in Advanced Manufacturing & Robotics

For Goods Industries Advanced Manufacturing and Robotics is the hardest skill to hire for today, however it is rated 5th hardest in the future. In 2020 there will be over \$100m of Federal DOL investment in Apprenticeships⁷ for Advanced Manufacturing & Robotics, which could support surveyed employers confidence in the future supply of skilled talent. Automated roles also tend to reduce headcount and require less future hiring.

On average all skills for New Tech companies are expected to get more challenging to hire for in the future. The next section illustrates how this is affecting HR.

What tech skills are a challenge to hire for? Now and in the future

- Data Analytics
- IT & Software Development
- Adv Manufacturing Robotics
- AI & Machine Learning
- Cybersecurity
- Blockchain



SCALE OF THE TECH CRISIS

HR is experiencing costly issues

100% of U.S. employers will experience one or more critical HR issues hiring for tech roles

We asked U.S. executives if they were experiencing common HR and recruitment issues when hiring, retaining & managing tech talent including:

- Talent Availability
- Employee Retention
- Wage Inflation
- Missing Technical Skills
- Missing Soft Skills
- Career development
- Engagement & Retention

There is a clear pattern across all industry sectors - there are serious issues with Talent Availability, Wage Inflation, Missing Skills, & Retention.

Talent availability is the most common, and most serious issue. Experienced across all but very specialist sectors, only 3% claim it is not a problem.

Wage Inflation and Retention are major problems in tech

Many tech roles are already highly paid and experiencing annual wage growth between two and four times⁹ above the 3% national average⁹, according to the Bureau of Labor Statistics in 2020.

Keeping wage costs under control is a goal for all employers. Managing this when candidates & employees command higher salaries due to high demand and a tight labor market is even more challenging. Our survey confirmed that wage inflation is almost universal across U.S. sectors, 91% claiming a problem now or in the future.

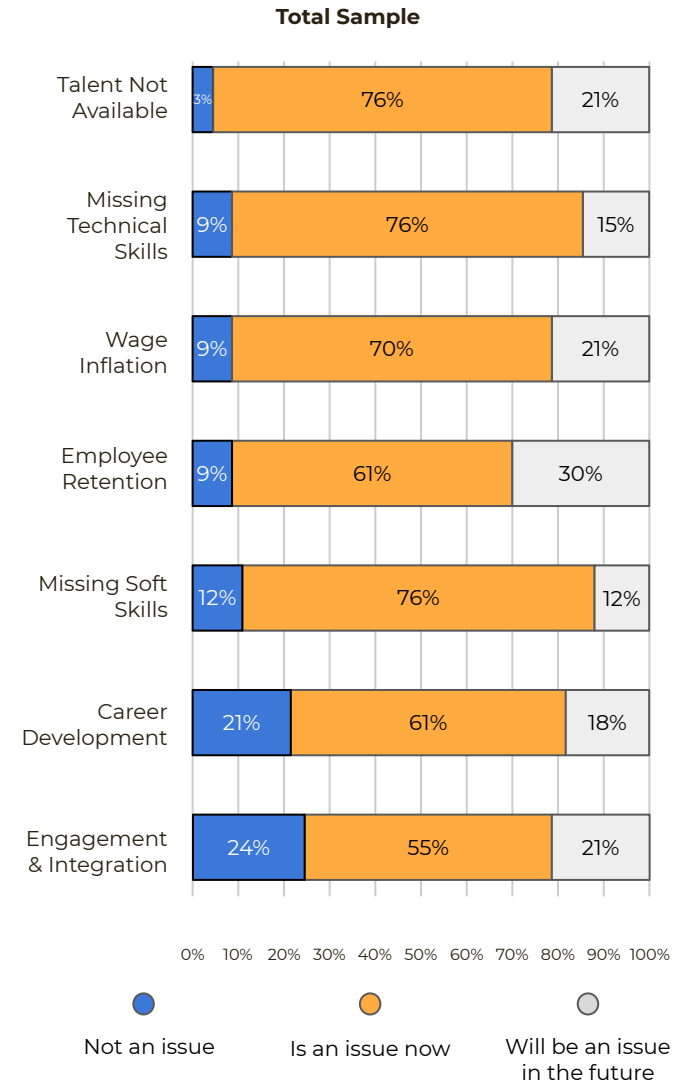
Employee retention is a serious issue across sectors

91% of companies see retention as a problem now or in the future. With SHRM estimating the cost of replacing an employees at 90%-200% of their annual salary¹⁰, and 38% of technology employees claiming they are likely to change employers this year¹¹, companies need to evaluate how they onboard and retain talent.

