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The Technology Skills Gap - It's Real!

Industry 4.0 (I4) is putting greater pressure on a workforce requiring technology skills.



Technology jobs are required in every industry sector and the need for individuals with information technology skills continues to grow. Industry 4.0 is well underway and growing manufacturing jobs are exacerbating the shortage as the time to fill technology jobs increases and the supply remains well below what is needed. Community workforce development strategies must look beyond traditional training and implement plans to boost technology skills for emerging, transitioning and current workforce in every sector.

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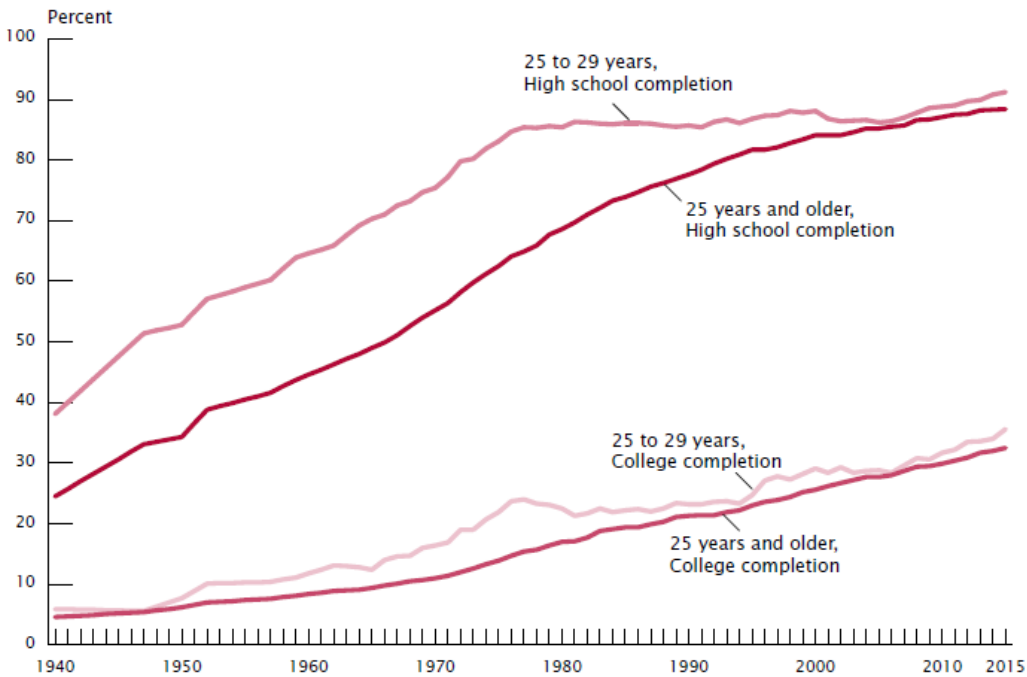
Industry 4.0

We've been hearing about the skills gap in the workplace for many years. The gap is real and it is growing – especially in technical jobs. What's happening to widen this gap? And what can be done to help reverse this situation?

There have been four industrial revolutions since the late 1700's each brought about by innovation. The first was driven by mechanization and steam power; the second by electricity and mass production. The third began in the 1980's with computers and automation. And in 2013, America moved from the third industrial revolution to the fourth – known as I4 or Industry 4.0 – denoted by cyber physical systems. The I4 drivers are artificial intelligence, big data analytics and faster, smaller computing - all connecting and freely flowing in a high tech, high speed and wireless cloud.

How did we get to this point of skills shortages? Each revolution was disruptive, and each drove major changes in workforce development. But what is markedly different now is that work is being done in a cloud. This means that everything is interconnected – including the workforce. This is indeed leading to disruption, but also greater opportunities. For industry to seize on this chance, their workforce must be prepared. The I4 impact is happening rapidly and the so must the pace at which the education and training system must respond – and accelerate. At the core of preparing the talent for I4 are skills like problem solving, systems thinking, active learning and technology.

