MICHIGAN INFORMATION TECHNOLOGY

2019 INDUSTRY CLUSTER WORKFORCE ANALYSIS

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WORKFORCE ANALYSIS

**BUREAU OF LABOR MARKET
INFORMATION AND
STRATEGIC INITIATIVES**

(517) 335-2472

IT'S BIGGER THAN DATA.

The Bureau of Labor Market Information and Strategic Initiatives is your one-stop shop for information and analysis on Michigan's population, labor market, and more.

- Our Federal-State Programs division runs the state's cooperative agreements with the U.S. Bureau of Labor Statistics and the U.S. Census Bureau, making us the official source for this information.

- Our Research and Evaluation division conducts workforce research and program evaluation, giving you the insight you need to make smarter decisions.
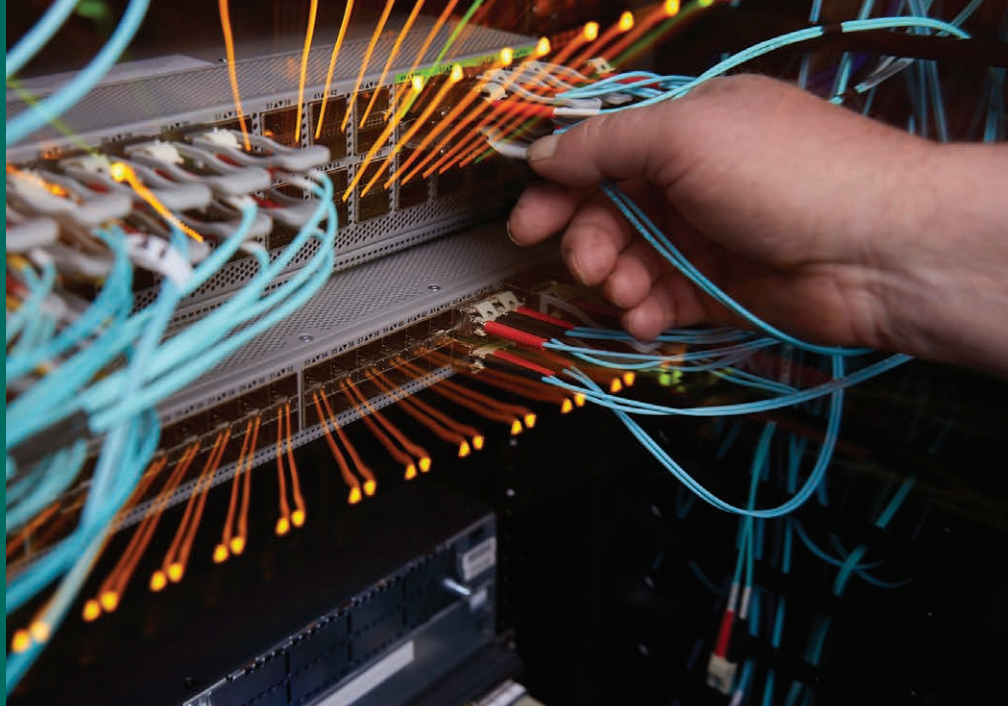
TABLE OF CONTENTS

Dear Colleagues,

The Michigan Department of Labor and Economic Opportunity partners with businesses to help them find the talent they need to be successful. To assist with this process, we worked with the Bureau of Labor Market Information and Strategic Initiatives to produce a series of workforce analysis reports, each focusing on a key industry cluster in the Michigan economy. These reports are loaded with useful information on talent, including an analysis of employment, wages, key occupations, demand jobs, talent pipelines, and career pathways. We hope these reports will help our business partners make data-driven workforce decisions and help our state grow a talent system that is second to none.

STEPHANIE BECKHORN
DIRECTOR, WORKFORCE DEVELOPMENT
Michigan Department of Labor
and Economic Opportunity

Dear Colleagues,

The Michigan Bureau of Labor Market Information and Strategic Initiatives is your one-stop shop for information and analysis on Michigan's population, labor market, and more. These reports provide traditional labor market information, but also discuss important topics such as talent pipelines and career pathways. These reports give our workforce partners, employers, and job seekers the insight they need to make smarter decisions. We would like to thank the Department of Labor and Economic Opportunity for partnering with us on these reports.

JASON PALMER
DIRECTOR
Michigan Bureau of Labor Market
Information and Strategic Initiatives

Key Findings

- Employment growth in the Information Technology (IT) industry cluster has been significant and is projected to continue. Technology's ability to fulfill society's increasing dependence on information and interconnection has contributed to the cluster's emergence. Most jobs in the cluster require an advanced level of education and have relatively high wages.

- The IT industry cluster has seen a 25.0 percent increase in employment since 2009. Like much of the economy, this cluster lost a significant number of jobs during the Great Recession, but has since shown employment growth above the state average.

- The median hourly wage of IT workers ($41.54) is close to two and a half times the statewide median hourly wage. Wage growth in IT since 2009 has been similar to Michigan's statewide growth rate.

- *Computer and mathematical occupations* such as *Software developers* and *Computer user support specialists* compose the largest number of workers among major occupational groups in IT. These jobs generally involve working with computers and software and require skills in programming, engineering, and electronics.

- A large share of IT jobs require a bachelor's degree or higher. Approximately 40 percent of males and 36 percent of females in this cluster have a bachelor's degree or higher.

- Jobs in IT have experienced significant growth since the recession, many occupations and industries in the cluster are projected to see double-digit growth through 2026.

An **industry cluster** is a geographic concentration of related employers, industry suppliers, and support institutions in a product or service field.

In a practical sense, clusters are an organizing framework to permit the selection of significant industry sectors for which in-depth knowledge and expertise on workforce issues are developed by service providers that convene employers. An industry cluster leverages the knowledge and resources of all involved, decreases duplication of effort, and often achieves cost savings for recruitment and training.

Three subclusters highlight the diverse array of activities composing this facet of Michigan's economy.

