As the automotive world moves toward fully connected and self-driving cars, it’s no surprise who’s driving the future of the industry. Michigan. Home to the world’s first and only real-world testing facility for autonomous vehicles, Michigan leads the country in research, development, innovation and technology. And it all makes up the epicenter of mobility known as PlanetM. To learn more, visit the MEDC booth in the concourse at CAR MBS.
Accelerating into the Unknown
Suppliers are planning for a disruptive future, marked by major transformations and growth opportunities.

Magnanimous Approach
Taking a “good ideas can come from anywhere” approach, Magna is adapting medical biosensors to autonomous vehicles.

Full Speeds Ahead
While planning for the automation/electrification of cars, suppliers also must nurture their existing products.

Tiering Up for Industry 4.0
“Cyber-physical systems” in the emerging fourth industrial revolution will fuse machines, sensors, people and data.

Chips Ahoy!
The next great automotive battleground will focus around sophisticated semiconductors and sensors.

GM Gains in Supplier Working Relations
Automakers need to continue to build trust with suppliers to spark innovation and collaboration.

Getting Out Front of Mod Assemblies
Integrated supplier component systems, such as HBPO’s front-end unit, can save automakers time and money.
The last several years have been a golden age for suppliers as the auto industry accelerated out of the 2008-09 recession. Companies that survived the downturn reaped the benefits, netting hefty profits fueled by soaring car and light-truck sales that climbed to a record 17.55 million units in 2016.

The next decade promises to be much more disruptive, marked by uncertainty, unsteady growth, risks, volatility and major transformations that will affect virtually every aspect of the auto industry. Globalization, consolidation, automation, electrification and other innovations are happening at a breakneck pace, compounded by stricter regulations, changing customer relations and evolving consumer expectations.

Suppliers have long had to deal with roller coaster market cycles, draconian cost pressures and tricky geopolitical factors. But the magnitude, breadth, speed and uncertainty has reached new heights—and continues to climb. In the past, suppliers could count on some long-term stability with markets eventually leveling out with known parameters. That’s not the case anymore.

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Component suppliers accounted for more than half of 2016’s automotive mergers and acquisitions, according to a PwC report. Analysts expect future M&A activity in the sector to remain strong due to a mix of increased competition, disruptive technologies and large cash balances.

“Everything is being questioned now,” asserts David Andrea, executive vice president of research for the Center for Automotive Research (CAR; cargroup.org), Ann Arbor, Michigan. He points to recent events such as General Motors selling its Opel operations in Europe to PSA Group; GM, Ford and Toyota ending production in Australia; and Delphi spinning off its powertrain business as the start of a new normal in which longtime legacy operations can be quickly overhauled or abandoned altogether.

What’s Next
The overall outlook remains positive, despite U.S. light vehicle sales falling 2.1 percent through the first half of the year, and a healthy global market—led by China—is predicted for 2017 and 2018, U.S. sales are expected to continue to hover at near-record highs, and a healthy global market—led by China—is predicted for the foreseeable future.

That’s the good news. But staying ahead of the competition will become increasingly difficult as markets tighten. Forecasting is relatively easy during growth and recovery periods, notes Jeff Schuster, senior vice president of forecasting for LMC Automotive (lmc-auto.com). As volumes plateau, he says, there’s more pressure for suppliers to stay ahead of the trends and become more flexible in terms of production, products and customers—and even overhauling their strategic plans.

“We’ll see a much wider separation between the winners and losers,” Schuster suggests, “and OEM relationships will become more strained as competitive pressures mount and margins are squeezed.”

Forecasting itself also is changing. The market is moving from traditional single-point models toward scenario forecasts and contingency planning as the industry tries to predict the impact of several potentially game-changing trends: vehicle electrification, self-driving cars and shared mobility services. The more unknowns, the greater the challenge. As a result, says Andrea, companies have to prepare for a wide range of outcomes, including worst-case scenarios and varying customer tactics.

