Beyond Tech

The Rising Demand for IT Skills in Non-Tech Industries

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burningglass TECHNOLOGIES

ORACLE Academy

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1.

Executive Summary

Information Technology (IT) skills and jobs are widely misunderstood to be housed primarily in the tech sector, and they are also thought to be inaccessible to all but a small minority of people who have focused intently on computer science. Building on our prior research efforts and mining a database of over 150 million unique online U.S. job postings, Oracle Academy and Burning Glass Technologies produce new evidence that neither of these perceptions are borne out by data. To the contrary, 90% of IT skills and jobs are concentrated in 10 non-tech industries, leaving only 10% in the tech sector. The rapid growth of IT jobs is more than 50% greater in non-tech industries than in tech industries.

IT jobs are both accessible and well paid, fully justifying the acquisition of IT skills. IT skills can be developed at many stages, and most IT jobs do not require a computer science degree. For those without a bachelor's degree, entry-level IT jobs in non-tech industries are also more accessible than in the tech sector. Those with IT skills earn more than those without, in every industry, and over the course of a career, an IT worker will earn 600% more than a worker receiving the minimum wage. With these data points in hand, students, educators, workers, and employers can all benefit from a deeper grasp of the strategic advantages enjoyed by those who can develop and apply IT skills in their work.

2.

Introduction

Since 2016, Oracle Academy and Burning Glass Technologies have been documenting the dynamic growth in the number and diversity of roles that information technology (IT) skills now play in the job market. Broadly, our goal has been to help high school and college students, educators, and counselors understand how IT skills are transforming the workplace, so that an increased command of the evidence can inform the curricular and pedagogical strategies of educators and the learning and career choices of the next generation of professional workers.

In 2016, "Beyond Point and Click: The Expanding Demand for Coding Skills" showed how the surging demand for coding skills extended well beyond programmers to involve artists, designers, scientists, data analysts and others. Our analysis of 26 million U.S. online job postings showed that jobs that required coding skills not only paid more, but were growing more rapidly than the job market itself. This analysis underscored the wisdom of learning to code. A year later, in "Rebooting Jobs: How Computer Science Skills Spread the Job Market," we documented that more than a fifth of jobs paying at least $15 per hour placed a high value on coding skills, and these jobs offered, on average, an annual salary premium of $20,000 over jobs in which coding skills were not relevant. By zeroing in on five sample job areas – data analysis, engineering and manufacturing, design, marketing, and programing and information technology – we showed that two thirds of the fastest-growing jobs and over three fifths of the highest paying skills within this broad diversity of job areas were computer science related. In another key finding, we showed that these jobs were highly accessible to people without a computer science related degree. The demand we tracked was for skills, not degrees: only 18% of the jobs we studied sought a computer science degree.

In this paper, we tackle two popular misconceptions which we believe may be delaying the development of a more robust match between the needs of the economy and the skills of the workforce. First, for many people, including some educators, there exists a widespread belief that most IT jobs are based in the tech sector. Many people regard computer science and IT skills as reserved for use in a rarified zone, populated by characters from The Big Bang Theory or Silicon Valley, in workplaces to which only computer science graduates, math majors, and bona fide techies need apply. There is a second fallacy that builds

on this first misperception. Because employers in other, non-tech industries in the economy are wrongly presumed to have less of a need for computer science or IT skills, students and workers considering these fields may assume they do not need to seek out and develop IT skills. This paper offers good evidence that this is precisely the wrong conclusion to reach.

Considering these misperceptions, Oracle Academy and Burning Glass Technologies determined to map the actual landscape of demand for IT jobs and skills across the economy. To counter the belief that IT jobs are concentrated in tech companies, this paper explores workforce demand for IT jobs that are located outside of the tech sector – which account for nearly 9 out of 10 IT jobs. This research quantifies the robust demand for IT workers outside of tech, unpacks the full range of IT opportunities across all industries, clarifies that those without IT skills will find themselves at an increasingly difficult disadvantage as current workplace trends progress, and offers educators and students a roadmap to finding IT careers in unexpected places.

3.

Methodology

To capture the universe of IT job postings across all industries, Burning Glass mined its database of more than 150 million unique online job postings in the United States, identifying jobs and skills related to IT. Specifically, Burning Glass included 1,934 IT skills, as well as approximately 170 IT occupations, and then pinpointed openings requesting these skills or occupations. Sample skills include software development, network administration, and cybersecurity; sample occupations include software developer, computer support specialist, and database administrator.