Providers and Support Services
Sales and Consulting Services
Manufacturing
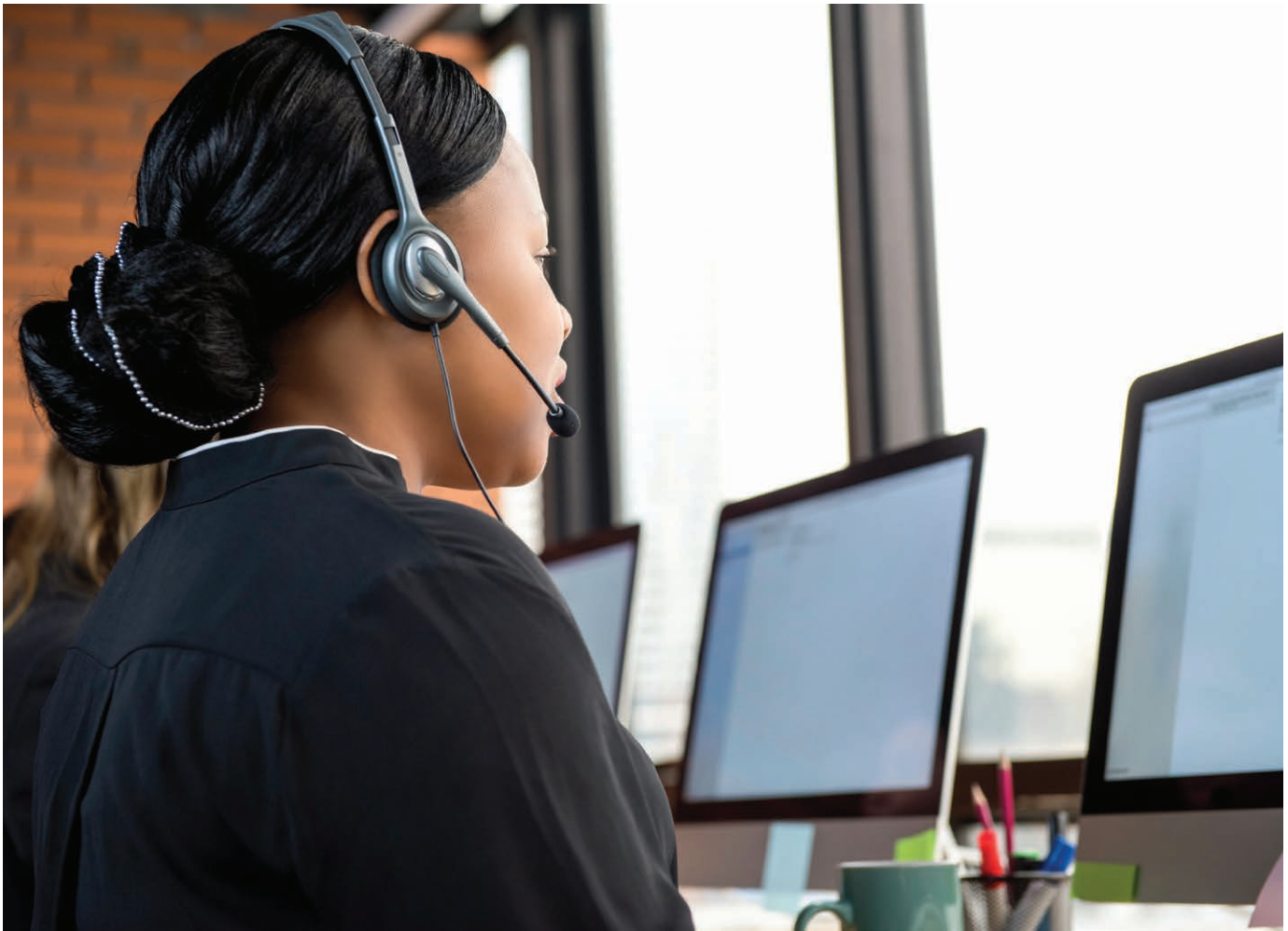
Information Technology Employment and Wages Analysis

Employment in the IT cluster in Michigan is growing rapidly. IT careers were once most prevalent in technology companies, but more and more, non-tech companies are adopting new technology and services. Using technology to track sales, for production, to stay interconnected, and for security has become essential for the success of most companies. Additionally, individuals and public institutions have become increasingly dependent on technology to be informed and connected. The demand for the IT resources required to set up and service tech and non-tech companies, individuals, and public institutions has created a surge of new jobs in the cluster.

Since 2009, employment in IT is up 25 percent, greater than Michigan's overall employment increase of 16.8 percent.
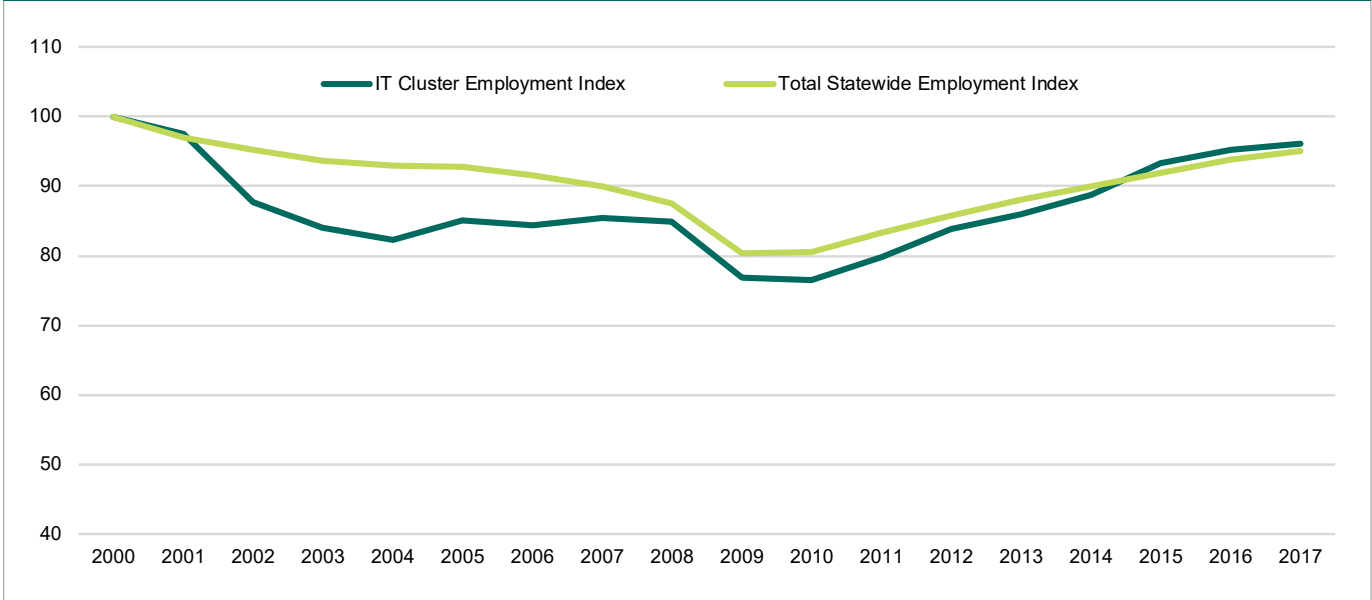
Employment in IT lost almost a tenth of its workforce, or close to 12,000 jobs, during the Great Recession from 2007 to 2009. Most of those jobs were fully recovered by 2012.

Most recent estimates of employment in IT were at 139,906, accounting for 3.7 percent of private employment in Michigan. The share of IT workers in Michigan has seen consistent growth since 2009, having advanced from 3.5 percent.

