



MICHIGAN MANUFACTURING

INDUSTRY CLUSTER WORKFORCE ANALYSIS

STATE OF MICHIGAN

Department of Technology, Management and Budget
Bureau of Labor Market Information and Strategic Initiatives

MICHIGAN MANUFACTURING

INDUSTRY CLUSTER
WORKFORCE ANALYSIS

BUREAU OF LABOR MARKET
INFORMATION AND
STRATEGIC INITIATIVES

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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.



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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.

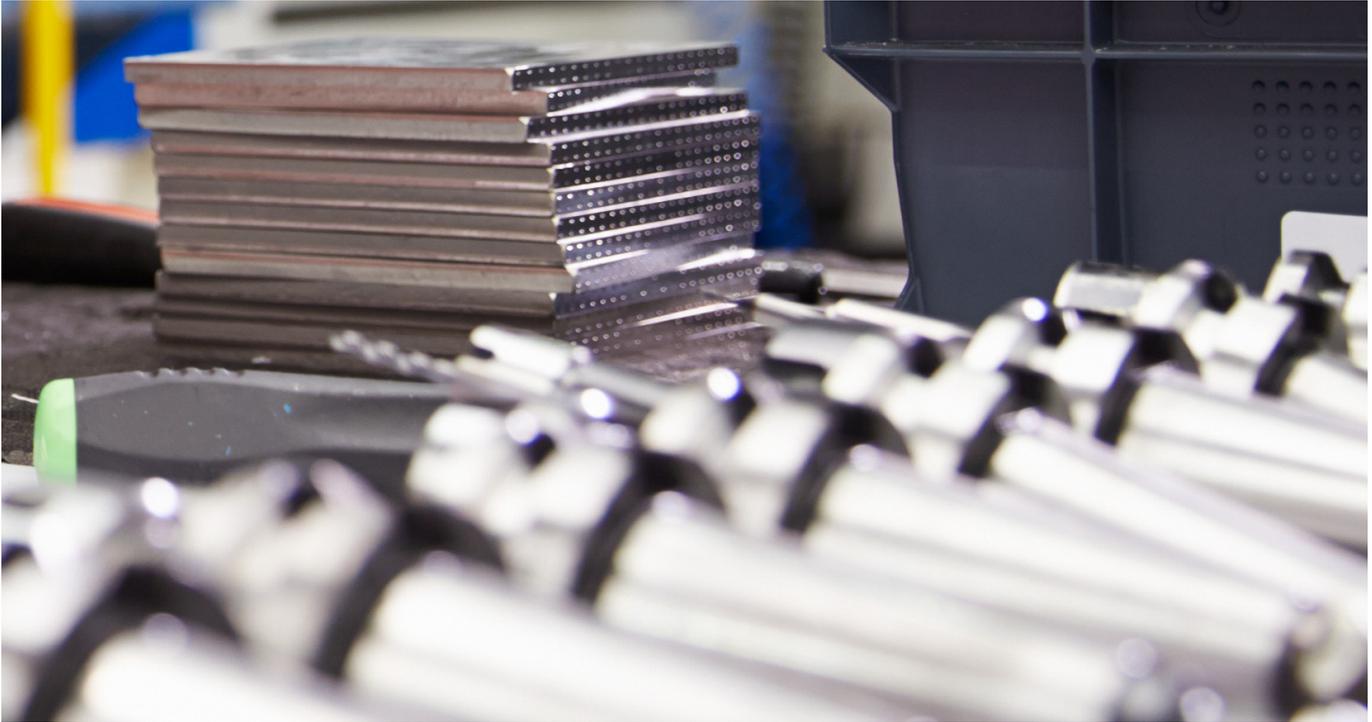


JASON PALMER
DIRECTOR
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Key Findings

- Manufacturing is a vital part of the Michigan economy. Over 600,000 workers are employed in the Manufacturing cluster, ranking second only to Healthcare among major industry clusters.
- The Manufacturing cluster has experienced significant expansion in employment since 2009, nearly doubling Michigan's private sector rate of employment growth.
- Nearly three in 10 of all workers in the cluster are in the subcluster of Auto Manufacturing. Close to 60,000 have been added to the subcluster since the Great Recession.
- Though the cluster makes up a diverse group of occupational types, over half of the jobs in Manufacturing are in *Production* occupations, with a median wage close to the state average.
- Although Manufacturing is projected to see a marginal drop in employment through 2026, it will continue to produce a large number of job openings.
- In Michigan, the educational attainment of workers with less than a bachelor's degree in the Manufacturing cluster is higher than the state overall. The number of workers with a bachelor's degree or higher in the cluster is slightly lower compared to the state.
- Workers in manufacturing tend to be older when compared with other clusters. The largest percentage of workers are between the ages of 45 and 64.



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.

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

- Automotive Manufacturing
- Metals Manufacturing
- Machinery Manufacturing
- Chemical Product Manufacturing
- Food and Beverage Manufacturing
- Computer and Electronic Product
- Natural Resource Products
- Other Miscellaneous
- Furniture



Manufacturing Employment and Wages Analysis

Manufacturing not only generates jobs within the cluster, but also contributes to indirect employment throughout almost every industry and region in Michigan. Manufacturing growth in the state has been impeded by various obstacles, both externally and within the industry. The Great Recession was a major setback to an already slowing industry, and accompanying advances in technology added to employment losses. Despite these issues, Manufacturing has made great strides in recovering its lost workforce, having nearly returned to its pre-recessionary level of employment.

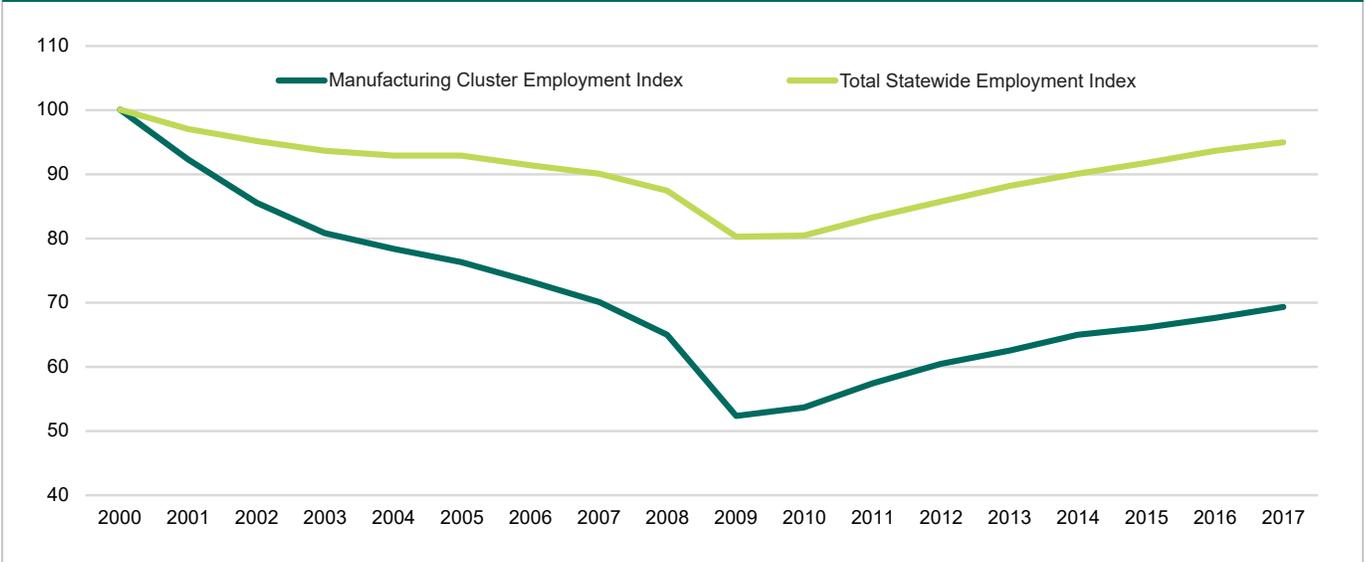
The rate of employment growth in Manufacturing (+32.4 percent) has nearly doubled Michigan's employment gains (+16.8 percent) since the peak of the recession in 2009. Although the industry's share of the state's employment has reduced to almost half what it was in 2000, the industry has seen a steady 3.0 percent annual average growth in employment since 2009 (Figure 1).

