MICHIGAN IS AUTOMOBILITY
Michigan: Global Leader in Next-Generation Mobility

Rooted in a century of design engineering and manufacturing expertise, Michigan is leading the automotive industry’s evolution from traditional manufacturer to the research, testing, and deployment of next-generation mobility technology. Comprised of top-notch manufacturers, technology companies, access to the global supply chain, a highly skilled workforce, and best-in-class research institutions, Michigan is home to the world’s most dense automotive industry cluster and is well-positioned to drive the industry’s transformation and growth into the next century.

- #1 for operational U.S. Department of Transportation funded and connected vehicle deployments with 11 projects.
- $12 billion business funded automotive R&D occurs in Michigan annually.
- 19 universities and colleges in Michigan offer nationally-ranked undergraduate engineering programs and four offer nationally-ranked graduate programs.
- 500+ miles of roadway equipped for connected vehicle testing by 2020.
- 18 original equipment manufacturers (OEMs) have headquarters or technology centers in Michigan.
- 22 vehicle models were assembled in Michigan in 2018.
- 2018 U.S. vehicle production and 11% of all North American vehicle production occurred in Michigan.
- $12 billion business funded automotive R&D occurs in Michigan annually.
- 96 of the top 100 automotive suppliers to North America have a presence in Michigan and 60 are headquartered here.
- 17% of all 2018 U.S. vehicle production occurred in Michigan.
- $29 billion in OEM and supplier investment in Michigan since 2009, more than three times any other state.

Publication Sources:
Michigan’s robust business climate has added more than 560,000 private sector jobs over the past eight years, resulting in a nearly 9% gain in median household income and an unemployment rate dropping as low as experienced in 2000. In addition, Michigan is a top 15 state for business tax climate and continues to streamline regulations, grow its workforce, and improve the overall environment for investment and economic growth.

**Rankings**

11th most robust economic climate in 2018.

3rd in the nation for technology and innovation.

4th in the nation for cost of living.

**Talent**

The average salary for employees is $50,649.

Michigan is home to 9.9 million people.

The civilian labor force is made up of 4.9 million people.

The median household income is $52,668.

**Job Growth**

Automotive manufacturing jobs have grown by 7% from 2014 to 2018.

In 2017, automotive manufacturing jobs rose by 1.1% or approximately 1,300 jobs.

From 2016 to 2018, Macomb County (#1), Wayne County (#20), and Oakland County (#28) led the nation in new manufacturing jobs.

**Taxes and Regulations**

Michigan has a flat 6% corporate income tax.

Michigan eliminated the personal property tax in 2014, saving businesses $5 million annually.
When it comes to mobility innovation, Michigan is leading the world in connected and automated vehicle (CAV) legislation and infrastructure investment. From key public-private partnerships to being nationally competitive in mobility-related patents, Michigan is the place for testing and deployment of connected, automated, and electric vehicles.

58% of Michigan automotive suppliers conduct automated vehicle testing in the state.

65% of Michigan suppliers engage in connected vehicle technology development.

Home to the largest deployment of V2I (vehicle-to-infrastructure) technology in the United States, with plans for more than 350 infrastructure miles compatible with V2I.
Michigan ranks sixth in the nation for number of inventors, with more than 10,000, that were issued patents in 2017.

Over 115 Roadside Units (RSU) for connected vehicles throughout the state.

#1 in the nation for engineering talent concentration.

Home to the second-largest system of adaptive traffic signals in the nation.

Home to two unique-in-the-nation automated testing sites, Mcity in Ann Arbor and the American Center for Mobility in Ypsilanti.
GOVERNING THE MOBILITY FUTURE

Within the next 30 years, fully autonomous vehicles will be commonplace on roadways across the United States. Legislation regulating connected and automated vehicle (CAV) technology is moving at lightning speed. In 2017, only 11 states and the District of Columbia had passed laws regulating autonomous vehicles. A year later, 26 states enacted legislation.

Michigan is leading with some of the most aggressive legislation and state funding for CAV testing with the creation of the American Center for Mobility test facility.

**Michigan Legislation**

**HOUSE BILL 5406 (2018)**

Established the State Infrastructure Council, which will collect statewide data on Michigan’s infrastructure systems and build a database that will inform a 30-year strategy for investment and management.

**SENATE BILL 169 (2013)**

Allowed for the testing of driverless cars on roadways and highways.

