



OEMs face technology investment challenges for a changing supply chain landscape





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Around the world, technology decision-makers at automotive OEMs and their suppliers are wrestling with some difficult decisions. How can they digitalise their supply chains in order to compete more effectively in the industry today, while at the same time preparing those supply chains for major disruption down the road? By Jessica Twentyman

It's a challenge not unlike changing a wheel on a car already moving at speed. At Mitsubishi Motors of North America, vice-president and CIO Natalie Milton sums it up like this: "With so many technological solutions available today, and so many more being introduced, it can be extremely difficult to determine which investments we should pursue for the supply chain," she says.

"We need to focus on the technology that provides the best value and shortest time to market. We need solutions that will disrupt what we are doing today and accelerate our responses to changes in market trends."

That's a hard ask when it comes to any technology investment, especially when you consider that the automotive supply chain will look far different in a few years.

The changes coming are likely to be huge, as automobiles become more connected, more autonomous, shared and electrified. And the impact on supply chains won't be any less significant, as they are increasingly expected to support new components, new suppliers, new ownership models and new vehicle types.

Electric avenue

Take just one of those automotive megatrends: electric vehicles. By switching from internal combustion engines (ICE) to electric powertrains, OEMs will radically reduce the number of components needed to build them.

However, they will need to deal with entirely new suppliers and take on a whole new set of requirements around the transport of components, thanks to the hazardous material issues that surround their lithium-ion batteries, according to Sven Dharmani, principal and performance improvement and global supply chain leader for the automotive sector at consultancy firm Ernst & Young (EY).



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Similarly, he says, “the increasingly connected car relies a vast array of new electrical and electronic components from more tech-savvy suppliers, as well as the reliable delivery of a steady stream of timely software updates to keep automobiles functional and secure.”

Improved visibility

All this will require not only greater visibility into what’s happening in the extended, multinational supply chain sector in real time, but also a great deal of foresight into what’s coming down the line, in demand terms.

And that rule doesn’t just apply to the major OEMs and their Tier 1 suppliers, who are already some way along on their digital transformation journeys, but also those companies further down the stack that are arguably lagging them in technology-adoption terms.

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“If you look at what’s happening in the automotive world in general, you’re not only seeing more complexity, variation and sophistication in the end product, but also more increased cross-dependency among OEMs and suppliers and potentially, more suppliers involved in the assembly of products,” says Paul Bellack, CIO at Tier-1 automotive parts supplier Magna International. “All these incremental changes quickly stack up to increase complexity in a multi-tier supply chain.”

Future complexities aside, the ability to anticipate trends and adjust to them has never been more important to the automotive sector as a whole, says Mike Ramsay, research director of automotive and mobility at research company Gartner. He warns it could be an issue of survival for many. “In an already pressurised industry, facing considerable digital disruption, the dangers of obsolescence should seem very real.”

(Join the debate over the future of the automotive supply chain together with automotive CIOs and supply chain executives at the 2019 Supply Chain Conference this March 19-21 in Atlanta, Georgia.)

Industry 4.0 and IoT

A great deal of effort in the automotive space has already gone into connecting factory-floor equipment with sensors connected to the ‘Internet of Things’ (IoT), making these machines able to report on their status and condition and receive instructions remotely.



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Says Gartner's Mike Ramsay: "That work has mostly been focused on understanding what these machines are doing, for two reasons: first, so companies can determine if machines are going to break down; and second; for quality monitoring to understand if the product that comes out at the end will involve less scrap and warranty issues."

There's a lot here that can immediately benefit the supply chain, in terms of reliably delivering product with minimum delays and quality issues. It's the focus, for example, of supplier Hirotec's work with software company PTC's ThingWorx IoT platform, which has the goal of reducing machinery downtime.

The rise of the cobots

New machinery entering production plants is also connected. Take, for example, the highly adaptable collaborative robot, or 'cobot': this is designed to work side-by-side with human colleagues, assisting them to perform tasks, and much cheaper, more flexible and, crucially, safer than the industrial robots commonly associated with automotive factory floors. Both BMW and Nissan, for example, are already using cobots from Universal Robots, as are suppliers such as Continental, Lear and Assa Abloy.

Then there are 3D printers, which are emerging from the design shops where they have been used to create prototypes and are now starting to build production-ready parts. At last September's International Manufacturing Technology Show (IMTS) in Chicago, Volkswagen showcased its plans with GKN Powder Metallurgy, a component supplier, to put metals 3D printing to work on production lines.

"A complete vehicle will probably not be manufactured by a 3D printer any time soon, but the number and size of parts from the 3D printer will increase significantly," said Dr Martin Goede, head of technology planning and development at Volkswagen. "Our goal is to integrate printed structural parts into the next generation of vehicles as quickly as possible. In the long term, we expect a continuous increase in unit numbers, part sizes and technical requirements."

Get yourself connected

Along with smart wearables that feed instructions to workers on the factory floor, what all this connected equipment has in common is the ability to speed up production response, based on big



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data analysis of real-time conditions. But what's increasingly needed is the ability to feed in demand data and use that to adapt production to actively anticipate - and then respond to - changes in demand.

As Mike Ramsay of Gartner puts it: "The real 'virtuous cycle' begins when analytics provide the bedrock not of what we see now, in terms of orders coming in, but what we see some time down the line, and give automotive companies the ability to feed that back into engineering and product development cycles."

What's more, across much of the industry, information on incoming orders sticks doggedly to a particular format: the electronic data interchange (EDI) system. While there have been significant steps made in 'digitalising' the information held in these tried-and-tested systems, there are doubts as to whether they meet the demands of tomorrow's more sophisticated analytical approaches, involving the use of artificial intelligence (AI), which will see order data integrated with all kinds of sociodemographic, geographic and weather data.

