Reskilling – A solution for the digital skills gap

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In this paper we lay out the challenges and opportunities around reskilling—equipping current employees with new skills. We believe this strategy can help solve the disconnect between the supply of talent and the demand for digital skills, while increasing diversity in the digital workforce. As a launchpad for further discussion, engagement, and impact, we are pleased to share trends and some insights from the internal digital reskilling strategy at PwC.

Leave no worker behind?

Employers are scrambling to find the talent needed to keep up with technological change. Although some jobs are being eliminated by the Digital Revolution, new ones are also being created—and all too often, not enough people have the skills to fill these positions. For example, 31% of executives surveyed for PwC's 2019 AI Predictions worried about meeting the demand for AI skills over the next five years.[1] Beyond AI, 54% of the CEOs responding to PwC's most recent CEO Survey pointed to a lack of analytical talent keeping executives from getting the information they need from the troves of data they possess, and 55% reported being unable to innovate effectively due to the skills gap.[2] That's why CEOs are thinking differently and shifting how they fill talent gaps. According to PwC's report Talent Trends 2019: Upskilling for a Digital World, almost half—46%—of CEOs globally say significant retraining/upskilling is the most important initiative to close a potential skills gap, against just 18% who say it's hiring from outside their industry. [3]

Automation is everywhere, and while it delivers many benefits, it has also created understandable concerns about the future of our workforce. As robotics, artificial intelligence, blockchain, and other seismic innovations continue to evolve and take hold in our economy, these transformational technologies will create, eliminate, and change many jobs. For many employees, acquiring a digital skillset and adapting those skills to changing times will be a prerequisite for continued employment and professional success. But determining which skills will be relevant and then gaining those skills while holding down a job is far from easy. As concerns about income and wealth inequality grow along with anxiety about being left behind in a digital, data driven economy, equipping employees with the right skills for the 21st century is an agenda for business strategy, redefined notions of employee benefits, and the broader debate about our political economy.

As noted above, reskilling is the globally preferred method (selected by 46% of CEOs surveyed) for closing the skills gap. For their part, employees also stand ready. Three quarters of the 10,000 respondents to PwC's Workforce of the Future Survey said they were prepared to learn new skills or completely retrain to remain employable.[4]

The preference for reskilling makes sense: In many instances, outside talent may be too scarce or costly. Moreover, reskilling existing employees creates meaningful benefits for the organization as a whole: employees gain the security of knowing that, so long as they opt in to reskilling opportunities, they will not be left behind. Employers appreciate retaining their own people, while strengthening and developing their contributions to the company. Increased loyalty and engagement are morale boosters, and both the organization and its people grow from an increasingly innovative culture.

And reskilling can create a virtuous cycle. Data from the OECD's recently released skills outlook, "Thriving in a Digital World," shows that workers in digital environments may learn faster, communicate better, and perform a greater variety of tasks.[5] This, in turn, makes these employees more likely to pick up new tools and methods during their careers.

Increasingly, early adoption of new technologies is table stakes for gaining a competitive advantage. Companies that prioritize digital reskilling and create a growth mindset culture can optimize their technological edge. Indeed, organizations that deploy reskilling to fuel ground-up innovation are likely to find—as PwC has (discussed below)—that the people who deal with issues and processes daily are ideally positioned to improve upon them, once provided the time and skills to do so.

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[1] **PwC, 2019 AI Predictions**, https://www.pwc.com/us/en/services/consulting/library/artificial-intelligence-predictions-2019.html#section2.
[2] PwC, **22nd Survey: CEO's curbed confidence spells caution**, https://www.pwc.com/us/en/library/ceo-agenda/ceo-survey.html.
[3] PwC, **Talent Trends 2019: Upskilling for a Digital World**, https://www.pwc.com/talent-trends-ceo-survey/
[4] PwC, **Workforce of the future: The competing forces shaping 2030**, https://www.pwc.com/gx/en/services/people-organisation/publications/workforce-of-the-future.html.
[5] OECD (2019), **OECD Skills Outlook 2019: Thriving In a Digital World**, OECD Publishing, Paris, https://doi.org/10.1787/df80bc12-en.