Despite employment gains in Manufacturing since the recession, wages have struggled to grow.

Average wage growth in the Manufacturing cluster kept pace with the statewide overall rate change between 2000 and 2014, as each grew by 29 percent during this period. However, since 2014, nominal wages in Manufacturing grew by only 3 percent, compared to overall wages which increased by triple that amount (9 percent).

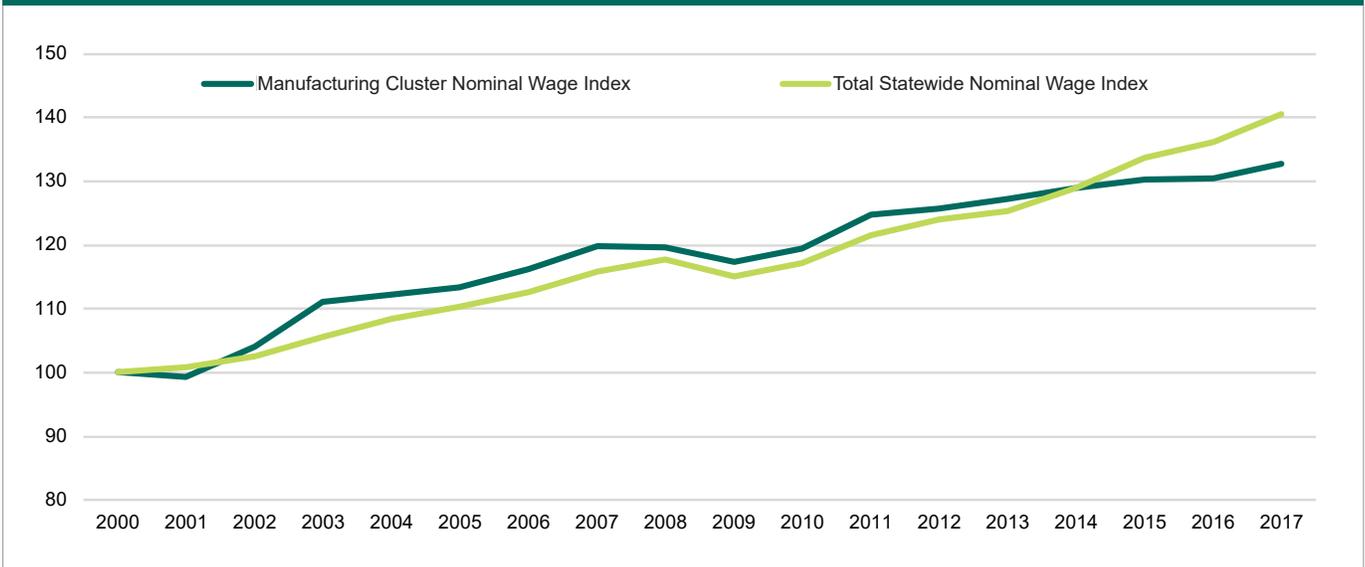
The average weekly wage of \$1,276 is above Michigan's average wage of \$1,006. Among the five other industry clusters studied in this group of reports, Manufacturing wages are right in the middle, with wages in Information Technology topping the list at \$1,662 and Agriculture at the bottom at \$816 per week.

FIGURE 1: EMPLOYMENT INDEX, MICHIGAN MANUFACTURING CLUSTER



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

FIGURE 2: NOMINAL WAGE INDEX, MICHIGAN MANUFACTURING CLUSTER



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

Analysis of Manufacturing Subclusters

The Manufacturing cluster is composed of a number of subclusters vital to Michigan's economy. *Auto manufacturing* and other indirectly related subclusters have long held a majority of employment in the cluster overall, but several additional subclusters are also vital to Michigan's prosperity. In addition, other manufacturing subclusters that are indirectly related to *Auto manufacturing* constitute a sizable portion of the cluster.

The three subclusters of *Metals*, *Machinery*, and *Chemical product manufacturing* combined compose over 40 percent of the Manufacturing cluster. The industries of *Metalworking machinery manufacturing*, *Machine shops and threaded products*, and *Plastics product manufacturing* make up the largest share of these subclusters, accounting for two-fifths of their total employment.

Automotive Manufacturing (181,626 jobs)

Motor Vehicle Manufacturing

Motor Vehicle Body and Trailer Manufacturing

Motor Vehicle Parts Manufacturing

Auto manufacturing continues to be the leading subcluster of Manufacturing in Michigan, comprising 3 in 10 of all workers in the cluster. Although *Auto manufacturing* has lost half of its workforce since 2000, almost 60,000 jobs have been added to the subcluster since the peak of the recession. This subcluster includes the core industries for the transporting of people and goods by motor vehicle. The manufacture of complete automobiles, trailers, and their parts — such as engines, suspension components, and transmissions — are covered. Industries in this subcluster include *Motor vehicle*, *Motor vehicle body and trailer*, and *Motor vehicle parts manufacturing*.

Metals Manufacturing (102,859 jobs)

Iron and Steel Mills and Ferroalloys

Purchased Steel Product Manufacturing

Alumina and Aluminum Production

Other Nonferrous Metal Production

Foundries

Forging and Stamping

Cutlery and Handtool Manufacturing

Architectural and Structural Metals

Boilers, Tanks, and Shipping Containers

Hardware Manufacturing

Spring and Wire Product Manufacturing

Machine Shops and Threaded Products

Coating, Engraving and Heat-Treating Metal

Other Fabricated Metal Product Manufacturing

Metal manufacturing has fared somewhat better than *Auto manufacturing*, having lost only one-fifth of its workforce since 2000. Transforming metal into intermediate or end products through the processes of forging, stamping, bending, forming, and machining is included in this subsector. Smelting and/or refining metals using rolling, drawing, and extruding operations to make castings and other metal products are also incorporated. Top industries include *Machine shops and threaded products* and *Coating, engraving, and heat-treating metal*.

Machinery Manufacturing (74,863 jobs)