The mean wage of jobs in the IT industry cluster is $41.54—considerably higher than Michigan's statewide industry average wage of $25.18.
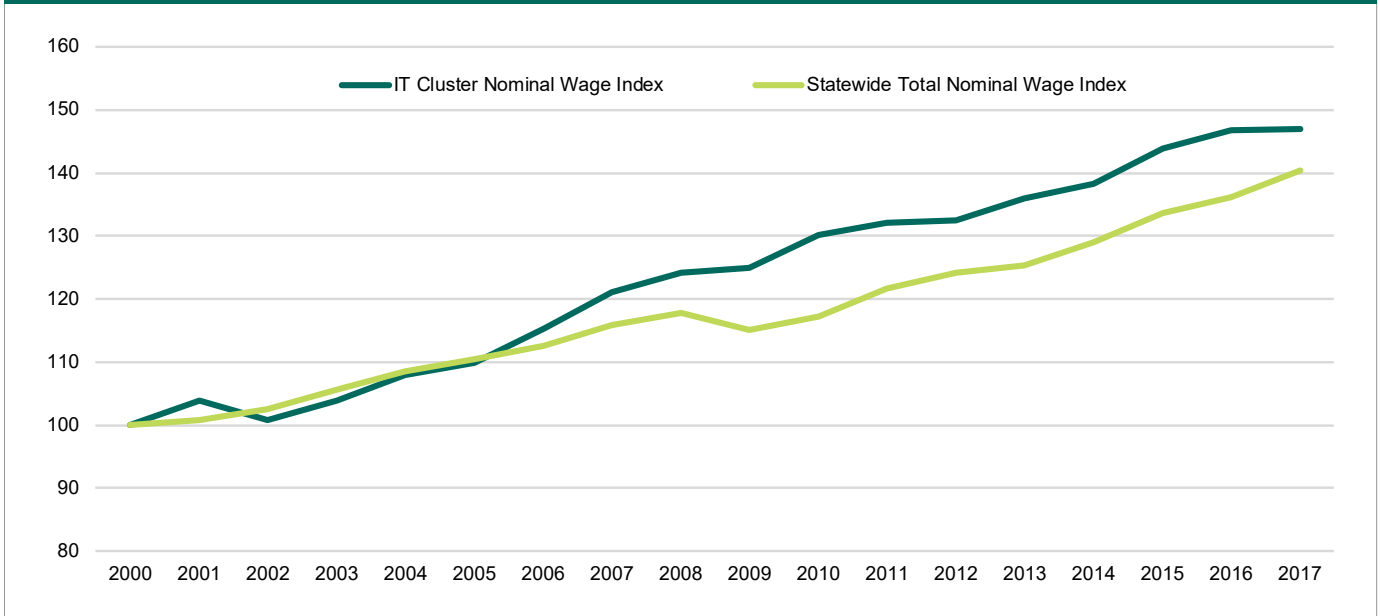
Nominal wages in the IT Cluster have grown by 34 percent since 2005, nearly twice the rate of overall wages in Michigan during that span. Prior to this, nominal wage growth in this cluster roughly matched the statewide average, with each segment experiencing a 10 percent rise in wages between 2000 and 2005.

FIGURE 1: EMPLOYMENT INDEX, MICHIGAN INFORMATION TECHNOLOGY CLUSTER

Legend: IT Cluster Employment Index — Total Statewide Employment Index

Y-axis: 40, 50, 60, 70, 80, 90, 100, 110

X-axis: 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017

Source: Quarterly Census of Employment and Wages, Michigan Bureau of Labor Market Information and Strategic Initiatives

FIGURE 2: NOMINAL WAGE* INDEX, MICHIGAN INFORMATION TECHNOLOGY CLUSTER

Legend: IT Cluster Nominal Wage Index — Statewide Total Nominal Wage Index

Y-axis: 80, 90, 100, 110, 120, 130, 140, 150, 160

X-axis: 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017

Source: Quarterly Census of Employment and Wages, Michigan Bureau of Labor Market Information and Strategic Initiatives

*Nominal wages are not adjusted for inflation.

Analysis of Information Technology Subclusters

Providers and Support Services (79,768 jobs)

Wired and Wireless Telecommunications Carriers
Satellite Telecommunications
Data Processing, Hosting, and Related Services
Computer Systems Design and Related Services
Electronic and Precision Equipment Repair and Maintenance

Industries in this subcluster include telecommunications services that primarily provide access to or operating facilities for the transmission of data, text, voice, sound, and video. Additionally, industries that conduct data processing, hosting, computer systems design, and repair and maintenance services are included. This subcluster is the largest of the three subclusters, with 56 percent of IT jobs. Since 2009, employment has grown 22.0 percent.

Sales and Consulting Services (31,964 jobs)

Software Publishers
Computer and Computer Peripheral Equipment and Software Merchant Wholesalers
Other Electronic Parts and Equipment Merchant Wholesalers
Electronic Shopping and Mail-Order Houses
Telecommunications Resellers
All Other Telecommunications
Internet Publishing and Broadcasting and Web Search Portals
Marketing Consulting Services
Other Management Consulting Services
Other Scientific and Technical Consulting Services
Computer Training

The selling, marketing, publishing, and distribution of computers, software, and related equipment, including computer training and consulting services, comprise this subcluster. Workers in this group work with individuals and businesses to provide and develop the type of IT necessary for achieving their objectives. Mean wages in this subcluster are higher than the other two subclusters, at over $46 per hour.

Manufacturing (29,654 jobs)

Computer and Peripheral Equipment Manufacturing
Communications Equipment Manufacturing
Semiconductor and Other Electronic Component Manufacturing
Manufacturing and Reproducing Magnetic and Optical Media
Electrical Equipment Manufacturing
Other Electrical Equipment and Component Manufacturing
Semiconductor Machinery Manufacturing
Mechanical Power Transmission Equipment Manufacturing
Audio and Video Equipment Manufacturing
Automatic Environmental Control Manufacturing for Residential, Commercial, and Appliance Use
Instruments and Related Products Manufacturing for Measuring, Displaying, and Controlling Industrial Process Variables
Instrument Manufacturing for Measuring and Testing Electricity and Electrical Signals
Analytical Laboratory Instrument Manufacturing
Other Industrial Machinery Manufacturing
Other Measuring and Controlling Device Manufacturing

The industries in this subcluster include the manufacture of computers, communications equipment, similar electronic products and the components for such products. While this is the smallest subcluster at 21 percent of IT jobs, strong employment growth (28 percent) in IT *Manufacturing* since 2009 demonstrates the increased use of these products in everything from vehicles to phones to most work places.