To sort the tech sector from the non-tech sector, Burning Glass began with the definition of the tech industry developed by the Computing Technology Industry Association (CompTIA), which makes use of the North America Industry Classification System (NAICS). This system includes firms in software publishing, computer systems design, and data processing, among many other industry codes listed in Appendix 3.

Burning Glass then amended CompTIA's definition by excluding four areas of work deemed too broad to be primarily included in the tech industry: engineering services, telecommunications, space and defense systems, and R&D testing labs. Through this process, any areas of work that did not fall into these Burning Glass codes belonged to "non-tech" industries.

With these definitions in hand, Burning Glass analyzed its database of online job posting data, developing the findings detailed below. To build and maintain this database of job postings, Burning Glass collects job postings from close to 40,000 online job boards, newspapers, and employer sites on a daily basis and de-duplicates postings for the same job, whether it is posted multiple times on the same site or across multiple sites. Burning Glass's proprietary data is supplemented and contextualized by additional indicators from the Bureau of Labor Statistics and other published sources. All data is sourced from Burning Glass except where indicated.

4.

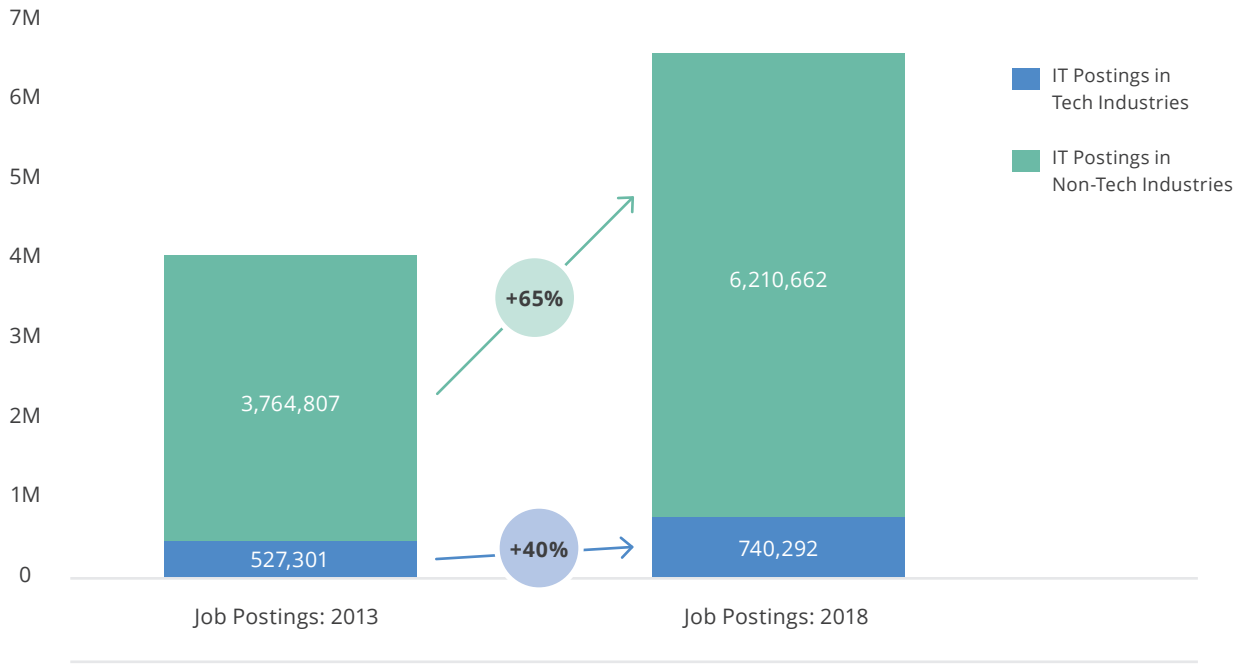
Key Findings

IT jobs are large and growing — especially outside of the tech industry.

In 2018 there were 6,950,954 online IT job openings, accounting for 24% of all online job openings. The vast majority of openings — 89 percent — were in non-tech industries, which also drove the bulk of demand growth for IT jobs.

Over a five-year period from 2013–2018, the growth in IT jobs in the tech sector was 40 percent; outside of tech, the rate of IT job growth jumped to 65 percent over the same period.