Complicating matters are uncertainties about pending regulations, such as the future of America’s plan to hike fuel economy requirements to 50 mpg by 2025 and the Paris climate agreement following the Trump Administration’s decision to pull the U.S. out of the 2015 accord that had been signed by more than 170 nations. Tax reforms and evolving trade agreements (Brexit, NAFTA and the Trans-Pacific Partnership) further muddy the waters.

As a result, Andrea says, suppliers are evaluating their operation in terms of potential changes to tariffs and tax structures. “Is there enough demand to warrant local capacity for a certain part or material?” he asks. “Or does the design itself need to be changed to accommodate new sourcing requirements?”

The various uncertainties are reflected in the latest Supplier Barometer Index conducted by the Original Equipment Suppliers Assn. (oesa.org). After an initial uptick following last November’s U.S. presidential election, supplier confidence fell three points in the second quarter to a rating of 51 on a 100-point scale.

Respondents cite potential changes in U.S. trade policies as their greatest concern. OESA members also griped about the Trump administration’s lack of clear policies, which makes manufacturing, sourcing and investment decisions more difficult.

On the plus side, companies say they learned valuable lessons from the recession that have been implemented in their long-term strategies. “We had to right-size our operations and make some painful cuts during the downturn,” acknowledges Matt Chapman, vice president of automotive marketing for Freudenberg. Chapman says the company developed a robust process to determine which facilities to consolidate that now is being applied to managing expansion. “Before building a new plant, we take a critical eye to adding capacity by improving process efficiencies at existing facilities,” adds Chapman, who works for the German company’s...
Freudenberg-NOK Sealing Technologies North American joint venture with Japan-based NOK.

Role Playing
The ongoing changes also are affecting supplier roles within the traditional multi-tiered system. In some cases, automakers are pulling more work in-house. Conversely, they’re asking some first-tier suppliers to become systems integrators, while at the same time going around others to deal directly with sub-tier suppliers. In addition, a growing number of startups and tech companies are entering the market on both the OEM and supply side—or somewhere in between.

“It’s a moving target,” declares Bob Vallance, senior vice president in charge of Visteon’s Customer Business Groups (visteon.com). He notes that the once stable and predictable value chain where everyone knew their place has been replaced by a continuous state of flux, with new players coming in, OEMs moving down and second- and third-tier companies moving up. Says Vallance, “We have to constantly look at our place and where we can add value.”

Among the major points of contention are electronics and software systems, especially those related to infotainment, safety and autonomous vehicle technologies. Automakers are struggling to maintain control in these areas, which promise to be brand differentiators and key profit centers.

“It’s becoming more about sensors, actuators, electronics and software,” says Michael Robinet, managing director of IHS Markit’s (ihsmarkit.com) advisory practice. “Today’s differentiators won’t be tomorrow’s differentiators.” He notes that the transition to electrified vehicles will affect everything from powertrains to braking, steering and thermal management systems.

As vehicles become more complex, automakers are demanding more from suppliers and involving them earlier in the design and development stages. They also are being asked to serve as systems integrators, a practice that has gained and waned in popularity for decades. “What’s old is new again,” jokes Lear (lear.com) CEO Matt Simoncini. “We were supplying complete interiors 20 years ago, then automakers reverted back to specifying build-to-print orders for individual components. Now it’s switching back again.”

Bidding out contracts on a per-part basis can lower piece rate costs, but Simoncini maintains a systems approach can provide much more significant overall benefits. These can include reduced systems costs and engineering redundancies, he says, while providing greater design flexibility and improved efficiency and performance capabilities.

Simoncini points to Lear’s relationship with General Motors as a model for how systems engineering and cooperation can and should work for the mutual benefit of both companies. Responding to a call for action for game-changing ideas from GM purchasing chief Steve Kiefer in 2015, Lear led a group of interior suppliers in a tear-down analysis of the automaker’s full-size truck platform. During the one-day exercise, the team identified $20 million in initial savings—and as much as $50 million over the life of the program—through design, mass and manufacturing optimizations. This type of proactive approach is becoming the price of admission, concurs Mark Rakoski, vp, Mitsubishi Electric Automotive

A Magnanimous Approach

The pace of change in the auto industry over the last five years is unprecedented, asserts Ian Simmons, who heads Magna International’s (magna.com) research and development business activities. He should know. Before joining the Canadian supplier in 2003, Simmons worked for several Carmakers and other suppliers around the world in a career that has spanned nearly four decades.

