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New CEO to set faster pace for Ford's transformation

While Hackett was faced with arrival of COVID-19 and the immediate production impact, Farley is left to address the new normal it has created, writes Megan Lampinen

There's change afoot at Ford with the promise of a new Chief Executive. After three years in the top post Jim Hackett has decided to retire and hand over the reins to current Chief Operating Officer Jim Farley, effective 1 October. The two Jims have been working closely together over the past few years as Hackett had him in mind for a potential successor almost from the start. Given their close

relationship, the transition should go smoothly, but Farley faces significantly more friction in other upcoming challenges.

Continuity

Back in 2017 Hackett was specifically tasked with modernising the company. Like Alan Mulally, a Boeing executive before leading Ford, Hackett came





Hackett has revamped the model line-up, cutting out weaker performers and launching groundbreaking new models



from outside the automotive sector, having spent 30 years at furniture company Steelcase. At Ford, he quickly set about applying the principles of design thinking—an approach to product development that centres on user experience and which became a key part of his strategy. Hackett also revamped the model line-up, cutting out weaker performers and launching groundbreaking models like the Mustang Mach-E, the new F-150 and the upcoming Bronco. Under his leadership Ford established pivotal global partnerships with the likes of BMW, Volkswagen and Rivian. But after three years—the same length of time served by his predecessor Mark Fields—it's now time to step down, and the board knew just where to look.

Farley is an automotive industry veteran and spent 20 years at Toyota before he joined Ford in 2007, hired by Mulally to serve as Global Head of Marketing and Sales. He later led Lincoln, Ford South America, Ford of Europe and all Ford Global Markets. Last year he was put in charge of Ford's New Businesses, Technology & Strategy team, tackling strategic decision making around artificial intelligence, automation, connectivity and new forms of propulsion. Earlier this year he was named

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His stint leading the New Businesses, Technology & Strategy team has given him a good understanding of just how profoundly new technology is shaping the auto sector

Chief Operating Officer, a position widely regarded as a precursor to a CEO appointment.

“We really didn’t look outside for a candidate, though we talked about it,” Bill Ford, Ford’s Executive Chairman, told media. “Whenever we threw some names around, Jim’s rose to the top. Sometimes going outside is great, and Alan Mulally and Jim Hackett are proof of that. But there are also benefits to continuity, especially if you are on the right path. The projects Jim and Jim were working on together were exactly what was needed to propel us into the future.”

Other management changes will be up to Farley down the line, but as he helped form the current management team, big surprises seem unlikely. Farley himself is regarded as a “car guy”, frequently spending weekends



The new Bronco is one of several significant product launches intended to refresh Ford's image



Mobility today entails much more than just car manufacturing

racing vintage cars. His stint leading the New Businesses, Technology & Strategy team has given him a good understanding of just how profoundly new technology is shaping the auto sector. “Jim is perhaps the singular executive that understands the integration of technology and auto,” observed Bill Ford.

Farley’s long automotive industry experience and solid marketing background should also prove real assets. “Since Ford is about to enter a new execution phase, the company likely decided it was time for a more experienced auto executive who knows the ins and outs of the industry to lead the charge, as opposed to an outsider trying to create change,” observed Jessica Caldwell, Executive Director of Insights at Edmunds. “Farley’s specialty is marketing, which will play a critical role as Ford gears up for significant product launches that are intended to revive and refresh Ford’s image.”

“

Jim is perhaps the singular executive that understands the integration of technology and auto

Lots of work ahead

Ford has come a long way under Hackett, shifting assertively into new mobility and technology areas. The automaker has also done much to address the underlying fitness of the base business, reducing bureaucracy and restructuring operations in underperforming markets. But it’s far from done. “We have lots of work ahead of us to really complete our mission,” asserted Bill Ford.

It now falls to Farley to execute Hackett’s US\$11bn restructuring plan and oversee pivotal product launches. Some of these

Ford and Agility Robotics are exploring how robot, Digit, can help get packages to the door efficiently with the help of self-driving vehicles



launches, notably the 2020 Ford Explorer, went dreadfully wrong and proved a real setback. “Farley is now set to replace Jim Hackett, whose efforts to turn around the company have been hindered by the botched Explorer SUV launch as well as by COVID-19,” said Ana Nicholls, Managing Editor for the Industry Briefing at the Economist Intelligence Unit (EIU). “While Hackett did manage to rein in Ford’s losses, Farley will find that he has a tough job turning that into a profit.”

