IT worker of the future

A new breed

Scarcity of technical talent is a significant concern across many industries, with some organizations facing talent gaps along multiple fronts. The legacy-skilled workforce is retiring, and organizations are scrambling for needed skills in the latest emerging, disruptive technologies. To tackle these challenges, companies will likely need to cultivate a new species—the IT worker of the future—with habits, incentives, and skills that are inherently different from those in play today.

BROAD demographic and generational stereotypes often move to front and center when talk turns to employment trends and workforce motivation. Indeed, macro-level trends, including the aging workforce, will likely have an impact on the IT workforce of the future. By 2025, for example, it is anticipated that 75 percent of employees will fall under the "Millennial" banner—those born after 1983.[1] By 2020, retiring Baby Boomers are expected to leave 31 million positions open.[2] Gender inequality continues to plague the technology field—only 30 percent of technology positions are currently filled by women.[3] Even though the number of STEM (science, technology, engineering, and mathematics) graduates has increased by some 100,000 during the past decade, more than half of these graduates don't practice their STEM craft for a living. The trends have led the US Bureau of Labor Statistics to predict that one million US programming jobs will go unfilled by 2020.[4]

Although these patterns are important, they are only part of the story.

The new tech frontier

A handful of recent developments are having a dramatic impact on today's IT workers. The pace of technological change has been the subject of our annual *Technology Trends* report since its inception. With each new topic comes the need for education and new capabilities. The needs, however, are straining formal learning methods and the ability to maintain relevant curricula in such a dynamic landscape.

Moreover, traditional credentials may not apply in this new world. Certifications and years of experience are irrelevant in nascent technologies. Accomplishments and hands-on capabilities, which may or may not be developed through traditional employment or academic avenues, may well trump credentials. A demonstrated propensity for and ability to learn new skills may become as important as one's existing knowledge base. Most leading organizations will likely create a culture that supports and rewards continuous learning and helps direct IT employees toward emerging trends.

At the same time, exposure to and comfort with technology is reaching unprecedented levels, regardless of age, geography, or education level.[5] The ubiquity of low- or no-cost technology coupled with a growing entrepreneurial spirit has given rise to the maker movement.[6] The movement encourages hands-on learning with not just software development, but the blending of coding with hardware and hard science. One byproduct of the movement is The Raspberry Pi, a credit card-sized, all-in-one computer that sells for $35 and teaches newcomers programming and product engineering, including the use of sensors, robotics, and other hardware add-ons. The maker movement encourages tinkering, experimentation, and prototyping, ideally in disciplines adjacent to workers' day-to-day responsibilities. Commercial successes from the movement include the Pebble Smartwatch, MakerBot's 3D printer, and Oculus Rift's VR headset.

But democratized innovation isn't just the domain of start-ups and incubators. It's also just as important to the war for talent as it is to the war for growth. Deloitte's annual Millennial Survey found that a company's reputation for fostering innovation is the single most important factor driving Millennials' employment decisions: It is a high priority for 78 percent of all global respondents, and for more than 90 percent of respondents in emerging markets such as China and India.[7]

Finally, the very nature of employment is changing. Despite a few high-profile bans on working from home by companies such as Yahoo,[8] companies are increasingly providing virtual work arrangements that stress flexibility over traditional incentives. And a recent survey found that 53 percent of IT workers would take a 7.9 percent pay cut in exchange for the ability to work remotely.[9] Technology such as virtual whiteboards, mobile robots, and video capability built into messaging platforms connect team members who may be continents apart. The adoption of crowdsourcing is rising for both those participating in crowd labor pools and enterprises looking to the crowd for dynamic, scalable resources. Jobs can be task-oriented, tapping local or global pools of vetted talent to handle simple, sometimes menial work. Or they can focus on highly specialized areas such as software engineering, data science, creative design, or even management consulting.[10] A Bersin & Associates[11] study found that more than 32 percent of positions were either part-time or contract-based. A growing number of these positions are being filled via crowdsourcing platforms such as GigWalk, Freelancer, oDesk, Kaggle, Tongal, and others.[12]
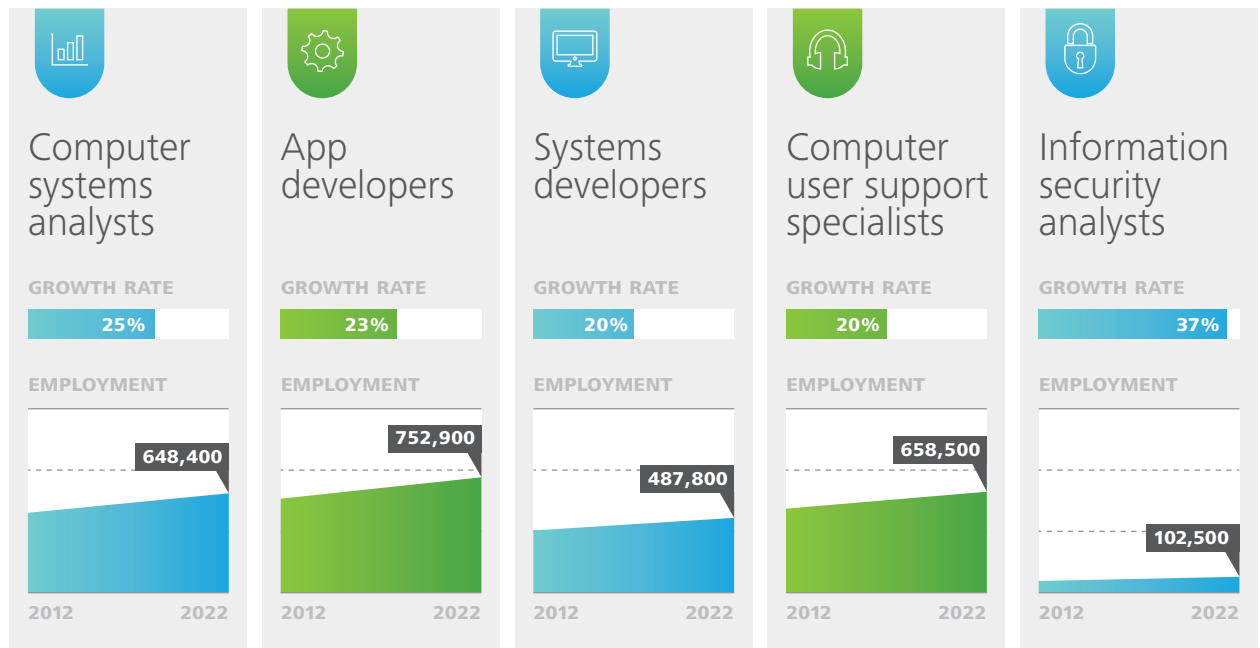
Design as a discipline

