2020 | Technology Talent Outlook

Navigating through current and future jobs in Northwest Indiana

The worlds of work and business are amid a monumental shift, with technology at the heart. Technology, in terms of capabilities and market viability, is unrecognizable to what it was even a quarter century ago when the Palm Pilot was in development and companies like Amazon, Yahoo, and EBay were first created. Today, nearly everyone has a device with more computing power than all of the technology that put a man on the moon. The impacts of this transformation, however, are not being felt equally. Technology's effects are determined by myriad, interconnected factors including industrial mix, geography, and population dynamics.

The industries that deal most directly with new technologies, by either creating or harnessing these technologies, have thus far benefitted the most. Indeed, many of today's most profitable companies fall into this 'technology sector'. These companies alone contributed an average of 20% of GDP growth over the past five years, and a technology firm was the first to reach a trillion-dollar valuation. Technology industries are not, however the only ones to employ new technological developments.

Many non-technology firms are also increasingly implementing new technologies with astonishing results. No doubt readers are familiar with stories of entire factories, restaurants, and retail establishments with nary a single human employee. Companies are increasingly able to accomplish more with less thanks to technology.

Technology's effect on workers has been dramatic as well with new workplace technologies changing nearly every occupation. As with the industries that employ them, the effects are not felt equally. Advances are allowing some workers to perform their jobs more efficiently, offloading standardized, repetitive tasks to software to allow more time for creativity. For other occupations, new technologies can be much more destructive by performing the essential functions of their job.

Finally, the geographic distribution of technologies effects is not equal either. The parts of the county that have been most successful at fostering the growth of these industries and technological adoption are thriving both economically and demographically. Indeed, places such as San Francisco and Seattle boast both household incomes and population growth rates that are more than double the national average. Conversely, many regions trying to catch up in the technology race also find themselves experiencing less growth.

These findings aim to make sense of this new paradigm and shed light on the state of technology in Northwest Indiana. For our analysis, we will examine the technology sector and associated industries, technology workforce, and the pipeline for technology skills.

Additionally, we'll identify national trends affecting our local labor market, and charts a path forward to ensure NWI remains competitive long into the future.

CWI

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Defining the sector and identifying NW Indiana's workforce

For our identification of Northwest Indiana's technology workforce, we eliminated all SOC occupations for which technology was not a main work focus or product. Figure 1 shows the 16 occupations, out of 974, identified as the technology workforce. The majority of these occupations fall under the Computer Occupations category. These technology jobs are almost entirely devoted to technology.

For hardware, we include occupations involved in design and development. Occupations producing hardware, however, are not on the list due to the fact that these positions are not delineated by manufacturing product in the SOC.

Software focused occupations are those which design and develop the digital systems which bring hardware to life, often referred to as 'coders'. Security occupations are those focused on protecting hardware and software from intrusions by malicious actors attempting to steal from or otherwise disrupt digital systems.

Finally, we include support occupations whose role it is to ensure the optimal performance of digital systems and hardware. These occupations include end user support and system maintenance. To be sure, there are numerous other occupations whose duties require direct interaction with technology, but for those occupations, technology is generally ancillary to the main product of work, such as a data scientist.

Figure 1. SOC Occupation Names and Common Job Titles

SOC	Occupation Name
11-3021	Computer and Information Systems Managers
15-1111	Computer and Information Research Scientists
15-1121	Computer Systems Analysts
15-1122	Information Security Analysts
15-1131	Computer Programmers
15-1132	Software Developers, Applications
15-1133	Software Developers, Systems Software
15-1134	Web Developers
15-1141	Database Administrators
15-1142	Network and Computer Systems Administrators
15-1143	Computer Network Architects
15-1151	Computer User Support Specialists
15-1152	Computer Network Support Specialists
15-1199	Computer Occupations, All Other
17-2061	Computer Hardware Engineers
17-2072	Electronics Engineers, Except Computer

Technology Sector and Associated Industries

We followed a similar process in our identification technology industries. From our NAICS hierarchy, we eliminate all industries other than those most integral to the design, development, production and maintenance of technology products, both hardware and software. Figure 2 on the following page lists the specific industries defined as the 'Technology Sector' for our analysis.

These 38 industries included under the Technology Sector umbrella are divided into three core groups, technology hardware manufacturing, digital systems design, and repair and maintenance services. The remaining technology industries supply digital content, sales, and ancillary technology services.

Measuring Technology Industries in Northwest Indiana

Figure 3. Technology Industries with Measurable NWI Employment			
Industry	**2018 Businesses**	**2018 Jobs**	**2018 Location Quotient**
Radio and Television Broadcasting and Wireless Communications Equipment Manufacturing	2	55	0.53
Bare Printed Circuit Board Manufacturing	1	55	0.93
Instruments and Related Products Manufacturing for Measuring, Display-ing, and Controlling Industrial Process Variables	6	356	2.65
Computer and Computer Peripheral Equipment and Software Merchant Wholesalers	11	57	0.12
Software Publishers	7	52	0.06
Data Processing, Hosting, and Related Services	13	169	0.24
Custom Computer Programming Services	84	184	0.09
Computer Systems Design Services	91	267	0.12
Computer Facilities Management Services	10	118	0.73
Other Computer Related Services	11	107	0.43

Employment and Firms

Northwest Indiana's technology sector in 2018 can best be described as limited. Of the 38 industries identified earlier in our analysis, only 10 have measurable employment in our region. Moreover, the industries that are present in our region are generally less concentrated and employ fewer workers than the national average. In Northwest Indiana, less than 2% of all companies are technology firms, accounting for one half of one percent of regional employment. Nationally, the average is 4% and 3%, respectively.