The Vast Majority of IT Job Openings are Outside the Tech Industry



Source: Burning Glass Technologies 2019

This trend of high levels of IT jobs outside of tech holds for many of the largest roles typically associated with the tech industry – such as software developers and network engineers – suggesting that there are opportunities for IT workers outside of the tech industry across a broad spectrum of IT occupations.

2018 U.S. Demand for Selected IT Roles in Tech and Non-Tech Industries

Occupation	IT Postings	Share of IT Postings in Tech Industries	Share of IT Postings in Non-Tech Industries
Development			
Software Developer / Engineer	315,824	10%	90%
Application Developer / Engineer	80,150	9%	91%
Networking and Systems			
Network Engineer / Architect	112,122	12%	88%
Systems Engineer	107,221	15%	85%
Computer Support			
Computer Support Specialist	71,462	5%	95%
Help Desk Technician / Analyst	48,628	5%	95%

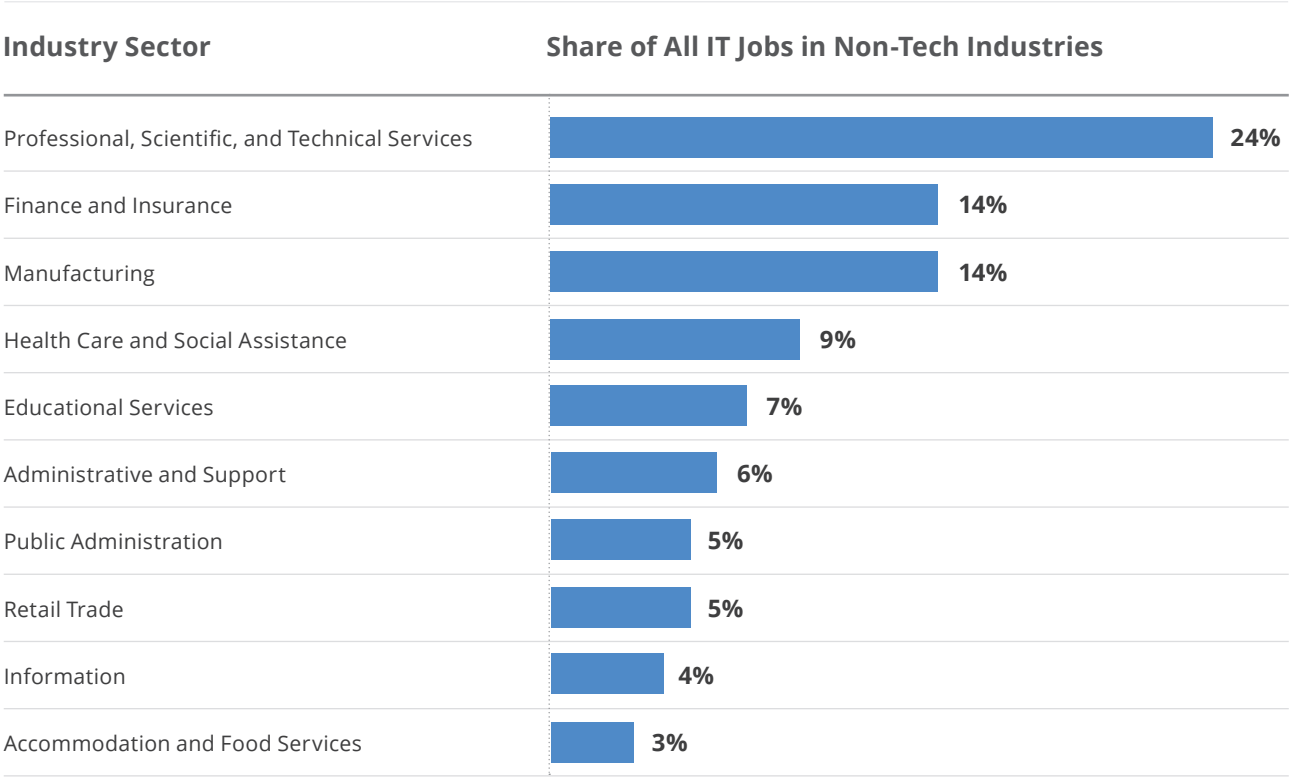
Source: Burning Glass Technologies 2019

These findings emphasize that IT jobs are not synonymous with jobs in the tech industry. In fact, quite the opposite is true: the bulk of all opportunities available to students and workers with IT skills reside in the broader, non-tech economy.