Over the years, Simmons and Magna have learned to take a broad-based perspective to product development. This includes monitoring other high-tech industries to identify adjacent technologies with potential automotive applications. A recent success story: Adapting medical biosensors to determine if a driver is fit to take back the controls from a self-driving car.

“We encourage tech companies to come to us,” Simmons says, adding that startups with cross-industry potential are especially attractive. This allows technologies to be used in less demanding applications while undergoing the typical long automotive gestation periods.

Simmons also works with Magna’s new tech council to identify emerging business opportunities. Led by Magna chief technology officer Swamy Kotagiri and outside members such as Tony Fadell, the co-creator of the Apple iPhone and iPod, the group is charged with steering Magna’s “technology road map” for advanced driver-assistance systems and other next-generation technologies.

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America (MEAA; meaa-mea.com). Instead of waiting for a purchase order, he says, suppliers need to bring solutions to customers and do more upfront engineering work just to get their foot in the door. MEAA took this tack in developing a center console display for Fiat Chrysler’s latest Dodge Charger police cruiser. “The larger screen eliminated the need for officers to plug laptop computers into the vehicle to access police data, according to Rakoski. Although the police program is relatively inconsequential on its own, MEAA hopes to play a role in consideration for infotainment and driver-assist systems on FCA’s mainstream models.

Go Big and Get Bigger

Bosch (bosch.us), the world’s largest supplier, expects its automotive investments to generate €47 billion ($53.4 billion) in sales this year. But Bosch’s growth isn’t unusual among the industry’s mega suppliers, with the top 10 global suppliers combining for about $306 billion in sales last year, up 6.6 percent over the top 10’s tally in 2015. And more than 100 suppliers can boast of annual sales of at least $1 billion. Such supersized operations reflect the need to have sufficient resources to compete globally and make the necessary investments in product development, as well as fund acquisitions to drive further growth. Bosch attributes its success to strong demand for electronics and sensors associated with electrified powertrains, increasing use of driver aids and the move toward autonomous driving systems. The company predicts revenue from radar and video sensors will jump 60 percent and 86 percent, respectively, in 2017. With 2016 sales of €31.2 billion ($37.8 billion), ZF Friedrichshafen (zf.com) has catapulted into second place behind Bosch in supplier earnings. Much of ZF’s recent growth has come through acquisitions, including 2015’s $12.4 billion deal for safety specialist TRW. This and several other recent purchases and partnerships—including Astyx Communication & Sensors (radar) and Ibeo Automotive (lidar)—are aimed at growing ZF’s capabilities for driver assist technologies.

This type of activity is expected to continue. Last year there were 581 auto-related mergers and acquisitions totaling €41 billion, according to an annual PricewaterhouseCoopers (PwC; pwc.com) report (see chart, p. 4). The overall value is down 14 percent from 2015’s 17-year-high mark, due in part to ZF-TRW and several other mega-deals that year, but the level of activity remains robust. Suppliers accounted for more than half of last year’s transactions. Future automotive deals will be buoyed by hefty cash balances and the increased pace of innovation, which PwC notes also is triggering an increased number of startup companies entering the market.

But analysts caution that suppliers must be smart and not chase a trend just because there’s a run on small tech companies, many of which won’t pan out. Noting that market values are being artificially inflated by bidding wars for unproven companies, Lear’s Simoncini says the best acquisitions sometimes are the ones that weren’t done. There will continue to be a place for smaller suppliers. But they must provide customers with a clear benefit, reasons IHS Markit’s Robinet, whether it’s new technology, lower costs, weight savings, improved quality or a specialized process such as a new type of hot stamping. “It has to be verifiable and sustainable,” he declares.

Among the lessons the industry learned during the recession is that every company has weaknesses and no one is completely safe, adds MEAA’s Rakoski. As a result, suppliers must redouble their efforts to understand and manage a wide variety of risks, making strategic investments and forging strong partnerships.