For the fourth quarter last year, well before the pandemic arrived, Ford reported losses of about US\$1.7bn. Stock price will also





remain a thorn in Farley's side, as it has for all the company's Chief Executives over the past decade. During the media call Farley dodged questions about whether or not he would prioritise the stock issue, stating only that he was "optimistic as growth initiatives like electric commercial vehicles come into focus." Shareholders may demand greater clarity if things do not change quickly, particularly when some of the newer start-ups, some of which have yet to build a vehicle, have seen astronomical valuations.

The new normal

Farley may not be willing to talk about the stock prices of these companies, but he clearly has them in his sights—along with some of the technology giants with aspirations to becoming mobility players. "We know our competition today," said

Farley. "It's Amazon, Baidu, Tesla, Apple, Toyota and others. They are well-financed and voracious companies."

But everyone, no matter how well financed or voracious, is feeling the impact from the novel coronavirus. While Hackett was faced with arrival of COVID-19 and the immediate production impact, Farley is left to address the new normal it has created. "Markets, though rebounding slowly, are in meltdown nearly worldwide, with only China offering some relief," Nicholls pointed out. "Next year will bring a bigger rebound, but still not enough to make up for the lost ground. Much more restructuring will be needed if Ford is to soldier through."

Farley's wealth of experience at Ford will help in tackling this and other challenges, and should also go down well with colleagues and workers. That said,

Ford is investing heavily in autonomous driving technology



Nicholls suggests that “he will also need to draw on his knowledge of the outside world, particularly in interactions with tech companies and with Volkswagen, which has tech-sharing alliance with Ford. The company’s gains from its investment in self-driving business Argo AI shows the potential of that alliance, but Ford will need to make sure it is not the troubled junior partner.”

Vishwas Shankar, Research Director at Frost & Sullivan, believes Farley will keep up the momentum that Ford has recently built up. “Farley will be looking at Ford’s internal strengths, its cash cows and crown jewels, and revisiting partnerships and investments in key areas within CASE mobility,” he told *Automotive World*. “Like his predecessors, he will continue to let go of non-productive assets and focus operations in those areas where Ford can be best-in-class, always with an eye on profitability.”

The investment community has been similarly bullish in their outlook on this new appointment, with Credit Suisse Analyst Dan Levy writing that “Farley brings a greater sense of urgency and action.” In the same vein, RBC Capital Markets analyst Joseph Spak suggested that the move signals “Ford is ready to take on a more aggressive, faster moving path forward.”

As for Farley, he has emphasised the continuity of his leadership plans more than anything else: “I don’t see any daylight between Jim [Hackett] and myself. The areas in which I believe we have huge growth opportunity are the same we have been working on together. Yes, I’m my own man but we have a tremendous team at Ford. I’m optimistic about executing our base business and these new areas to compete against new and existing competitors. I will share specifics with the team at the right time.”



What's the post-COVID commercial vehicle outlook?

Roland Berger's Wilfried Aulbur shares his expectations for the CV sector in the wake of the novel coronavirus

The global commercial vehicle (CV) sector is facing some serious headwinds. The novel coronavirus (COVID-19) and the subsequent economic downturn are impacting automaker strategies, touching on everything from production planning and supply chain management to powertrain offerings and autonomous driving investments. Wilfried Aulbur, Senior Partner at Roland Berger, has been following developments closely.

How big a hit has the CV segment taken from COVID-19?

The volatility of this pandemic has been quite pronounced. Although the CV industry knows how to handle volatility, this has been a significant shock. We have seen a dramatic reduction in North America coming from a high. The same thing is happening in Europe. China recorded a very sharp contraction but currently sees lots of optimism. Our initial projection for China was that the market would be flat, but it seems to be growing this year due to the kind of activities that the government is putting in place in trying to prop up the overall economy.

What does this mean for automakers?

This environment leads to a situation where all the major players are, first and foremost, challenged to conserve cash. We have seen this reaction across the board in terms of everybody cutting non-essential expenses, making sure they don't spend marketing money that doesn't really bring a return. Everybody is going in for cost and headcount reduction measures. We have also

seen automakers re-evaluating investment portfolios—what activities make sense versus what can you do without? There has also been a re-evaluation of the core business—are there product segments that you shouldn't be covering anymore? Look at the medium-duty space in Europe as an example. That's a relatively small volume one. Do you really need to be present in this market? If you still want to be present in the market, do you really need to develop major components for this segment or can you buy them instead?