Design lies at the heart of the IT worker of the future. The emphasis on design may require new skill sets for the extended IT team—which may include graphic designers, user experience engineers, cultural anthropologists, and behavioral psychologists. IT leaders should add an "A" for fine arts to the science, technology, engineering, and math charter—STEAM, not STEM. Designing engaging solutions requires creative talent; creativity is also critical in ideation—helping to create a vision of reimagined work, or to develop disruptive technologies deployed via storyboards, user journeys, wire frames, or persona maps. Some organizations have gone so far as to hire science fiction writers to help imagine and explain moonshot thinking.[13]

Design can also underpin more agile, responsive techniques in IT management and delivery by instilling a culture focused on usability—not just concentrating on the look and feel of the user interface, but addressing the underlying architectural layers. Design can rally Dev and Ops around a shared vision of improved end-to-end design and end-user experience—responsiveness, reliability, scalability, security, and maintainability in streamlined and automated build and run capabilities.
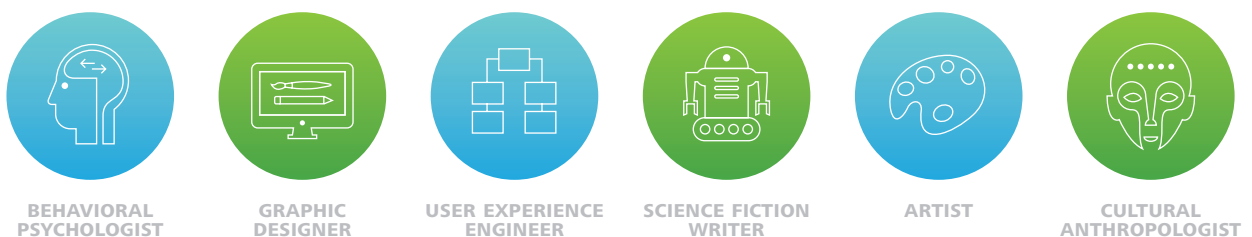
STEM occupations in high demand: 2012–2022 projected growth[a]

The increasing demand for science, technology engineering, and math (STEM) workers underlines their growing importance for the business—between 2009 and 2012, the ratio of general job seekers to online job postings was 3.8 to 1; for STEM workers, it was 1 to 1.9.[b] In addition, the Bureau of Labor Statistics projected STEM jobs would grow at a rate of 17 percent between 2008–2018, with non-STEM jobs at 9.8 percent.[c]

Computer systems analysts

GROWTH RATE

25%

EMPLOYMENT

648,400

2012 — 2022

App developers

GROWTH RATE

23%

EMPLOYMENT

752,900

2012 — 2022

Systems developers

GROWTH RATE

20%

EMPLOYMENT

487,800

2012 — 2022

Computer user support specialists

GROWTH RATE

20%

EMPLOYMENT

658,500

2012 — 2022

Information security analysts

GROWTH RATE

37%

EMPLOYMENT

102,500

2012 — 2022

STEAM: Adding arts skill sets to the IT team

The new IT worker is technical, functional, client-ready, and creative, and may have non-traditional skills.