“Companies need to capitalize on market conditions as they exist,” advises Mike Jackson, OESA’s executive director of strategy and research. “In the end, success still comes down to providing value and the strength of a supplier’s relationship with its customers.”

Globally Speaking—Sprechen the Talk

Freudenberg says it evaluates every customer on a global basis to best meet all their needs. In addition to adopting common processes to ensure consistent quality across manufacturing plants, the supplier also makes sure it has a mix of international representatives—covering multiple languages—at all of Freudenberg’s facilities. This allows team members to communicate directly with customers around the world, says Matt Chapman, the supplier’s vice president of automotive sales marketing. The Detroit sales office, for example, speaks as many as nine languages on a daily basis as part of ongoing interactions with 300 global customers.
FULL SPEEDS AHEAD

Electrification, automation and shared transportation promise to transform the auto industry in the coming years. But widespread adoption of these technologies and services are still at least several years away, which is causing suppliers to juggle resources and focus.

“There’s a massive change coming,” says Jeff Schuster, LMC Automotive’s (lmc-auto.com) senior vice president of forecasting. “It’s just a matter of when it happens and to what extent.”

As a result, companies are creating divergent strategies for what’s becoming separate but connected businesses. Suppliers need to develop products and services for next-generation advanced mobility systems while continuing to nurture current products, which Schuster notes keeps companies afloat and funds advanced development projects and strategic investments.

Bosch (bosch.us) and other suppliers are making the transition. “In the past five years, we’ve begun the shift from being a product-based company with a 130-year history into a digital company with connected services built on a strong sensor platform,” says Mike Mansuetti, who heads the company’s North American operations.

“We’re finding we need to operate at two speeds. Our product business needs to be very careful in innovating and development,” says Mansuetti, noting this requires a traditional mistake-free mindset to planning and execution. Bosch’s emerging eMobility businesses, meanwhile, need to operate with greater agility and connectivity, according to Mansuetti, who describes the model as being a risk tolerant, venture capitalist-type approach to pitching new ideas and learning from mistakes.

To help aid the conversion and reduce risks, Mansuetti advocates aligning with multiple tech partners. He points to recent ventures with Silicon Valley chipmaker Nvidia, digital mapmaker TomTom and China’s Baidu as good examples on how to leverage new technologies.

ZF Friedrichshafen (zf.com) also is working to balance new world products with its traditional driveline business. In its 2013 strategic business plan, the company correctly identified emerging megatrends such as automated driving and e-mobility systems. But it underestimated how fast things were changing, CEO Stefan Sommer concedes. Technologies ZF anticipated being introduced in 2025 such as hands-off autonomous vehicles, he notes, now are expected early next decade.

In addition to a host of strategic investments, ZF is forming flexible partnerships with other top-tier suppliers to better prepare for the future. In June, ZF announced a nonexclusive partnership with Hella to develop sensors and systems for driver aid features and autonomous vehicles. This follows an “advanced engineering” alliance earlier this year with French interiors giant Faurecia to develop a cockpit of the future to address the various interior configurations and occupant positions that could occur within autonomous vehicles.
As much as in-vehicle technology is advancing, there also are massive changes occurring throughout the manufacturing process. We’re talking about the Fourth Industrial Revolution, or Industry 4.0. While the first three revolutions were characterized by mechanization, mass-production and computerization, respectively, Industry 4.0 is all about “cyber-physical systems” with interconnected machines, sensors and people continuously communicating and sharing information with each other.

The change is happening fast. Automakers and large tier one suppliers are conducting pilot programs and beginning to implement select elements. But there’s a big drop off when it comes to second- and third-tier suppliers, which may not have the financial wherewithal, expertise or awareness to join the revolution, warns Tom Kelly, the executive director of Automation Alley (automationalley.com), a Troy, Michigan-based manufacturing association.

“Everyone’s frame of reference has been reset,” notes Kelly, who compares the speed of change related to Industry 4.0 to that of autonomous vehicles in recent years. “It’s critical the rest of the supply chain keeps up with OEMs and tier ones or they could get left behind.”