While Career Development & Employee Engagement are the least common HR issues reported, they are still commonplace. More than 75% of surveyed employers reported these as an issue now or in the future.

Our full report includes detailed analysis of each of these challenges by industry, sector, and company size.

What issues do you experience hiring, retaining & managing tech talent?



IMPACT OF THE SKILLS GAP

The low availability of talent is costly

Projects are slowing stopping and increasing in cost

Without enough skilled candidates for the number of tech roles in the U.S., business is bound to be impacted. The projects and company growth plans that these roles are intended for will be compromised.

This impact is already having a serious effect on companies of all sizes and industries.

We looked at six challenges common to this issue and found that 82% of large U.S. employers had projects slow down due to not having the right tech talent. Additionally:

- 50% were freelancing domestically at higher cost
- 38% had projects not start, or had to reduce project requirements
- 29% had to stop existing projects or freelance overseas

Freelancing overseas is less common in very large organizations (over 10,000 employees)

Where businesses resolved to keep projects on track, about 43% freelanced talent domestically, 39% had to reduce project requirement), and nearly 3 in every 10 employers (29%) turned to freelancing talent overseas.

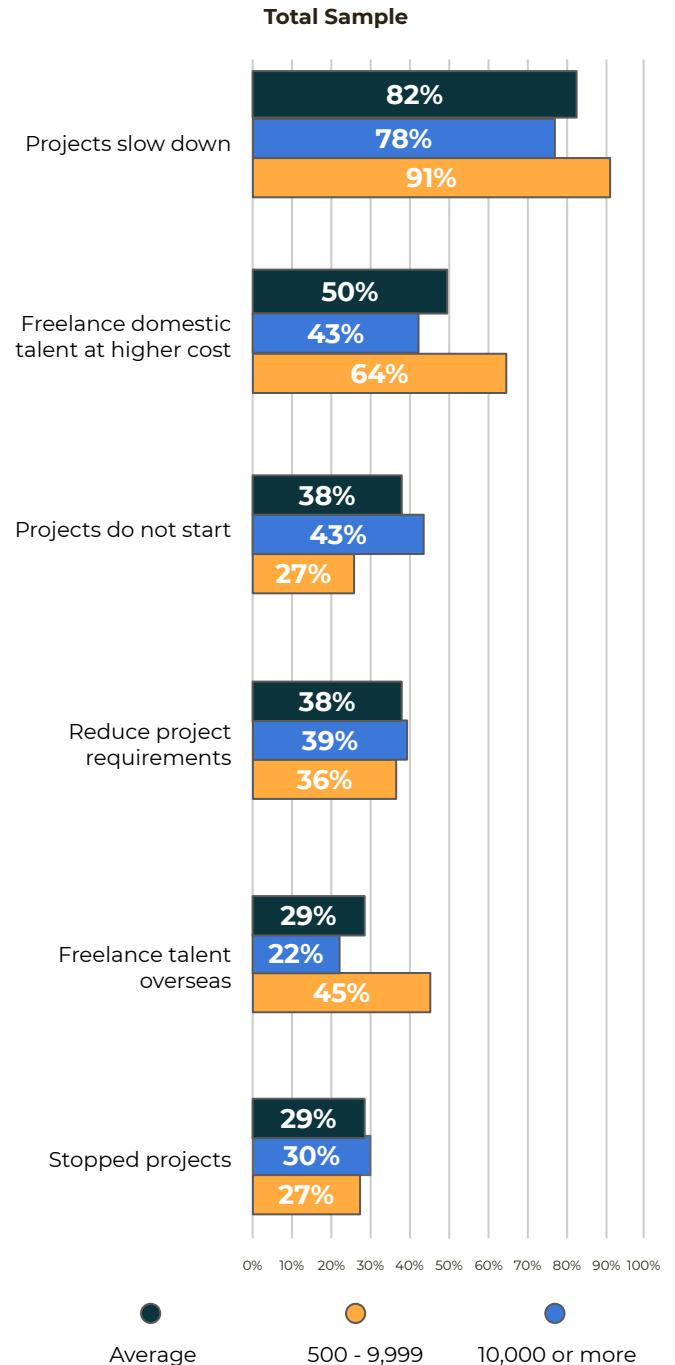
Companies with under 10,000 employees are 2x more likely to freelance talent overseas - with respondents coming from industries across various sectors including Utilities, Retail, & Manufacturing.