BEHAVIORAL PSYCHOLOGIST

GRAPHIC DESIGNER

USER EXPERIENCE ENGINEER

SCIENCE FICTION WRITER

ARTIST

CULTURAL ANTHROPOLOGIST

Sources: [a] Dennis Vilorio, "STEM 101: Intro to tomorrow's jobs," *Occupational Outlook Quarterly*, spring 2014, http://www.bls.gov/careeroutlook/2014/spring/art01.pdf, accessed January 13, 2015. [b] Change the Equation, "What are your state's STEM vital signs?," July 2013, http://changetheequation.org/sites/default/files/About%20Vital%20Signs.pdf, accessed January 13, 2015. [c] United States Department of Commerce, "The state of our union's 21st century workforce," February 6, 2012, http://www.commerce.gov/blog/2012/02/06/state-our-union%E2%80%99s-21st-century-workforce, accessed January 13, 2015.

Bringing it home

Many IT organizations are improving their ability to sense and respond to emerging trends and modernize legacy systems and delivery models. Really understanding your workforce is important: Who do you have, what skills do they bring, and are they sufficiently forward-thinking in their use of technology to lead your organization in innovation? Consider the future IT worker's new skill sets and behaviors. A tactical example is the recent "bring your own device" trend. Seventy percent of Millennials admit to bringing their own applications from outside their enterprise to support their work[14]—a trend that will likely only grow as more cloud, mobile, and analytics offerings target the workplace. Organizations need to set policies that guide, govern, and support workers' evolving adoption of external devices, applications, data, and collaboration.

Cross-pollinating teams with both the young and old helps new hires gain practical experience with legacy systems and encourages established employees to broaden their skill sets into new areas. Isolated, commoditized skills will likely be outsourced or automated over time through machine learning, artificial intelligence, and advanced robotics that replace blue-collar, white-collar, and so-called "professional" jobs.[15] With this shift, coders, architects, and engineers become even more important, and multiskilled players with deep institutional knowledge will continue to be critical. Identify, nurture, and seed the new breed, and introduce change team by team, project by project.

Spend your energy attracting, challenging, and rewarding the right kind of talent instead of succumbing to legacy organizational constructs that are no longer relevant—unleash the IT worker of the future on your business.

Insurance Industry Perspective

Judy Pennington, Amy Titus, Chance Spiker, Matt Stevens, and Brett Mackey

Technology is advancing so fast today that many insurance organizations are challenged to maintain pace. These technological advancements are fueling the demand for IT workers to develop new skills and capabilities, and adapt to new ways of learning and working. The model of the IT worker who masters a singular role over a long period of time and establishes deep expertise in a single capability is a thing of the past. Today, insurance companies need people who have breadth, depth, and the ability to absorb new skills quickly.

The IT worker of the future should be comfortable in an environment where the wall between IT and the business has fallen.

Like other industries, the insurance IT worker is impacted by cybersecurity, legacy modernization, and cloud computing. There are several themes that pose unique challenges for the insurance IT worker and the implication on their careers as the industry continues to evolve.

Big data

Insurers compete on data. Better data can lead to better decisions, leading to more profitability. And as the big data concept begins to take root, the insurance IT worker of the future should be fluent in not only what "big data" means, but also how it affects the organization and its business partners:

- **Business intelligence dashboards.** This is big data made simple and can be used to aggregate complex aspects of the risk business into an easily consumable, real-time format on a desktop or mobile device. Major insurers have turned policy administration reports, previously separated into hundreds of views and published on a weekly or monthly basis, into real-time business intelligence that gives product managers a single view into their business that never existed before.

- **Data quality governance.** The insurance industry as a whole faces major risks due to the inconsistency of customer data. Insurers typically have customer data feeding in from many sources (claims processing, web quotes, former customer lists, and local and national marketing campaigns, to name a few) and on varying systems and platforms, such as legacy systems, custom in-house built platforms, and off-the-shelf modern solutions. Bad data can result in inaccurate premiums, compliance issues, misfired marketing campaigns, and embarrassing brand exposures. Adequate guidelines and governance, along with a corresponding roadmap, can mitigate risk and put an insurer on surer footing for the future.

- **Internet of Things.** As the IoT continues to mature, it's inevitable that insurers will look to leverage these capabilities for their homeowner products. Smart home technology changes the advisory conversations agents could be having, and the strategic projects insurers pursue. In the near future, IoT-based insurance could be implemented more heavily around personal umbrella policies, consumer household product insurance, and other major and minor lines.

Customer experience

The customer experience that insurance customers demand is no longer informed by how they interact with other insurers or banks, but by the more technology-savvy world of retail, consumer products, and services companies. The implication: ease of use is top of mind for both the novice and experienced insurance customers—and IT workers need to do things differently to support customer engagement.