Has there been any significant dialling back on electrification investment?

From a CV player perspective, we have not seen a major retraction of investment. The vehicle manufacturers that have exposure to Europe know that the emissions regulations will come and, as a consequence, they need electrification. They also need hydrogen as a medium- to long-term solution. We have seen players understanding that they will need to work together to create the scale and bring down cost to a level that is feasible for the overall ecosystem. The joint venture between Daimler and Volvo is a good example of this.

Do you see newcomers like Nikola posing a serious threat to the more established players on this front?

One has to wait and see. As a B2B business that's very much around understanding the business model of the end customer, the hurdles for operating in this environment and being successful here are high. That's because you need the

In June, Scania warned that it was conducting a broad review of the number of consultants and employees on its books, with an eye to reducing global headcount

infrastructure. With a fuel cell or an electric truck, you need to think about the uptime, the convenience in terms of getting repairs done and the training of a network. There are some real challenges to make these things work and I think that's one of the reasons potentially why Nikola tied up with Iveco. This partnership gives it access to the kind of ecosystem and experience that it needs to really roll out its technology.

Autonomous driving has been another major investment area for many CV companies. Has this been sidelined in the wake of COVID-19?

Here we have seen two approaches. Some players have decided to push back autonomous investments for the time being, while others see this as an opportunity. They may be thinking that in this environment it will be more difficult for start-ups to secure funding. That means they may be able to either gain a head start—or increase it—when it comes to acquiring



talent. They are trying to use this crisis to their advantage.

Will the pandemic prove a short-term or long-term challenge?

In some sense, the COVID situation is a short-term challenge. Even if we don't get this under control quickly, I would think that by 2021 we would have some solution in terms of medication, which then would lead to normalisation of the overall economy, albeit on a lower level. By that time, if it really takes that long, the negative impact on employment will be quite significant. And, as

a consequence, the negative impact will also be there as far as the overall economic performance. In that sense, that's a real cause for concern. Having said that, the first green shoots are visible. If we look at the kilometres driven by trucks in the US or Europe, they are very much close to being back to normal numbers.

Which players are going to emerge from this in the strongest position?

In transport there are some sectors that are actually doing quite well already. If you carry groceries to supermarkets, you're

Many delivery applications have recorded a boost in activity following the pandemic



probably not doing badly. If you are exposed to some of the e-commerce players or are taking goods to shopping centres, you're not doing badly. It is a varied picture across the different end applications, but overall, traffic has come back to normal levels or close to normal levels.

Will that translate into service and parts revenue for OEMs?

Definitely, so that's positive for the network and the OEMs. Down the line, it will also lead to order incomes that are closer to what a normal year would look like. In the US, the fleet customers have the confidence

that the worst is behind us and they can start buying again rather than ageing their fleet.

Given the current constraints of the industry and lowered outlooks, what do you think would characterise a successful 2020 for the CV industry?

If you are able to manage your cash flows reasonably well in this year and you manage to safeguard essential investments, I think then you've done a good job. We have an unprecedented challenge with both the supply side and the demand side disruption. The

first order of business is clearly ensuring cashflow, being able to defend market share as much as possible, and not jeopardising essential investments in the future.

And when it comes to what constitutes essential investment, is that going to vary some degree by company?

Yes, exactly. It will vary on the overall position of the company, and how invested it is in certain technologies already. It also depends on the strategic call that a company takes on a particular technology.

2022 Asian Games could confirm China's autonomous leadership

Large events like this have become popular stages on which to showcase self-driving capabilities, and the pressure is on to get it right. By Megan Lampinen

The next Asian Games could prove make or break for China's autonomous mobility ambitions. Like the Olympics, this sporting event—held every four years—attracts floods of visitors, temporarily boosting the number of people in the host city. For 2022, the challenge of transporting those crowds falls to the city of Hangzhou, Zhejiang. Speaking at a recent logistics planning conference, Hangzhou 2022 Deputy Secretary General and Deputy Mayor of the Municipal Government, Chen Weiqiang, warned that transportation and logistics for the Games would be “complex.” Autonomous vehicles

(AVs) are set to play a key role, and if Hangzhou gets it right, China's global reputation as an AV pioneer could be solidified.