When, on average over 8 in 10 projects slow down and almost 1 in 3 completely stop valuable time is lost, expenses pile up, and income forecasts shrink.

Without quickly finding a way to obtain properly skilled labor these companies will fail to realize their sizeable digital transformation investments, risk losing revenue and, over time, lose out to competition.

It is important that hiring managers and HR put the right talent in place to mitigate these costs. Next we look at hiring practices and how large organizations are approaching this specific challenge.

What is the business impact of not being able to fill roles with the right tech talent?



HOW U.S. EMPLOYERS HAVE REACTED

Traditional HR methods do not increase the supply of talent

Traditional methods of attracting and retaining talent dominate HR efforts

After exploring the extent of the skills gap among large U.S. employers, and its impact, we wanted to assess the approaches large employers are using to obtain tech talent.

Across the sample, the top five approaches were: Referrals / Personal networks, Internships, College/University recruiting, Training / Career development; and Enhanced compensation / benefits.

Re-training existing employees and engaging Veterans were not far behind with approximately 6 in 10 respondents citing these approaches.

These traditional methods are widely used however, they are not fulfilling current hiring need. Considering the labor market conditions and the projected growth in the skills gap, these methods will not be able to satisfy future demand.

Employers understand how Apprenticeships address critical HR challenges but adoption is low

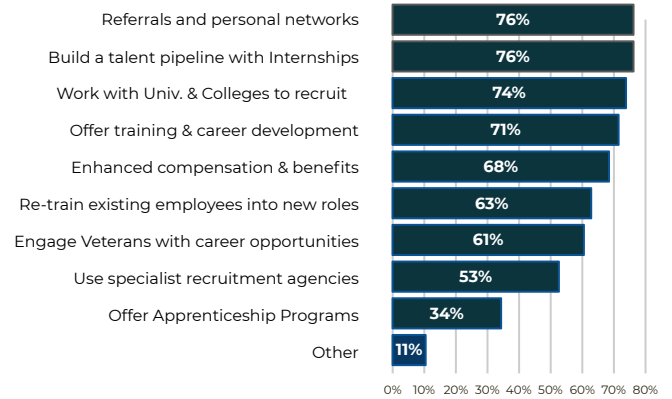
Across all the companies surveyed, just over 1 in 3 use Apprenticeship programs to recruit for tech talent. However, a vast majority of companies surveyed were aware of how Apprenticeships could be used as a tool to solve issues like diversity, tech recruitment, and re-skilling.

Of the 2 in 3 companies with no apprenticeship programs only 5% of understand the costs and logistics of setting one up. This suggests that most organizations are yet to begin, or are very early in the consideration stage for tech Apprenticeships. Most large organizations appear to understand that there is a solution but are not sure where to start.