Taking this to the next level, many insurers have started to interject gamification in their interactions with policyholders. A leading P&C insurer is prototyping the linking of its telematics smartphone mobile app with an interactive social user experience that allows the customer's driving quality to be recorded in real time, and then shared with family members or friends. The customers can enter into competitions with family and friends to see who drives best, and even share the results on social media. It is not difficult to envision a future where gamification sees family members competing with each other for discounts, or where neighbors utilize IoT technology with their smart homes to keep track of and share water usage for their lawns during droughts.

Customer experience also extends to the devices used by customers. As the mobile revolution continues and becomes the new normal, there will be times when "mobile only" is the most common sense, cost-effective solution. One example of this is the mobile claims centers deployed by many insurers after catastrophes. The technology powering these movable technology hubs include satellite-based Internet and telecommunications, mobile printers with check-printing ability, and tablet-based operating systems. The devices have evolved to meet the needs of both businesses and customers.

The IT worker of the future should think customer experience first, supported by the underlying technology.

IT as a business

Insurance organizations also should consider shifting their view of IT from that of a cost center to a profit and innovation center. When IT was a function that simply delivered services and then billed the business, the IT worker's mindset and skills matched this operating model. Today, successful organizations leverage their IT departments to imagine and create differentiated efficiencies and profit-driving new products. Being really good at following business requirements used to be enough. Today, IT workers need to be able to turn the table and create original ideas that drive the discussion around business requirements.

IT workers know the weaknesses of their operational teams' processes. In many instances, IT has developed workarounds on behalf of the operational teams, and these interim solutions present opportunities for further automation and streamlining. One major P&C company has an prioritized project focused on extracting these inefficiencies. The idea is driven from both the business and IT collaborating on new ideas. This is the essence of IT coming to the table with thinking to drive a better, more profitable business.

A shift to meet these evolving themes

The IT worker of the future likely will need new skills and abilities—ranging from business analysts developing configuration capabilities to technical designer developing user experience and user interface capabilities. Organizations that intend to embrace the future effectively will need to build the right foundation for IT workers to adapt.

There was a day when an IT worker could successfully build an entire career by mastering a particular language of programming code, IT service management process, or infrastructure platform. Specialization was differentiating and provided each worker with job security.

That environment is changing. The half-life of an IT employee today sits at two years. New disruptive technologies can emerge during a performance management cycle.[i] And this evolution will continue well into the future. Staying relevant and adapting to change are some of the most pressing priorities for today's IT worker.

The future skills of the IT insurance worker

The IT worker of the future needs to be comfortable in an environment where there is no wall between IT and the business. This means that IT workers need to be trusted partners who understand the business, can articulate technology solutions to business problems, and can proactively advise the business. The IT worker can no longer rely on passive, formal or "event based" learning. IT workers must maintain their own awareness and understanding of current and future technology.

To meet this evolving need, insurers should look to implement a program for increasing the flexibility and adaptability of insurance IT workers across four categories:

- **Education.** Traditional, formal methods of training and development, such as instructor-led classroom training, online courses, virtual classrooms, and simulations. Insurance vendors offer formal and informal training – an insurer should push their IT team members to learn the platforms of the current day and future.

- **Experience.** Formal as well as informal on-the-job learning experiences, such as stretch assignments, job rotations, and special projects. Experience can also refer to off-the-job learning opportunities, like volunteer and board work.

- **Exposure.** Relationship building with other professionals and thought leaders inside and outside their organizations. This can include coaching and mentoring, joining internal and external communities of practice, participating in professional organizations, and attending conferences.

- **Environment.** Tools, systems, and other infrastructure that support employees in their day-to-day work, or that they can use on the job to learn. For example, learning management systems that incorporate search, ratings, and discussion groups help learners find the resources and training they require to resolve an immediate problem or to facilitate their longer-term growth.

A recent Deloitte study found that "CIOs rank talent—acquiring, retaining, and developing it—among their top priorities."[ii] Technology organizations increasingly recognize that innovation and business growth require two things: immediate access to solution-based learning for on-the-job problem solving, as well as a robust learning strategy to "continually upgrade the capabilities of existing internal staff" to strategically meet long term organization needs. As insurers address a rapidly evolving competitive environment, developing the team to lead them in the future is increasingly imperative to continued growth.

Footnotes

i   Eric Bloom, "Your technology skills have a two year half-life and 6 ways to stay current", IT World, October 24, 2011, http://www.itworld.com/article/2735945/careers/your-technology-skills-have-a-two-year-half-life-and-6-ways-to-stay-current.html, accessed May 12, 2015.
ii Deloitte LLP, *Talent Development: Training an All-Star IT Team,* February 18, 2015, http://deloitte.wsj.com/cio/2015/02/18/talent-development-training-an-all-star-it-organization/, accessed May 12, 2015.

Lessons from the front lines

Insuring the future

AIG realizes that, in today's continually evolving digital era, leading IT organizations need to balance supporting the business's current operations with bringing in new perspectives and emerging technologies. Striking that balance means working and learning differently and fostering a next-generation workforce that can manage the old and new.