When considering only technology workers, 17% of region technology workers are employed by technology industries, as compared to the national average of 40%.

Our region has long been an epicenter of manufacturing activity in this country, and that continues to be true for two technology hardware manufacturing industries, industrial process sensor and circuit board manufacturing. These industries have a location quotient, or measure of industry concentration, near or above the national benchmark of one.

One other industry, computer facilities management services, is also quite prevalent in NWI. This service provides support to the data hosting and processing industry and is expected to grow given the Digital Crossroads data center currently in development on the Hammond waterfront.

Sector Productivity

Staffing alone, to be sure, is not the only measure of an industry sector. In fact, a hallmark of the technology sector is lean staffing patterns, evidenced by the fact that technology firms nationally employ only 3% of all workers while producing 7% of gross domestic product.

Another way to measure an industry is to look at activity. For our analysis, we looked at data regarding the demand for and production of technology industry outputs by looking at the volume, in dollars, of sales and purchases. Business sales and investments, however, can be quite volatile and cyclical. As a result, we looked at this information based on the average of the most recent 3 years (2017-2019).

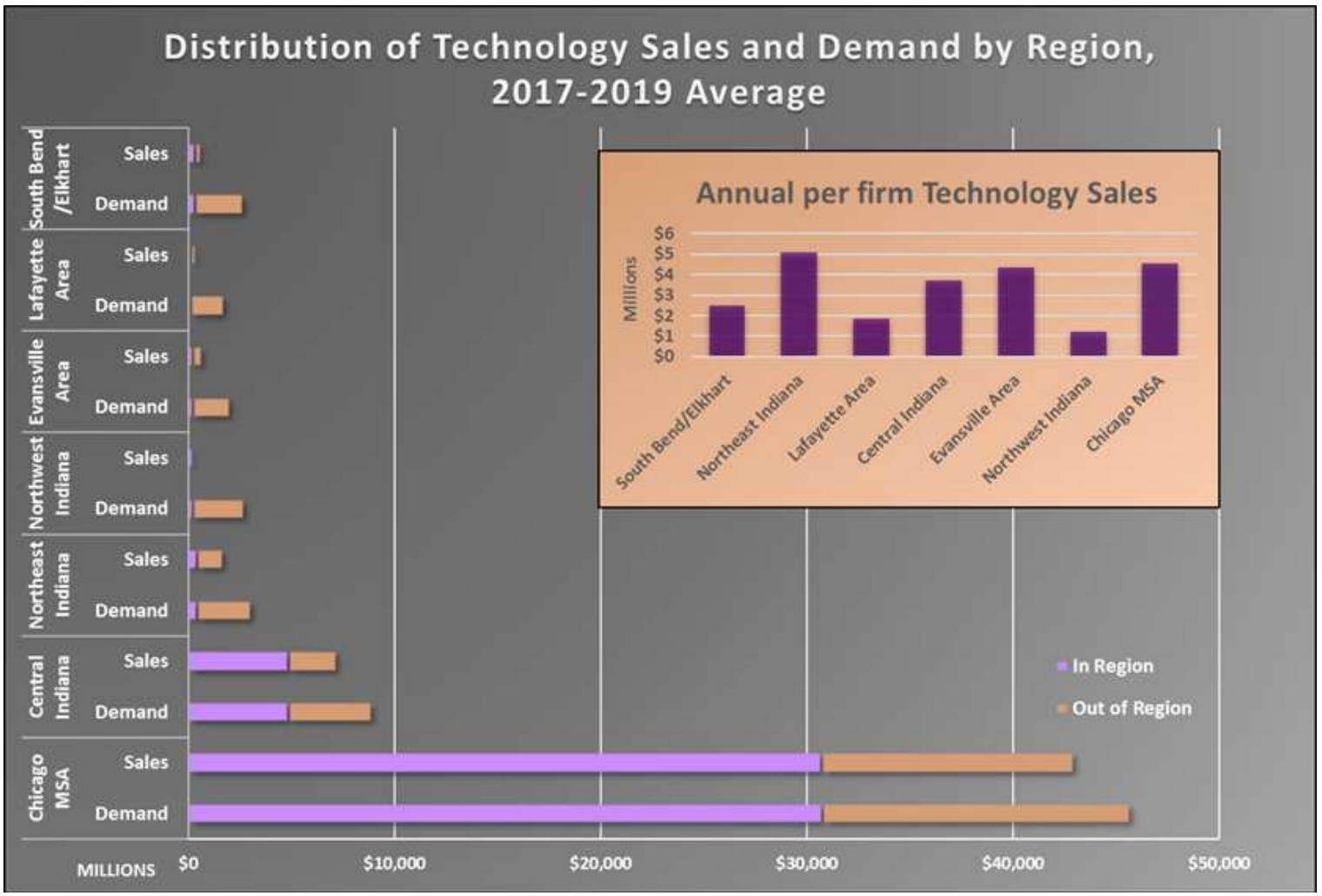
Figure 4 (p. 4) shows this sale and purchase data separated by region and how the sales and demand were satisfied, within or outside of the given region, for Northwest Indiana, the other leading regions in Indiana, and the Chicago Metropolitan Statistical Area (MSA).