Agriculture, Construction, and Mining Machinery

Industrial Machinery Manufacturing

Commercial and Service Industry Machinery

HVAC and Commercial Refrigeration Equipment

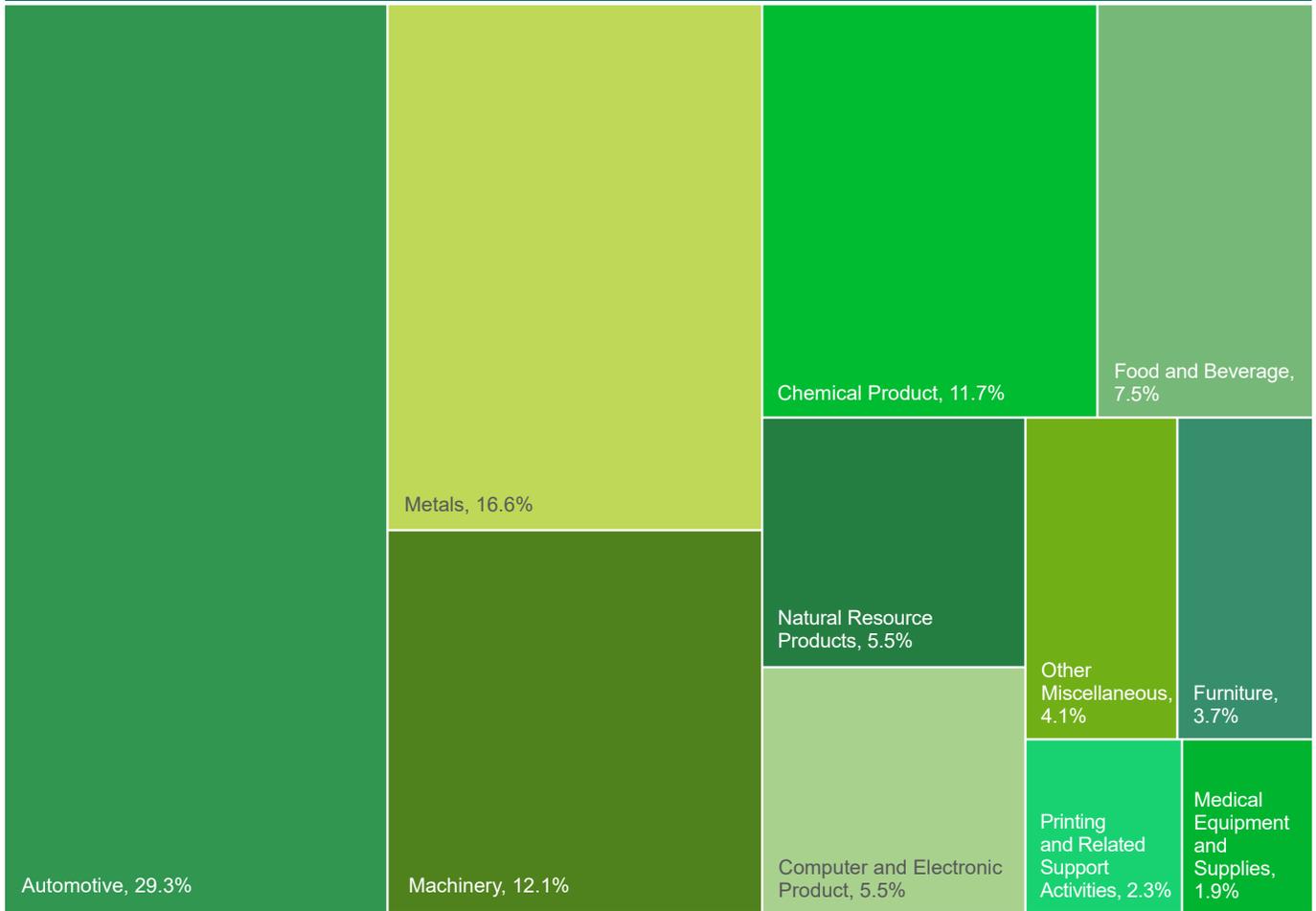
Metalworking Machinery Manufacturing

Turbine and Power Transmission Equipment

Other General-Purpose Machinery Manufacturing

Employment in this subcluster is up 6.5 percent since 2007, just before the recession. This sector encompasses the creation of end products that apply mechanical force, such as gears and levers. Complex assembly operations are an inherent part of these production processes. The industry of *Metalworking machinery manufacturing* makes up the majority of jobs in this subcluster.

FIGURE 3: SUBCLUSTER DISTRIBUTION, MICHIGAN MANUFACTURING CLUSTER, 2017



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

Chemical Product Manufacturing (72,242 jobs)

- Basic Chemical Manufacturing
- Resin, Rubber, and Synthetic Fibers
- Agricultural Chemical Manufacturing
- Pharmaceutical and Medicine Manufacturing
- Paint, Coating, and Adhesive Manufacturing
- Cleaning Compound and Toiletry Manufacturing
- Other Chemical Preparation Manufacturing
- Plastics Product Manufacturing
- Rubber Product Manufacturing

This subcluster recovered all of its lost jobs since 2004, and employment is up 35.2 percent since the recession. These industries focus on the formulation of products through the transformation of organic and inorganic products by a chemical process. The production of rubber, plastics, cleaning supplies, paints, and pharmaceuticals are some of the core products of this subsector. *Plastics product manufacturing* account for the majority of employment in this field.

Food and Beverage Manufacturing (46,256 jobs)

- Animal Food Manufacturing
- Grain and Oilseed Milling
- Sugar/Confectionery Product Manufacture
- Fruit, Vegetable, and Specialty Foods Manufacturing
- Dairy Product Manufacturing
- Animal Slaughtering and Processing
- Bakeries and Tortilla Manufacturing
- Other Food Manufacturing
- Beverage Manufacturing
- Tobacco Manufacturing

This is an important subcluster in Michigan due to the state's strength in agriculture. Ranking second in agricultural diversity only to California, Michigan leads the nation in the production of red tart cherries, dry beans, blueberries, and squash. As a result, *Food and beverage manufacturing* is the state's fifth-largest subcluster, comprising 7.5 percent of employment in Manufacturing.

Computer and Electronic Product (33,795 jobs)

Computers and Peripheral Equipment
Communications Equipment Manufacturing
Audio and Video Equipment Manufacturing
Semiconductor and Electronic Components
Electronic Instrument Manufacturing
Magnetic Media Manufacture and Reproducing
Electric Lighting Equipment Manufacturing
Household Appliance Manufacturing
Electrical Equipment Manufacturing
Other Electrical Equipment and Components

This subcluster has been growing since the Great Recession and is up nearly 5,000 jobs in five years. This subcluster covers a variety of products from television components to Christmas tree lights.

Natural Resource Products (34,265 jobs)

Sawmills and Wood Preservation
Veneer and Engineered Wood Products
Other Wood Product Manufacturing
Pulp, Paper, and Paperboard Mills
Converted Paper Product Manufacturing
Petroleum and Coal Products Manufacturing
Clay Product and Refractory Manufacturing
Glass and Glass Product Manufacturing
Cement and Concrete Product Manufacturing
Lime and Gypsum Product Manufacturing
Other Nonmetallic Mineral Products

This subcluster is up over recent years, but down steadily since the early 2000s. In 2000 the subcluster had nearly 54,000 employees and has since dropped roughly 37 percent.

Other Miscellaneous (25,368 jobs)

Fiber, Yarn, and Thread Mills
Fabric Mills
Textile and Fabric Finishing and Fabric
Textile Furnishings Mills
Other Textile Product Mills
Cut and Sew Apparel Manufacturing
Accessories and Other Apparel Manufacturing
Leather and Hide Tanning and Finishing
Other Leather Product Manufacturing
Aerospace Product and Parts Manufacturing
Railroad Rolling Stock Manufacturing
Ship and Boat Building
Other Transportation Equipment Manufacturing
Other Miscellaneous Manufacturing

The *Other miscellaneous* subcluster contains a variety of smaller manufacturing industries. Employment dropped heavily from the early 2000s through the Great Recession, but has rebounded to levels nearly equal to 2000. Some industries in this subcluster are related to transportation and mobility outside of automobiles.

Furniture (22,795 jobs)

Household and Institutional Furniture
Office Furniture and Fixtures Manufacturing
Other Furniture-Related Product Manufacturing

Furniture manufacturing is a key industry in parts of the state, with a history dating back to the 1800s. Employment has risen slightly since the low of 2009 (+19.1 percent) while the number of employers has actually dropped slightly (-6.5 percent).

Printing and Related Support Activities (14,123 jobs)

Printing and Related Support Activities

This subcluster is made up of one industry that includes many kinds of print products, including newspapers. Employment is roughly level with 2009. The number of employers has declined as print products have become less popular.

Medical Equipment and Supplies (11,886 jobs)

Medical Equipment and Supplies

This subcluster comprises less than 2 percent of all manufacturing jobs in the state, but has been growing. Employment is up 14 percent since 2009, and total annual wages have doubled since then.



Key Manufacturing Occupations

Occupations are an important level of analysis within the Manufacturing cluster. The top 15 key occupations in the cluster (featured in Table 1) are 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 occupation. 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 labor 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. Only 2 of the 15 key occupations require a bachelor's degree, with 12 requiring on-the-job training. 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 MANUFACTURING CLUSTER