The country has been jockeying for a leadership position in self-driving technology, and numerous development projects are currently underway. By 2025, the government aims to have large-scale production of self-driving cars, though admittedly operating in limited geographies. McKinsey believes China could potentially become the world's largest market for AVs and predicts that AVs could account for more than 40% of its new vehicle sales by 2040. What

Cao Cao's fleet is powered by DeepRoute technology



better opportunity to showcase the latest capabilities and future promise than the upcoming Games.

Large events like this have become popular stages on which to demonstrate AV capabilities. Aptiv and Lyft have been running self-driving taxi fleets at CES in Las Vegas. Yandex was supposed to run a fleet at the North American International Auto Show this year, though the show was cancelled in the wake of COVID-19. Toyota planned to have a fleet shuttling visitors around the 2020 Tokyo Olympics, though this too was hit by COVID and is now postponed until 2021.

No emissions, no driver

Providing the Asian Games go ahead as planned, Geely-backed ride-hailing company Cao Cao Mobility will be operating a fleet of autonomous,

electric robotaxis during the event. Both visitors and participants will be able to hail a ride using the Cao Cao app for travel within the city. "With more than 40 venues being used during the Games, the ability to seamlessly hail a robotaxi will save attendees time on walking and allow them to visit as many places as possible during their time there," pointed out Nianqiu Liu, Vice President of DeepRoute.

It is DeepRoute that provides the automated functionality to the fleet. Its comprehensive Sense II system includes sensing capabilities, high-definition (HD) mapping, perception, planning and control, simulation and cloud technology. According to the company, DeepRoute-Vision and its synchronisation controller for sensor data, DeepRoute-Syntrac, can accurately detect surrounding objects in real-time to deliver a safe and smooth driving experience.

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Geely established Cao Cao as a strategic move into ride-hailing, and it is now present in more than 50 cities



DeepRoute-Syntrix is an advanced data synchronisation controller that can synchronise information from different types of sensors, enabling the perception algorithm to process sensor data aligned in the same standard. The data creates HD maps, which allow the self-driving vehicle to understand what's on the road and how to execute its trajectory.

“Since our computing platform within the self-driving solution is small and our sensing solution is an all-in-one product, Cao Cao found that it was easy to integrate,” Liu told *Automotive*

World. “As the system could be deployed quickly and cost-efficiently, it proved a real help in achieving Cao Cao’s robotaxi service objectives.”

However, considerable work was still needed to bring everything together, and teams from DeepRoute, Cao Cao and Geely worked closely on not only the integration of the self-driving system but also the backend operations for dispatch and the user-based app experience. DeepRoute is also working with Cao Cao to create testing and operation guidelines as well as standards for the robotaxis.

The AutoX and Amap partnership marked the first time that robotaxis were available on a major ride-hailing platform in China



From pilots to mass production

While autonomous driving pilots like this one have become increasingly frequent, that doesn't necessarily mean the technology is ready for commercialisation. For DeepRoute, though, it's not far off. "In terms of safety and cost, our technology is very close to being ready for mass production," Liu asserted.

The cost aspect could prove the real ace up its sleeve. At mass production, he projects system costs at around US\$20,000. "The system was

designed to be cost-efficiently manufactured at scale so it will be accessible to self-driving companies of all sizes," he added. "To keep costs to a minimum for our customers, we created our own inference engine so that the system doesn't require a large computing platform."

DeepRoute also stands out from the competition in terms of the accuracy of its perception technology. Liu proudly points to test results from the KIITI Vision Benchmark Suite, a project between the Karlsruhe Institute of Technology and Toyota Technological Institute at Chicago:

DeepRoute's advanced perception technology can detect objects around a vehicle up to 140 meters away



“Our advanced perception technology has ranked highly on the KITTI and Semantic KITTI tests, showcasing how it can identify different types of objects with a high level of accuracy.” The perception model and algorithm can detect objects around a vehicle up to 140 meters, even in low-visibility weather conditions.

The next step in system development is to gain exposure in a wider variety of environments. As Liu elaborated: “While we have already made strong progress enabling vehicles to operate safely, with few driver engagements in a variety of scenarios, our solution still needs to be deployed in more cities to collect more data to train the system.” DeepRoute is conducting real-world

testing in various cities as well as using test courses and simulation.