As with the employment and concentration data discussed earlier, technology sector productivity is limited in our region and many others across the state. With the exception of the Chicago MSA and Central Indiana, none of the geographies studied came close to satisfying local technology demands within their region. Obviously, it would be foolish to think that any region would be able to completely satisfy technology demands internally, given the nature of technology industries outputs. At the same time, Northwest Indiana technology industries are only able to satisfy a strikingly low 10% of local demand.

Comparatively, the Chicago MSA (which includes Lake, Porter, Newton, and Jasper counties) and Central Indiana both satisfied more than 50% of local demand. It is clear to see that the nature of Northwest Indiana's technology sector is different, even when compared to neighboring regions.

Looking more closely at the sale of technology goods and services in these regions, we find similarly understated outputs in all regions except for Central Indiana and the Chicago MSA. In fact, technology sales by NWI firms were the lowest among all the regions studied in figure 4.

Finally, when considering sales on a per firm basis, we find similarly understated outputs in our region. As with total sales of technology products, Northwest Indiana's per firm sales are also the lowest among the studied regions at $1.2 million. Comparatively, the average annual sales per technology firms was $4.2 million for the nation, and Northeast Indiana had the highest of those studied at $5.1 million per firm.



Technology Jobs

Identifying the Workforce

The SOC system also follows a hierarchical structure to organize similar occupations. As such, nearly all the occupations we identified as technology jobs are categorized as 'computer occupations' by the SOC, with the exception of computer and information systems managers and technology hardware engineers. Later in this report we will look more specifically at other occupations that use technology, but were not classified as technology jobs in this analysis.

Technology workers only represent one tenth of one percent of all workers in Northwest Indiana. Overall, the story of Northwest Indiana's resident technology workforce is one of commuters and non-technology sector employment.

As discussed earlier, 82% of all technology workers are employed outside of the technology sector, compared to only 60% in the United States workforce as a whole. This low percentage of technology jobs at technology sector technology firms in our region is affecting technology workers in other ways beyond pushing workers to commute out of the region.

> "37% of all technology workers in Northwest Indiana commute out of the region."

Different Jobs, Different Wages

Technology sector firms are some of the most profitable of all industries, with a large portion of GDP growth over the past five years being attributed to technology firms. In geographies with a robust sector, wages for technology jobs are inflated as tech and non-tech firms alike compete for talent.

Average earnings for all workers at technology firms in Northwest Indiana were $78,500 in 2018. For the nation overall however, with employment in all 38 technology sector industries, average earnings were $130,100 in 2018.

Regional earnings for technology workers in any industry were much closer to the national average. In 2018, the median earnings for NWI were $80,900 compared to $92,000 for the U.S.

This much narrower gap for workers as opposed to industries is best explained by the specific industrial distribution in Northwest Indiana as opposed to other areas. Figure 7 shows the median annual wages for technology occupations in our region, the Chicago MSA, and the nation.

Figure 6. Technology Jobs and Workforce in NWI

Occupation	2018 Jobs	2018 Resident Workers	Net Commuters
Computer and Information Systems Managers	200	388	-188
Computer and Information Research Scientists	168	141	27
Computer Systems Analysts	349	627	-278
Information Security Analysts	93	108	-15
Computer Programmers	128	239	-111
Software Developers, Applications	268	578	-310
Software Developers, Systems Software	200	338	-138
Web Developers	64	114	-50
Database Administrators	64	102	-38
Network and Computer Systems Administrators	428	544	-116
Computer Network Architects	98	160	-62
Computer User Support Specialists	595	866	-271
Computer Network Support Specialists	112	197	-85
Computer Occupations, All Other	176	317	-141
Computer Hardware Engineers	43	41	2
Electronics Engineers, Except Computer	85	122	-37
	3,071	4,883	-1,811

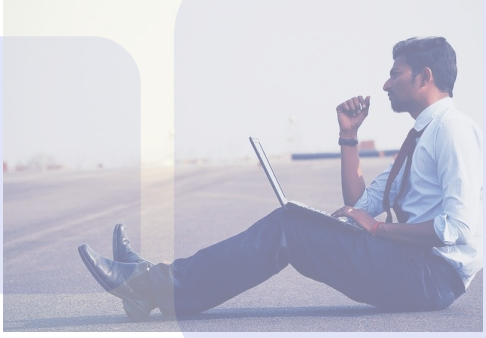


Figure 7. Median Wages by Region for Technology Occupations			
Occupation	**NWI**	**Chicago MSA**	**United States**
Computer and Information Systems Managers	$118,409	$138,959	$142,542
Computer and Information Research Scientists	$108,216	$110,761	$118,373
Computer Systems Analysts	$93,309	$88,276	$88,733
Information Security Analysts	$106,266	$99,021	$98,342
Computer Programmers	$67,029	$88,451	$84,282
Software Developers, Applications	$98,302	$97,569	$103,626
Software Developers, Systems Software	$77,981	$108,944	$110,011
Web Developers	$70,297	$73,002	$69,430
Database Administrators	$102,605	$99,989	$90,085
Network and Computer Systems Administrators	$74,431	$86,284	$82,056
Computer Network Architects	$82,615	$120,011	$109,013
Computer User Support Specialists	$48,673	$51,915	$50,981
Computer Network Support Specialists	$69,130	$64,278	$62,774
Computer Occupations, All Other	$78,975	$93,188	$90,272
Computer Hardware Engineers	$109,768	$104,011	$114,608
Electronics Engineers, Except Computer	$85,508	$97,317	$102,690

In NW Indiana, there are some specific occupations that receive a wage premium compared to the Chicago MSA and the nation. These above average wage occupations are generally support and security focused. The occupations with wages below the other regions are those most focused on software, which are generally more concentrated in technology industries. Support and security occupations, on the other hand, are utilized by nearly all industries.