FIGURE 3: SUBCLUSTER DISTRIBUTION, MICHIGAN INFORMATION TECHNOLOGY CLUSTER 2017

Providers and Support Services, 56.4%

Sales and Consulting Services, 22.6%

Manufacturing, 20.9%
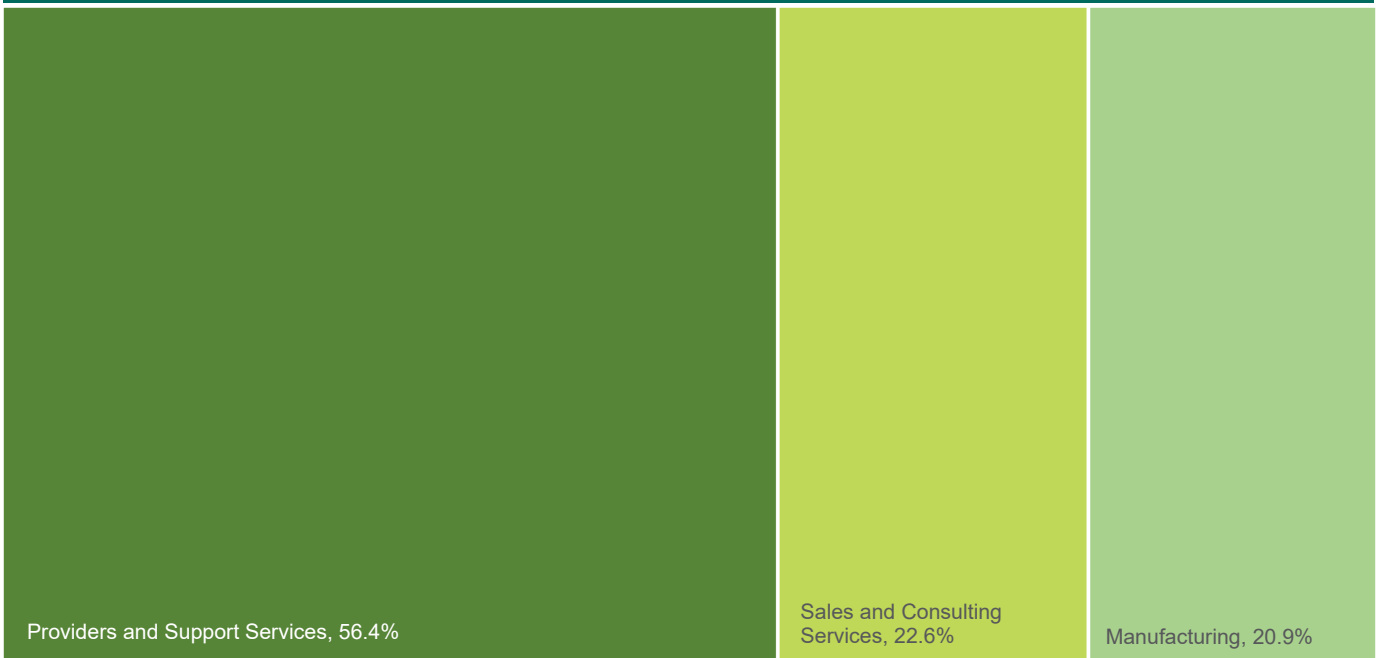
Key Information Technology Occupations

Key occupations are the top 15 occupations in the cluster as determined by two criteria: the occupation's share of the cluster's total employment and the occupation's share of the state's employment for that job. Because the volume of these jobs in the cluster is large, they are fairly representative of the typical wages, education, skills, and demand for the cluster.

Table 1 includes a column that measures the talent gap for each occupation, meaning the difference between the talent supply and employer demand for that occupation. The occupations were each given a separate score for supply and demand based on composite indexes. Shortages or surpluses were then determined based on the differences between the supply and demand scores. Some occupations were not scored due to their small size or a lack of available data, and are marked N/A. More information on Michigan's Occupational Supply and Demand and the Talent Gap variable can be found in *Michigan's Labor Market News*, vol. 74, issue 10.

### TABLE 1: KEY OCCUPATIONS, MICHIGAN INFORMATION TECHNOLOGY CLUSTER

KEY OCCUPATION	CLUSTER EMPLOYMENT	MICHIGAN EMPLOYMENT	CLUSTER WAGE RANGE	ANNUAL OPENINGS	TYPICAL EDUCATION AND TRAINING	TALENT GAP
Computer and Information Systems Managers	3,640	9,350	$46–$73	830	Bachelor's Degree	Balanced
Computer Network Support Specialists	1,710	3,840	$20–$35	490	Associate Degree	Shortage
Computer Programmers	1,790	3,630	$27–$42	250	Bachelor Degree	Shortage
Computer Systems Analysts	6,130	17,260	$30–$48	1,200	Bachelor Degree	Surplus
Computer User Support Specialists	7,070	18,190	$17–$29	1,790	Some College, No Degree	Balanced
Electrical, Electronic, and Electromechanical Assemblers, Except Coil Winders, Tapers, and Finishers	6,750	12,040	$12–$18	920	High School Diploma, Moderate On-the-job Training	N/A
Electronics Engineers, Except Computer	1,720	3,590	$31–$46	250	Bachelor's Degree	Balanced
Logisticians	1,830	8,000	$27–$48	820	Bachelor's Degree	Balanced
Management Analysts	4,880	16,640	$29–$49	N/A	Bachelor's Degree	N/A
Market Research Analysts and Marketing Specialists	3,020	17,570	$21–$40	2,080	Bachelor's Degree	Balanced
Network and Computer Systems Administrators	2,600	8,250	$28–$45	650	Bachelor's Degree	Balanced
Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	2,990	8,520	$27–$54	1,040	Bachelor's Degree, Moderate On-the-job Training	N/A
Software Developers, Applications	13,290	25,940	$33–$52	2,160	Bachelor's Degree	Balanced
Software Developers, Systems Software	7,140	11,090	$33–$51	1,000	Bachelor's Degree	Balanced
Telecommunications Equipment Installers and Repairers, Except Line Installers	5,070	6,270	$18–$30	540	Postsecondary Nondegree Award, Moderate On-the-job Training	Balanced

Sources: Cluster employment, Michigan employment, and Wage range: Occupational Employment Statistics, Michigan Bureau of Labor Market Information and Strategic Initiatives (2017); Annual Openings: Long-term Occupational Projections (2016–2026), Michigan Bureau of Labor Market Information and Strategic Initiatives; Typical Education and Training: Bureau of Labor Statistics; Michigan's Occupational Supply and Demand and the Talent Gap: Linskey, Evan. 2018. "An Analysis of Occupational Supply and Demand in the Michigan Labor Market." Michigan's Labor Market News, Vol. 74, Issue 10.

- Four of the top five key IT occupations are in *Computer and mathematical occupations*. *Software developers, applications* make up the largest share of workers in this group, with close to 13,300 employed. These workers create and modify computer software or other programs with the goal of optimizing operational efficiency. A bachelor's degree is required along with knowledge of web platform development and development environment software.

- The subsequent jobs with the greatest employment among *Computer and mathematical* occupations are similar in knowledge and skills to *Software developers, applications* and include: *Software developers, systems software, Computer user support specialists,* and *Computer systems analysts*. These occupations typically require a bachelor's degree and have high median wages.

- In addition to skills in software development, IT occupations also require abilities in written and oral comprehension, computer and electronics, and complex problem solving.