IT jobs are in high demand across the non-tech sector.

The professional services, manufacturing, and financial services industries are the largest in terms of absolute demand for IT jobs, accounting for about half of all IT openings in the non-tech sector. However, these are major industries for hiring in general, so their large absolute demand numbers are unsurprising.

IT Hiring in Non-Tech Industries

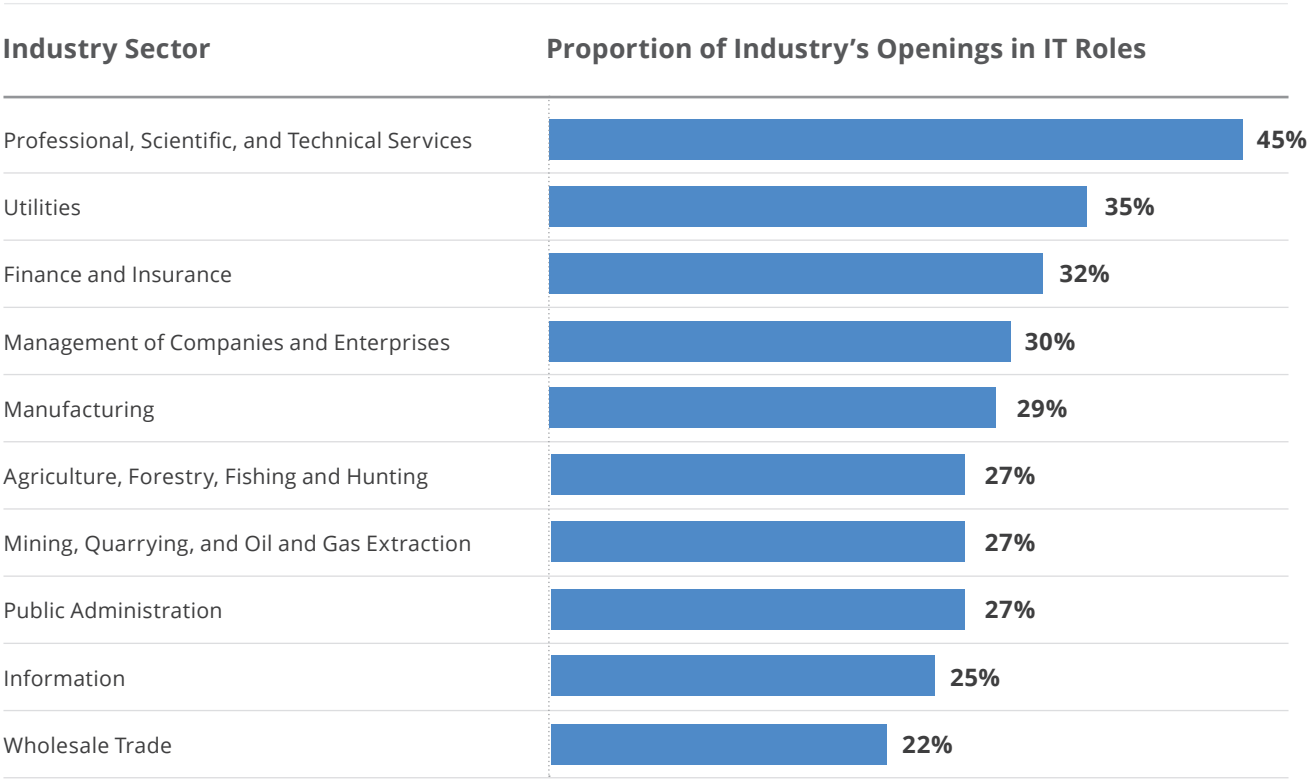


Source: Burning Glass Technologies 2019

IT jobs have a bigger footprint in some non-tech industries than others.

Many of the industries with the smallest absolute number of IT jobs actually have the largest proportion of their job openings in IT roles. The utilities industry, for example, accounts for 1% of all non-tech IT jobs. However, IT jobs constitute 35% of all job openings in the industry – the second-highest proportion of an industry's job openings in IT, behind only professional services.

Proportion of Each Non-Tech Industry's Openings that are IT Roles



Source: Burning Glass Technologies 2019

Specialization within industries is common.