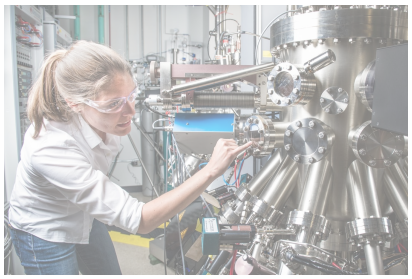
"Northwest Indiana has been an epicenter of manufacturing activity in this country, and that continues to be true for two technology hardware manufacturing industries--**industrial process sensor** and **circuit board manufacturing**."

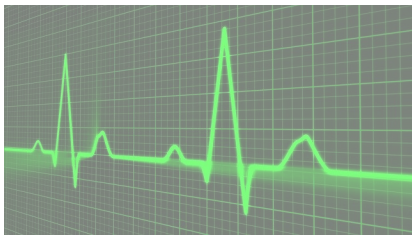
Technology Workforce in Non-Technology Industries

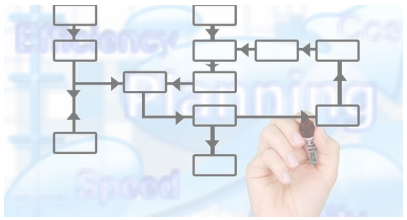
With only 17% of technology workers employed by technology industries, particular attention must be paid to technology jobs at all other industries. The industries employing the most technology workers are corporate headquarters, steel mills, post-secondary education institutions, commercial banks, and healthcare facilities. More than one third of all technology workers employed in our region work in these 5 industries. This, however, comes as little surprise given that these industries are some of the most productive in our region.

Figure 8. NWI's Non-technology industry Jobs Change 2008 -2018

Industry	2008 Technology Jobs	2018 Technology Jobs	Change (2008 - 2018)	% Change (2008 - 2018)
Finance and Insurance	167	246	79	47%
Health Care and Social Assistance	117	170	53	45%
Government including Public Education	486	537	51	10%
Professional, Scientific, and Technical Services	498	548	50	10%
Management of Companies and Enterprises	139	185	46	33%
Manufacturing	318	363	45	14%
Administrative and Support and Waste Management and Remediation Services	117	154	37	32%
Utilities	52	82	30	58%
Educational Services	113	130	17	15%
Transportation and Warehousing	60	72	12	20%







> 82% of technology jobs in Northwest Indiana are in non-technology industries."

Technology employment at non technology firms in NWI has grown substantially over the past ten years. Every industry group has seen double digit growth, and three industries have seen their technology workforce grow by nearly half.

Looking back at the demand data for technology products and services it is safe to assume these industries will continue to employ more technology workers in to the future to maximize their substantial technology investments. It is also evident that the industry's most heavily investing in technology are also the largest employers of technology workers, largely support and security positions.

Figure 9. NWI Industry Purchases from Technology Firms, 2017-18

	Total Technology Purchases
Manufacturing	$814,531,000
Healthcare	$248,052,000
Government including Public Education	$201,083,000
Wholesale Trade	$129,054,000
Retail Trade	$130,115,000
Professional, Scientific, and Technical Services	$114,346,000
Finance and Insurance	$75,814,000
Administrative and Support Services including Management of Companies	$152,881,000
Construction	$90,521,000
Transportation and Warehousing	$72,321,000
Utilities	$40,046,000
Total	$2,412,883,000

National Trends Affecting Northwest Indiana

In addition to the local dynamics outlined in this report, there are also national technology trends affecting Northwest Indiana's businesses and workforce now and in the future.

While the exact trajectory of technological adoption is still a point of contention among experts, one thing that is clear is new technologies, including automation and artificial intelligence, will have a profound effect on the economy, our lives and the way those two interact.

The foremost experts in these fields have developed wide ranging arguments, with some envisioning a utopian world without the need for work, others picturing mass layoffs as technology replaces worker while others still predict that to maintain current economic growth, businesses must maintain full employment along with utilizing new technologies. Given these disagreements, the responsible assumption is that reality will most likely fall somewhere in the middle, most likely with technology creating some new jobs while replacing others.

By adopting this approach as a region, we will be better equipped to addresses the economic and workforce issues that arise due to technology. What follows is a deeper look at national trends previously identified in our 2019 State of the workforce report.

Digitalization of the Northwest Indiana Workforce

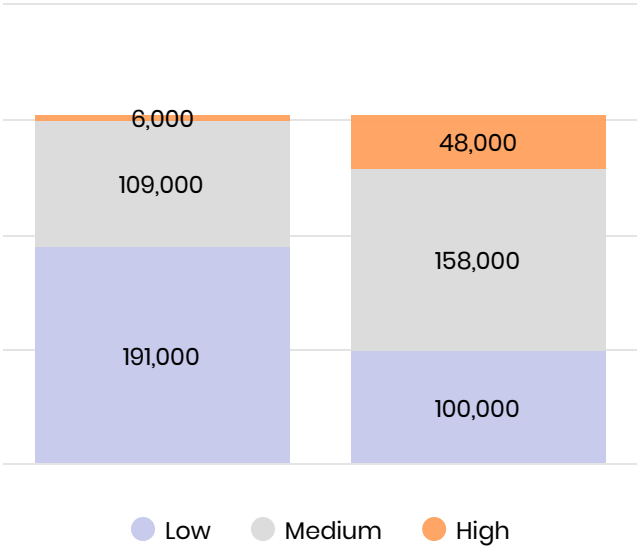
We have adopted an analysis developed by the Metropolitan Policy Program at Brookings Institute to assess the technology-related aspects of U.S. jobs. Specifically, this methodology looked at two factors: the knowledge of computers and electronics required for each job; and the percentage of a job's work activity spent interacting with computers. Armed with this data, they developed a Digital Score framework; with scores between 0 and 100, along with tiers to distinguish between High, Medium, and Low score; and a tool to assess the progression of scores over time.