FIGURE 4: **HIGH-WAGE HIGH-DEMAND IT OCCUPATIONS**
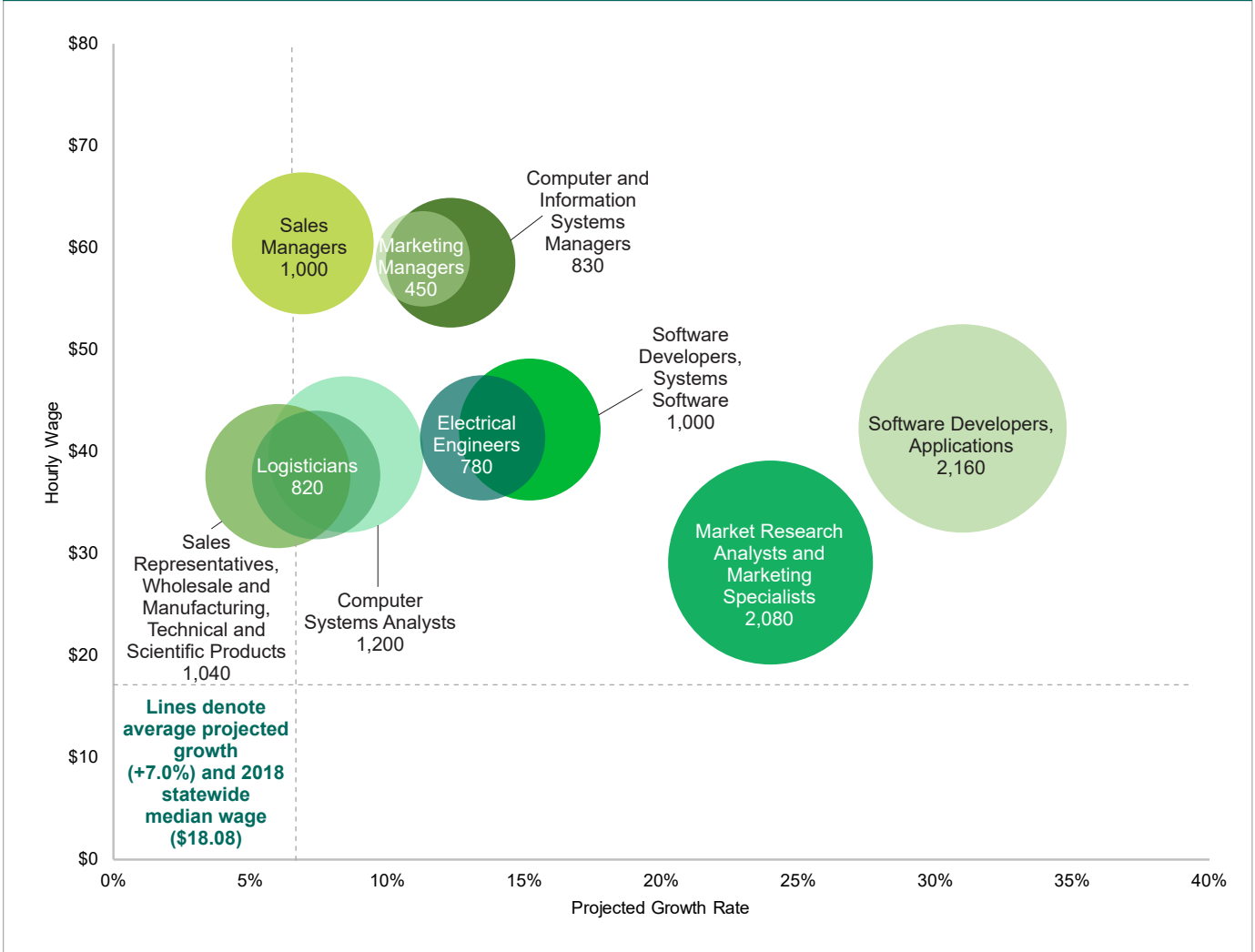
Sources: Wages: Occupational Employment Statistics, Michigan Bureau of Labor Market Information and Strategic Initiatives; Projected Growth Rate: Long-term Occupational Projections (2016–2026), Michigan Bureau of Labor Market Information and Strategic Initiatives; Michigan's Occupational Supply and Demand and the Talent Gap: Linskey, Evan. 2018. "An Analysis of Occupational Supply and Demand in the Michigan Labor Market." Michigan's Labor Market News, Vol. 74, Issue 10.

High-demand

This figure includes occupations that show a favorable mix of projected long-term job growth, projected annual job openings, and median wages. It does not reflect current hiring demand. Wages displayed are median wages for 2018. Circle size denotes average projected annual openings.

Occupations that are high-wage and high-demand are determined by jobs that generally have a wage higher than the state average, are expected to incur positive long-term growth in employment, and will have many annual job openings.

The figure above includes 10 high-wage high-demand occupations in IT. *Software developers, applications* and

Market research analysts and marketing specialists have a high projected growth rate and large number of annual openings. *Sales managers, Marketing managers*, and *Computer and information systems managers* have high hourly wages.

Information Technology Career Pathway

Computer Support Specialist

$50,640
High School Diploma
Certificate

Computer Programmer

$76,450
Bachelor's Degree

Database Administrator

$83,900
Bachelor's Degree

Information Security Analyst

$93,850
Bachelor's Degree

Computer Systems Manager

$131,100
Bachelor's Degree

Source: Occupational Employment Statistics, (2018 Annual Wages), Michigan Bureau of Labor Market Information and Strategic Initiatives

Career pathways identify the career opportunities in an industry, entry-level to advanced, and show how an individual can grow his/her career in the industry.
"A Practical Guide to Developing Career Pathways," May 2018, Talent and Economic Development of Michigan

High School Diploma or Equivalent and Short-term Training

Customer Service Representatives
Data Entry Keyers
Office Clerks, General
Retail Salespersons
Secretaries and Administrative Assistants, Except Legal, Medical

While occupations requiring a high school degree or on-the-job training often pay less than occupations requiring more education, a large number of openings are projected for these jobs. *Customer service representatives* and *Retail salespersons* have some of the highest number of job postings in the state.

Postsecondary Certificate or Moderate-term Training

Bookkeeping, Accounting, and Auditing Clerks
Inspectors, Testers, Sorters, Samplers, and Weighers
Maintenance and Repair Workers, General
Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products
Telecommunications Equipment Installers and Repairers, Except Line Installers

The top occupation in the category requiring a postsecondary degree or moderate on-the-job training is *Sales representatives, wholesale and manufacturing, except technical and scientific products*. Workers in this occupation typically sell goods for manufacturers or wholesalers where technical or scientific knowledge is required.

Associate Degree/Long-term Training/ Apprenticeships

Computer Network Support Specialists
Electrical and Electronics Engineering Technicians
Electrical and Electronics Repairers, Commercial and Industrial Equipment
Telecommunications Line Installers and Repairers
Web Developers

Jobs that require an associate degree, long-term on-the-job training, or an apprenticeship are led by *Computer network support specialists* and *Web developers*. These two occupations make up close to half of these jobs in the state, typically require an associate degree, and have a median wage higher than the statewide median.

Bachelor's Degree or Higher

Computer and Information Systems Managers
Computer Systems Analysts
Sales Managers
Software Developers, Applications
Software Developers, Systems Software

High-wage and high-demand occupations requiring a bachelor's degree or more are similar to the key occupations in IT. *Software developers*, both in *applications* and *systems software*, are among the top five in this category; along with *Sales managers* and *Computer and information systems managers*. The median wage of positions in IT with a bachelor's degree or more is typically far greater than Michigan's rate of $18.08 and annual openings are close to 1,000 or more for each occupation.