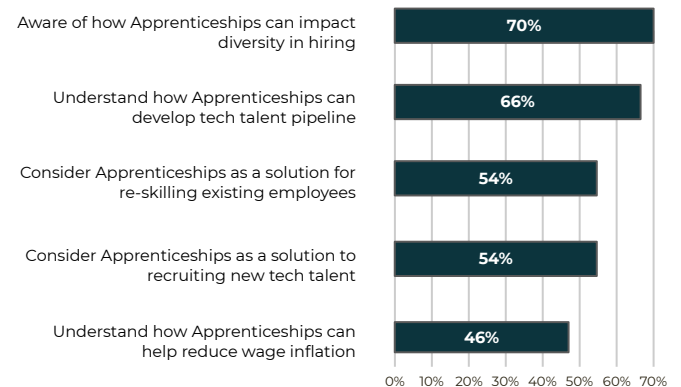
Traditional recruiting needs to be supplemented with a powerful tool

Modern apprenticeships are a tested and proven method of building rapidly scalable, customized talent pipelines. To stay ahead of the skills crisis and meet their business goals employers need to quickly understand and engage with this model in order to attract, create, and retain talent.

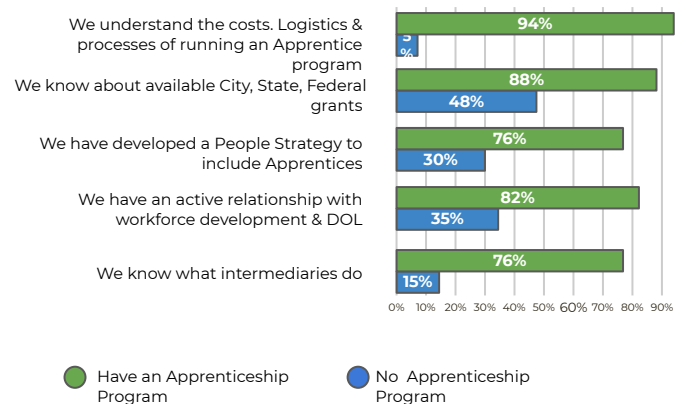
What approaches do you use to recruit tech talent?



Awareness of Apprenticeships Average



What do organizations understand about how to set up Apprenticeship programs?



Apprenticeships create a skilled workforce to solve the skills crisis

HR teams are working hard to address the skills gap

Large US employers are not ignoring the skills crisis. Judging by our survey responses, HR teams are putting in considerable effort to meet their tech hiring needs.

The problem is that these traditional methods assume two things:

1. That there is sufficient ready-made talent in labor market
2. That the education system is producing sufficient new skilled talent

Since we know both of those assumptions do not align with the state of the labor market, it's not likely these efforts will reap sufficient rewards.

Modern tech apprenticeship models are the solution for a modern tech workforce

Modern Tech Apprenticeships are an industry-driven, high-quality career pathway where employers can develop and prepare their future workforce, and individuals can obtain paid work experience, classroom instruction, mentorship, and a portable, nationally-recognized credential.

The earn-while-you-learn method of Apprenticeships allows businesses to gain skilled labor faster than traditional hiring and education pipelines, at scale.

Apprenticeships are perfectly set up to:

- address workforce diversity
- build relationships with local communities
- help employers save jobs where workers might have otherwise been laid off
- Retrain existing employees on the job

All this brings numerous benefits in retention, reward and employee engagement, and return on investment, solving a majority of the problems currently created by the tech skills gap¹².

Apprenticeships are a proven method to create talent

Europe has seen widespread adoption of modern Apprenticeship programs in countries like the UK, Germany, and Switzerland.

Faced with a similar skills crisis these countries evolved the Apprenticeship model, traditionally associated with blue collar roles, into tech career paths. This quickly addressed the rapidly growing need across many business sectors and functions including technology, marketing, healthcare, finance, and leadership.

The programs have become a notable fraction of their workforce:

- In Germany, over 1.5 million apprenticeships¹³ have started programs since 2017
- In the UK over 1.1 million apprenticeships¹³ have started since 2017
- In contrast, during that same period, there have been 705,000 apprenticeships starting in the U.S. for all types of Apprenticeship, not just tech¹⁴

Apprenticeships in the U.S. are gaining momentum

Differences in European governments approach to policy, as well as their tax and social structures have contributed to the growth of their Apprenticeship programs. In the U.S. this approach to job creation has seen bipartisan support across multiple Administrations as a driver for the future economy, enabling a bright future for American workers and business.