A good fit for automation

While cities around the world are interested in harnessing the potential benefits of autonomous driving, China could be a particularly good fit. A KPMG study from July 2020 found China to be one of the top five performing countries in terms of securing AV-related industry partnerships. At the same time, numerous local companies are transitioning to become suppliers of pivotal AV technologies including chipsets, LiDAR, AI algorithms and

vehicle communications technologies. The country's extensive 5G network could also facilitate developments.

"China is leading the world, both on technology and pace of adoption and implementation, especially with its early introduction of 5G networking," said Philip Ng, Partner, Head of Technology, KPMG China. "Along with work to develop cooperative vehicle infrastructure system, this will build strong foundations for the introduction of AVs. The Chinese public also appear receptive to using such vehicles, particularly younger generations." DeepRoute's Liu also noted the importance of positive consumer attitudes around this technology. "Studies have shown that people in China are very open to self-driving technologies," he noted.

a base for its autonomous mobility development, and opened a new research hub there in April 2019.

But it's not all about robotaxis; trucks are another focus area for autonomous developments, and earlier this year DeepRoute partnered with Dongfeng Commercial Vehicle Co to equip container trucks with its self-driving solutions to automate operations in the Xiamen Ocean Gate Container Terminal, owned by Cosco Shipping. "This industrial application demanded a customised solution for its unique requirements," explained Liu. "Our perception model quickly learned how to identify relevant objects such as shipping containers and cranes—things that aren't generally seen during typical self-driving tests—and navigate safely around them. This

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People are culturally accepting of ride-sharing and they celebrate the idea of AVs

Robotaxis in particular are a hot application area for autonomous technology, not surprising given the low vehicle ownership ratio, so Cao Cao and DeepRoute have plenty of company in this space. "People are culturally accepting of ride-sharing and they celebrate the idea of AVs," said Jewel Li, Chief Operating Officer at Chinese autonomous tech developer AutoX. The company has been working with China's largest mobility operator, Amap, on a robotaxi trial in Shanghai. Aptiv has also honed in on China as

streamlined their terminal loading and unloading process."

With projects like these, China could well be one of the first markets in the world to see AVs go mainstream. Liu is certainly bullish in his outlook: "We believe autonomous mobility will roll out across China in the next five years as there are already robotaxi services in several Chinese cities. Our partnership with Cao Cao pushes us one step closer to a future where autonomous transportation will be the norm."

Nio: 'AI will become one of our most intimate friends and companions'

In-vehicle AI assistants could offer automakers daily access to a previously inaccessible market. By Jack Hunsley



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In the future of mobility, the key differentiator in choosing to buy a car from one brand over another will no longer be determined solely by driving range, performance, equipment and features. It will be the emotional value of the product and the brand

5 2 years on, Stanley Kubrick's 2001: A Space Odyssey stands as one of cinema's greatest, if slightly more bizarre, pieces of work. It also features one of cinema's key memorable moments when the supercomputer HAL 9000 begs astronaut Dave Bowman to spare it. As Bowman chooses to ignore HAL's pleas for mercy and begins an arduous shutdown procedure HAL delivers one of pop culture's most famous confessions: "I'm afraid, Dave... my mind is going. I can feel it." Though 2001 split opinions at the time, the famous late film critic Roger Ebert sang its praises, with one factor, in particular, resonating with him: how Kubrick had managed to make what was supposed to be the perfect computer instead the most human of all the characters.

Though an extreme example, some similarities can be drawn from HAL to today's automotive industry. No automotive developer is attempting to create a wholly sentient, and inevitably malevolent, artificial intelligence (AI), but the consensus is that AI can be used by the industry to nurture a brand identity through creating a tangible virtual persona. For instance, BMW's intelligent personal assistant's attention can be summoned by simply saying "Hey, BMW." Customers that instead want to use their preferred home-based assistant in-vehicle can do so by calling for Alexa's, Siri's or Cortana's help. It's also a route on which Chinese start-up Nio is pinning its connected strategy.