Real-time Demand for Information Technology Employment

Real-time demand reflects the number of new online job postings for an occupation. With the increasing growth of the IT industry, demand for workers in the field is very high. Several IT occupations rank in the top 20 highest number of job advertisements in Michigan for 2018.

- Among the total number of statewide job ads for 2017, *Software developers, applications* and *Computer systems analysts* were two key occupations in IT within the top 20 highest number of job ads in the state.

- Over 80 percent of job advertisements in 2018 for key occupations in IT were for full-time employment. Just over 9 percent of ads were for contract work and 5 percent for part-time positions. The average posting period for these jobs was 36 days.

Top skills in postings for key occupations include:

Software Development,
Microsoft Office
Java
Structured Query Language

- Detroit had the highest number of job ads for key IT occupations, followed by Troy, Lansing, Ann Arbor, and Grand Rapids.
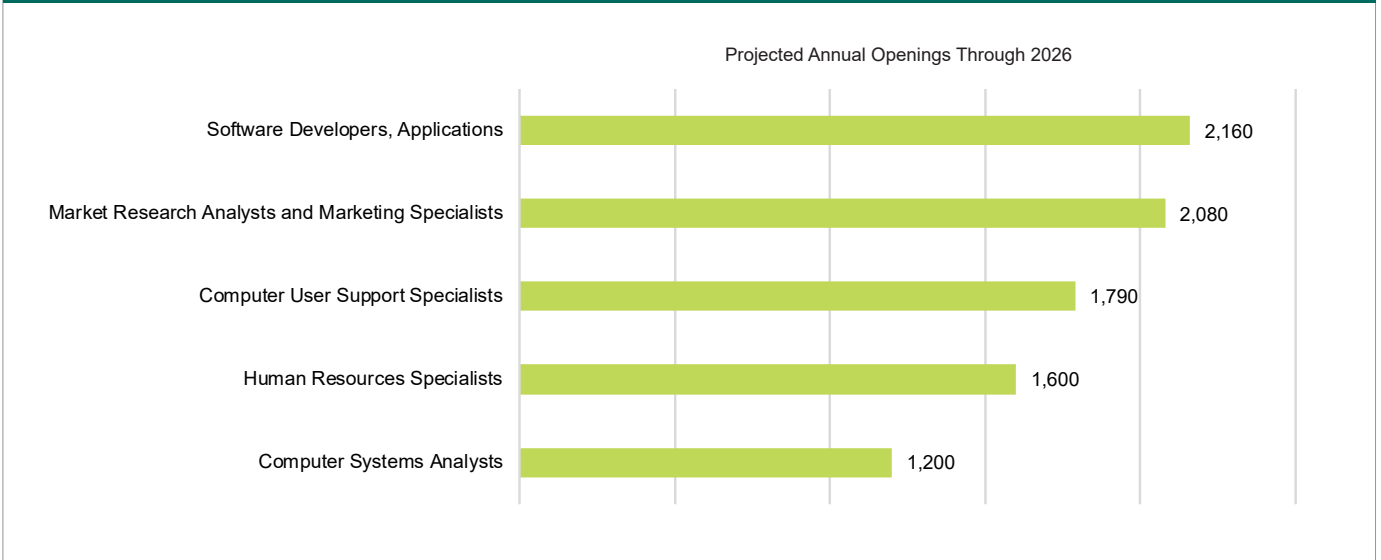
Real-time demand is measured as the number of job advertisements posted online for an occupation.

Information Technology Employment Projections

As more businesses use technology in their day-to-day activities and as new IT businesses arise, the need for IT and development will continue to increase. Jobs in IT have grown almost 25 percent since 2009, and state projections show that growth continuing through 2026.
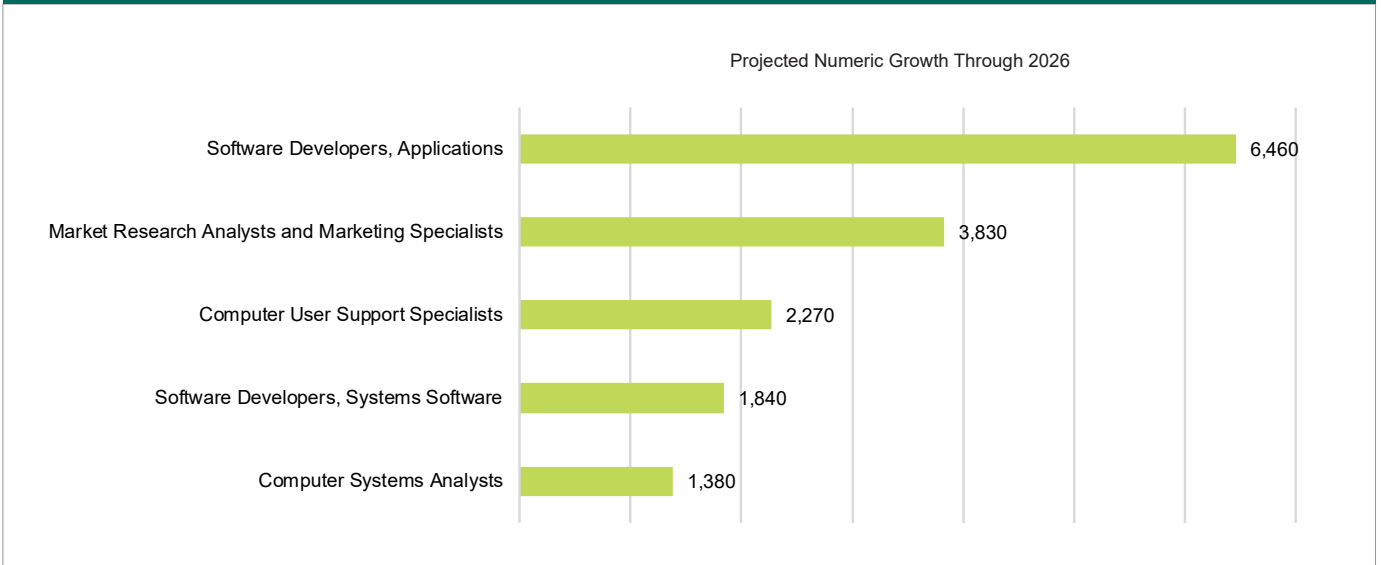
- The industry of *Computer systems design and related services* is projected to see over 21 percent growth with close to 11,000 new jobs created through 2026. Jobs with *Software publishers* are expected to see close to 19 percent growth over the same period.

- *Software developers*, *systems software* are expected to see over 15 percent growth in jobs, while *Software developers, applications* should gain 31 percent.

- *Computer and information systems managers*, *Computer systems analysts*, and *Computer user support specialists* are also expected to see strong growth in employment through 2026. These jobs require at least some postsecondary education or training.