Over the past two years, Northwest Indiana's firms have invested more than **$2.4 Billion** in technology products and services. Quantifying the effect of this proliferation of technology in the workplace for the **99.9%** of workers that are not in technology occupations becomes imperative.

Figure 10. Digital Scores for common occupations in NWI

Digital Level	Digital Score	Representative NWI Occupations
HIGH	61 and above	Software Developers, Applications (**94**); Computer Hardware Engineers (**91**); CNC Machine Tool Programmers, Metal and Plastic (**74**)
MEDIUM	33 - 60	Transportation, Storage, and Distribution Managers (**60**); Management Analysts (**53**); Stock Clerks and Order Fillers (**36**)
LOW	32 and below	Heavy and Tractor-Trailer Truck Drivers (**30**); Hosts and Hostesses, Restaurant, Lounge, and Coffee Shop (**22**); Farmworkers and Laborers, Crop, Nursery, and Greenhouse (**16**)

Figure 11. NWI Distribution of Jobs by Digital Score Level, 2002-2016



This Digital Score framework clarifies the increasing centrality of technology to U.S. jobs. When the framework is applied to Northwest Indiana's jobs, the change in the demands of technology on the region's workers becomes quantifiable.

Increasingly, Northwest Indiana workers' access to economic opportunity depends on their developing digital skills. Between 2002 and 2016, 86% of NWI jobs demanded an increase in digital skills (with another 2% already in the highest Digital Score tier). Though data is not available to pinpoint how Digital Scores have shifted since 2016, an overall decrease seems unlikely, meaning that today, 67% of Northwest Indiana's jobs require moderate to advanced interaction with technology.

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Automation of Work Tasks

Automation is the process by which work tasks, and in some rare cases, entire occupations, are replaced by technology hardware and software. To measure the impact automation will have on our region, we have adopted the use of the Automation Index developed by Emsi.

An occupation's Automation index is a coefficient representation of the percentage of a job's tasks that are automatable with currently demonstrated technology. This does not mean that the job itself is automatable, but that a percentage of the job's tasks are potentially automatable. A value of 100 represents the baseline likelihood of automation, with values below 100 representing occupations with tasks less likely to be automated and values above being more likely.

AUTOMATION RISK	AUTOMATION INDEX	MEDIAN DIGITAL SCORE	REPRESENTATIVE NWI OCCUPATIONS (Digital Score, Automation Index)
Well below average	55 - 85	60	Software Developers, Applications (94, 81); General & Operations Managers (61,82)
Slightly below average	86 - 100	59	Transportation, Storage, & Distribution Managers (60,88); Management Analysts (53, 91)
Slightly above average	101 - 115	43.5	Stock Clerks & Order Fillers (36, 112); Heavy & Tractor-Trailer Truck Drivers (30, 110)
Well above average	116 - 145	27	Combined Food Preparation & Serving Workers, including Fast Food (27, 131); Janitors & Cleaners, except Maids & Housekeeping Cleaners (18, 123)

By combining the automation index value with the digital scores discussed previously, we found a strong inverse relationship between automation risk and the digital demands of an occupation, meaning that occupations requiring more interaction with technology are often less able to be automated.

In January of 2017, the McKinsey Global Institute released an analysis in order to look more deeply into automation. In A Future that Works: Automation, Employment, and Productivity, McKinsey laid out its findings from analyzing more than 2,000 work activities across 800 occupations:

Less than 5%

of all occupations in the global economy can be automated entirely through demonstrated technologies.

100%

of occupations in the global econonomy have tasks that can be automated.

About 60%

of occupations have at least **30%** of their activities that are automatable.

(For example, roughly 25% of the typical Chief Executives' tasks are automatable with currently demonstrated technology.)

Automation-driven job change affects nearly everyone, regardless of education, sector, or earning power:

"AI techniques can significantly speed up drug discovery by performing some of the tasks typically handled by scientists. "It is not that machines are going to replace chemists," said drug discovery researcher and blogger Derek Lowe. "It's that the chemists who use machines will replace those that don't." ~ CIO Journal (April 2019), AI for Molecular Design

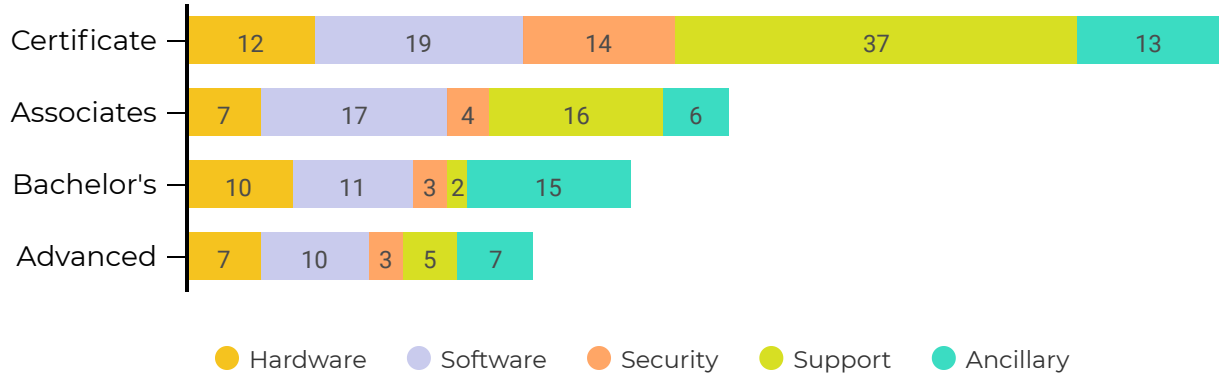
Or, as one advanced manufacturing employer in the region quipped, *"I have yet to see a robot walk through the door, set itself up, and maintain itself. Robots don't replace people. They just change the skills people need, turning manufacturing jobs into high skilled technical jobs."*