Skill requirements for IT workers differ across industries, suggesting that while there are core IT skills that benefit workers regardless of sector, there are also industry-specific skills that help workers enter and advance within specific industries. Many of the top IT skills that prevail in the tech industry—for example, Software Development, Java and SQL—are found in similar proportions in non-tech industries like Finance. In other non-tech industries, there are different IT skills that predominate, such as Enterprise Resource Planning (ERP) in the Manufacturing industry. Notably, Software Development and SQL are core IT skills that are prized in both the tech and non-tech industries, suggesting these are key skills for individuals to develop, regardless of industry.

2018 U.S. Top IT Skills by Sector and Industry

Tech Sector	**Non-tech Sector:** Finance	**Non-tech Sector:** Manufacturing Industry
1. Software Development	1. SQL	1. ERP Software
2. SQL	2. Data Analysis	2. Technical Support
3. Java	3. Java	3. Data Analysis
4. Python	4. Software Development	4. Software Development
5. Linux	5. Python	5. SQL

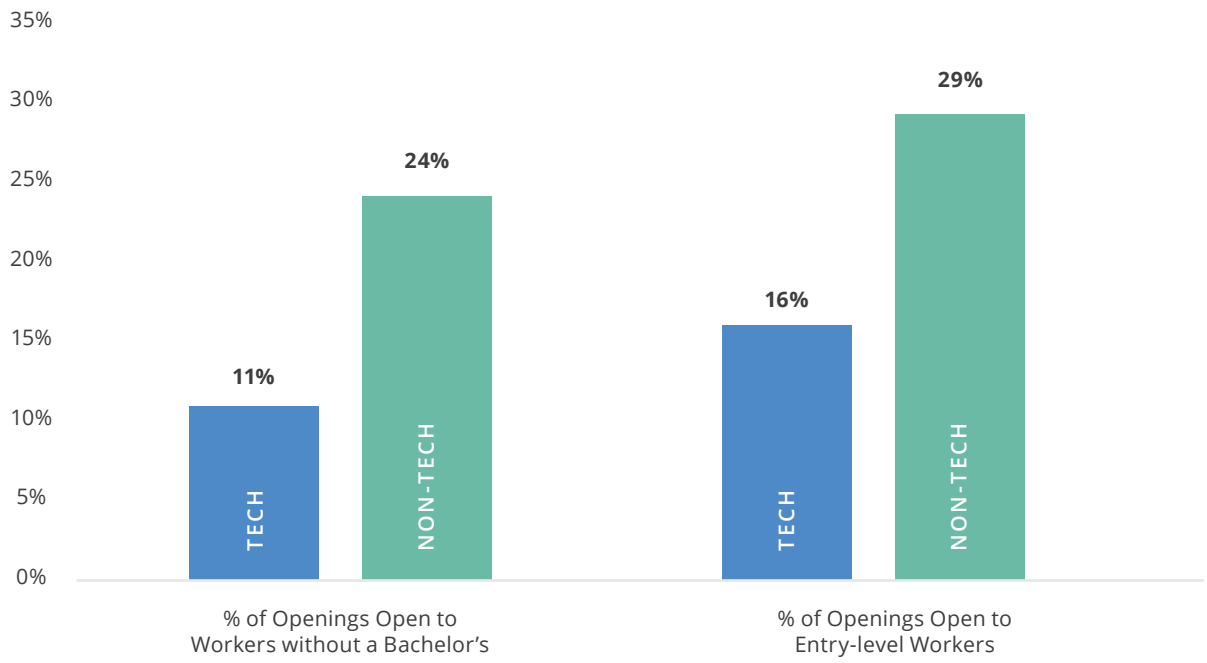
Source: Burning Glass Technologies 2019

A core set of skills are commonly in demand across both the tech and non-tech sectors. Yet roles will also demand industry-specific skills. For example, Software Developer postings across Finance and Manufacturing both require Java, Software Development, and Python. However, Software Developers in Finance would benefit from knowledge of data analysis, while Software Developers in Manufacturing might require familiarity with Robotics and MATLAB(an engineering programming language). Clearly, many Software Developers are equipped with a set of core IT skills that enable them to transfer across industries. At the same time they might also need industry-specific skills to specialize within sectors.

IT jobs in non-tech industries are more accessible than in the tech sector, making them strong entry-points into careers in IT.