The first hurdle is understanding all the moving parts. Industry 4.0 can include additive (3D) manufacturing, advanced robotics, artificial intelligence/big data, cloud computing, cybersecurity, modeling/simulation/augmented reality, the Industrial Internet of Things (IIoT) and smart materials. All of these technologies, which are disruptive on their own, are starting to converge. But participation isn’t an all-or-nothing proposition.

Automation Alley’s job is to educate the supply chain, Kelly says. This includes hosting weekly tech sessions for members with manufacturing experts. In addition, the trade group is launching an annual conference for Industry 4.0 called Integr8 that will be held Nov. 9 in Detroit. The organization also wants to promote case studies as companies begin to deploy Industry 4.0 strategies.

The potential benefits can be significant—improved efficiencies and quality, while reducing costs and downtime. For example, Kelly says, using a 3D printer for prototype parts can allow companies to make quick modifications without huge upfront tooling costs. Some suppliers are reporting a return on investment payback as soon as three months for a $25,000 collaborative robot that works alongside humans. But companies have to properly prepare workers and explain the robots are designed to help improve productivity and ergonomics, not to take their jobs away—doing more with the same headcount rather than the same with fewer workers.

“Suppliers have to do their homework and find the best way to make the most of Industry 4.0,” Kelly stresses. “The true value will be in the data, which could lead to whole new revenue streams.”

**Tiering Up for Industry 4.0**

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The next great automotive battleground is shaping up to be a-chipsy affair with increasingly sophisticated semiconductors powering a host of next-generation electronic devices, including self-driving cars systems.

San Diego-based Qualcomm Technologies became the largest supplier of automotive semiconductors following its $47 billion purchase of NXP Semiconductors last year. NXP briefly held the title after it purchased rival Freescale Semiconductor for nearly $12 billion in late 2015.

Qualcomm had expanded into the auto industry in recent years with wireless charging and connected vehicle technologies. But the company was a relatively minor player, even after its 2014 purchase of telematics specialist CSR—until now. With NXP, Qualcomm powers 14 of the 15 most-popular vehicle infotainment consoles, and is one of the top semiconductor suppliers for emerging advanced driver assistance systems and automotive cybersecurity technologies. The combined operations are expected to generate annual sales of more than $30 billion.

Rival Intel, which is best known for chips used in personal computers, also is steering toward automotive applications. In March, the company agreed to buy Israel’s Mobileye for $15.3 billion. Intel plans to merge Mobileye, which makes camera-based sensors for advanced driver assistance systems, into its own Automated Driving Group. Last year Intel and Mobileye partnered with BMW to develop technologies and open standards for self-driving vehicles, including algorithms to run Mobileye’s data modeling on Intel’s computing platforms.

Qualcomm and Intel also are competing on 5G-based technologies. Both companies are pilot testing 5G modems that can be used to help power and connect self-driving vehicles and smart cities. But the technology, which enables computing speeds of 5 gigabits per second—more than 10 times as fast as current 4G LTE modems—isn’t expected to be widely available until at least 2020 when cellular carriers upgrade their networks. California-based chipmaker NVIDIA also is focusing its attention on self-driving cars. In June the company announced three partnerships, including separate deals with Volvo and Volkswagen to develop “deep-learning” artificial intelligence (AI) systems for autonomous vehicle technologies. The third partnership, with mega-suppliers ZF and Hella, aims to use AI to help self-driving cars meet European safety requirements.

NVIDIA’s Drive PX2 in-vehicle super-computer uses AI and deep learning to quickly teach itself safe driving techniques from simulations, real-world testing and input from engineers and professional drivers. With the ability to process 24-trillion operations per second, the system continually gathers and integrates information from dozens of sensors while a vehicle is driving.

Bosch also is expanding its semiconductor operations. The company, which already is the largest automotive supplier in the world, plans to open a €1 billion ($1.1 billion) semiconductor plant in Dresden, Germany, in 2021. The project is said to be the biggest single investment in Bosch’s 180-year history. The semiconduc-
tors will be used for a variety of mobility and internet-of-things applications, including autonomous vehicles, industrial robots, smart homes and other connected devices. The average passenger vehicle produced last year contained nine Bosch semiconductors, according to the supplier.