Nomi

At Nio, unsurprisingly AI's core value is found in enabling autonomy, given its long-term aim to build electric, autonomous vehicles (AVs). However, if and when these electric AVs make it to market, Nio is confident it can also create

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Early on, people may say Nomi is just a little robot on top of the instrument panel. However, Nomi is designed to be far more just an ‘add-on’ to the standard infotainment system. It is the brain and centre of car’s AI



an in-vehicle environment where driver and machine can converse and interact with one another seamlessly. To reach this future, Nio’s first stepping stone can be seen through the development of its own bespoke in-vehicle virtual personal assistant, ‘Nomi’.

First unveiled alongside the launch of the ES8 SUV in 2017, the automaker originally marketed Nomi as “the world’s first in-car AI system,” capable of interacting with passengers using its ‘emotion engine’. “The most obvious business area for AI is autonomous driving, where Nio Pilot is already trying to become one of the market leaders. However, the other less obvious yet fundamental area is lifetime companionship, which defines the relationship between the

user and the vehicle,” said Ted Li, Associate Vice President, Product Management Department & Senior Expert, Experience Manager at Nio. “Nomi can give the user a much more engaging ownership experience, not just through operating functions, but also by offering a digital companionship which is not achievable through conventional methods.”

When Nio says ‘companionship’ it quite literally means that. At the most basic level, Nio allows owners to rename their Nomis to whatever name they’d like. For US\$700 users can also upgrade to the ‘Nomi Mate’, which contrary to the base model features two digital eyes which turn to greet passengers as they enter the vehicle and can display a variety of

facial emotions. Regardless of which model buyers opt for, Nio places great significance on fostering this human-machine relationship. “Early on, people may say Nomi is just a little robot on top of the instrument panel. However, Nomi is designed to be far more just an ‘add-on’ to the standard infotainment system. It is the brain and centre of car’s AI,” said Li. “Each motion, open and closure, adjustment and command are all neural connected to Nomi’s emotion engine and conversation system.”



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Nomi can give the user a much more engaging ownership experience, not just through operating functions, but also by offering a digital companionship which is not achievable through conventional methods

Relationship

Today, however, Nio just scratches the surface of Nomi’s in-vehicle possibilities. Going forward the automaker is eager to expand on Nomi’s current functionalities and bring more AI-enabled value to the customer experience. “In our next steps, we will give Nomi further AI capabilities, including autonomy and cabin perception. The entry-level Nomi will also be able to operate a wide range of interior functions including media players, opening windows and sunroofs as well as handling navigation,” said Li. Though a common development route throughout the sector, Li is eager to stress how important these seemingly minor features will be in fostering a brand identity in a connected, autonomous world.

“In the future of mobility, the key differentiator in choosing to buy a car from one brand over another will no longer be determined solely by driving



range, performance, equipment and features. It will be the emotional value of the product and the brand,” he said. Nio, in particular, sees current adoption rates on products featuring Alexa and Siri functionality as a key indicator in how consumer interests are changing in this connected space. “AI will become one of the most intimate friends and companions to our next generation, as well as ourselves,” he added. “In the very distant future, when full autonomy is available and when the steering wheel is no longer necessary, Nomi will become the primary interface for user interaction. That is the end goal.”

Privacy

If assistants such as Nomi do end up as the main point of interaction, it could pose some practical problems. One example is the cultural consumer differences when attempting to develop such AI-enabled functionality for several markets. Western consumers traditionally prefer their virtual assistants to remain strictly machine-like, whereas Asian customers tend to prefer a more personified digital experience.

“Asian culture tends to be more receptive to animated and virtual characters compared to the rest of the

world,” said Li. “However, most people will gradually grow fond of Nomi once they start to experience it and get used to it.” Though Nio is confident that all markets will eventually warm to Nomi, anyone developing similar tools will need to think carefully about how best to develop that human-machine-interface (HMI) operability to cater for bespoke market demands.

handled in an encrypted way and will be erased from the cloud once all voice and learning sessions are completed,” added Li. “Given that we are also planning our global entry strategy, our connected vehicle and data services will be strictly following GDPR and related privacy protocols.” Nomi also runs proprietarily on Nio’s bespoke operating system which only

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AI will become one of the most intimate friends and companions to our next generation, as well as ourselves

Another consideration is data privacy, especially if the industry shifts to largely shared vehicles. Though a virtual human-like assistant would be a hugely valuable tool in this theoretical market, in which vehicles are potentially more akin to whitegoods, reassuring consumers that their information remains private and secure will be critical in unlocking this value.