In the tech sector, 89% of IT jobs require at least a bachelor's degree, compared to 76% in non-tech industries. Similarly, there are also greater opportunities for entry-level workers to begin their IT careers outside of tech: 29% of openings in non-tech industries request 0-2 years of work experience, compared with only 16% in tech. This illustrates the increased opportunities for entry-level IT workers and individuals without a bachelor's degree in the non-tech economy, suggesting that workers who start their job search outside of traditional tech firms may encounter greater success.

2018 U.S. Share of Openings Available to Entry-Level Workers and Workers Without a Bachelor's

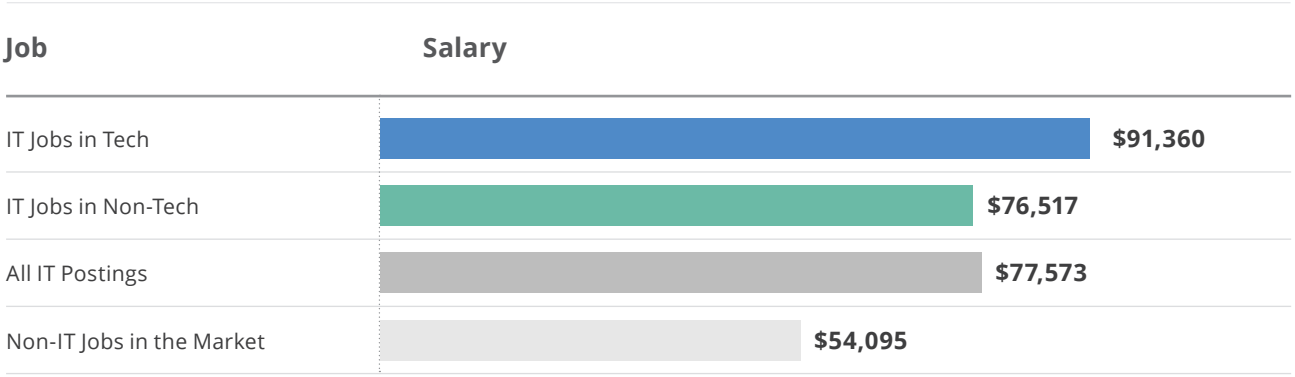


Source: Burning Glass Technologies 2019

IT careers are highly lucrative across sectors.

Across tech and non-tech sectors, IT jobs pay impressive salaries. However, there is a premium associated with IT jobs in the tech industry, with an average salary of over $91,000, compared to nearly $77,000 in the non-tech sector. Nonetheless, IT jobs both in and out of the tech sector pay substantially more than non-IT jobs, on the order of $20,000 and up.

2018 U.S. Average Salary for IT and Non-IT Jobs

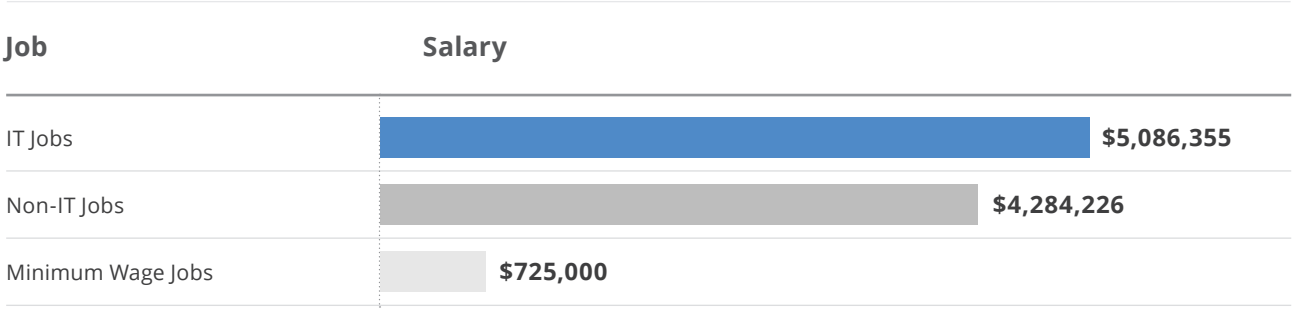


Source: Burning Glass Technologies 2019

Developing IT-related skills pays off.