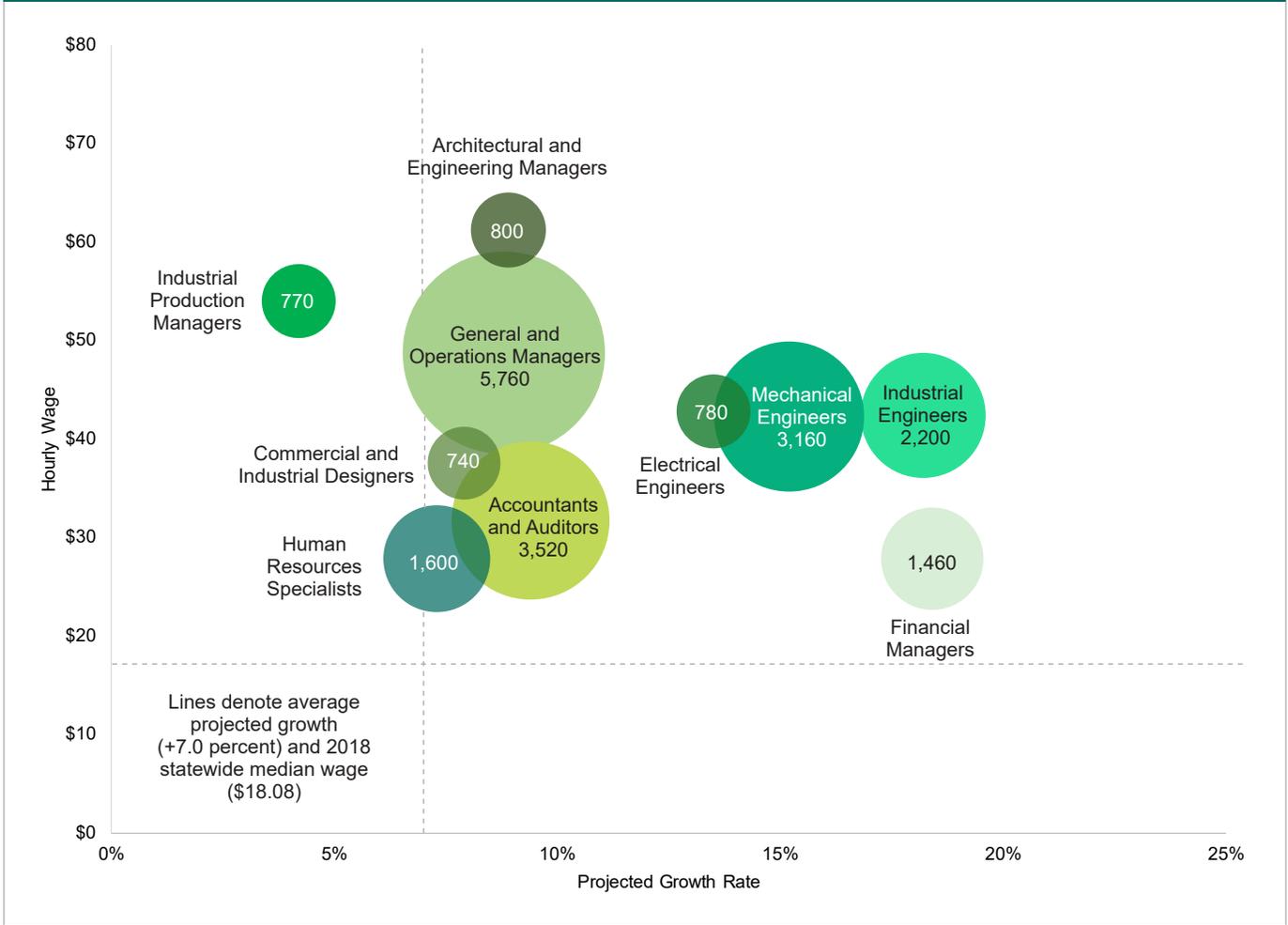
KEY OCCUPATION	CLUSTER EMPLOYMENT	MICHIGAN EMPLOYMENT	CLUSTER WAGE RANGE	ANNUAL OPENINGS	TYPICAL EDUCATION AND TRAINING	TALENT GAP
Assemblers and Fabricators, All Other, Including Team Assemblers	85,490	106,070	\$13–\$22	10,380	High School Diploma or Equivalent, Moderate-term On-the-job Training	Shortage
Cutting, Punching, and Press Machine Setters, Operators, and Tenders, Metal and Plastic	17,200	20,000	\$13–\$21	1,820	High School Diploma or Equivalent, Moderate-term On-the-job Training	Shortage
Electrical, Electronic, and Electromechanical Assemblers, Except Coil Winders, Tapers, and Finishers	11,420	12,040	\$13–\$18	920	High School Diploma or Equivalent, Moderate-term On-the-job Training	Shortage
First-Line Supervisors of Production and Operating Workers	22,060	28,150	\$23–\$38	2,820	High School Diploma or Equivalent	Shortage
Industrial Engineers	15,900	28,460	\$34–\$51	2,200	Bachelor's Degree	Shortage
Industrial Machinery Mechanics	13,440	20,100	\$19–\$30	1,830	High School Diploma or Equivalent, Long-term On-the-job Training	Shortage
Inspectors, Testers, Sorters, Samplers, and Weighers	16,220	28,440	\$12–\$20	2,790	High School Diploma or Equivalent, Moderate-term On-the-job Training	Balance
Laborers and Freight, Stock, and Material Movers, Hand	17,010	70,090	\$11–\$17	10,690	Short-term On-the-job Training	Shortage
Machinists	24,260	26,970	\$15–\$24	2,680	High School Diploma or Equivalent, Long-term On-the-job Training	Balance
Mechanical Engineers	14,790	44,680	\$34–\$53	3,160	Bachelor's Degree	Balance
Molding, Coremaking, and Casting Machine Setters, Operators, and Tenders, Metal and Plastic	13,550	15,000	\$12–\$18	1,360	High School Diploma or Equivalent, Moderate-term On-the-job Training	Shortage
Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	11,360	52,440	\$20–\$43	5,680	High School Diploma or Equivalent, Moderate-term On-the-job Training	Shortage
Shipping, Receiving, and Traffic Clerks	9,980	23,620	\$13–\$19	2,150	High School Diploma or Equivalent, Short-term On-the-job Training	Surplus
Tool and Die Makers	13,720	14,270	\$20–\$31	990	Postsecondary Nondegree Award, Long-term On-the-job Training	Balance
Welders, Cutters, Solderers, and Brazers	9,860	12,240	\$15–\$21	1,520	High School Diploma or Equivalent, Moderate-term On-the-job Training	Balance

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.



- As the major occupational group, *Production* comprises the majority of jobs in Manufacturing, and *Assemblers and fabricators* hold the most employment within this group. These workers make up one in four jobs in the Manufacturing cluster, and account for over 80 percent of all *Assemblers and fabricators* in Michigan. Typically, these occupations work together as a team to assemble an entire product or component of a product. They have knowledge of the production process and raw materials they are working with, and have skills in coordination, monitoring, and quality control analysis.
- *Machinists* hold the next-largest share of Manufacturing workers, making up nine in 10 of all *Machinists* in the state. These jobs typically require a high school diploma and long-term on-the-job training. *First-line supervisors of production and operating workers* make up the third-largest share, followed by *Cutting, punching, and press machine setters, operators, and tenders, metal and plastic*.
- The knowledge and skills required for key Manufacturing cluster occupations generally include mathematics, production processing, and oral and written comprehension. Use of computer software such as computer-aided design, enterprise resource planning, database, and graphics software are a few of the technical skills that are highly sought after.

FIGURE 4: HIGH-DEMAND OCCUPATIONS, MICHIGAN MANUFACTURING CLUSTER



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 2017. Circle size denotes average projected annual openings.

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

Figure 4 includes 10 high-wage, high-demand occupations in Manufacturing. Most of the high-wage Manufacturing occupations are around the \$40 per hour wage range, while many of the bubbles are large, indicating a high number of job openings.

Manufacturing Career Pathway

Assemblers

\$34,880
High School Diploma

CNC Machinist

\$40,250
Certificate

CNC Programmer

\$51,730
Certificate

Robotics Technician

\$64,200
Certificate

Machining Supervisor

\$61,360
Certificate

Mechanical Engineer

\$88,340
Bachelor's Degree
Professional Engineer License

Source: Occupational Employment Statistics (2017 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

First-Line Supervisors of Production and Operating Workers
Laborers and Freight, Stock, and Material Movers, Hand
Industrial Truck and Tractor Operators
Helpers-Production Workers
First-Line Supervisors of Mechanics, Installers, and Repairers

Occupations requiring a high school diploma or short-term on-the-job-training compose the smallest portion of workers in Manufacturing. Although these positions require low levels of education, they include supervisory positions which are often high in pay.

Postsecondary Certificate or Moderate-term Training

Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products
Welders, Cutters, Solderers, and Brazers
Computer-Controlled Machine Tool Operators, Metal and Plastic
Maintenance and Repair Workers, General
Production, Planning, and Expediting Clerks

The largest share of Manufacturing occupations that require a postsecondary degree or less, or moderate- and short-term training include *Sales representatives*, *Maintenance and repair workers*, *First-line supervisors*, and *Laborers and freight, stock, and material movers*.

Associate Degree/Long-term Training/ Apprenticeships

Machinists
Tool and Die Makers
Industrial Machinery Mechanics
Electricians
Industrial Engineering Technicians

Jobs that require an associate degree, long-term on-the-job training, or an apprenticeship are led by *Machinists*, *Tool and die makers*, and *Industrial machinery mechanics*. *Tool and die makers* in Manufacturing make up over 96 percent of all *Tool and die makers* in the state. The top occupations in this category pay above-average wages without requiring a lot of education, but they necessitate a considerable amount of on-the-job training and experience.