**SENATE BILL 995 (2016)**

- Allowed for open operation of CAVs beyond testing.
- Allowed on-demand automated vehicle networks to link passengers and various forms of transportation.
- Allowed autonomous vehicle platoons on roadways.

**SENATE BILL 928 (2016)**

Penalizes an individual who hacks or damages automated vehicles.

**SENATE BILL 997 (2016)**

Established the American Center for Mobility in Ypsilanti.
Government Partnerships

Recognizing that other states and countries have a key role in the development of automated vehicle safety, testing, and deployment, Michigan has entered into agreements with five countries and three states, including:

- Australia
- Canada
- China
- Netherlands
- United Kingdom

Cybersecurity

Provides feedback on issues related to automated vehicle cyberattacks, infrastructure, data sharing, and penalties for malicious sharing of data.

Legal Insurance

Reviews the Michigan Compiled Laws, especially the Vehicle Code and Insurance Code and established the “Michigan Journal of Mobility Law” at the University of Michigan Law School.

Strategy

Recommends how the state can lead in areas of technology associated with connected and highly automated vehicles, creates benchmarks for research and development of CAVs, and determines how to facilitate the integration of connected vehicles in communities.

Michigan Council on Future Mobility

The Council provides the governor and Legislature recommendations regarding state policy to ensure Michigan continues to be the global leader in automated, driverless, and connected vehicle technology.

- Cybersecurity
- Legal Insurance
- Strategy

TxDot/Texas Transportation Institute Partnership

MDOT and the Texas Department of Transportation (TxDOT) signed a Letter of Intent (LOI) titled “Infrastructure Advancement for the Transition of CAV,” with the intent to collaborate for the deployment of smart and connected infrastructure to support the transition to connected automation and on-demand mobility services.

Smart Belt Coalition

This long-distance connected and automated vehicle network supports research, testing, policy, funding, and deployment of next-generation vehicles.

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MICHIGAN: GATEWAY TO THE WORLD

Michigan is one of the most globally connected regions in the nation. Sharing an international border with Canada, it is the sixth largest export market and is home to the third best airport for customer satisfaction.

Michigan companies exported $59.8 billion in goods with $29.2 billion allocated to transportation equipment in 2017.

- Michigan is the **#1** exporter of transportation equipment in the United States.
- Michigan is the 6th in the nation for exports in 2017.
- One of two states among the top 10 largest exporters to post positive five-year export growth.
- 10.5% of U.S. transportation equipment manufacturing exports come from Michigan companies.
Foreign Direct Investment

Investment from foreign-held companies is critical to Michigan’s economy. For the second straight year, the state received more than 70 foreign direct investment (FDI) projects totaling more than $2 billion, an increase of $500 million over 2016. With 1,400 foreign subsidiary locations in the region, Southeast Michigan’s proven track record of moving goods globally is a magnet for companies looking to do business with the automotive industry.

Top Five Countries Investing in Michigan (by ranking)

- Germany
- Japan
- Canada
- China
- United Kingdom

9th in the nation for number of FDI projects announced over the past 10 years among all states.

9,527 jobs were added through FDI.

$500 million more in investments were announced over 2016.

More than $2 billion in investments were announced for a second straight year.

54% of investment by industry cluster was dedicated to transportation equipment.

Global Impact of the ‘Detroit Three’

Combined, Detroit’s largest automakers — FCA US LLC, Ford Motor Company, and General Motors Co. — operate 88 international assembly plants.
MICHIGAN’S TALENT PIPELINE

The state’s workforce and talent pipeline drive the innovation and growth necessary for the automotive and mobility industry’s transformation. From access to top engineering graduates across the state to the high-skill jobs powering Michigan’s legacy industry, talent is the lifeblood of Michigan’s growing economy.

8,000+ engineering degrees were awarded by Michigan education institutions in 2017, with 41% masters’ degrees or higher.

19 Michigan universities and colleges have nationally ranked undergraduate engineering programs. Four have ranked graduate programs.

121,468 total degrees were awarded by Michigan educational institutions in 2017.