Preparing the Technology Workforce

Northwest Indiana is home to leading post-secondary education institutions, and this excellence extends to technology training as well. Our regional institutions offer an astonishing 188 technology skills programs, and when also including remotely available programs from all Indiana institutions, the number grows to 218.

These programs range from industry recognized certifications and technical certificates to Masters Degrees and post baccalaureate certificates. Additionally, these programs are distributed across a variety of concentrations. Figure 13. provides an overview of the distribution of these programs. The focus of these programs available regionally span the breadth of technology occupations.

Figure 13. NW Indiana Digital Skill Training Programs



Many of these training types have already been discussed throughout this report. The ancillary skills category of trainings refers to programs that utilize technology, but are not technology occupations. These types of trainings include data analytics, health information management, digital design, and management of information systems.

There has been a recognition among higher education institutions of the necessity of digital skills in the labor market not just of the future, but also of today, as shown by the increasing need for digital skills across occupations. Our regional institutions have recognized this need and have be adding programs to satisfy employer needs. A number of the programs identified by this report are new developments. Indiana University Northwest, Purdue Northwest, Ivy Tech, and others have all added technology programs to their curriculum. Additionally, the adult education consortium in our region has also be adding basic digital skills programs to meet the needs of employers. This overall proliferation of technology programs bodes well for our region as employers look for increasingly more technology talent.

Conclusions

One of the most over used phrases that exists when it comes to workforce development for the future is that we must prepare students for jobs that don't yet exist. The rate of technological change is now such that, in the time that it takes firms to implement a new technology, many multiples more have been created. More honestly, this adage should be, we need to train students to utilize technologies that do not yet exist to perform jobs that also don't exist. Based upon our research, it is clear, if we are going to adequately prepare children for the future, we must equip them with solid foundation of digital core competencies alongside the ability to quickly learn new, specific skills based upon employer needs.

Additionally, work must be done to increase our understanding of where the greatest technology needs exist currently, in addition to standardizing the way we talk about technology as a region. Finally, we must ensure that the top technology talent trained in our regional institutions want to, and is able to, work locally.

Basic Skills Transformation

As previously demonstrated, the digital skills required by all occupations, not just those in technology, are on the rise. Nearly every occupation requires a greater understanding of technology than it did just a few years ago. Indiana has recognized the need for basic digital skills, and in 2016, the state implemented K-12 computer science education standards. Additionally, all public schools will be required to offer computer science curriculum to all grade levels beginning in 2021. These steps will help ensure Indiana's future workforce will be competitive in terms of technology skills. Locally, however, we must also focus on the basic digital skills of our current workforce.

Based upon anecdotal evidence from regional employers, a gap exists between the digital demands of regional employers and the digital skills of region residents. To measure the digital skills gap in our area, Goodwill industries of Michiana, through a grant from Google has begun working to assess the digital skills possessed by Northern Indiana residents. Part of this effort has included screening the digital literacy of their career services customers.

In the first nine months of 2019, over 1,300 Goodwill career services customers have participated, with just over 57% passing the basic computer skills assessment based on the most fundamental of digital skills. While this is only a small, non-representative sample, it demonstrates the existence of a population in our region that is at risk not just of lagging in terms of wages, but also being locked out of the labor market entirely moving forward. Given the ever increasing demand for digital skills, and implications of falling behind, more must be done to measure and elevate the level of basic technology skills possessed by region residents. This, however, is not an easy proposition.