Bachelor's Degree or Higher

Industrial Engineers
Mechanical Engineers
General and Operations Managers
Financial Managers
Market Research Analysts and Marketing Specialists

Among high-demand and high-wage occupations that require a bachelor's degree or more, many are in engineering and managerial professions. Close to half of all engineers in the state are in Manufacturing and have a median wage far greater than the state overall. *Industrial* and *Mechanical engineers* top the list of these occupations, followed by *General and operations managers*.

Real-time Demand for Manufacturing Employment

Real-time demand represents the number of online job advertisements for an occupation. Because of the large share of Manufacturing jobs in Michigan, a high number of job advertisements are posted for jobs in this cluster. Despite overall employment for the cluster shrinking over the past two decades, many workers are needed each year to fill the numerous Manufacturing jobs available annually.

- Among 2018 job advertisements for key occupations in Manufacturing, many were for engineering jobs such as *Industrial and Mechanical engineers* and *First-line supervisors of production and operating workers*. Jobs for *Machinists* and *Helpers-production workers* also had some of the highest number of job ads in 2018. Since these occupations comprise a large number of jobs in Manufacturing, they also receive a high number of job ads.
- As expected, the top three employers for workers in Manufacturing in Michigan are automobile companies. Fiat Chrysler, General Motors, and Ford were the largest companies that advertised their vacancies online, followed by Altair Engineering, UPS, and TRW Automotive.

Top skills and certifications in postings for key occupations include:

Microsoft Office
Powertrain
Computer-aided Design
Accreditation Board for Engineering and Technology
Design for Six Sigma
Certified Association Executive
ISO TS16949

- Over 80 percent of job advertisements in 2018 for key occupations in Manufacturing were for full-time employment. Just over 8 percent of ads were for part-time work, and less than 1 percent for contract positions. The average posting period for these jobs was 36 days.

Real-time demand is measured as the number of job advertisements posted online for an occupation.

Manufacturing Employment Projections

Projections for Manufacturing are based on statewide data through 2026. Although Manufacturing jobs are not projected to grow through 2026, the reduction in employment is expected to only be around 1.0 percent. Technological advancements may shift labor demand toward those with more skills and higher levels of education.

- The subcluster with the largest projected statewide growth through 2026 is *Food and beverage manufacturing* with 5,260 new jobs or 12.0 percent growth. *Plastics and rubber products manufacturing*, which is a subsector of the *Chemical product* subcluster, is estimated to see 5.4 percent growth (+2,250 jobs). *Electrical equipment, appliance, and component manufacturing*, which is a subsector of the *Computer and electronic product* subcluster, should grow 10.8 percent (+1,420 jobs).
- Almost every other subcluster in Manufacturing is projected to see negative growth through 2026. *Automotive manufacturing* is expected to lose 4,270 jobs (-2.4 percent), *Metals manufacturing* will drop 5,580 jobs (-5.5 percent), and *Machinery manufacturing* will contract by 3,620 jobs (-5.0 percent).
- *Assemblers and fabricators, Laborers and freight, stock, and material movers, hand, and General operations managers* are projected to see the largest numbers of job openings in Michigan overall.
- Employment in the fields of engineering and management is expected to see growth in terms of projected long-term employment through 2026.

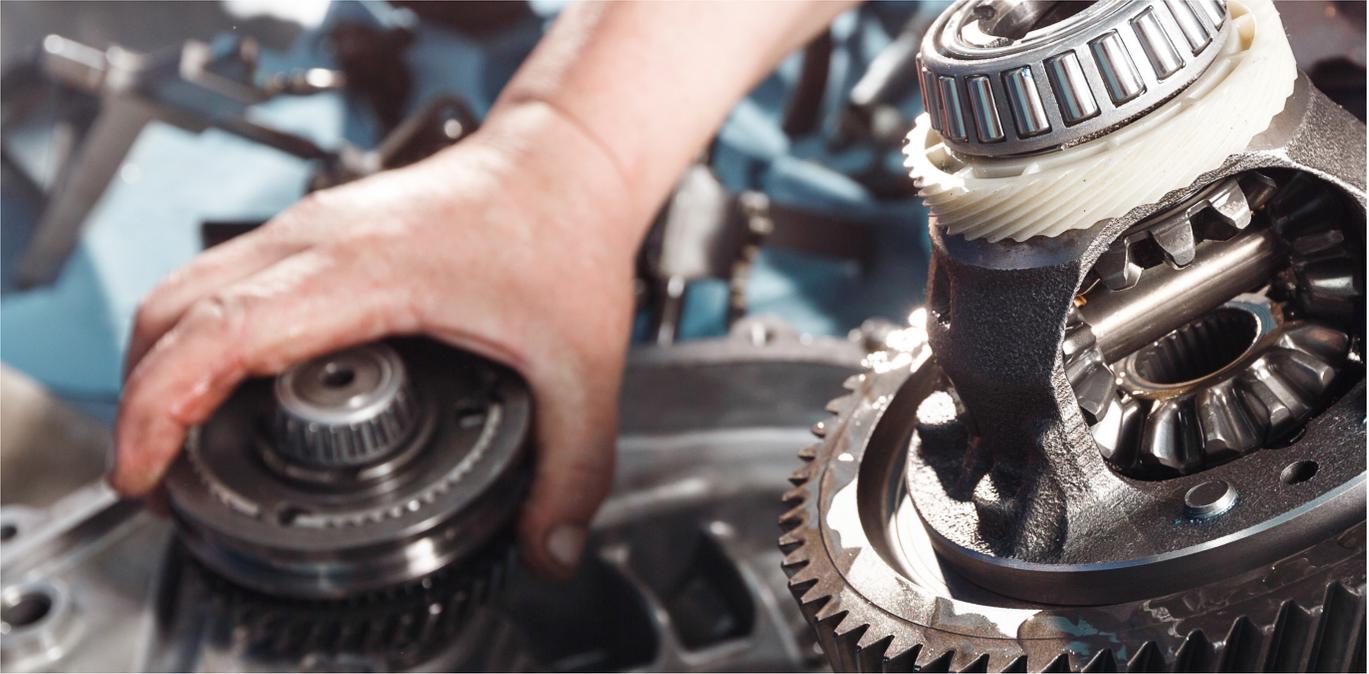
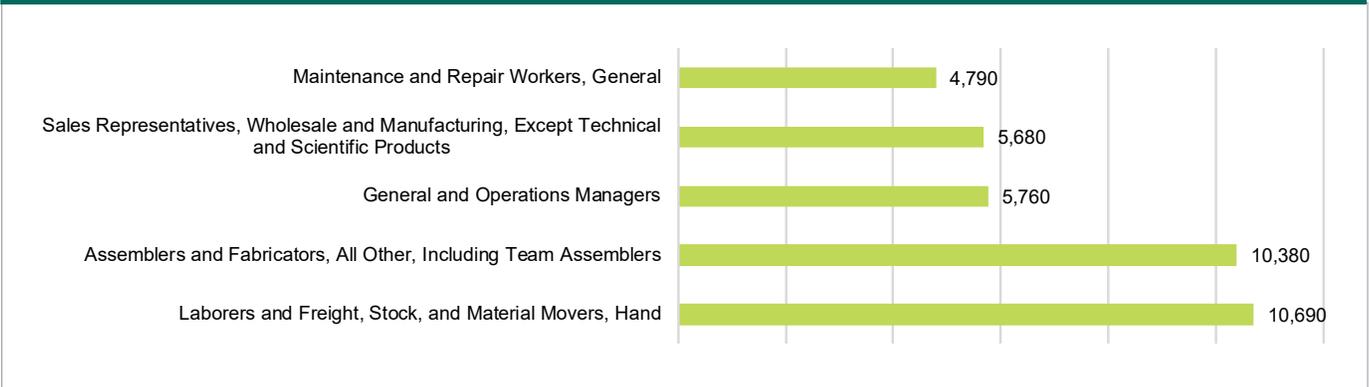
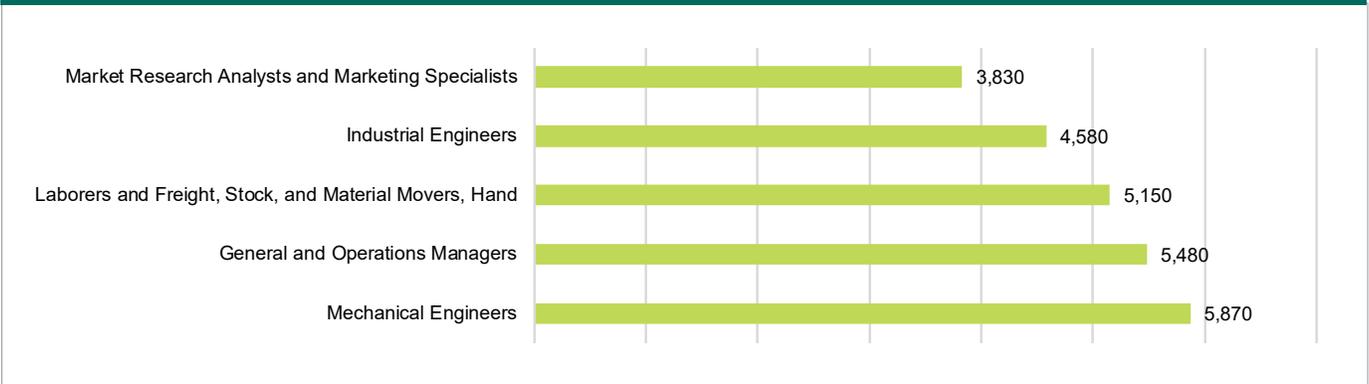