Mark DeBenedictus, SVP and head of AIG Global Services (AIGGS), is launching a program to do just that: the Technology Career Acceleration Program (TCAP). The program targets high-potential undergraduates by providing career development and personal growth through a non-traditional IT experience. The first program of its kind within AIG, TCAP has the goal of attracting young talent, teaching them the business, and creating a powerful learning and discovery opportunity.

The 28-month program identifies potential participants through the company's campus hiring and internship programs. TCAP then exposes participants to traditional internal and vendor-led training, self-paced e-learning, group assignments, simulation exercises, and multiple rotations to provide exposure to both the business units and IT. DeBenedictus' goal is to provide a program where learning is broad and deep, and where "hands on" development is emphasized over classroom training.

Working in cohorts, program members are challenged to develop their skills and knowledge every day through real-world experiences and structured coaching. To make the coaching effective, TCAP brings together individuals from across the organization, including AIGGS leadership, human resources, program advisors, technical capability leads, and peer-level buddies. Participants also gain valuable exposure to company leaders.

Since TCAP participants work side by side with experienced AIGGS employees, the program also benefits the current workforce, an integral goal of the effort. TCAP's predominantly Millennial demographic acts as a kernel for change that injects new knowledge and work styles into the organization, which gives experienced employees the opportunity to refresh their skills and explore new technologies—from social media and collaboration tools to cloud and wearable devices.

DeBenedictus understands that, when adopting new technologies, businesses can rarely afford to build all new systems and completely retire the old. IT organizations often must support a mix of legacy and new technologies. The TCAP program is designed to help AIGGS become a leading IT organization that can do both and that is also equipped to adapt to things that haven't even been foreseen yet. The first cohort of AIGGS's TCAP program launches in 2015—setting the foundation for AIG's IT workforce of the future.

Evolving the federal foundation

The United States General Services Administration (GSA) was created in 1949 when six agencies were consolidated into one large organization tasked with streamlining the administrative work of the federal government. Years of increasing responsibilities and expansion have resulted in an organization that is divided into bureaus and regions, each with its own leadership, infrastructure, and processes. GSA leaders recognize that, for the agency to fulfill its mission in the 21st century, it will need to operate more efficiently. Achieving this goal will likely require rethinking how GSA employees are organized, how they work and serve their

customers, and, equally as important, how the GSA IT organization can support new operational strategies.

On the technology front, Sonny Hashmi, GSA's CIO, developed a roadmap of seemingly minor investments that formed a new precedent for consolidation, standardization, and enhanced usability. Instead of attempting a sweeping overhaul, Hashmi focused on initiatives IT could spearhead, often in high-touch commodity areas. Email, document management, and collaboration suite projects yielded early wins. Many of these projects tapped cloud-based solutions that improved the user experience while also reducing cost and complexity. They also helped create a new technology environment—one driven by innovation and collaboration—that Hashmi now leverages to cultivate IT workers of the future. The agency proved to be an early adopter of cloud, open source, digital, and agile development—helping to lead the way for emerging technology adoption in the US federal government.

This groundwork is important as the GSA continues to modernize its IT footprint. A massive application modernization initiative, which includes a tenfold rationalization of more than 1,000 applications, is currently underway. Simplifying the core in this way frees resources that can be directed toward innovation and emerging technologies. Hashmi is also investing in retraining and reinvigorating the talent pool, preparing his people "for not just new tactical skills, but a new paradigm change in how IT is delivered."

GSA IT teams now sit side by side with their internal customers, leveraging open platforms to iterate quickly. They use DevOps, UX, and cloud computing to build new capabilities that complement tried-and-true processes. The GSA has also begun transforming its office facilities by knocking down walls, eliminating assigned seating, and creating open meeting rooms. Rethinking the organization's workspace approach has led to increased flexibility, agile work techniques, and cross-team collaboration. Using mobile technologies, workers can now connect to critical systems from anywhere at any time. This capability paid dividends during Hurricane Sandy, where field workers stayed operative wherever they could find an Internet connection—hotel lobbies, office parks, or public shopping centers. Hashmi also helped create a digital services agency called 18F—an internal innovation hub—which is composed of Presidential Innovation Fellows.

Finally, Hashmi is changing the GSA's approach to recruiting and hiring IT talent. Hashmi has had success recruiting former Silicon Valley players with the skills and experience needed to solve some of the government's toughest problems. His team now includes a dozen Silicon Valley technologists who are excited by the challenge, the potential impact, and the spirit of civic duty they find in their new roles.

Reorienting the IT organization

Deloitte LLP's information technology services (ITS) organization provides and maintains the infrastructure needed to support Deloitte's network of roughly 210,000 professionals. This global footprint comprises a wide range of applications consumed via a mix of corporate and employee-owned devices.