PERCENTAGE OF THE POPULATION 25 YEARS AND OVER WHO COMPLETED HIGH SCHOOL OR COLLEGE BY AGE GROUP: SELECTED YEARS 1940-2015



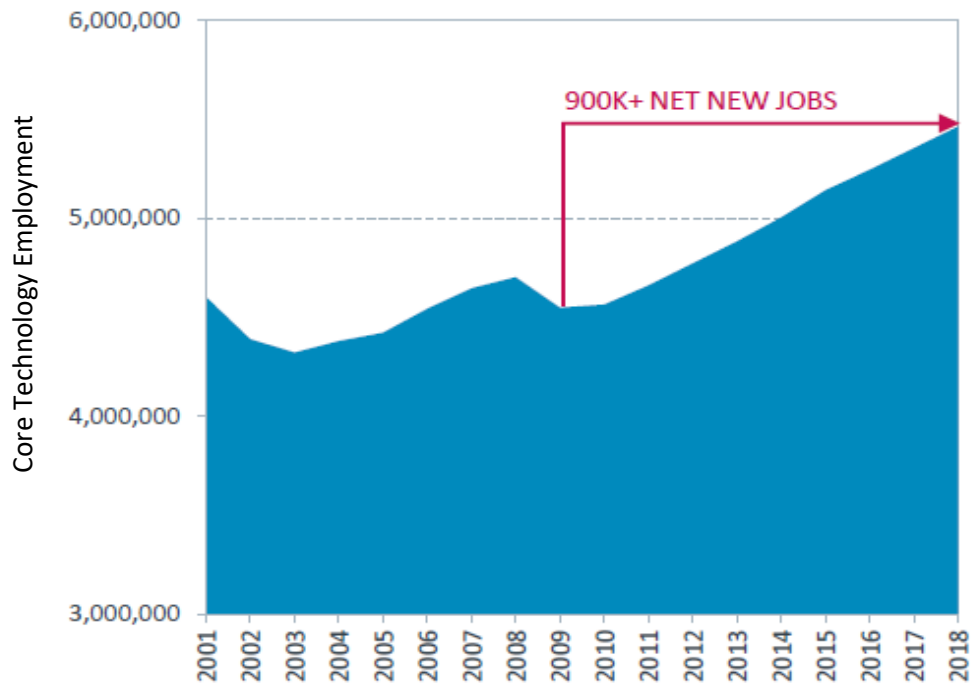
Note: Data for every individual year are not available for years prior to 1964. Source: U.S. Census Bureau, 1947-2015 Current Population Survey and 1940 Decennial Census.

Education trends in America have been responsive to the skill changes required for technology driven industrial changes through the 1980's. But in the 1980's the pace of high school completion rate slowed and maintained around 88%. The college completion rate continued to increase but at a slightly slower pace from 1980 forward. We would have expected to see an increase of college completion rates with the onset of the third industrial revolution; that did not happen. Technology has been impacting the workforce at all levels requiring a more highly skilled worker – even for many entry level jobs. When the needed educational response did not happen, the skills gap was born.

The Technology Skills Gap

To better understand the impact of the skills gap today and how it is affecting talent development to support I4, let's look at technology job demand vs. workforce supply.

U.S. CORE TECH OCCUPATION EMPLOYMENT: 2001-2018



Source: "IT Industry Outlook 2018", CompTIA Properties, LLC.

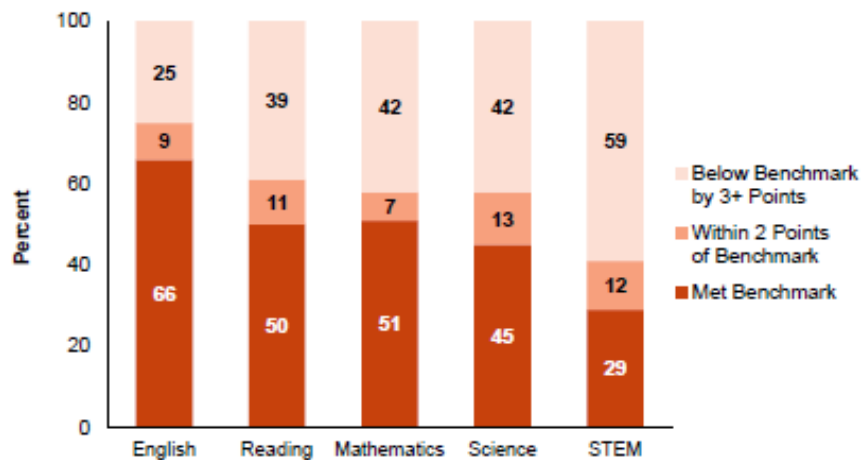
Since the beginning of the recovery in 2010, CompTIA, an IT trade association, reports there have been nearly 900,000 net new core technology jobs; that's a pace of about 112,500 new jobs created per year. CompTIA defines core technology jobs as those that are true technology occupations both in the tech industry and those in other sectors such as manufacturing, healthcare, finance or media. The report notes that 56% of the tech employment is outside of the tech industry sector. Occupations that comprise the 2017 data above include:

Tech Occupation Categories	2017 Jobs
Software Developers, Applications	898,689
IT Support Specialists	733,210
Systems Analyst/Systems Engineers	649,390
Software Developers, Systems	454,735
Computer and Information Systems Managers	405,314
Network and Computer Systems Administrators	403,294
Computer Programmers	341,388
Other such as IT project managers, software QA, gaming, etc.	322,810
Web Developers	264,238
Network Support Specialists	224,159
Network Architects	170,700
Computer, ATM, Office Machine Repair [declining]	159,733
Database Administration	122,162
Cybersecurity Analysts	101,051
Computer Hardware Engineers	75,439
Information/Data Research Scientists	28,716

Source: BLS | EMSI | CompTIA as cited in "IT Industry Outlook 2018", CompTIA Properties, LLC

Now let's evaluate the supply side using ACT 2016 Science, Technology, Engineering and Math [STEM] data. About 2.1 million students took the ACT college entrance exam in 2016 which was approximately 56% of the high school graduating class. Of these students, 1,009,232 showed either an expressed or measured interest in pursuing STEM related careers. Of the STEM interested students, 12% expressed an interest in pursuing computer science related programs of study; this equates to 117,086 students.

2016 ACT NATIONAL STEM REPORT: STUDENTS INDICATING COMPUTER SCIENCE AND MATHEMATICS STEM INTEREST



Percent of 2016 ACT-Tested High School Graduates by ACT College Readiness and STEM Benchmark Attainment

The gap widens. ACT's data shows that approximately 41% of tested students met or are within 2% of the STEM benchmark. This translates to approximately 48,000 students that indicated an interest in pursuing computer science related majors, are ready to successfully complete their freshman year of classes in this major. The current college graduation rate over a six-year period is 59%. Applying that graduation rate to the 48,000 students that are prepared for college —the pipeline is about 26,900 graduates in 2022. That is an annual gap of 85,600 based on today's computer technology job creation data against the ACT STEM data.

Job creation estimates used in this article by CompTIA and EMSI is in terms of technology employment and not inclusive of the technology jobs that are going unfilled. Unless addressed, this trend forecasts trouble for America's competitiveness in a connected cloud-based workplace that can seek its workforce from across the globe.

As shared earlier, technology permeates every industry sector in the country including manufacturing. Case in point of how the technology skills shortage is impacting this sector we turn to the Deloitte and Manufacturing Institute's 2015 Report: *The Skills Gap in US Manufacturing and Beyond* that shows the

number one skills gap manufacturing executives cite in their current workforce are technology and computer skills.

MANUFACTURING EMPLOYEES DEFICIENT SKILLS



Note: Skills in which manufacturing employees are most deficient. Percentage indicates the percentage of executives who did not opt for “Extremely sufficient” or “Sufficient”. Source: “Deloitte Manufacturing Institute 2015 Report: The Skills Gap is US Manufacturing and Beyond”

With the integration of technology in almost every job - in every sector, and futurists predicting that the use of technology in the workplace will only continue to grow, computer or digital literacy is a skill that everyone in the workforce needs and to keep current.

Call to Action

How do we fix this? There’s much work to be done to close the skills gap in the age of 14. The first step is recognizing there is not only a skills gap – but a technology skills gap. The second step is ensuring your community workforce development plan is centered on advancing technology skills for both the short and long-term talent pipeline for its core clusters like manufacturing, logistics, health care, bio-tech and others. With the current workforce trend is that as many workers will be over 40 as under, companies will have to ensure technology training is a core part of professional development for all workers. For the emerging workforce, community strategy needs to ensure the talent pipeline has a robust career navigation plan for students that includes technology skill development and tracking their STEM readiness at every node on their career trajectory. Third, the education system – from K12 to post-secondary and life-long learning- must integrate a robust technical learning experience for students and workers. Educators will need to challenge and encourage students of all ages to learn more about technology to advance their careers while helping their employers advance their bottom line. Is your community ready?

Let’s talk! As the new principal strategist for workforce development at Garner Economics, it is my role and distinct pleasure to work with states, regions, communities, academic institutions and workforce boards, to evaluate and help design workforce preparedness programs, and assist in the implementation of those plans. See more information about our related services by clicking [here](#), and with our diagram below outlining our four-step process. Please reach out to me at debra@garnereconomcs.com to see how we may be of value.

Talent is the New Currency - Our Workforce Analysis Process:



About Garner Economics: We are data driven strategists helping companies, communities and organizations, large and small, urban and rural, achieve success.

We offer location advisory services, analytical research, industry targeting, strategic planning, and organizational assessments with a wealth of expertise to companies, communities, and organizations globally. We are based in Atlanta, GA with representative offices in Europe (Berlin), Asia (Seoul), and North Carolina.

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