FIGURE 5: OCCUPATIONS WITH THE MOST PROJECTED ANNUAL OPENINGS THROUGH 2026, MICHIGAN MANUFACTURING CLUSTER



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 MANUFACTURING CLUSTER

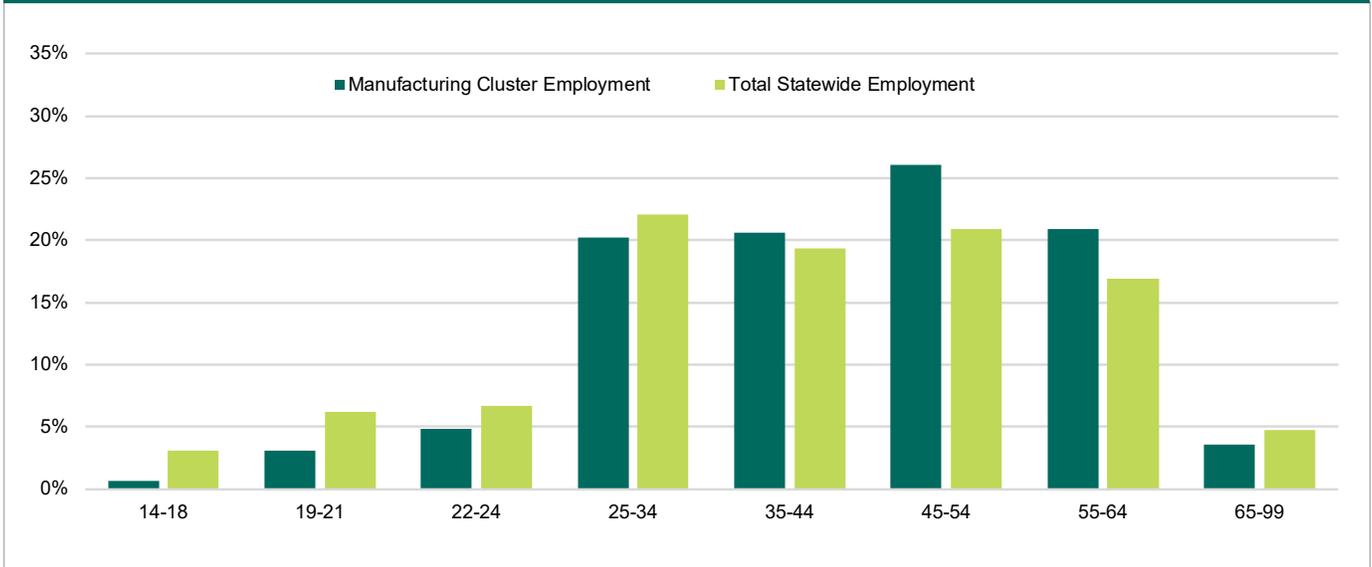


Source: Industry and Occupational Employment Projections (2016-2026), Michigan Bureau of Labor Market Information and Strategic Initiatives

Manufacturing Workforce Demographics

Demographic and educational attainment information is useful in identifying workforce characteristics and 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 figures display characteristics of the Manufacturing workforce in Michigan.

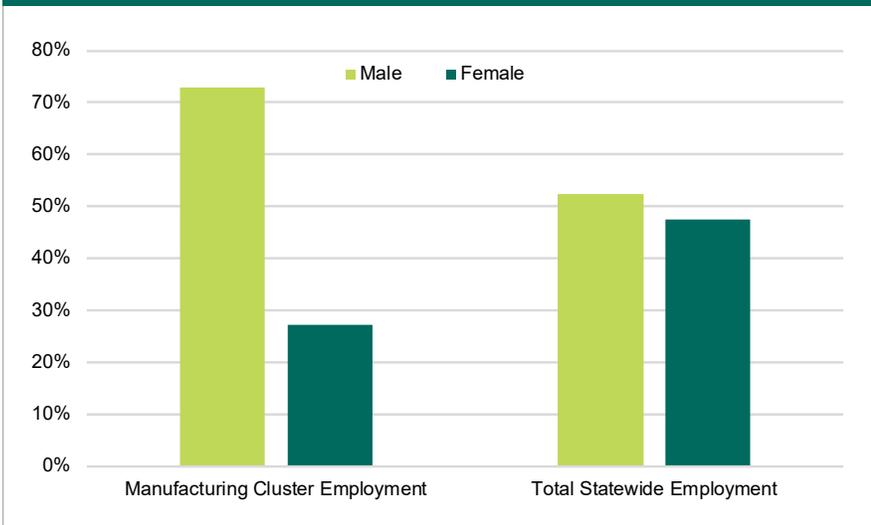
FIGURE 7: EMPLOYMENT BY AGE, MICHIGAN MANUFACTURING CLUSTER



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

Most employees in Manufacturing are older compared to Michigan’s overall workforce. The largest share of workers fall in the 45-54 and 55-64 age range, accounting for almost half of all workers in the cluster. In contrast, the largest share of workers in Michigan — 22 percent — are between the ages of 25-34, and Michigan workers hold a higher share of workers in every lower age group.

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



The ratio of women to men in Manufacturing has been increasing slightly over the years, from one in three in 2013 to just over two in five today. The share of women by age group follows the same trend as men, with the largest number of women in Manufacturing between 45 and 54 years old.