Learn, adapt, combine, repeat

One of the challenges employers, educators, and workers face is planning today for the skills that will be in high demand tomorrow. In addition to acquiring concrete digital skills, employees who bring a long-term commitment to learning, growth, and agility will benefit as technology continues to change the way we work. As stated in the OECD's "Thriving in a Digital World" report, "The readiness to learn new things may be one of the most important skills to develop in a rapidly changing working environment."[6]

Additionally, workers who can combine skills likely have an advantage in the digital economy. In a recent study with Burning Glass, BHEF identified three core groups of "New Foundational Skills of the Digital Economy,"[7] based on analysis of millions of resumes and job postings:

- Human skills (social, creative, and critical intelligence, including analytical skills, collaboration, and relationship building)

- Digital building block skills (including data analysis and management, software development, computer programming, and digital security and privacy)

- Business enabler skills (including project management, business process, communicating data, and digital design)

Professionals with one of these foundational skills command higher salaries, and those who combine skills from each of the three core groups are at an even greater advantage.

Reskilling while promoting diversity and inclusion

The increased demand for digital skills presents a challenge and an opportunity for companies seeking to improve diversity and inclusion. The under-representation of women and many minorities in technology is well documented. Engineering graduates constitute an important source of talent in many sectors, including financial services. Consider that in 2017, only 25.7% of engineering master's degrees were awarded to women, a small increase from 22.4% in 2008. The numbers for under-represented minorities in these fields are also stark: 75.2% of engineering master's degrees were earned by whites or Asian-Americans, with Hispanics accounting for 8.5% and Blacks or African Americans earning 4.7%.[8]

This means that for many organizations, the new talent pipeline could continue to be dominated by groups that are already well-represented in tech. Business leaders and educators have the opportunity—and responsibility—to foster greater diversity in STEM fields. In a previous joint report, Investing in America's Data Science and Analytics Talent, PwC and BHEF documented the emergence of the hybrid economy, characterized by increasingly digitally-intensive organizations across all sectors.

CEO Action for Diversity and Inclusion™ is an outstanding example of how leaders in business and higher education are coming together to address these challenges. More than 700 CEOs of the world's leading companies and 70 university presidents have pledged to take collective action to advance diversity and inclusion in the workplace. These leaders have pledged to promote inclusion through open dialogue, experiential learning, and education on unconscious bias. These leaders also commit to sharing what they are learning—driving measurable outcomes in what is now the largest public database of organizations to support inclusion at CEOaction.com.

Given the growing demand for and short supply of digitally savvy talent, companies have an opportunity to create a more diverse workforce by looking beyond their usual recruitment pools. For example, more undergraduates are enrolled in STEM fields at four-year minority-serving institutions than at other four-year institutions.[9]

For this reason, building and sustaining relationships with historically diverse academic institutions—like HBCUs—is an

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[6] OECD (2019), **OECD Skills Outlook 2019: Thriving In a Digital World**, OECD Publishing, Paris, https://doi.org/10.1787/df80bc12-en.
[7] BHEF, **The New Foundational Skills of the Digital Economy: Developing the Professionals of the Future**, http://www.bhef.com/publications/new-foundational-skills-digital-economy-developing-professionals-future.
[8] Brian L. Yoder, American Society for Engineering Education, *Engineering by the Numbers*. https://www.asee.org/documents/papers-and-publications/publications/college-profiles/2017-Engineering-by-Numbers-Engineering-Statistics.pdf.
[9] The National Academies of Sciences, Engineering, Medicine, **Minority Serving Institutions: American's Underutilized Resource for Strengthening the STEM Workforce**, https://www.nap.edu/catalog/25257/minority-serving-institutions-americas-underutilized-resource-for-strengthening-the-stem.

example of how companies can recruit more diverse digitally savvy talent. In fact, the ROI of hiring out of HBCUs goes beyond acquiring staff with digital skills. A more diverse workforce tends to be more innovative, disruptive, and creative, and these are the very ingredients needed to keep pace with today's technological change.