Here, blockchain could provide a more 'digitally-native' approach to order data, allowing it to be more neatly combined with other data formats. (See below Technology to watch: blockchain)

"With new analytical technologies, we have some really good tools to learn quickly from what works and what doesn't and to predict new demand patterns even as they're emerging," says Ashim Bose, worldwide leader for analytics and AI at IT services giant DXC Technology. "There's a ton of things that these new technologies can already be used to help automotive suppliers adjust and prepare for change."

The changes predicted could be short-term ones, such as anticipating a rush of orders for winter tyres from customers in a particular region, based on weather data for the region over the months ahead, says his colleague Matthias Bauhammer, head of DXC Technologies' Analytics Automotive Center of Excellence.

Can EDI can meet the demands of tomorrow's analytical approaches, involving the use of artificial intelligence (AI)?

But with more sophisticated AI models based on data from a wider range of sources, he says, it will become much more possible to detect longer term patterns and trends.



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In turn, AI-led approaches will help automotive companies adjust course in response - reconfiguring manufacturing cells on plant floors and relocating whole plants closer to demand sources, for example, in order to handle incoming orders for specific designs or customisations.

It may also help them optimise staffing, energy consumption and the supply of raw materials, suggests Uli Muench, global vice president of the automotive business unit at software company SAP.

“Artificial intelligence can sound pretty scary for some of the companies that we work with, but for others, it’s a huge opportunity. Either way, we’re helping automotive companies work towards becoming more ‘intelligent enterprises’, using machine learning to feed models with varied data that connects the supply chain with the demand chain, so that they’re better able to forecast developments to optimise product portfolios and production schedules,” he says.

Accepting the risk of failure

However, substantial cultural change will be required not only to take the leap and implement new technologies, but also to truly take advantage of new insights, says Bose at DXC Technology. “The supplier network has been optimised over decades and the risk of failure associated with new technologies can sometimes seem very high at many companies. It’s certainly not easy to move from one proven technology stack to a new one, but these companies need to think about step-by-step ways for implementing new plans for new insights,” he says.

These changes will also demand a big shift in the kinds of skills that automotive companies have in-house, says Dr Richard Viereckl, a partner at Strategy&P, an arm of management consultancy PWC. “Our research suggests that, in order to participate in a more intelligent supplier, many automotive companies will need perhaps 40% fewer machine operators, but as much as 40% to 60% more programmers and data analysts,” he says.

Overall, however, efforts made on these fronts will lead to an automotive supply chain that can more robustly respond to the changes demanded of it. As Uli Muench at SAP puts it:

“It’s pretty hard to guess at this stage which companies will come out as the winners - but my prediction would be that they will be the automotive-sector companies that are able to deploy AI in smart ways to the task of analysing data. And that preparation work should be happening now, so



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that they're already meeting the real needs of automotive customers today, not what they have been in the past."

Technology to watch: blockchain

In January 2019, SEAT became the first carmaker to join Alastria, a cross-industry blockchain initiative promoted by Spanish businesses and public-sector organisations - but this is by no means the company's first foray into experimenting with the distributed-ledger technology more commonly associated with cryptocurrencies such as Bitcoin.

In fact, SEAT is already collaborating with telco Telefonica on a blockchain-based proof of concept to improve the traceability of parts in the supply chain at its Martorell plant in Catalonia. This work got underway "in the last few months", SEAT confirmed.

"We are convinced of the importance that blockchain technology will have in the future, and for this reason, we want to be involved from the outset," said SEAT president Luca de Meo.

Other automakers are thinking the same way. For example, in January, Ford announced it was working with IBM to use blockchain technology to trace and validate ethically sourced minerals for use in electric vehicle batteries.

The company is also a big-name participant, along with GM, BMW and Renault, in the Mobility Open Blockchain Initiative (MOBI), which kicked off in May last year among over 30 automotive industry partners. One focus of this initiative is supply chain issues.

It's still early days for these explorations, says Mike Ramsay, an analyst with research firm Gartner. "Right now, blockchain's a technology seeking an application - but there are some interesting applications for the automotive supply chain being proposed," he says.

"For example, there are the issues around tracking VINs [vehicle identification numbers], where blockchain could provide a history of every part on a car and every repair or replacement to that car, so that you get an unchangeable ledger of a vehicle's history," he says.



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“The other area, not specific to automotive, is tied to track-and-trace capabilities for materials and components as they make their way across the automotive supply chain, enabling every company involved in that process to better understand their role - and the role of other suppliers - in the different inputs that go up to build a vehicle.”

That’s certainly got the interest of Paul Bellack, CIO at Magna International - with some caveats. His company, a Tier 1 automotive supplier, currently handles around 5m EDI transactions per month. He calls it the “nervous system” of the automotive supply chain, “but it’s getting long in the tooth and blockchain looks to me like being the way of the future.”

“But there’s a lot of companies out there, a lot of stakeholders, and it takes time to move away from a technology that’s been the transaction industry of the industry for decades. Everybody has to participate, because that’s where you’ll see the biggest bang for your buck, and that probably needs to be driven by the OEMs, because it’s kind of hard to start something like this if you’re in the middle of the supply chain. If it’s going to work, and become the transaction engine for our industry, then everyone needs to be involved, but the effort needs to be led from the top.”

At Gartner, Ramsay agrees with those caveats. “It’s chicken-and-egg,” he says. “Blockchain can’t be useful in this track-and-trace role unless a very, very large number of companies are using it. For now, it’s theoretical, but I see great promise here.”

(Join the discussions with MOBI, together with CIOs and supply chain executives, about how blockchain and other technologies will impact the supply chain at the 2019 Supply Chain Conference this March 19-21 in Atlanta, Georgia)