FIGURE 5: OCCUPATIONS WITH THE MOST PROJECTED ANNUAL OPENINGS THROUGH 2026, MICHIGAN INFORMATION TECHNOLOGY CLUSTER

Projected Annual Openings Through 2026

Occupation	Openings
Software Developers, Applications	2,160
Market Research Analysts and Marketing Specialists	2,080
Computer User Support Specialists	1,790
Human Resources Specialists	1,600
Computer Systems Analysts	1,200

Source: Industry and Occupational Employment Projections (2016–2026), Michigan Bureau of Labor Market Information and Strategic Initiatives

FIGURE 6: OCCUPATIONS WITH THE MOST PROJECTED NUMERIC GROWTH THROUGH 2026, MICHIGAN INFORMATION TECHNOLOGY CLUSTER

Projected Numeric Growth Through 2026

Occupation	Growth
Software Developers, Applications	6,460
Market Research Analysts and Marketing Specialists	3,830
Computer User Support Specialists	2,270
Software Developers, Systems Software	1,840
Computer Systems Analysts	1,380

Source: Industry and Occupational Employment Projections (2016–2026), Michigan Bureau of Labor Market Information and Strategic Initiatives

IT Workforce Demographics

Educational attainment and demographic information are useful in identifying workforce characteristics and evaluating potential workforce disparities. Gaps in education, skills, or training may result in impediments to economic growth if left unresolved. Maintaining the employment of a young workforce may require employers to adapt to the interests those workers value. The following displays characteristics of the IT workforce in Michigan.
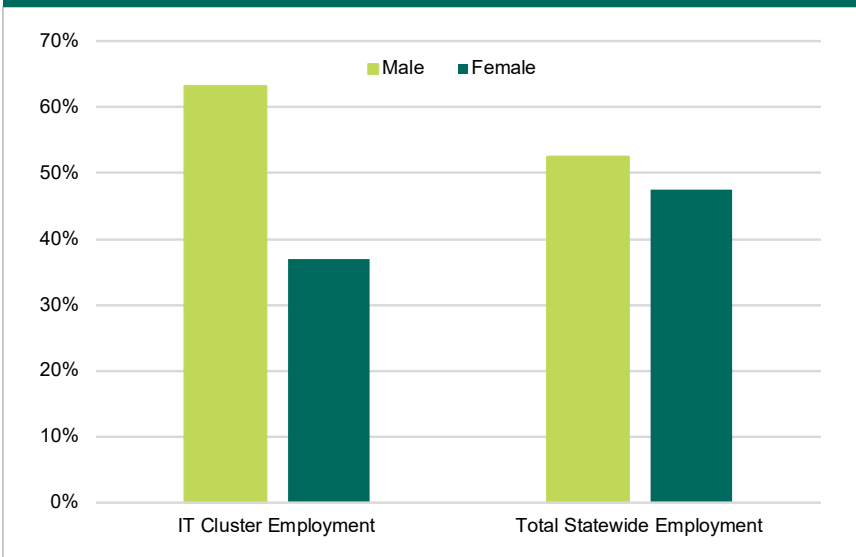
FIGURE 7: EMPLOYMENT BY AGE, MICHIGAN INFORMATION TECHNOLOGY CLUSTER

Source: Longitudinal Employer-Household Dynamics program, U.S. Census Bureau

**The largest portion of workers in IT are in the 25–34 age group, accounting for 26 percent of workers.**

FIGURE 8: EMPLOYMENT, ALL AGES (14-99), MICHIGAN INFORMATION TECHNOLOGY CLUSTER

A sizable gender gap exists in IT, with two in three workers being male. That gap decreases among progressively older workers.

FIGURE 9: EMPLOYMENT BY EDUCATION, MICHIGAN INFORMATION TECHNOLOGY CLUSTER

Legend: ■ IT Cluster Employment ■ Total Statewide Employment
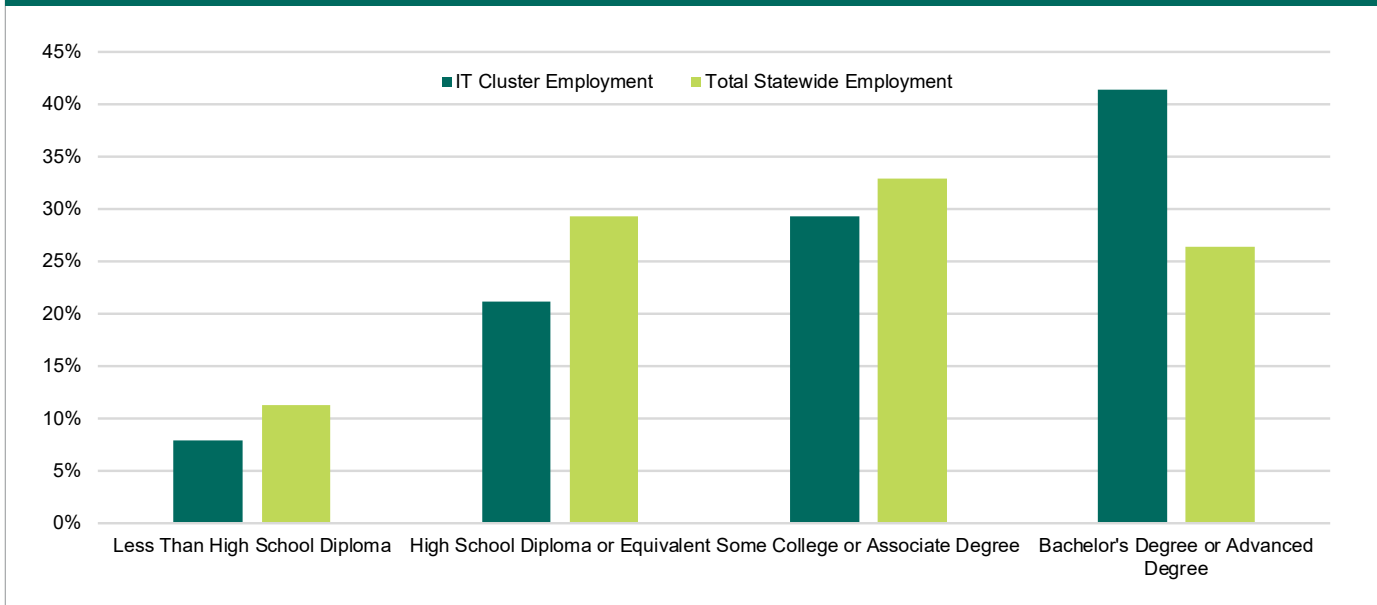
Source: Longitudinal Employer-Household Dynamics program, U.S. Census Bureau

A high level of education is typically required in IT occupations. Over 38 percent of IT occupations require a bachelor's degree or higher, which is greater than all of Michigan's other clusters and higher than Michigan's overall rate of 22 percent. IT occupations with some college or associate degree have the second-highest level of education at 27 percent.

Information Technology Talent Pipeline

The number of people completing IT-related educational programs can be an important figure in determining the labor supply for the cluster. In the academic year of 2016–2017, close to 8,200 certificates or degrees were awarded to people completing IT-related programs.