### Top 10 Engineering Graduates

<table>
<thead>
<tr>
<th>Institution</th>
<th>City</th>
<th>Degrees Conferred (2017)</th>
</tr>
</thead>
<tbody>
<tr>
<td>University of Michigan</td>
<td>Ann Arbor</td>
<td>2,502</td>
</tr>
<tr>
<td>Michigan Technological University</td>
<td>Houghton</td>
<td>1,066</td>
</tr>
<tr>
<td>Michigan State University</td>
<td>East Lansing</td>
<td>898</td>
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<tr>
<td>Wayne State University</td>
<td>Detroit</td>
<td>748</td>
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<tr>
<td>University of Michigan</td>
<td>Dearborn</td>
<td>467</td>
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<tr>
<td>Lawrence Technological University</td>
<td>Southfield</td>
<td>454</td>
</tr>
<tr>
<td>Western Michigan University</td>
<td>Kalamazoo</td>
<td>432</td>
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<tr>
<td>Oakland University</td>
<td>Rochester</td>
<td>409</td>
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<tr>
<td>Kettering University</td>
<td>Flint</td>
<td>333</td>
</tr>
<tr>
<td>Grand Valley State University</td>
<td>Allendale</td>
<td>141</td>
</tr>
</tbody>
</table>

### Community College Programs

[Washtenaw Community College](#)
**Advanced Transportation Center**

[Macomb Community College](#)
**Center for Advanced Automotive Technology**
NEXT-GENERATION OF TALENT

FIRST Robotics
Michigan ranks No. 1 in the amount of high school and elementary teams in the country. The global FIRST Robotics championship will be held annually in Detroit through 2020.
- 540 high school teams
- 808 early elementary teams

Intelligent Ground Vehicle Competition
Held annually at Oakland University, the event offers cutting-edge competition among college students encompassing a wide range of disciplines focused on the latest technologies, from electrical engineering and computer science to intelligent vehicle systems.

Cyber Training Institute
First in the nation, this cybersecurity program held at Pinckney Community High School, allows students and adults to enroll in cybersecurity courses, earn state-approved certifications, and engage in cybersecurity training exercises.

Autonomous Innovative Vehicle Challenge
Hosted by Square One Network, the event is held on the campus of Kettering University in Flint and challenges students to re-engineer a Power Wheels Jeep into an autonomous vehicle utilizing next-generation technology, GPS, and sensors.

Formula SAE Michigan Competition
Held at the Michigan International Speedway, students enhance their engineering design and project management skills by developing and constructing a single-seat race car with the best overall design, construction, performance, and cost. In 2018, 2,567 students participated in the competition.

Michigan Mobility Institute
This educational institute offers academic, professional, executive, retraining, and skilled-trades programs to develop talent in fields such as artificial intelligence, robotics and cybersecurity. A Master of Mobility degree will be developed with university partners, starting in 2021.

University Research Corridor (URC)

$18.7 billion in economic impact with 140,285 students and $2.3 billion in research and development spending.

1.2 million graduates worldwide attended URC colleges, with 669,274 graduates residing in Michigan.

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TALENT ADVANTAGE

Michigan ranks #1 among all states in number and concentration for the following occupations:

- **44,680** mechanical engineers
- **1,630** model makers (metal and plastics)
- **28,460** industrial engineers
- **5,690** commercial and industrial designers

113,262 engineers in Michigan

Ranked 3rd in number of engineers in the nation.
Skilled Trades

Skilled trades workers comprise 1.1 million people across the state. Michigan’s national competitive advantage includes high concentrations of numerous skilled trade occupations, including:

- Model makers (nine times the national average)
- Tool and die makers (six times the national average)
- Machine setters, operators, and tenders (three times the national average)
- Computer numerically controlled machine tool programmers (three times the national average)

Michigan’s more than 108,000 highly-skilled assemblers and fabricators, working in mobility-related occupations, produce the world’s most complex and highly technical product.

Job Postings

3,755 average monthly hires in engineering in Michigan.

53,867 unique engineering job postings were available in Michigan in 2018.

Michigan is ranked 4th for active engineering job postings (13,760), after California, Texas, and Florida.

Top-Engineering Job Postings in Michigan

Note: 2018 unique postings.

- Design engineers 5,797
- Controls engineers 2,740
- Quality assurance engineers 2,594
- Product engineers 2,282
- Quality engineers 2,198

53,867 unique engineering job postings were available in Michigan in 2018.
$20 million in funding was earmarked by the state of Michigan for investment in next-generation mobility technology companies and pilot programs during the 2019 fiscal year to help strengthen Michigan as the nation’s hub for advanced automotive and mobility research.