Automakers with good supplier relations are more likely to spurn benefits from supplier innovation, investments, price concessions and collaborative efforts, according to Planning Perspectives Inc. (PPI; ppis.com). The Birmingham, Michigan-based consulting firm, which conducts an annual study on the health of such relationships, notes there also could be a significant impact on an OEM’s bottom line. Despite recent slips, Toyota (first place) and Honda (second place) remain the leaders in the 17th annual study. GM, meanwhile, has made significant progress in the last two years to catapult into third place—it’s best rating ever—in PPI’s North American Automotive OEM-Supplier Working Relations Index.

Ford fell to fourth but remains near the leaders in the index’s “adequate” to “good” range on the 500-point scale. Anchoring the bottom with “poor” scores for the third consecutive year are Fiat Chrysler Automobiles and Nissan, which has plunged more than 50 points since 2014 and now is the lowest-rated company. PPI President John Henke says GM’s turnaround has come through improvements in all five areas used to create the index: OEM-supplier relationship, OEM communications, OEM help, OEM hindrance and supplier profit opportunity. Nissan declined in each of those measures. Both companies have ongoing cost-cutting efforts, but PPI says their programs have had opposite results in terms of supplier relations. Taking an adversarial approach to cutting costs has disrupted Nissan’s supplier relations and cost the company “tens of millions of dollars” in contribution to profits, according to PPI’s calculations.

Conversely, Henke says at least 20 percent of GM’s profits in North America can be attributed to good supplier relations. He points to the leadership of Steve Kiefer, GM’s purchasing chief, and his ability to communicate and instill a common strategy throughout the purchasing team. In some cases, Henke notes, one bad buyer can adversely affect an entire company’s reputation. Other potential hot buttons include frequent personnel changes and inadequate training.

Policies need to be driven down and continually reinforced with buyers to help them build trust and yield lasting results, Henke says. “Buyers will not change their behavior unless improving supplier relations is part of their performance measures.”

Policies need to be driven down and continually reinforced with buyers to help them build trust and yield lasting results.
Getting Out Front of Mod Assemblies

Having a supplier deliver a built-up module simplifies the manufacturing process for automakers, in some cases eliminating multiple work stations and dozens of assembly operations that can lead to significant time and cost savings. Other benefits include greater design freedom and outsourcing program management responsibilities to a lead supplier.

The approach can be applied to a number of different systems, including the axles, doors, fuel system, instrument panel, seats and roof. Front-end modules also are becoming increasingly popular with about one-third of light vehicles produced worldwide using such preassembled systems, according to Germany’s HBPO (hbpgroup.com).

HBPO—a joint venture equally owned by Hella, Mahle and Plastic Omnium—produced 5.3 million such modules worldwide last year and is gearing up to expand. The company expects to make nearly 60 percent more (1.4 million units) front-end modules in North America this year than it did in 2016 and will open two more plants in Mexico (Aguascalientes and Saltillo) by the end of 2018.

Recession to Prosperity: Cooper-Standard Sets Aggressive Goals

Novi, Michigan-based Cooper-Standard aims to become a top 30 global supplier and be in the top 5 percent in terms of return on invested capital by early next decade, which would require significant advances from its current ranking of 61 on the global list. These goals may have seemed unobtainable when the supplier set them in 2013, just a few years after emerging from bankruptcy following the great recession. But the company has made steady progress in recent years, including a stellar 2016 that saw the supplier of fluid transfer, sealing and anti-vibration systems set company records for sales ($3.5 billion) and several other financial metrics.

Chief operating officer Keith Stephenson attributes the turnaround to a refocused product portfolio—divesting some businesses while acquiring new ones—expanding the company’s global footprint beyond its core North American operations and a greater emphasis on product development. The latter is driven by the company’s i3 (imagine, initiate, innovate) process aimed at products that haven’t been updated in many years. The company’s new Armorhose technology, for example, features an abrasion resistant outer layer that eliminates the need for a protective sleeve.
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