Domestically the growth is encouraging. Apprenticeships in the U.S. have been expanding at over 200,000 enrollments per year¹⁵. This rate has increased with additional funding commitments from the federal government, climbing considerably with over \$285M committed¹⁶ in 2019. This funding allows costs to be offset through Federal, State & City programs.

Case studies in the US and abroad have proven that these programs work and are driving results, including:

- 87% retention rates¹⁷
- Up to \$1.47 return on investment for every \$1 spent¹⁷
- Up to & over 15% cost savings over a traditional hire¹⁸
- Training industry and government standards
- Increase in diversity and innovation

Even in the current social and economic climate large organizations can work with the right partner to build their own custom talent pipelines, tailored to fit the changing needs of their business, while reducing cost and creating a long term, sustainable strategy.

Apprenticeships create a skilled workforce that solve the skills gap

How it works

Employers can build rapidly deployable and scalable training programs, building fully competent workers to fit their needs in as little as one year. With a typical program :

- Apprenticeships typically start at a reduced salary, up to 66% of normal market
- Employee salaries increase during the program, recommended quarterly, rising with their skills to meet market rate at the end of the program
- The standard cost of hiring, training and onboarding a traditional hire is 15% of their salary, apprenticeship programs often have this cost built in

Example model of how an Apprentice saves money on hiring and training

- A traditional entry level tech salary is \$50,000, plus 15% on the year one cost of hiring or \$7,500
- Apprenticeships save on the year one cost of hiring
- At a scaled wage a year one Apprenticeship salary totals \$39,688
- An apprenticeship program costs \$10,000
- The total year one cost of paying and training an apprentice is less than a traditional entry level salary
- For an employer hiring 100 Apprentices into entry level roles at a \$50k salary, the year one cost savings is \$781k

With our funding playbook we can help further offset the cost of the program through federal, state, and local grants.

Intermediaries close the gap

Intermediaries are an invaluable resource for employers new to Apprenticeships, managing critical components of the process that many companies do not have the experience or resource for.

Acting as extensions of your HR team, Intermediaries can support, set up, and manage some or all of your program including:

- Program development
- Candidate recruitment
- Funding application & administration
- Training
- Management of apprentices
- Administration of program

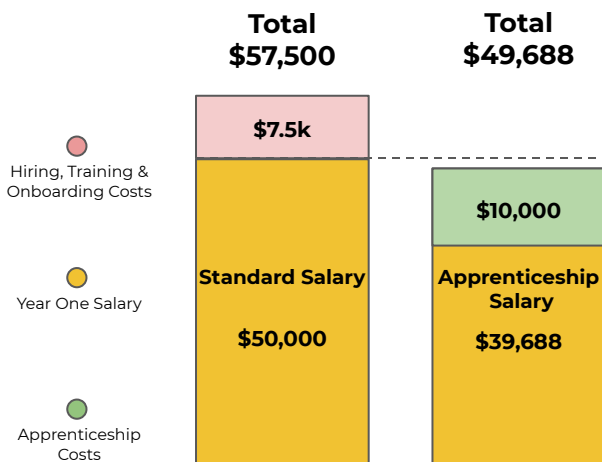
Intermediary organizations are dedicated to supporting employers with the expertise, capability and network needed to easily develop an apprenticeship program.

The solution is available. For U.S. companies to achieve their ambitions, hire and keep the right talent they will need to:

- Remove reliance on 4 year degree qualification in tech roles
- Build a tech skills apprenticeship program customized to the roles you are hiring
- Consider reskilling existing employees
- Develop best in class soft & technical skills training programs
- Hire based on aptitude and capability, versus direct experience or certification

By adopting Apprenticeships New Tech companies can create diverse, sustainable, and cost effective pipelines that connect them to their communities, the American worker and create a better future for everyone.

Comparison of Year One Hiring Costs
Standard Hire v Apprentice



ABOUT THE SURVEY

Who's in the survey?

About the survey?

We surveyed large U.S. employers (over 500 employees) via email & social media between December 1st 2019 & January 31st 2020. We invited them to anonymously complete a ten minute questionnaire.