**Venture Capital**

21 venture capital firms and eight angel investors funded mobility technology startups in Michigan, while another 61 provided entrepreneurial support.

9% of the startups that received funding from venture capital firms in Michigan in 2017 were focused on mobility solutions.

10% of venture capital investments in Michigan were dedicated to the mobility sector in 2017.

9% of angel investors fund mobility startups in the state.

**PlanetM Startup Grants:**
11 pilots in total to be deployed by fall 2019. Four mobility startups already awarded and deployed real-world solutions to transportation challenges, include: Derq, HAAS Alert, Humanising Autonomy, and RoadBotics.

**PlanetM Testing Grant:**
Providing mobility startups opportunities to access advanced testing facilities with grant funding.

**Michigan Mobility Challenge:**
13 pilots have been announced and will be deployed in 2019 as part of the $8 million fund for transportation projects that solve mobility gaps for seniors and persons with disabilities.
Techstars Detroit: This accelerator invested in 44 startups that have raised $80 million and are valued at $215 million. Techstars connects startups to corporate accelerators, network sponsorships, the Techstars network engagement program, and an innovation bootcamp.

Detroit Mobility Innovation Initiative: This business and nonprofit initiative led by the city of Detroit and state of Michigan, aims to create mobility-focused solutions for neighborhood mobility, downtown accessibility, and electric vehicle utilization and education.

World Economic Forum’s SIMSystem: This project provides support through design workshops focused on increasing mobility efficiency in Detroit, Ann Arbor, and Windsor, Canada.

Detroit Moves: Located in downtown Detroit, the event includes live demonstrations and activations that showcase the innovative mobility technology being designed and produced across the state.

2030 Detroit Equitable Mobility: A joint project of the College for Creative Studies, Design Core Detroit, Ford Motor Company, and GTB, this effort focused on mobility equity in Detroit and creating solutions for how mobility effects health, employment, education, and socialization.

May Mobility Deployments: This startup deployed self-driving shuttle fleets in Detroit and Grand Rapids through public and private partnerships.
As the technology and automotive industries converge, Michigan automakers are actively engaged in partnerships with companies around the globe driving innovation around electrification, autonomous driving, mobility, and connectivity.

Connected Vehicle Deployments

The Detroit region leads the nation with a mix of private and public proving grounds, road initiatives, and CAV investments. Additional Michigan investments include statewide CAV data acquisition and weather-responsive information systems, along with signalized intersections in Ingham County.

Cold weather testing facilities in the Upper Peninsula of Michigan include the Keweenaw Research Center, engaged in testing for over 60 years, and the Continental Brimley Development Center.
Michigan is home to 2,200+ facilities, with engineering, design, testing, and validation capabilities.

PlanetM Pilot Programs

Ann Arbor Mobility Transformation Program: A public-private partnership consisting of Ann Arbor SPARK, the city of Ann Arbor, Deloitte, Ford Smart Mobility, PlanetM, and the University of Michigan, this program aims to integrate data from mobility solutions into a centralized digital platform for city planners and transportation users to make more informed decisions.

Project Kinetic: This unique 12-week collaboration between the public, private, and philanthropic sectors resulted in more than 120 innovative solutions to tackle some of the most pressing mobility challenges facing Detroit. Six pilots were selected to launch in 2018.

City of Tomorrow Challenge: Co-hosted by the city of Grand Rapids, Ford Motor Company, Mobile GR, PlanetM, and The Right Place, the Challenge awarded Kaizen Health a $100,000 prize to fund a pilot program aiming to eliminate transportation as a barrier to good medical care.

Labs/Research Centers

American Center for Mobility
Opened in 2017, the American Center for Mobility (ACM) is a national center for CAV research, testing, product development, validation, and certification.

- 500 acres with 12 configurable test environments utilized by government, industry, and academia.
- 23-member academic consortium enabling Michigan colleges and universities to collaborate on workforce transformation.
- Awarded $2.4 million for research involving fuel-efficient platooning on highways by the U.S. Department of Energy.

EPA National Fuel and Vehicles Lab: State of the art facility that provides emission testing services, along with developing, designing, and fabricating new and cost-effective technologies and components to reduce vehicle or engine emissions and increase fuel efficiency.

