CONNECTED AND AUTOMATED VEHICLES
EMERGING TECHNOLOGY SKILLS GAP ANALYSIS

Compiled by the Workforce Intelligence Network for Southeast Michigan on behalf of the Ralph C. Wilson, Jr. Foundation

SPRING 2020

EXECUTIVE SUMMARY
ABOUT THIS REPORT

The Ralph C. Wilson, Jr. Foundation is supporting two reports detailing the emerging technologies talent system in southeast Michigan. This report is focused on connected and automated vehicles (CAV) and will analyze the current and emerging technology workforce in southeast Michigan. Where appropriate, national comparisons are included as well.

This report builds upon and updates the original CAV Skills Gap Analysis published by the Workforce Intelligence Network for Southeast Michigan (WIN) in 2017 in connection with the ATLAS Center and the Macomb/St. Clair Workforce Development Board, with financial support from the Office of Economic Adjustment, Department of Defense. The WIN special report on connected and autonomous vehicles was among the first of its kind in the public space to measure the impact of CAV on the workforce.

This complementary report seeks to analyze changes in the emerging technologies talent system. Understanding the complexity of the talent supply for CAV development and other upcoming technologies will aid continued economic growth in the region. New occupations will be created to sell, maintain, service and grow these technologies and their integration into teaching and service occupations. Tracking emerging technologies and their impact on the workforce is key to preparing secondary, post-secondary, and other educational markets for changing workforce demands from employers.

CAV manufacturing presents an opportunity to both create new jobs and upskill the existing workforce. Given the high number of training providers in southeast Michigan, the region is poised to make the most of this opportunity. CAV is the new frontier of transportation for personal vehicles, public transportation, and first responders, and proponents feel it will enhance safety and efficiency of travel. As development of CAV is happening across the nation, this analysis includes data for the entire United States where applicable. Necessary occupations for CAV development include IT design and cybersecurity workers helping vehicles to communicate with each other and with surrounding infrastructure and to keep travel data secure; design and testing engineers and manufacturing workers; quality control specialists ensuring vehicle safety; and civil engineers and planners creating the intelligent transportation systems needed to make CAV effective and efficient on roadways. Each of these groups of workers requires a distinct skillset and training, while experienced workers may need more information to work on emerging technologies.

Continued advancements in cybersecurity, and other, less mature technologies such as artificial intelligence and virtual reality are entwined with many facets of human life, though the impact these technologies have created is yet to be determined and analyzed. In particular, CAV technology is closely related to the Internet of Things (IoT) due to the similarity of technologies needed between the two and the increased prevalence of automation in manufacturing. Cybersecurity is important to all kinds of increasingly connected businesses, and especially to connected device creation.

1The original report content reflected the views of the Macomb/St. Clair Workforce Development Board and did not necessarily reflect the views of the Office of Economic Adjustment.
The Workforce Intelligence Network for Southeast Michigan (WIN) is a partnership of community colleges and workforce development boards, known locally as Michigan Works! Agencies (MWAs), in greater southeast Michigan. It was established in 2011 to create a comprehensive and cohesive talent development system in the region to ensure workers are prepared for success. Accordingly, WIN serves three primary roles:

1. Gathering, analyzing, and distributing real-time labor supply and demand intelligence on workforce characteristics specific to the Southeast Michigan Region;

2. Convening, facilitating, and engaging employers, and serving as the connection point for business, industry and other stakeholders as it relates to workforce development; and

3. Developing strategies and funding proposals for the delivery of regional workforce development programs through its partners.

To learn more about WIN and to explore past reports, visit WINintelligence.org.
Acknowledgements

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In the time since WIN’s Connected and Automated Vehicle (CAV) Skills Gap Analysis was published, CAV has begun a transition from distant transportation frontier to emerging technology. Automakers, delivery companies, and transit providers have launched pilot vehicles and shuttle routes; partial automation has become common across new vehicles in the form of safety features, such as lane and brake assist; states and municipalities grapple with broad questions of CAV regulation as well as narrow ones such as machine-friendly traffic lights and pavement markings. As major automotive manufacturers and technology companies around the world design and test new automated vehicle technology, current employees are learning new skills and future workers will be asked to apply a specific skillset to CAV projects as the product cycle for this disruptive technology continues to mature.