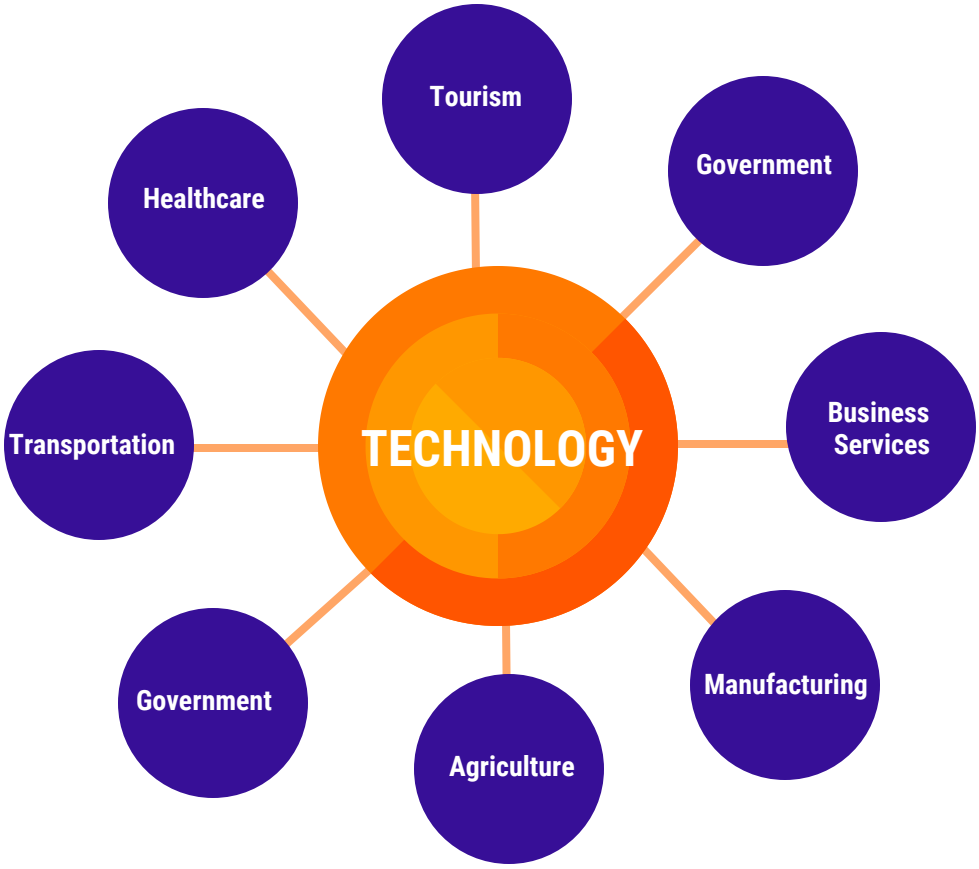
Each industry and occupation utilizes technology in different ways, and the myriad workplace technologies currently in existence make generalizations difficult. To address this problem, O*NET and Burning Glass Technologies, a labor market data analytics firm, partnered to analyze millions of job postings to identify the most frequently requested technology skills, Hot Skills, for each of the 974 SOC occupations. Through these efforts, updated quarterly, we are able to identify cross-cutting Hot Skills that apply to many different occupations.

With the near ubiquity of the Windows operating system in business, it should come as no surprise that many of the programs included in the Microsoft Office Suite, including Power Point, Word, and Outlook are among the most frequently posted among all occupations. Proficiency in any of these software will give workers advantage over others, but perhaps the most beneficial is Excel. The spreadsheet software Hot Skill not only appears more frequently than any other technology, found in postings for 89.5% of all occupations, but also because the specific nature of Excel teaches users how computers work through computational thinking.

Computational thinking is a problem-solving method in which solutions take the form of structured steps from start to finish. Computers operate the say way, through a clear, structured, and universal language, or code. Excel is important because even the most basic functionalities, like finding the sum of two cells, require users to explain the solution in a structured and clear way, using functions and formulas, to get the desired output. As a result, the ability to use excel jumpstarts basic technology skills unlike any other software, and must be adopted as a regional basic skills competency.

"Today 67% of Northwest Indiana's jobs require moderate to advanced interaction with technology."

"Given that 82% of technology workers are employed by industries outside of the technology sector, companies in these industries must have a seat at the table."



A re-emerging practice in workforce development, sector strategies, are a collaborative, industry led working group that brings members of the business community together to discuss challenges of the industry, and then brainstorm and implement solutions. These can include representatives of business in the same industry, or a cross-industry group focused on a shared challenge. Currently in NWI there are multiple sector strategies active or in development in industries such as Healthcare, manufacturing, and agriculture.

If our economy is to thrive in the future, Northwest Indiana must develop a cross-industry technology sector strategy. Given that 82% of technology workers are employed by industries outside of the technology sector, companies in these industries must have a seat at the table. Industries that employ the most significant number of technology workers, such as Healthcare, Education, Steel manufacturers, commercial banks, and corporate headquarters stand to gain the most from a sector strategy.

Industries that currently do not employ a significant number of technology workers but account for a significant part of NWI's economy. One of biggest hurdles to implementing an enterprise technology solution is knowing where to start. By convening and discussing challenges and looking at case studies, such a sector strategy would help expedite technology adoption.

Such a strategy would also help to close the digital skills gap in Northwest Indiana. By bringing these business leaders together, we will be able to identify the baseline of digital skills required within these industries. It will also allow workforce development to more quickly discover and alleviate specific skill pain points in addition to developing a greater regional understanding of technology.

An issue surrounding technology that is not unique to Northwest Indiana is the lack of a full understanding of the details of technology. Many companies know they have technology needs, but struggle to articulate the specifics. A regional technology sector strategy would allow for technology vocabulary and understanding to be standardized in our region, benefiting both business and job seekers. This would provide a basis to begin charting technology job pathways for our region.

Talent Retention

Technology is not just changing how jobs are done, but also transforming where they are done. Flexible work arrangements, including telework options and full remote work, are increasingly changing the work paradigm, with companies taking jobs to top talent as opposed to the other way around.

Our regions proximity to Chicago, the cutting edge technology infrastructure, and world class training programs provides our region a strategic advantage to take advantage of this new dynamic over many other regions in the Midwest and the rest of the country.

Currently, however, our region is not maximizing this relationship. Northwest Indiana's workforce has long been accustomed to commuting into Chicago, and the same is true for technology workers specifically, with 38% of our regions technology workers commuting out of the region in 2018. No doubt a number of these commuting workers are taking advantage of flexible work arrangements.