160 unique responses were collected, representing employers with a combined \$3tn in annual revenue, over 3m employees, and approximately \$2bn in annual training expenditure.

83% of respondents to the survey were senior executives in HR, Talent or Learning functions, with 51% in leadership roles at Vice President or above, and 5% in the C-suite.

We are here to help

American Apprenticeships Work is an intermediary & HR consultancy specializing in custom development of Apprenticeship programs.

If you'd like to learn more please contact us at:

Email : info@apprentices.work

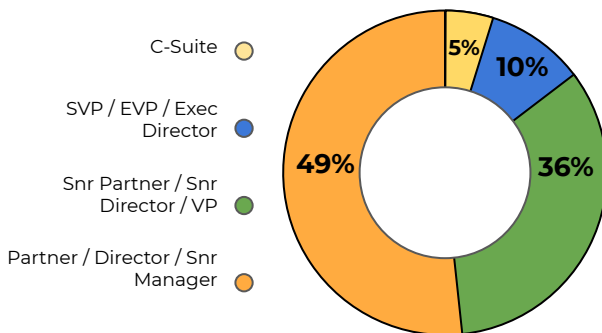
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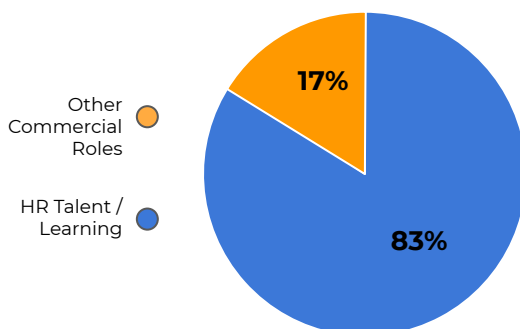
A full copy of the report is available for purchase from our website www.apprentices.work

The complete 40+ page report includes breakdowns by industry sector, industry group, and company size

Responses by Job Level



Responses by Job Function



Citations:

- 1 CompTIA <https://www.scoop.intelligence.com/articles/americas-get-talent-just-not-enough-in-it-1157168626>
- 2 McKinsey [JOBS LOST, JOBS GAINED: WORKFORCE TRANSITIONS IN A TIME OF AUTOMATION](https://www.mckinsey.com/industries/technology/ai-and-robotics/our-research/jobs-lost-jobs-gained-workforce-transitions-in-a-time-of-automation)
- 3 Korn Ferry <https://www.kornferry.com/news/5161/pdf>
- 4 Smithsonian [The STEM Imperative](https://www.smithsonianmag.com/tech/the-stem-imperative-180971782/)
- 5 Bootcamps <https://www.courserereport.com/reports/coding-bootcamp-market-size-research-2019>
- 6 NCEES [ncees.edu](https://www.ncees.edu/)
- 7 DOI [Investment](https://www.doi.gov/newsroom/releases/eta_eta20200218) www.doi.gov/newsroom/releases/eta_eta20200218
- 8 Wage Growth [The Dice 2020 Tech Salary Report | eBook](https://www.dice.com/resources/research/white-paper)
- 9 BLS <https://www.bls.gov/news.release/sector01.htm>
- 10 Cost [The Cost of Losing Employees - PayScale](https://www.dice.com/resources/research/white-paper)
- 11 Wage Growth [The Dice 2020 Tech Salary Report | eBook](https://www.dice.com/resources/research/white-paper)
- 12 CTA <https://www.cta.tech/cta/media/resources/research/pdfs/cta-apprenticeship-white-paper.pdf>
- 13 UK Gov <https://researchbriefings.files.parliament.uk/documents/SN0613/SN0613.pdf>
- 14 <https://www.doi.gov/agencies/eta/performance/updates>
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- 16 <https://www.doi.gov/newsroom/releases/eta/eta20191122>
- 17 White House Summit on American Apprenticeships
- 18 <https://www.shrm.org/hr-today/trends-and-forecasting/research-and-surveys/Documents/2017-Talent-Acquisition-Benchmarking.pdf>