Over the last five years, Deloitte, like many of its clients, has been impacted by numerous technology trends, including the consumerization of IT, rising mobile adoption, cloud, and big data, among others. The rapid pace of technological change brought about by these trends has challenged ITS to transform its organization and operational models in ways that can help streamline and accelerate development projects. On the process side, this has meant adopting agile development techniques in which large investment programs are divided into small and mid-size releases, allowing small teams to work iteratively in
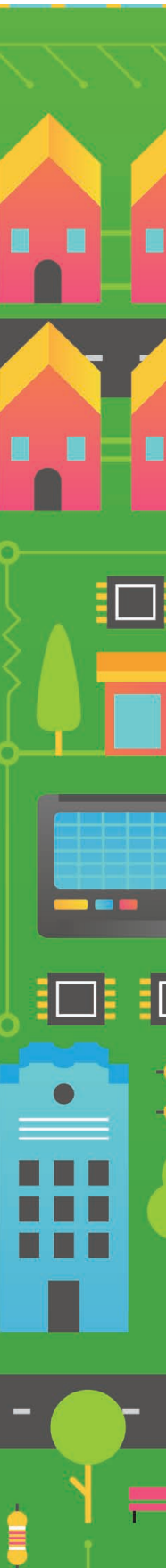
short sprints, making it easier to accommodate in-process design changes based on real-time feedback from customers and end users. Though more traditional waterfall techniques remain useful for some legacy projects and maintenance, ITS now approaches new initiatives from a "Why not agile?" perspective.

ITS has also shifted its resource mix from predominantly onshore resources, formerly organized in competency-based Centers of Excellence (CoE) and multitasking across multiple projects, to a new model in which teams of external, onshore, and offshore resources collaborate closely within autonomous delivery units—a studio model. Along with adopting the studio model, ITS has also altered its approach to recruiting new talent. Traditionally, fluency in English was a requirement for most offshore development roles, which limited the pool of potential candidates. In the studio model, only a small offshore mirror studio team—which regularly communicates with the onshore delivery management studio team—needs English proficiency. This frees ITS to hire leading candidates for specialized work, regardless of their language skills.

Additionally, ITS has begun hiring employees who bring more to the job than just technical degrees and IT experience. Prospective candidates are now expected to possess three primary traits that can help teams create more user-centric designs: a focus on empathy, intellectual curiosity, and mastery of a particular craft (whatever that may be). Recent hires now come from a broad variety of backgrounds spanning 12 nationalities, 22 degrees, and dozens of majors, including computer science, information systems, graphic design, psychology, anthropology, art history, and sociology. Moreover, ITS now trains employees in non-traditional subjects, including the art of empathy and designing from a user-centric point of view, to better align with the design studio methodology. The result is a multidisciplinary team that blends creative, user experience, engineering, and functional knowledge to enhance creativity and innovation. Focusing on the end-user experience, the onshore studio teams conducts research and brainstorming to gain a deep understanding of customer needs, talks to end users to better understand their behaviors and motivations, looks at processes from end to end, understands the data involved, and seeks inspiration from existing paradigms in the external world.

Post-reorganization, on-time project delivery has risen from less than 70 percent to 94 percent, with corresponding increases in user adoption and engagement, and overall ITS organizational satisfaction.

My take

Michael Keller, EVP and chief information officer, Nationwide Mutual Insurance Company

An important part of Nationwide's IT strategy is to become a learning-driven organization that anticipates and adapts to changes in business demand and technology trends. We know that the incredible pace of technology change means we need to rethink traditional, incremental approaches to workforce development and planning. We're committed to keeping an internal competency in IT, and we realize that the size and skill sets of our IT workforce will be substantially different in the future. To get from here to there, we're evaluating a variety of approaches, including how we recruit and train employees, manage suppliers, and form vendor alliances.

Nationwide IT has teamed with our company's human resources and sourcing and supplier management groups to take a fresh look at workforce needs, organizational optimization, and associate readiness for change. Together, we are working to better understand our workforce acquisition process and the way we deploy internal and external resources. Our goal is to become more efficient at measuring the success of our vendor partners and to develop support mechanisms that help associates and leaders strengthen their roles in the change process. With the engagement and involvement of our associates, we are focusing on career development opportunities. As a result of many of these efforts, we are experiencing higher retention, productivity, and loyalty. It's a two-way street that works for both our associates and Nationwide. It's about a commitment to our people— which is a core value for our organization.

Technology trends are creating significant changes in the way IT associates approach their jobs. For example, our move from custom-developed applications to package and SaaS-based solutions changes the way our application development teams work. Similarly, the move from traditional server-storage-network infrastructures to highly virtualized, standardized, and automated cloud infrastructures is altering the way Nationwide's infrastructure teams design and support our technology towers.

Planning ahead will smooth the change for both the company and our associates. We identified the future skill mix needed in our nine IT professions, which are organized around technology domains such as architecture, application development, and project management. By understanding future IT needs and skills, we can create a roadmap, plan for the change, and educate our associates. Our leaders are refreshing career guides, leading formal training, facilitating lunch-and-learn sessions, and creating on-the-job opportunities. We also are exploring external opportunities to augment experiences and accelerate the ramp-up.