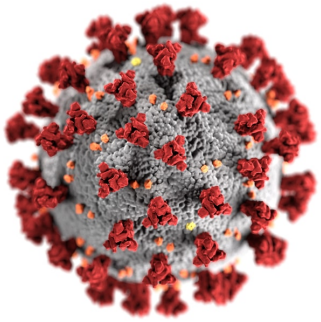
When looking at strictly remote workers, however, our region has not kept pace with the fastest growing parts of the country or the national average. These fast growing regions in Western and Sunbelt states, attract high numbers of remote workers with many geographies hovering around 10% of all workers being remote. This is contrasted by a national average of 4.7% and a regional average in NWI of 3.2%.

More anecdotally, a recent survey of region residents that moved to other parts of the country conducted as part of the Ignite the Region Economic Development Initiative revealed that the top reason for migration was a perceived lack of employment opportunity in top occupations.

Northwest Indiana's economic development sales pitch, for good reason, has long focused on the economics of doing business in the state and our region's proximity to nearly all of the Midwest's major metropolitan areas, including Chicago. For workers, this means a lower cost of living without sacrificing access to high wage jobs available in the city. For companies, this means easy access to some of the largest markets in the country, low taxes, and one of the best business climates in the country. Based upon the research in this report, however, this pitch should be expanded going forward.

Where should our focus be at this time?

As a state, particular focus has been placed on developing digital skills as a competitive advantage over other geographies in the nation. This is even truer for our region specifically, given our stellar school corporations and innovative regional higher education institutions. A greater focus should be given to advertise the technology workforce possessed by our region to grow our technology sector and the number of technology jobs available in our region.



Technology and the Workforce: The Impact of the Pandemic

The novel **Coronavirus (COVID-19)** pandemic has had a massive impact on the workforce. At the time of writing, during the response, the full extent of the effects on workers and businesses large and small is still unknown. What we do know, however, makes the findings in this report even timelier.

In the first three weeks from the onset of social distancing guidelines, March 15 – April 4, about 10% of workers in the U.S. had newly filed for unemployment. Many of these worker come from food service, hospitality, retail and retail industries closed due to social distancing in addition to other industries closed due to being deemed non-essential.

Many workers in other industries have been deemed essential, and bravely risk exposure to fulfil critical functions, such as health care workers, first responders, grocers, and delivery workers. These workers are on the front lines ensuring the health and safety of all others.

Finally, there is a group of workers that have, for now, transitioned out of the office and in to the home for work. Before the outbreak of COVID-19, less than 13% of workers have an arrangement that includes remote despite nearly 37% being capable of remote, according to the Bureau of Economic Research.

Through this crisis, technology has shifted even more workers into this category. Some health care industries have been able to shift to remote patient care, taking advantage of previously underutilized telemedicine technology. Additionally, technology has also created an entire ecosystem of remote work for varying skill levels which has been highlighted by this disaster. While the true number is unclear, COVID-19 has created many new remote workers and new ways to work. For some, this new work arrangement may be welcomed, but for others, a lack of basic digital skills has led to challenging transitions.

For many businesses, this crisis hasput a spotlight on their own technology assets. Companies now operating remotely are running into issues of scalability, connectivity, and security as they try to maintain operations with their workforce at home. During past economic downturns and recessions, the adoption of new technology accelerated. It is expected that the rate of technological adoption including automation, artificial intelligence, and remote work technology will increase as a result of COVID-19 as well.

The full economic effects of the COVID-19 pandemic and associated response have still not been felt. It is clear, however, that the nature of work will be different both in the short and long term. As this report outlines, nearly every industry maintains technology systems and employs technology workers. A cross-industry collaboration would help the region troubleshoot the adoption of technologies to better protect workers and customers.

As the economy returns from the COVID-19 pause, it is important that as a region we move together to comeback even stronger. This disaster has demonstrated how powerful technology can be, with large parts of the economy operating remotely. The findings and conclusions in this report can help chart a path to an economy of the future.

Our Methodology and Sources

The dramatic effects technology is having on the world is only overshadowed by the rate at which it is happening. Due to the breakneck speed of advancement, research has struggled to keep pace. Even the foremost research organizations and think tanks differ in their assessments and horizons for technology adoption. Disagreements can be found in the expected effects current technology will have once fully implemented into the world of work. Even more fundamentally, the terms, definitions and structures in technology research are not unified. To structure our analysis of technology, we will be adopting the conventions used when researching all other industries and occupations.

Adopting this approach allows CWI to ground our research into recognized government sources with decades of research experience and authority. We have informed our research and adapted analysis techniques to regionalize workforce trends from research conducted by the Brookings Institute, McKinsey Global Institute, the Bureau of Economic Research, and others.

For our analysis of occupations, we make use of the Standard Occupational Classification (SOC) System. The SOC was developed in 1977 as a way to standardize how occupational information is collected and published to allow comparisons. The SOC organizes occupations into a hierarchical structure featuring increasing degree of specificity. Additionally, we make use of the Occupational Information Network (O*NET), which allows an even greater degree of granularity, including specific skill, experience and work activity requirements.

Our examination of industries is similarly based on a government developed structure the North America Industry Classification System (NAICS). As with the SOC, industries are organized into a hierarchical structure to allow greater degrees of precision analysis. Utilizing these industry recognized, government maintained resources lends our research the authority of these sources.

This framework then allows for CWI to overlay labor market data provided by EMSI, a labor market data analytics firm whose data covers more than 99% of the workforce and is compiled from a wide variety of government sources, job postings, and online profiles and résumés. All data is sourced from EMSI except where indicated. For more information about Emsi, visit https://www.economicmodeling.com.