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

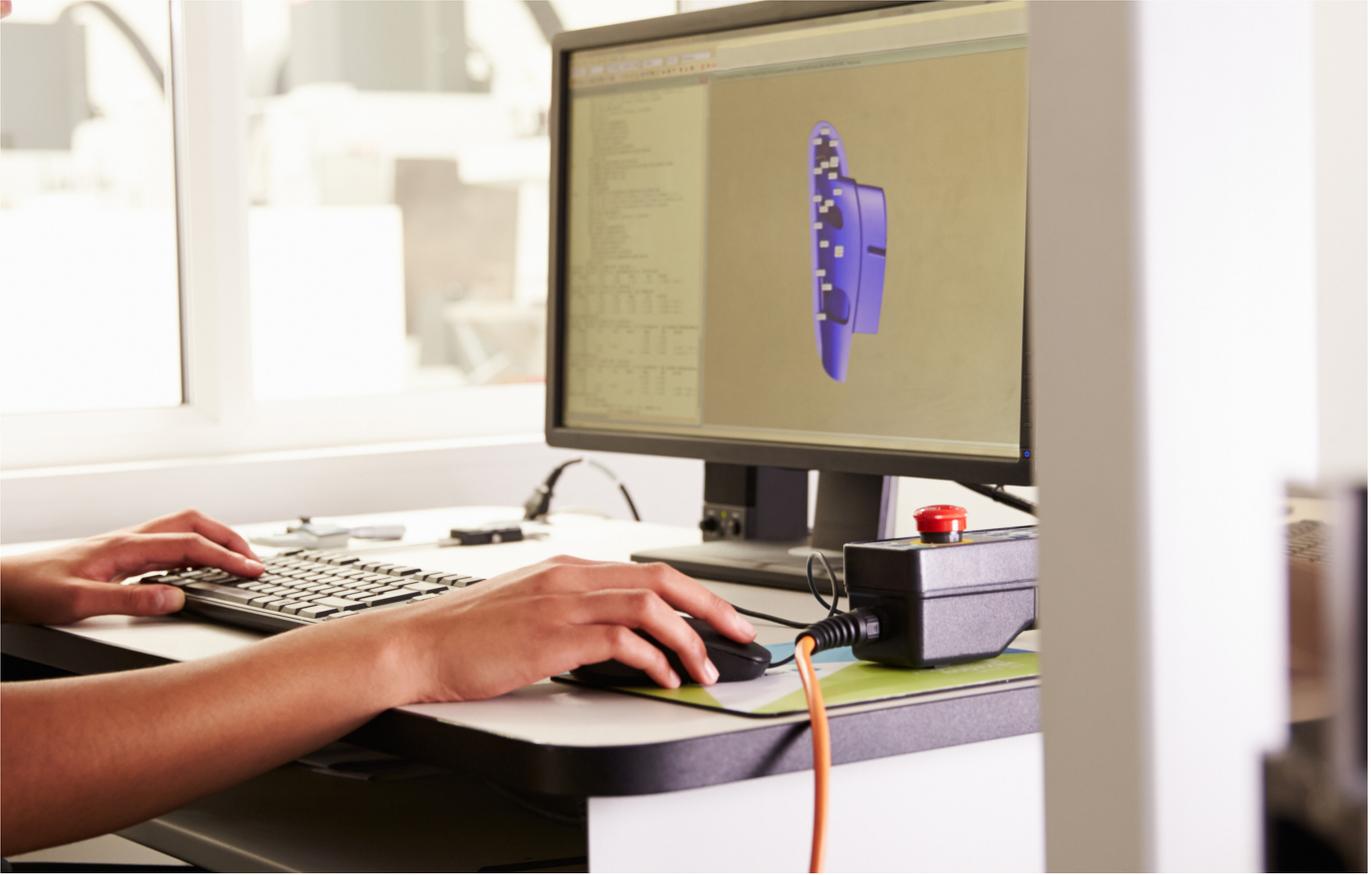
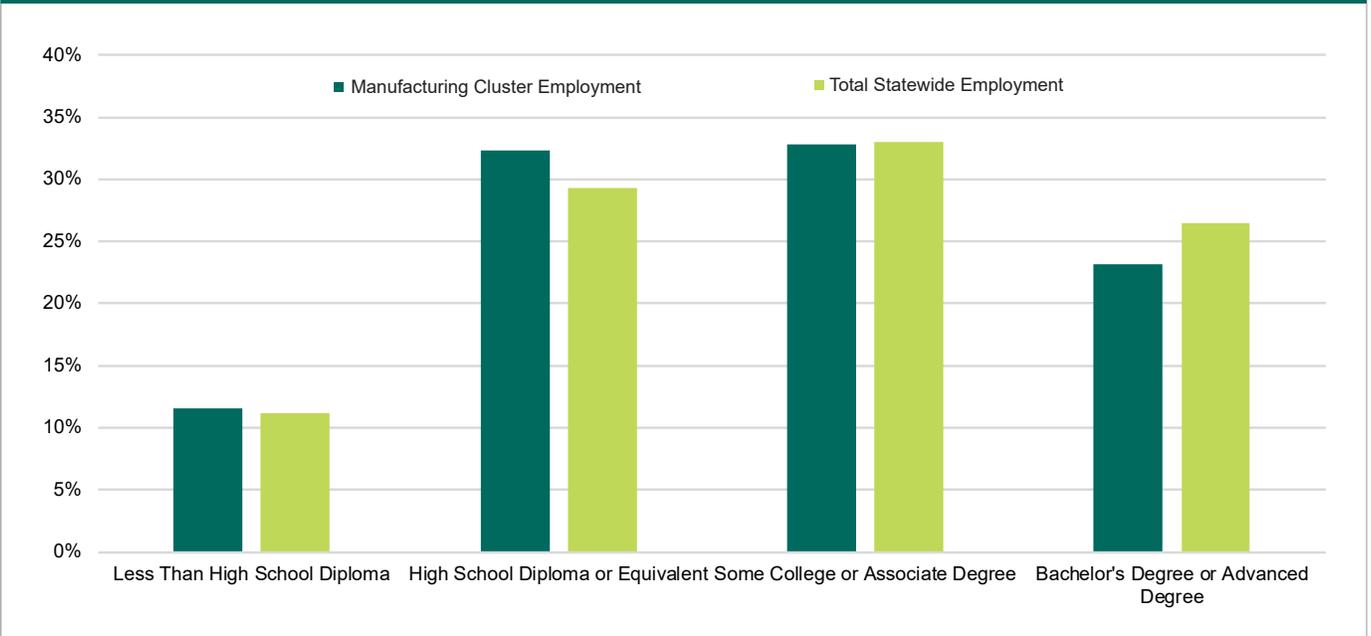


FIGURE 9: EMPLOYMENT BY EDUCATION, MICHIGAN MANUFACTURING CLUSTER



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

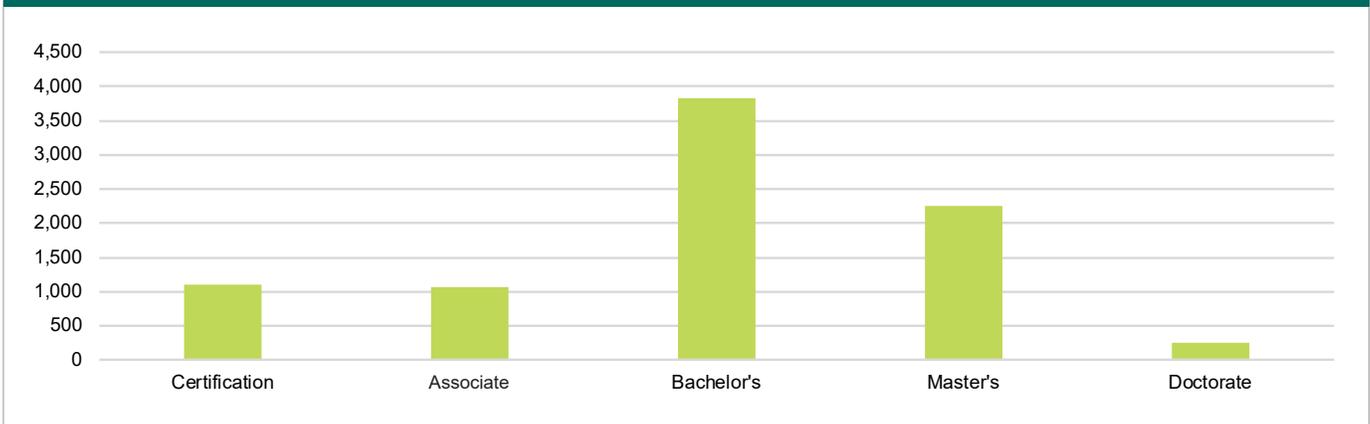
The educational attainment of workers in Manufacturing compared to the state overall is mixed. Michigan tends to have a higher number of workers with a bachelor’s degree or more compared to Manufacturing. Workers with some college or an associate degree or less than a high school education are very similar across the two groups, but Manufacturing has a higher number of workers with a high school degree and no college experience.

Manufacturing Talent Pipeline

Information on the number of people completing Manufacturing-related programs is a valuable way to determine the labor supply for the cluster. Just over 8,500 certificates or degrees were awarded in the academic year of 2016–2017 for Manufacturing-related programs.