Industry-led public-private partnership, operated by the American Lightweight Materials Manufacturing Innovation Institute (ALMMII), to develop and deploy advanced lightweight materials manufacturing technologies and implement education and training programs to prepare the workforce.

Battery Lab: This initiative is part of the Energy Institute public lab developed with MEDC and Ford Motor Company to work with the industrial and academic energy storage user community, including suppliers and manufacturers, to prototype, test, and analyze batteries and the materials that go into them.

Mcity: This mock city is a test environment created to cultivate diverse expertise and resources required for emerging technologies, with 60 industry partners, 50 faculty, more than 100 students involved in research activities, and $20 million invested in 40 R&D projects.

Robotics Institute: This $75 million building includes 140,000 sq.ft. of specialized labs, collaboration space, and a fourth floor leased to Ford Motor Company robotics engineers. Includes M-Air test facility, the autonomous aerial vehicle outdoor lab.

Transportation Research Institute (UMTRI): Operating since 1965, UMTRI is dedicated to achieving safe and sustainable transportation for a global society. There are more than 1,000 interdisciplinary research projects focused on increasing driving safety and transportation systems knowledge.

U.S. Army Tank Automotive Research, Development, and Engineering Center (TARDEC), a TACOM partner, is responsible for maximizing research, development, and sustainment of technologies and integration across systems. In cooperation with MDOT, platooning technology tests have occurred on Michigan roads and across the region’s international border.
Next-Generation Mobility

Entrepreneurs

1.8 million vehicles assembled at plants, producing 22 models in 2018.

Testing and Validation Centers

American Center for Mobility: 500 acres and $135 million investment.

Mcity: 60 industry partners and $20 million in research projects.

Talent Advantage

113,000 engineers in Michigan, ranking the state third in the nation.

19% of U.S. automotive manufacturing jobs are in Michigan.

#1 in the nation:
Mechanical engineers (45,000); Industrial engineers (28,000); Commercial and industrial designers (5,000).

Deployments and Pilot Projects

#1 in number of U.S.DOT-funded operational connected vehicle deployments.

Ann Arbor Connected Vehicle Test Environment:

27-square-miles, 5,000 test vehicles, and largest real-world deployment of CAV infrastructure.

1st CAV international border crossing with U.S. Army/TARDEC, and MDOT Truck Platooning Test.

Global Automotive Center

18 OEM world headquarters or technology centers.
MOBILITY ECOSYSTEM

Legislation
Michigan CAV legislation leads the nation, allowing driverless cars and vehicle platoon testing on public roads.

Industry 4.0
Cybersecurity
Michigan Cyber Range operates 12 sites and hubs.

Robotics
20,000 industrial robots, more than any other state.

Defence
4,000 companies employing over 100,000 people.
$3 billion in defense contracts.
KEY MILITARY INSTALLATIONS:

Education Pipeline
8,000 engineering degrees conferred annually.
19 nationally-ranked undergraduate engineering programs and four nationally-ranked graduate programs.

Transportation, Distribution, and Logistics Supply Chain
#1 northern international border crossing.
100+ years of transportation, distribution, and logistics expertise.
Michigan State University ranked #1 graduate program for supply chain management.

Culture
New and historic automotive culture is demonstrated at:
- Automotive Hall of Fame
- Chevrolet Detroit Grand Prix
- The Henry Ford
- Michigan International Speedway
- North American International Auto Show and AutoMobili-D
- Woodward Dream Cruise

KEY MILITARY INSTALLATIONS:

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MICHauto, Michigan’s automotive and mobility cluster association, provides a platform for industry leaders and stakeholders to engage in advocacy, build awareness, increase access to talent, and foster next-generation mobility.

120 investors working together through MICHauto to promote the industry and tackle industry issues.

135 CEOs engaged through MICHauto initiatives, events, and strategic convening.

1,500+ students engaged annually through MICHauto events and initiatives.

30 mobility startups have found a home in Detroit’s PlanetM Landing Zone, a partnership between the Detroit Regional Chamber, MICHauto, and Michigan Economic Development Corp.

100+ Michigan legislators engaged and educated on industry issues through MICHauto and the Michigan Auto Caucus.

The artwork featured on the cover of this publication was created by student illustrator, Tyler Osgood, in partnership with the College for Creative Studies (CCS). For more information visit TylerOsgoodArt.com.