Approaches for increasing diversity also include training and support for faculty, creating engaging introductory courses to make computer science courses more attractive to more students, and designing curricula for practical use.[10] These strategies can be applied beyond data science to broaden and diversify the talent pool in other STEM fields.

It is important, however, to look beyond STEM to meet the growing demand for digital skills. Providing digital credentials to higher education students from a broad array of disciplines can expand opportunities for non-STEM majors and grow the talent pipeline for employers that need non-tech generalists with certain digital competencies. BHEF, together with universities, is charting a path forward on this front by designing and deploying new digital credentials.[11]

Similar opportunities exist for reskilling an existing workforce. As they lay the groundwork for new reskilling initiatives, business leaders can promote that diversity and inclusion are important priorities. This means creating time and incentives for all workers to build their skills, and providing paths forward for employees with varying backgrounds, levels of expertise, and digital knowledge. Leaders in business and higher education can also support organizations, like Girls Who Code, to expand diversity in the tech enabled talent pipeline. A recent report by Girls Who Code found that "According to states' own data from the last two years, states with policies aimed at increasing the volume of classrooms have not seen increased participation by girls. Boys still make up the overwhelming majority of students in CS classrooms… numbers indicate a positive relationship between states with Girls Who Code (GWC) programming and the rate of girls' participation in CS−making a strong case for gender-specific approaches."[12]

Additionally, as BHEF's foundational skills groups make clear, reskilling goes far beyond pure technological skills. Inclusive leadership skills and the ability to collaborate and innovate with a wide range of colleagues are critical to future individual and organizational success.

A case study of PwC's digital reskilling experience

Business leaders today are confronted with marketplace demands for increased quality and a better digital experience for customers, all while driving digital transformation of internal operations and delivering products and services at a lower cost. At the same time, employees are confronted with the challenge of maintaining relevant skills in a digital, data driven economy.

PwC's digital strategy addresses these challenges through business-led digital initiatives and "citizen-led" innovation, utilizing crowdsourcing and a platform to drive rapid change at scale.

Leadership sets the direction and drives business initiatives, defining outcomes and empowering people to access learning resources for reskilling and opportunities for rapid application. Leadership also aligns incentives to reward the acquisition and application of new skills that drive business outcomes via on-the-job innovation. "Citizen-led" change complements this, and is catalyzed by platforms, such as the PwC Digital Lab, a collaborative solutions platform and social community that allows people across the firm to crowdsource ideas and solutions, scale innovations with quality assurance, propose modifications, and apply their skills.

While the firm provides employees with access to learning assets, people must also opt in by taking responsibility for their own digital fitness. As a recent Harvard Business Review article by Fenlon and McEneaney emphasized, in-house digital skill building at PwC is "fundamentally about culture and people experience—and bringing to life a shared growth mindset among individuals and teams, and across the entire organization."[13]

PwC's reskilling strategy is built on a foundation of digital acumen for all employees, which is also personalized through a

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[10] BHEF and PwC, **Investing in America's data science and analytics talent: The case for action** (2017), https://www.pwc.com/us/dsa-skills.
[11] Isabel Cardenas-Navia and Brian K. Fitzgerald, **The digital dilemma: Winning and losing strategies in the digital talent race**, https://journals.sagepub.com/doi/abs/10.1177/0950422219836669. **See also BHEF, Creating Purposeful Partnerships**, http://www.bhef.com/publications/creating-purposeful-partnerships.
[12] Girls Who Code, **The State of Girls in K-12 Computer Science Classrooms: Making the case for gender-specific education policies** https://3zjc852t4swp1lmezl171oga-wpengine.netdna-ssl.com/wp-content/uploads/2019/06/GWC_Advocacy_2019K12Report_PDF-min-1.pdf
[13] Michael Fenlon and Sarah McEneaney, **How We Teach Digital Skills at PwC** (Harvard Business Review, 2018) https://hbr.org/2018/10/how-we-teach-digital-skills-at-pwc.

variety of learning "channels." For example, PwC created a proprietary app that customizes learning through an assessment and learning paths for each user. Employees have been asked to "opt-in" and build their digital acumen, earn digital knowledge badges and personalize their development given a wide range of interests and diverse technical backgrounds. On top of that foundation, PwC established fast track programs, including digital academies and a Digital Accelerator role for select employees.