In the case of Nomi, Li reassures that all voice conversations and data processing passes through a local embedded engine. From here, Nio then deploys a cyber security gateway which handles all data communication between the car and the cloud, with all data also being masked and anonymised. “All data is

operates software digitally certified by Nio itself.

Time will tell whether consumers will truly warm to in-vehicle virtual assistants, as well as whether these assistants can display and invoke emotion in a HAL-like manner. But what is clear is that through the use of AI there lies a previously largely inaccessible opportunity for automakers to interact with customers in-vehicle on a daily basis. Today, these players must place significant development focus on making sure such assistants can offer users an enjoyable, and frustration-free experience. With that foundation built and market interests weighed, automakers can then decide just how human they would like their future vehicles to appear.

Voyage's 'COVID-ready' vehicle to salvage shared mobility

Voyage's third-generation robotaxi could become the model for creating COVID-ready shared vehicles. By Jack Hunsley

The COVID-19 pandemic has hit mobility hard. On one hand, automakers and suppliers have been forced to take stock and reprioritise development to keep afloat. On the other hand, on-road traffic initially ground to a halt. Though lockdowns have started to lift and commuters are beginning to return to their daily routines, transit levels are still depressed.

Figures from Intel's transit aggregator Moovit paint this picture well. Taken from daily data of public transit usage across 108 cities worldwide, not one single city on Moovit's books has seen transit usage return to pre-COVID levels. Some are faring far worse than others: transit usage in Washington,

D.C. is still down 56.9% compared to the 25.7% decrease currently seen across Moovit's native Israel, for example.

These drops are perfectly understandable. Many nations have warned citizens to only use public transit if there is no alternative and if their journey is absolutely essential. However, another explanation could be heightened concerns over the contagion and how easily it might spread within a confined area such as a bus or a taxi. For an automotive industry building towards a shared, mobility world, failure to address this anxiety could be catastrophic. But it is an anxiety which several players are eager to overcome.



COVID-ready

One such player is robotaxi operator Voyage. To date, it has made its name largely by shunning the more popular dense inner-city development programmes to instead trial its technology in retirement communities in Florida and California. Though on paper it might not sound a wholly exciting testing ground, it is important to bear in mind that The Villages facility in Florida is home to more than 120,000 people, technically making it one of the fastest-growing metropolitan areas in the entire country. For Voyage, it's a location which sits perfectly in the 'Goldilocks' complexity sweet spot: not too big, not too small, but just right. Its work so far also has attracted the attention of FCA which partnered with the operator in May 2020.

Though it has seen some initial early success the time has come for the company to target scale, and to do that it

has announced its third generation robotaxi, the G3. Based on Chrysler's Pacifica Hybrid minivan, the G3 offers Voyage around a 50% cost saving over its current G2 model. Spec-wise, it comes equipped with Voyage's 'Commander' technology, which includes its "state-of-the-art perception, prediction, and behavioural modules," and well as its collision mitigation system 'Shield' and remote operations solution 'Telessist'. Most intriguing in this COVID-hit market, however, is its "ambulance-grade" automatic disinfection system.

"It is 'COVID-ready', and I do not use that term loosely," Voyage's Co-Founder and Chief Executive, Oliver Cameron, told *Automotive World*. "As we've seen with Uber's and Lyft's results, the shared mobility industry is in the process of being decimated because not only do you have a contract workforce which is perhaps a little inconsistent in the safety standards across the fleet but there is



The Voyage G3 uses ultraviolet to deactivate pathogen DNA, halting reproduction cycles of viruses, fungi and bacteria



also just the fact that you have a human driver which is an inherent transmission risk. We saw this as a technology challenge.”

Though the G3’s initial design philosophy was not targeted solely at countering COVID, the global pandemic has encouraged Voyage to think how its vehicles could be used

to enable a more hygienic shared world. One benefit is that, contrary to its predecessor, the G3 is a driverless car and so removes the chance of direct driver-to-rider transmission. To attempt to eliminate transmission risks entirely, however, Voyage opted for a more ambitious solution through the use of ultraviolet-C (UV-C) light.