Making Nationwide a learning organization is central to creating the IT worker of the future. We are fostering the idea that learning is both an organizational and individual mandate. Hiring great people and giving them the right tools for lifelong learning is important, so we are developing a multifaceted learning approach that targets real-time learning across IT disciplines and keeps pace with technology change.

Managing talent needs isn't restricted to within the four walls of Nationwide. Here in Columbus, Ohio, I serve on the board of Columbus 2020, a non-profit partnership that brings together leaders from local businesses, academic institutions, and government entities to drive economic development. We are working together through the formation of the Columbus Collaboratory to increase the pipeline of talent in central Ohio and develop the skills of our current workforce in areas like cyber security and big data analytics. While there are many innovative ways to close IT talent gaps, it is critical to begin with a clear picture of your future IT workforce needs.

Cyber implications

TECHNOLOGY has entered an era of usability, openness, and convenience. End users expect solutions to be simple, intuitive, and easy to use, not just for the IT worker of the future, but for the entire workplace of the future.

At the same time, the stakes around cyber security and data privacy continue to increase, making cyber risk management a strategic priority across industries. Yet traditional techniques like complex passwords, containers, key fob two-factor authentication, and CAPTCHA verification can interrupt the end-user journey. Frustrated users may look for shortcuts or alternative means for carrying out their business. In doing so, they often bypass controls and introduce new vulnerabilities. Security protocols can only be effective if users follow them.

Therefore, it is critical to balance the need for security with a focus on user experience (UX) by creating a well-integrated, unobtrusive risk framework that is anchored around the end user's journey. Superior user experiences will have security attributes so tightly integrated that they are barely noticeable; they can quietly and unobtrusively guide users toward more vigilant and resilient behaviors. For example, technical advances in fingerprint authentication, facial recognition, and voice detection embedded into commonly used consumer devices make it possible to protect without sacrificing user interface flows.

This marriage of UX and cyber risk management has a dark side. New threat vectors target weaknesses of specific personas within your employee base—spoofing alerts to update mobile apps with malicious proxies or corrupted links posing as social media interactions. The response cannot just be more usable, intuitive, risk-managed systems—education and awareness are critical. Arm your employees with not only the "what," but the "why" and the "so what." Beyond enforcing compliance, make cyber risk management a strategic organizational pillar and a shared cultural concern embedded across solution life cycles and operational processes. A broader enterprise governance structure can help, communicating the intent and importance of cyber security measures. Your employees should be taught how to identify and handle risk, not just how to comply with the minutiae of policies and controls.

The combination of cyber-aware user experiences and education programs can elevate security and privacy beyond being reactive and defensive. And IT workers aren't just end users. They are also the creators and managers of the systems and platforms that drive the business. Cyber security and privacy should be tightly integrated into how software is delivered, how systems are maintained, and how business processes are executed. As new IT organizational and delivery models emerge, build muscle memory around modern approaches to security and privacy. The IT workers of the future can become the new front and back line of defense—informed, equipped, and empowered.

Where do you start?

CHANGE can be hard in any organization. For IT, balancing the demands of tomorrow with the realities of today can be daunting, especially given the care and feeding needed for the existing IT footprint at the core of the business. Describing the IT worker of the future may not be easy, but driving the organizational change needed to realize that vision can seem impossible. Below are some ways to embark on the process.

- **Find your leaders.** Establishing a culture where the IT worker of the future can thrive starts at the top. What is the reputation of the IT department in the business and market at large? Are deep technologists celebrated or commoditized? Role models should be put into leadership positions throughout the organizational chart and measured partially by how they activate communities around them. Hewing to hierarchies and reporting channels is less important than fostering connectivity, education, and growth anchored in the creative, design, and technical skills central to your strategy.

- **Recruit differently.** Externships can put candidates quickly to work through "speed dating" versions of internships. They can also be used to vet the transfer of individuals within and across your organization—a "try before you decide" method that allows both parties to understand aptitude, fit, and interest. Similarly, some companies are hosting internal and external "hackathons," day- or weekend-long competitions where participants rapidly explore, prototype, and demo ideas. Hackathons are no longer exclusively the domain of the tech-savvy startup or tech giant; state and municipal governments, as well as established

companies such as 7-Eleven, Aetna, and Walgreens, are leveraging hackathons to unlock innovation.[16] Hiring decisions can be based on demonstrated results instead of on resume depth and the ability to navigate a round of interviews. Finally, consider training employees with no technical background—38 percent of recruiters are actively doing so to fill IT positions.[17] Graphic designers, artists, cultural anthropologists, behavioral psychologists, and other backgrounds are fantastic building blocks for user experience, mobile, data science, and other desperately needed skills. Adding "A" to the STEM priorities can be a key differentiator, especially as design rises as an important discipline needed in IT departments.[18]

- **Industrialize innovation.** Harness the energy of your people in previously untapped ways to give them an outlet and vehicle for exploring new and exciting skills. Not every organization can afford to give employees open-ended time for continuous innovation, as do Google[19] and Netflix.[20] However, companies should have a mechanism for submitting, exploring, and potentially developing new ideas. From ongoing idea competitions to marketplaces that match interest and need around new technical skills, enterprises should encourage people to grow and find ways to put their passion to work.