- Since 2013, the number of completers has risen just over 6.0 percent in IT programs, increasing from 7,700 to 8,200 over the four-year period. The rate of growth in completers is below where it needs to be to keep up with the roughly projected 20 percent growth in employment in many IT industries over the next decade.

- The advanced level of education among the IT workforce is reflected in the number of completers earning advanced degrees. Two-thirds of 2017 completers were in bachelor's and master's degree programs, accounting for 43 and 24 percent of all completers.

- Some of the highest number of registered apprenticeships in Michigan that were also IT occupations were for *Electrical and electronics repairers, commercial and industrial equipment*, and for *Telecommunications equipment installers and repairers, except line installers*.

FIGURE 10: **IT-RELATED PROGRAM COMPLETERS BY AWARD LEVEL, MICHIGAN, 2017**
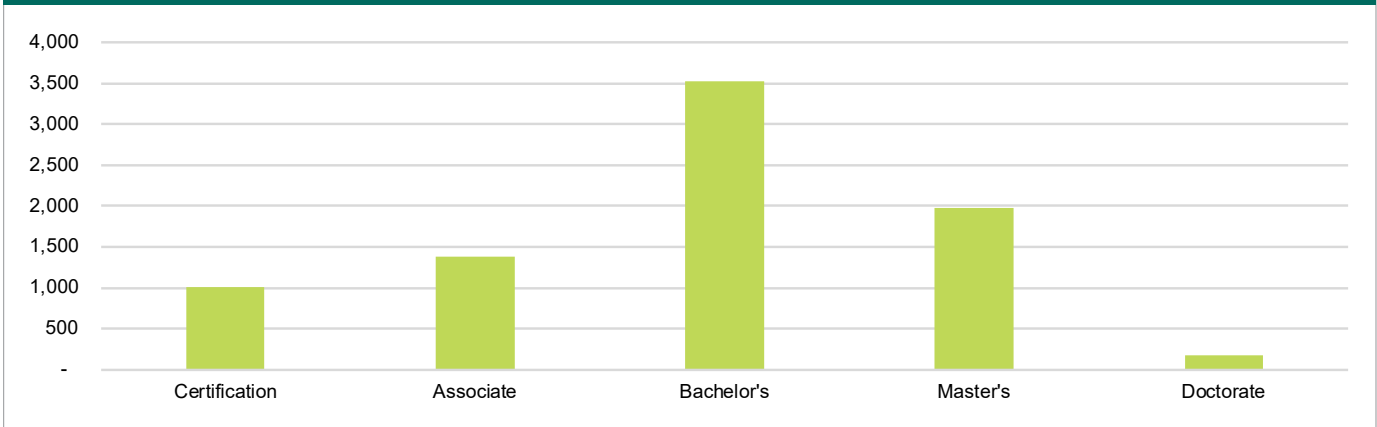
Source: National Center for Education Statistics (NCES), Integrated Postsecondary Education Data System (IPEDS)

FIGURE 11: **IT-RELATED PROGRAM COMPLETERS TREND, MICHIGAN, 2017**
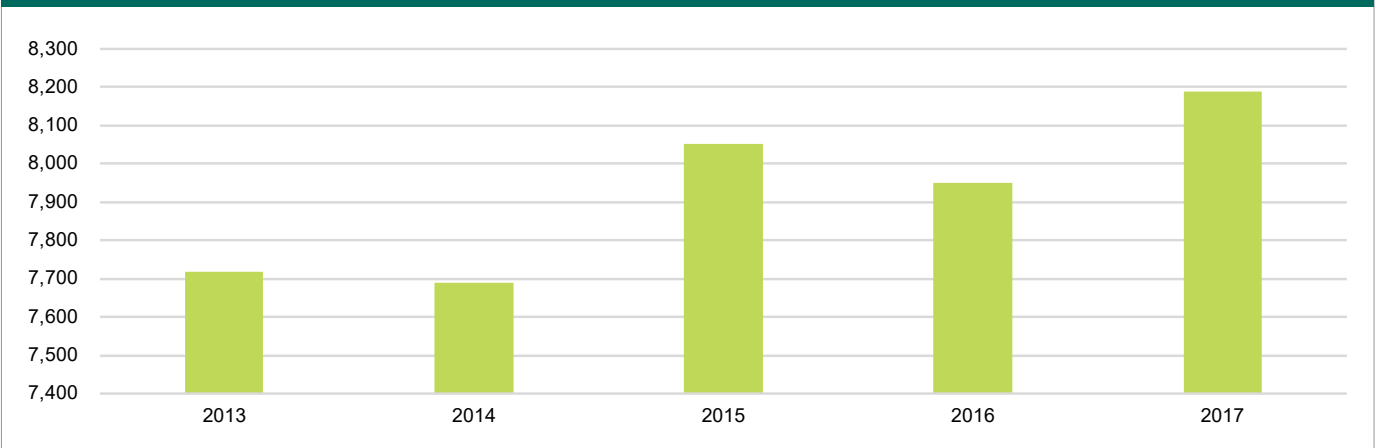
Source: National Center for Education Statistics (NCES), Integrated Postsecondary Education Data System (IPEDS)

Conclusion

Growth in IT has been occurring for many years, and that trend is projected to continue over the next decade. Individuals and schools have become increasingly dependent on new technologies to transfer knowledge and stay informed. Most companies and organizations use technology in some capacity for their operations. As a result of society's increasing dependence IT, the cluster will continue to exhibit strong growth for years to come.

Strengths:

High Demand
Many IT occupations are expected to see significant job growth in the coming decade, with some reaching over 20 percent in increased employment. Because of the reliable availability of jobs in this cluster, educators and employers can confidently recruit and maintain a strong workforce that will be needed for years to come.

Highly Educated
Because of the advanced level of education required for IT occupations, the importance of providing individuals with a university-level education will help fulfill the expected employment growth in IT. As males and females hold a similar share of education in IT, it will be important to make sure that hiring is equally inclusive of all genders.

High Wage
Although many IT jobs require a high level of education, they also have a very high median wage. The median wage in IT is far greater than in Michigan overall and higher than many other clusters.

Challenges

Young Workforce
IT workers are generally much younger than workers in other occupations. The ability of employers to adapt to the working requirements of these younger individuals will be necessary in talent recruitment. Employers will need to consider the type of work environment, conditions for employment, and typical duration that younger workers hold a job, as these factors tend to vary from those of older employees.

Adequate Education and Skills
IT is a continually evolving and advancing industry. Employers and educators will need to keep up with the latest technological trends in order to stay competitive. Failing to educate students and employees with current technological skills risks the potential for finding jobs and the ability for businesses to succeed.

Gender Equity
Women are largely underrepresented in IT. Females in the age group of 25 to 44 account for close to half the number of men. In order to recruit more women to educational programs and businesses, an open environment that fosters a culture of appreciation and acceptance of all genders will be necessary.

Not Enough Apprenticeships
The rate of employment growth in IT has exceeded the rate of growth in IT-related apprenticeships. Additional apprenticeship programs could foster the growth of employment in IT jobs.

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