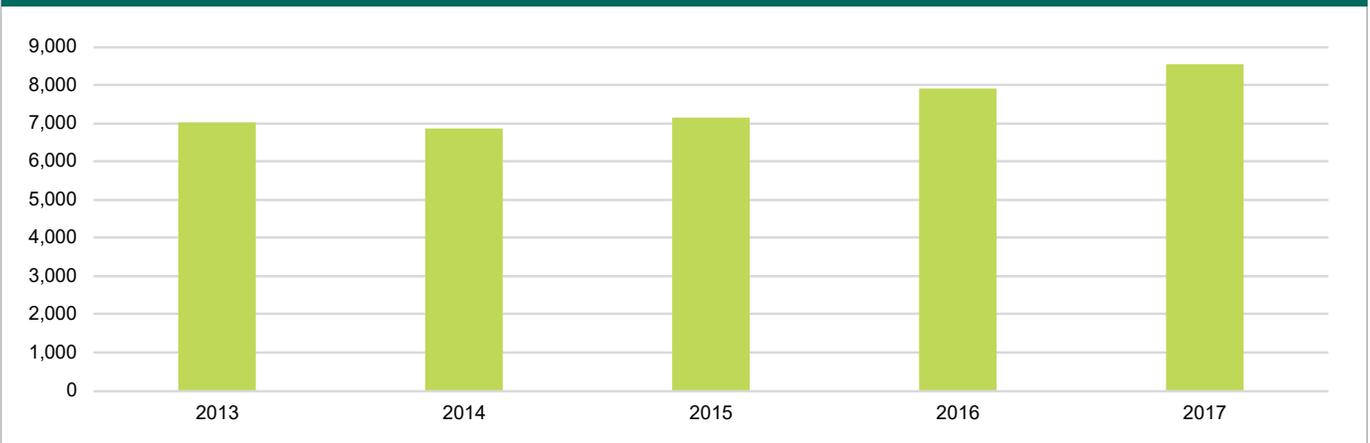
- The number of completers in Manufacturing-related programs has risen steadily since 2013, advancing from just over 7,000 to 8,500 in 2017—a 21 percent increase.
- Just over 3 percent of all completers in the state are in Manufacturing-related programs. The largest portion of Manufacturing-related completers were in bachelor’s degree programs, accounting for 45 percent of all students. Those earning a master’s degree held the second-largest share at 26 percent.
- State-level data is available for the number of registered apprenticeships in Michigan. Some of the highest number of apprenticeships in Manufacturing occupations were for *Electricians, Tool and die makers, Industrial machinery mechanics, and Sheet metal workers.*
- The largest formal educational programs in Michigan include those preparing students for careers as mechanical, electrical, or civil engineering. More than 400 students also received awards in programs labeled Industrial Mechanics and Maintenance Technology/Technician which prepares individuals to apply technical knowledge and skills to repair and maintain industrial machinery and equipment.

FIGURE 10: MANUFACTURING-RELATED PROGRAM COMPLETERS BY AWARD LEVEL, MICHIGAN, 2017

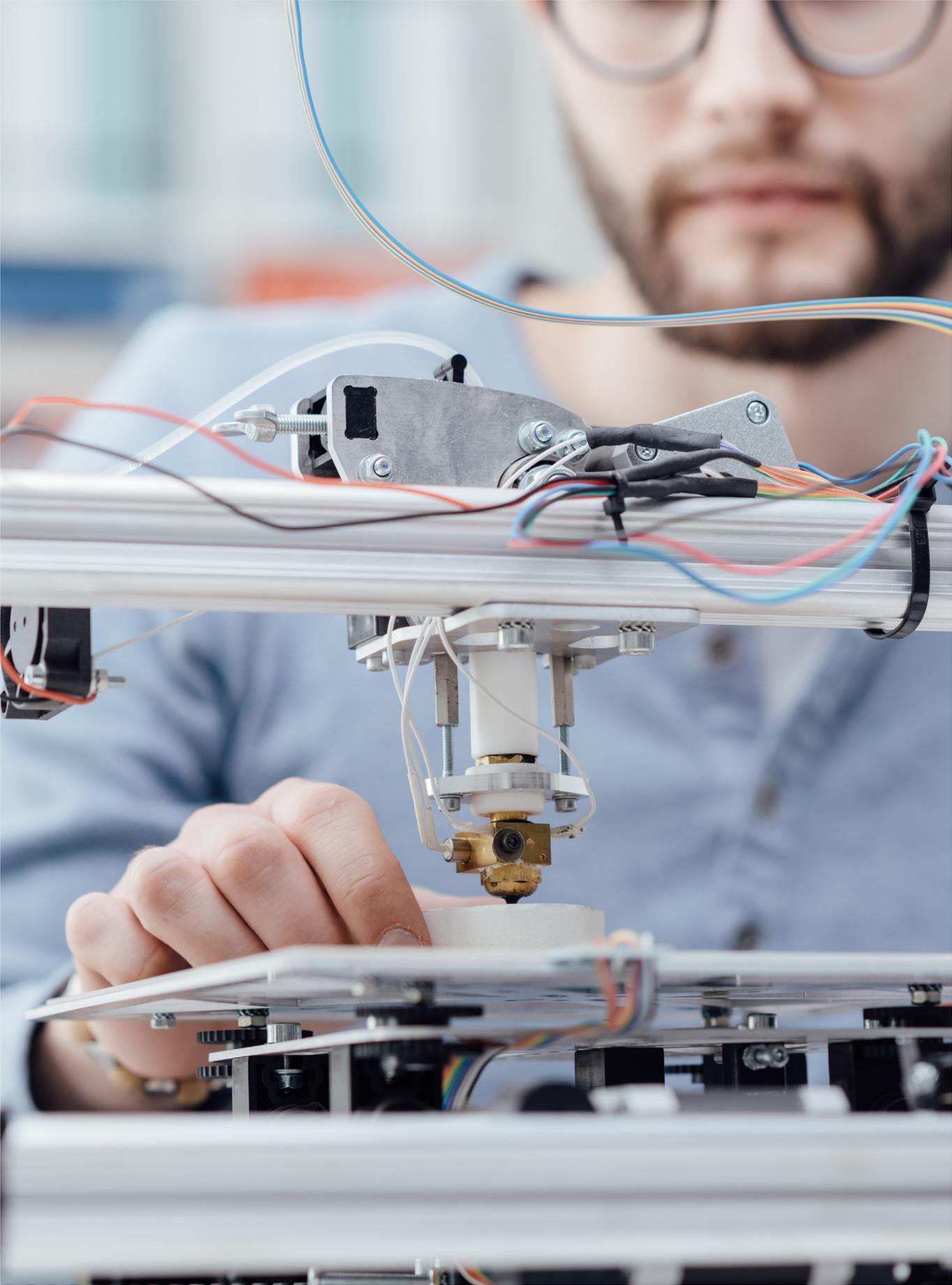


Source: National Center for Education Statistics (NCES), Integrated Postsecondary Education Data System (IPEDS)

FIGURE 11: MANUFACTURING-RELATED PROGRAM COMPLETERS TREND, MICHIGAN



Source: National Center for Education Statistics (NCES), Integrated Postsecondary Education Data System (IPEDS)





Conclusion

Manufacturing has been and will continue to be a major part of Michigan's economy. Despite slowing growth in the coming years, it is projected that many employment opportunities will be continue to be available annually by industries in the cluster. Additionally, an aging workforce will contribute to more retirees and additional job openings. The diversity of occupations in Manufacturing can afford people of wide-ranging backgrounds opportunity for employment with above-average wages in many positions. *Production workers* still account for a large portion of jobs in the cluster, where less than a bachelor's degree is required, but as technology advances and more jobs are automated, higher levels of educational attainment will be required.

With the changing demographic and technological dynamics that Manufacturing will continue to encounter, these factors are important for accessing the resources needed to allow these industries to prosper. An interdisciplinary approach that involves the interaction of actors of many groups—government agencies, businesses, and educators—will be necessary to keep up with a globally competitive industry.

Strengths:

Large Employment Base

Because of the size of Manufacturing in Michigan, a high number of jobs will be annually available for different positions. With over 600,000 private-sector jobs in the cluster, one in six workers are employed in Manufacturing, making it a vital source for Michigan jobs.

Diverse Job Types

A wide range of positions provides opportunity for a workforce with a diverse set of credentials. Jobs in *Production* allow for people with less formal education a chance of good pay, often health benefits, and opportunities for career advancement. Engineering and managerial positions typically require a bachelor's degree and beyond and create the potential for high-earning careers.

Challenges

Wage Competition

Despite employment in Manufacturing having grown since the Great Recession, real wage growth has declined. With a workforce that's becoming more and more educated, it will be difficult to attract talent to an industry that is not competitive in wages.

Lack of Growth

Even though only a few Manufacturing industries are projected to see positive growth through 2026, Manufacturing overall is only expected to contract by around 1 percent. A large number of Manufacturing jobs will continue to be available for many years to come, but adequately preparing the workforce for changing types of available jobs will be crucial.



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