While it is true that IT jobs pay more in the tech sector, the salary benefits to careers in IT are clear across sectors. The estimated lifetime earnings of IT workers, regardless of industry, greatly exceed those of non-IT workers or minimum-wage workers. On average, IT workers can make 19% more than non-IT workers, or $802,129 over the course of a career. That number soars to 600%, or $4,361,355, when measuring the lifetime earning difference between minimum-wage workers and IT workers.

U.S. Estimated Lifetime Earnings



Source: Burning Glass Technologies 2019

5.

Conclusion and Implications

This report reaffirms and expands the key findings from previous reports from Oracle Academy and Burning Glass: IT jobs and skills are in widespread demand and among the most valuable in the market. This research illustrates that strong career opportunities in IT exist in a broad range of industries, and answers the question of whether IT jobs are concentrated in tech firms with a resounding no. Not only is demand for IT jobs not bound to the tech sector, it is overwhelmingly located in the non-tech zone.

This research also provides clear implications for students, educators, and other stakeholders:

The money is better in IT than outside of it.

IT careers offer strong salary benefits to workers across the economy. This suggests that students and educators should be expansive in targeting both IT learning and career opportunities. There is a clear value in developing IT-related skills, suggesting that educators should embed these skills within their curricula and students should seek out opportunities to cultivate these skills.

IT jobs in non-tech industries are more accessible to a larger number of people, including those who do not yet have a bachelor's degree.

Students and workers who are just starting their IT careers will benefit from exploring opportunities outside the tech sector, where they will find more entry-level opportunities, especially for workers without a bachelor's degree.

The substantial and diverse opportunities available to workers with IT skills must be communicated to everyone.

If people who lack a bachelor's degree labor under the impression that one can't do IT unless employed in the tech sector, or without a bachelor's degree, they are far less likely either to prepare and look for IT jobs when they enter the workforce, or to consider future training in IT. They are likely to steer away from jobs in non-tech industries that pay more than non-IT alternatives. Therefore, educators, career counselors, and mentors must battle these misperceptions by communicating the true range of opportunities in IT.

Above all, these findings underscore the diverse range of opportunities for IT workers, and demonstrate the enduring value of pursuing a career in IT.

6.

Appendices

Appendix 1:

2018 U.S. Top IT Skills by Sector and Industry

Metropolitan Statistical Area (MSA)	IT Postings: 2018	Share of IT Jobs in MSA
New York-Newark-Jersey City, NY-NJ-PA	515,106	32%
Washington-Arlington-Alexandria, DC-VA-MD-WV	353,567	41%
Los Angeles-Long Beach-Anaheim, CA	339,757	25%
San Francisco-Oakland-Hayward, CA	321,761	37%
Dallas-Fort Worth-Arlington, TX	276,544	28%
Chicago-Naperville-Elgin, IL-IN-WI	250,644	28%
Boston-Cambridge-Nashua, MA-NH	227,698	31%
San Jose-Sunnyvale-Santa Clara, CA	221,014	50%
Seattle-Tacoma-Bellevue, WA	173,462	31%
Atlanta-Sandy Springs-Roswell, GA	171,720	31%
Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	161,382	25%
Phoenix-Mesa-Scottsdale, AZ	145,345	24%
Denver-Aurora-Lakewood, CO	136,288	26%
Minneapolis-St. Paul-Bloomington, MN-WI	131,626	28%
Detroit-Warren-Dearborn, MI	130,172	25%
Houston-The Woodlands-Sugar Land, TX	126,204	25%
San Diego-Carlsbad, CA	108,853	29%
Charlotte-Concord-Gastonia, NC-SC	99,303	31%
Baltimore-Columbia-Towson, MD	98,350	28%
Austin-Round Rock, TX	96,611	33%
Miami-Fort Lauderdale-West Palm Beach, FL	90,636	20%
Portland-Vancouver-Hillsboro, OR-WA	84,513	25%
Tampa-St. Petersburg-Clearwater, FL	81,856	26%
St. Louis, MO-IL	77,102	27%
Columbus, OH	72,440	28%
National Average	6,950,954	24%

Source: Burning Glass Technologies 2019

Appendix 2:

Top Metro Areas by IT Job Demand in Comparison to National Average

Metropolitan Statistical Area (MSA)	IT Postings in MSA: 2018	Concentration of IT Postings Compared to Nation[1]
California-Lexington Park, MD	4,177	+106%
San Jose-Sunnyvale-Santa Clara, CA	221,014	+106%
Washington-Arlington-Alexandria, DC-VA-MD-WV	353,567	+69%
Trenton, NJ	19,638	+66%
Huntsville, AL	22,649	+61%
Sierra Vista-Douglas, AZ	2,479	+53%
San Francisco-Oakland-Hayward, CA	321,761	+50%
Durham-Chapel Hill, NC	32,237	+45%
Columbus, IN	2,116	+43%
Raleigh, NC	62,889	+43%
Austin-Round Rock, TX	96,611	+33%
New York-Newark-Jersey City, NY-NJ-PA	515,106	+29%
Corvallis, OR	2,358	+28%
Seattle-Tacoma-Bellevue, WA	173,462	+28%
Lansing-East Lansing, MI	13,599	+28%
Boston-Cambridge-Nashua, MA-NH	227,698	+27%
Atlanta-Sandy Springs-Roswell, GA	171,720	+27%
Hartford-West Hartford-East Hartford, CT	32,719	+26%
Boulder, CO	16,147	+25%
Charlotte-Concord-Gastonia, NC-SC	99,303	+25%
Tallahassee, FL	8,015	+21%
Palm Bay-Melbourne-Titusville, FL	9,467	+19%
San Diego-Carlsbad, CA	108,853	+19%
Richmond, VA	37,651	+16%
Minneapolis-St. Paul-Bloomington, MN-WI	131,626	+15%
Dallas-Fort Worth-Arlington, TX	276,544	+15%
Columbus, OH	72,440	+14%

1 Concentration is a measure of per capita demand in comparison to the national average.

Source: Burning Glass Technologies 2019

Appendix 3:

Definition of Tech Sector

NAICS Code	NAICS Industry Name
334111	Electronic Computers
334112	Computer Storage Devices
334118	Computer Peripheral Equipment
334210	Telephone Apparatus
334220	Radio and TV Broadcasting and Wireless Communications Equipment
334290	Other Communications Equipment
334310	Audio and Video Equipment
334412	Bare Printed Circuit Boards
334416	Capacitor, Resistor, Coil, Transformer, and Other Inductors
334417	Electronic Connectors
334418	Printed Circuit Assembly
334419	Other Electronic Components
333242	Semiconductor Machinery
334413	Semiconductor and Related Devices
334510	Electromedical and Electrotherapeutic Apparatus
334511	Search, Detection, Navigation, Guidance, Aeronautical, and Nautical Systems and Instruments
334512	Automatic Environmental Controls
334513	Industrial Process Control Instruments
334514	Totalizing Fluid Meter and Counting Devices
334515	Electricity Measuring and Testing Equipment
334516	Analytical Laboratory Instruments
334517	Irradiation Apparatus
334519	Other Measuring and Controlling Instruments
334613	Manufacturing and Reproducing Magnetic and Optical Media
334614	Software and Other Prerecorded Content Reproducing
518210	Data Processing, Hosting, and Related Services
519130	Internet Publishing and Broadcasting, and Web Search Portals
511210	Software Publishers
423430	Computer and Computer Peripheral Equipment and Software Merchant Wholesalers
541511	Custom Computer Programming
541512	Computer Systems Design
541513	Computer Facilities Management
541519	Other Computer Related Services
611420	Computer Training
811211	Consumer Electronics Repair and Maintenance
811212	Computer and Office Machine Repair and Maintenance
811213	Communication Equipment Repair and Maintenance
811219	Other Electronic and Precision Equipment Repair and Maintenance

Source: Burning Glass Technologies 2019

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Acknowledgents

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About Burning Glass

Burning Glass Technologies delivers job market analytics that empower employers, workers, and educators to make data-driven decisions. The company's artificial intelligence technology analyzes hundreds of millions of job postings and real-life career transitions to provide insight into labor market patterns. This real-time strategic intelligence offers crucial insights, such as which jobs are most in demand, the specific skills employers need, and the career directions that offer the highest potential for workers. Find out more at burning-glass.com.

About Oracle Academy

AAs Oracle's global, philanthropic educational program, Oracle Academy advances computing education around the world to increase knowledge, innovation, skills development, and diversity in technology fields. In the past year, Oracle Academy had a significant impact worldwide, engaging with thousands of educational institutions and educators in more than 120 countries and helping millions of students become college and career ready.

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