Available to all and tailored to each: Digital Fitness app and learning channels

PwC's Digital Fitness app assesses each employee's digital acumen and enables people to customize a learning path that includes access to all learning assets and courses in a single "digital hub," with podcasts, gamification, skill building experiences, and quizzes to enable all employees to increase their digital fitness and earn digital badges. Training spans multiple domains, including data analytics, AI, automation, blockchain, and design thinking. At the same time, the app and other learning platforms generate valuable information for planning and skill development, allowing PwC to hone its strategies going forward.

Fast track programs: The Digital Accelerator role

In addition to ensuring that everyone has digital reskilling opportunities, PwC fast-tracks digital development for a select group. Those who are selected for the Digital Accelerator Program dive deeply and rapidly into specialized reskilling, including data analytics, visualization, automation, AI, and digital storytelling. Accelerators obtain dedicated time for skill development, while still serving clients and rapidly applying their new skills. They also receive advanced digital knowledge and skill badges as they progressively acquire new expertise.

Digital reskilling, talent pipeline and social purpose

Digital reskilling is a core element of business and talent strategy. This includes offering digital academies to university faculty, creating dedicated workshops for HBCU faculty and administrators, and supporting focused diversity talent acquisition conferences.

At the same time, as a purpose-led and values driven firm, the people of PwC have opportunities to support digital reskilling as a form of investing in society and communities in need of greater access to skill building. For example, PwC is bringing digital upskilling to underserved communities through their $320 million program, Access Your Potential (AYP). Getting the future workforce excited about developing technology skills starts in the classroom, but only 10% of educators feel confident teaching technology concepts.[14] This uncertainty is more acute in low-income school districts, an issue PwC is working to remedy. That's why PwC created a customized version of the Digital Fitness Assessment for educators free-of-charge and already, 20,000 teachers are using it in their classrooms. PwC is also creating opportunities for professionals to apply their digital skills to tackle the challenges being faced by nonprofits through their Skills for Society program.

All of these activities support a broader commitment to society, aligned with CEO Action for Diversity and Inclusion™.

Next steps

We live in a world where talent scarcity is hindering innovation and growth, and where the threat of job losses due to automation is causing fear and uncertainty. PwC and BHEF are advancing digital reskilling strategies as an important part of the solution to both challenges. In the coming months, we plan to continue to research and explore opportunities for engagement and action by businesses, educators, researchers, and policymakers to create a digitally fit workforce. Our recommendations include:

Assess the supply-demand challenge for digitally skilled talent by identifying:

- Workforce trends and pathways to higher skilled jobs

- Reskilling strategies that create inclusive, high performing digital environments and enable rapid innovation at scale

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[14] PwC, **Technology consumers vs. creators: Are we preparing our kids for the jobs of tomorrow?** https://www.pwc.com/us/en/about-us/corporate-responsibility/library/preparing-students-for-technology-jobs.html

- Collaborations with education and training providers to align skills and accelerate skill acquisition
- New digital learning credentials and educational pathways

Investigate the steps businesses can take to:

- Include diversity and inclusion strategy as part of reskilling
- Make digital upskilling a business and people priority
- Facilitating the right expertise, investments, assets, and processes to promote technology-enabled learning, often requiring a transformation of traditional corporate Learning and Development functions
- Build an inclusive personal growth mindset culture
- Promote adjacencies in roles and skills, and bridge generations to tap potential and skills

Invest in diversity and inclusion reskilling as a top business and societal priority:

- Build the pipeline of talent through reskilling
- Realize the full potential of a workforce by raising awareness, education, and redesigning talent processes to address unconscious biases
- Fast track strategies for attracting and retaining diverse talent for a digital innovation economy
- Identify opportunities to share practices and learnings through forums like BHEF and CEO Action for Diversity and Inclusion™

Demonstrate how education and training collaborators can:

- Align learning across all disciplines with foundational digital skills. This includes analyzing workforce demand to understand which jobs and skills will be most critical to the digital economy
- Build more flexible and responsive learning and skill acquisition models
- Focus on technology-assisted learning with new credentials to reduce cost

About the authors

Michael J. Fenlon
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Michael J. Fenlon leads the people strategy and organization for PwC US, part of a network with over 200,000 people in 158 countries. He is an experienced global leader in strategy, leadership development, learning, innovation, culture, and performance. *Fast Company* magazine recognized Mike as one of the 100 most creative business leaders in the world in 2016. Mike is passionate about diversity and creating an inclusive workplace and believes this is a key to innovation and competitiveness in the 21st century. Mike founded "Aspire to Lead: PwC's Series on Leadership and Gender Equality," a global, university based forum (www.pwc.com/aspire), and co-sponsors PwC's HeForShe global impact partnership with the United Nations.

Mike was a faculty member of the Columbia Business School executive education team ranked #1 in the world by *The Financial Times*. As Associate Dean at Columbia Business School, he led EMBA programs and partnerships with London Business School and UC-Berkeley, and taught a popular course on Executive Leadership. He directed The Fundamentals of Management: Highlights of the MBA, and the Columbia Senior Executive Program. He consulted in the non-profit and government sectors and served in Executive Programs at the Kennedy School at Harvard University.

Publications include articles on leadership, people strategy and innovation. He has been featured in *The Financial Times, Harvard Business Review, HR Magazine, The Wall Street Journal, Wharton Business Radio*, *Fox Television Business News, Big Think,* and many other outlets. Mike resides in New York, where he and his wife, Dana, are raising four children and a yellow lab. He is a runner and is active in his community. He was educated at Columbia University where he received three master's degrees and a Ph.D.

Dr. Brian K. Fitzgerald
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Dr. Brian K. Fitzgerald, an internationally recognized leader in creating innovative talent solutions, has served as the Business-Higher Education Forum's (BHEF) chief executive officer since 2005. Under Dr. Fitzgerald's leadership, BHEF developed and implemented a long-term strategic plan, through which BHEF has formed dozens of successful partnerships between the nation's leading business and academic institutions to create new talent development solutions in high-demand emerging fields and utilized insights from case studies and cutting-edge market intelligence to influence thought-leaders and policy makers. Dr. Fitzgerald is an internationally recognized expert on the future of the American workforce, and his work has been widely published in domestic and international publications. He regularly presents the organization's latest market intelligence and insights to business and academic audiences and provides them with recommendations for successfully implementing BHEF's talent models.

Dr. Fitzgerald has served on a number of commissions and working groups during his tenure as CEO, most notably, he played a major role in the STEM working group under President Obama for the President's Council of Advisors on Science and Technology, which produced the widely cited 2012 report *Engage to Excel,* and the National Academies of Science study group of undergraduate computer science enrollment. Dr. Fitzgerald currently serves as a member of the Bipartisan Policy Center Higher Education Task Force, which will advise Congress on the reauthorization of the Higher Education Act.

Dr. Fitzgerald earned his master's and doctoral degrees from the Harvard Graduate School of Education, where he currently serves on the Dean's Leadership Council. Previously, he served as a member of the alumni council at Harvard for four years, acting as chairman for a year. He received his bachelor's degree from the Massachusetts College of Liberal Arts, where he was named a Distinguished Alumnus and awarded an honorary doctorate in public service. An avid sailor, Dr. Fitzgerald has sailed the Western Atlantic Ocean from Maine to Grenada and crewed on 11 Newport and Marion-Bermuda races, finishing 1st in class five times. He resides in Washington, DC, with his wife and three dogs.

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