In order to better understand future workforce demands in the CAV space, WIN partnered with the Ralph C. Wilson, Jr. Foundation to analyze job postings for a broad set of occupations involved in the design, manufacture, and infrastructure development necessary to catalyze the CAV product cycle.

In this report, WIN examines occupations that are critical in developing CAV by analyzing data on the workforce’s employment trends, local demand, entry requirements, and regional specialties. Due to the broad range of occupations — including engineers, software developers, cybersecurity professionals, and transportation planners — that are integral to the rollout of connected vehicles, as well as the wide range of other industries seeking these versatile workers, the government’s standard occupation codes are not nuanced enough to truly capture CAV workers. The analysis carried out for this report features job posting data from Economic Modeling Systems International (Emsi) for 76 unique occupation codes linked to CAV-specific projects through the application of keyword and industry filters in data collection. Using data from job postings in the CAV space nationally, from 2016 to 2019, WIN researchers present analysis on the demand for CAV workers.

Key Findings

1. In 2017, 8.4 percent of nationwide postings (10,403 online job advertisements) for these occupations included automation keywords, while in 2019, 12.1 percent (25,726 advertisements) expressed specific interest in automation. The state of Michigan accounts for 2.4 percent of all postings for these occupations nationwide, while southeast Michigan accounts for 1.6 percent of all national CAV-related postings. By comparison, Michigan accounts for 2.9 percent of national employment overall and 3.4 percent of employment in CAV-related occupations.

2. In 2019, CAV-related occupation employment totaled 504,400 workers, meaning 18.8 percent of all workers in southeast Michigan are employed in occupations with skills helpful in developing CAV. Though only 103,700 of these workers are employed in auto manufacturing and development industries and not all workers may be on automation-related projects, this indicates a wide talent pool in the region to draw potential workers from.
3. The enormous growth in automated vehicle worker demand has led to a variety of strategies for meeting workforce needs. Changes in the CAV ecosystem have led to rapidly evolving skill needs, such as cybersecurity and other safety concerns that have arisen with more widespread deployment. Educational providers, auto manufacturers, and industry groups alike are seeking long- and short-term solutions for upskilling the CAV workforce.

4. The strong presence of automotive manufacturing infrastructure in southeast Michigan has helped provide ample pathways for CAV workers. The 37 higher education institutions providing programs related to CAV-related occupations, industry collaborations considering talent attraction, and existing manufacturing workforce interested in upskilling all lead to a diverse talent pool. Encouraging CAV development in the region can help provide long-term pathways in vehicle and engineering technology can assist with talent retention in the state overall.

5. Increased utilization of automation and robotics within the manufacturing industry are in turn impacting automated vehicle workers. Available machining and modeling technology is leading job growth in well-paying technology-focused occupations while slowing growth in others. Posting and employment changes, an academic automation index, and other metrics can be considered in developing curriculum for emerging high-demand occupations.

Recommendations

The following recommendations, discussed in detail in the conclusion of the full report, suggest considerations and strategies that may help the CAV workforce in southeast Michigan continue to mature. They will also help build capacity for the region to lead the way in autonomous vehicle development.

1. Degree requirements should be made flexible when possible, allowing workers without a bachelor’s degree to enter the CAV workforce provided the right skills and training. Expansion of middle skill positions has the potential to meet talent demand and strengthen the region’s overall economy. At this time, many occupations in technology roles have high degree requirements for positions that could be filled with an individual who had completed short-term training or an apprenticeship in the right skills.

2. Educators, employers, and workforce boards must collaborate in creating robust training pathways to fill both short- and long-term skill needs. In particular, upskilling existing production workers is still a major opportunity.

3. To meet demand and continue transforming the connected vehicle space, employers must focus efforts on attracting technology talent to southeast Michigan.

To view the full report, visit: winintelligence.org/report/cav-report
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