- **Embrace virtual.** Create a culture and provide tools that allow and support remote workers. Given the global nature of many teams, productivity, collaboration, and communication tools are essential. Companies should provide them to full- and part-time employees as well as selected third parties for specific durations.

To retain institutional experience, organizations should consider contract arrangements for aging employees that offer part-time packages at lower compensation and benefits.

- **Outside in.** To achieve positive results, organizations will likely need to participate in external talent ecosystems. Define a crowdsourcing strategy that guides the usage of crowd platforms to solve your organization's problems, and give employees permission to participate in crowd contests, on the job or off the clock. Incubators and start-up collaboration spaces are looking for corporate sponsors; they provide a chance to co-locate workers with inventors and entrepreneurs exploring new ground. Institutions such as Singularity University and the MIT Media Lab offer education programs and opportunities to collaborate with leading researchers in areas like advanced manufacturing, artificial intelligence, medicine, social computing, and big data. Deliberately seek out briefings and ideation sessions with your vendor and partner community to harness software, hardware, system integrator, and business partner thinking and research.

- **Light your talent beacon.** Your own people are critical to attracting the IT workers of the future. Seventy percent of Millennials learn about job opportunities from friends; 89 percent of software engineers are staying put, having applied for fewer than two jobs in the past five years.[21] Leading organizations need to be a net importer of talent, and the front lines start with their people. Communicate your vision for the organization, commit to the talent strategy, and invest in incentives to drive retention and referrals.

- **Transform HR.** Not an insignificant task. Not every employee is being hired to retire, and the future worker of IT (and workers in other departments) will likely need a different set of services, support, and development than they receive today. HR can become a competitive weapon in the war for talent by shortening the time needed to develop the IT worker of the future.[22] HR may need to be overhauled along with your IT organization by shifting its focus from people and policy administration to talent attraction and development. HR transformation initiatives should consider the IT worker of the future—not just the existing employee base.
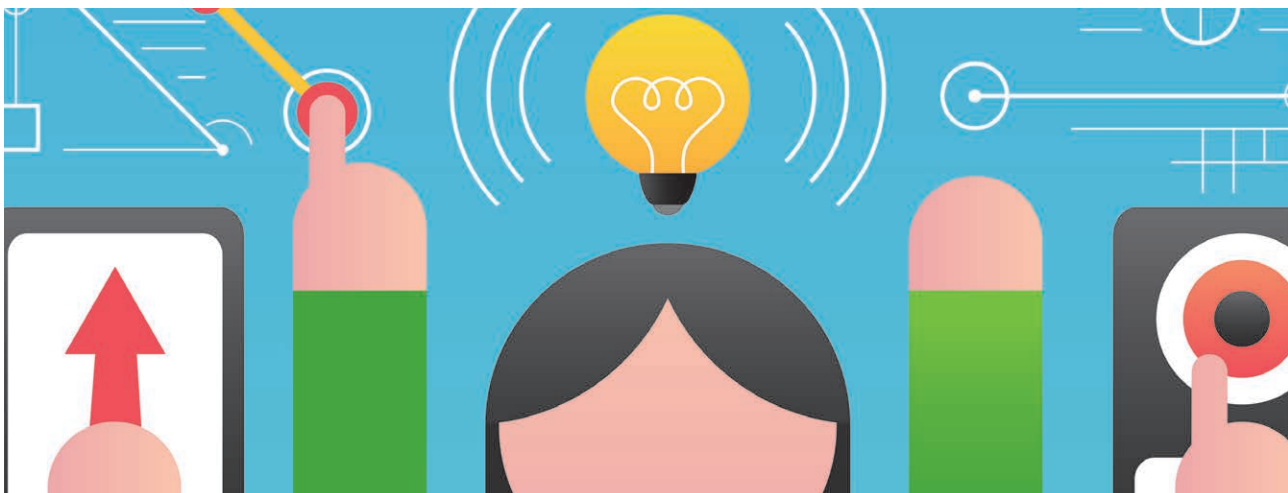
Bottom line

THE IT worker can be the bedrock of an organization's ability to compete in this era of exponential technologies. But beyond rhetorical remarks about talent scarcity, few organizations are investing in attracting, retaining, and developing their organizational capabilities. And while companies will secure commoditized skills through the most efficient means, innovation and growth will depend on workers with the skills and the vision needed to reimagine the art of the possible within the bounds of existing constraints such as the realities of existing systems and data and a limited understanding of emerging, cross-discipline technologies. While future technologies may not exist today, the need is clear, the potential is immense, and the time is now to start retooling your people to be the IT workers of the future.

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