“To tackle this issues we looked towards ambulances as they have already solved this problem by installing UV-C lights,” said Cameron. “When these are triggered, with no one in the car as that would be very dangerous, the lights can eradicate infectious viruses that might be lurking on surfaces or in the air.” This process, which takes around three to four minutes, is operated using three lights which can halt the pathogen reproductive cycle through inactivating DNA. Effective on a range of pathogens including viruses, fungi and bacteria, the solution allegedly eradicates 99.9% of pathogens including the seasonal flu and COVID-19.

On paper, it is an attractive offering for any shared vehicle operator, but for Voyage, in particular, the solution is extremely important. Given its current core demographic of senior citizens, many of whom perhaps have underlying health conditions or weaker immune systems, finding a practical and effective sanitation mechanism could quite literally be the difference between life and death.

“It is particularly important for us to tackle COVID as it is very dangerous for seniors,” said Cameron. “While COVID is the focus currently, there is going to be a significant reduction of the most infectious viruses being

transmitted in shared vehicles with this solution. Hopefully, we’ll see more of these vehicles from ourselves and other companies which can start to prevent several other viruses such as the seasonal flu.”

The future

Looking forward, Voyage remains wholly confident in its development roadmap. Currently, Voyage’s first G3, referred to as the ‘Alpha G3’, is already operating in San Jose, California. The first driverless ‘Beta G3’ will be on the road in a few months according to Cameron. Though a few more G2 vehicles are still expected to be added to the fleet, Voyage anticipates that these vehicles will be fairly quickly cycled out for the new model. Production for the G3 is currently scheduled for early 2021 for deployment in both its California and Florida operations.

It will be interesting to follow the impact that Voyage’s new scalable model could have on this currently struggling sector. Though the G3 could offer a total 50% cost reduction overall, more specifically it has been able to achieve a 65% cost reduction on its sensor costs and a 25% reduction on its computing costs. These savings combined with a theoretical COVID-ready vehicle offers a compelling example for the ride-hail players already operating in major towns and cities which are eager to ease rider concerns.

“

Effective on a range of pathogens including viruses, fungi and bacteria, the solution allegedly eradicates 99.9% of pathogens including the seasonal flu and COVID-19

Who will succeed in the crowded LiDAR space?

Affordable, scalable LiDAR remains an elusive piece of the self-driving puzzle. This is not for lack of effort, with numerous companies competing in the space. By Xavier Boucherat

If the LiDAR segment looks crowded, it is hardly surprising: the majority of automakers and self-driving technology developers agree that LiDAR will be pivotal for realising safe autonomous vehicles. That company which can provide scalable, affordable units stands to profit enormously.

The US\$75,000 price tag on early roof-mounted Velodyne models proved as big a talking point as

LiDAR's purported benefits, and the race to bring down unit cost has intensified in recent years, particularly with the emergence of solid state technology as opposed to mechanical scanning. This year at CES, the same Velodyne claimed to have completed work on an automotive LiDAR which, produced at volume, could go below US\$100. The figure is an estimate, but one worth taking seriously, having come from a market leader.



Velodyne isn't the only company to have established a name for itself primarily on the basis of LiDAR development. Luminar has gone from strength to strength in recent years, recently partnering with Volvo on its SPA2 modular vehicle architecture. This will bring its LiDAR units to series production by 2022, enabling high-level autonomy functions such as Highway Pilot. The recent addition of five new executives, all with considerable automotive experience,

marks the evolution of Luminar from "tech development company working with R&D programmes to the first company enabling autonomy in automotive series production," Chief Executive Austin Russell said in a statement.

Then there are startups such as Blickfeld and AEye. The former, based in Munich, has tasked itself with a goal shared across the space: the production of high performance,

Automotive LiDAR players

Evolution of the industry

Source: LiDAR for Automotive and Industrial Applications report, Yole Developpement



Source: Yole Developpement

The LiDAR space is increasingly crowded

mass producible solid state LiDAR. Its recent Series A financing round attracted investment from Continental, Bayern Kapital and Osram Ventures, among others. Meanwhile, Dublin, California-based AEye has dedicated its efforts to the creation of intelligent perception technology, namely iDAR (Intelligent Detection and Ranging). Smart perception software will be key for helping LiDARs to operate in real time, as scanners will need to distinguish between those objects which are important, and those that are not.

As such, the space is attracting both hardware and software talent with different aims and ideas of how to run a company. Luminar's Russell, for example, wants to run a perception-as-a-service business, with subscription models that make its software available

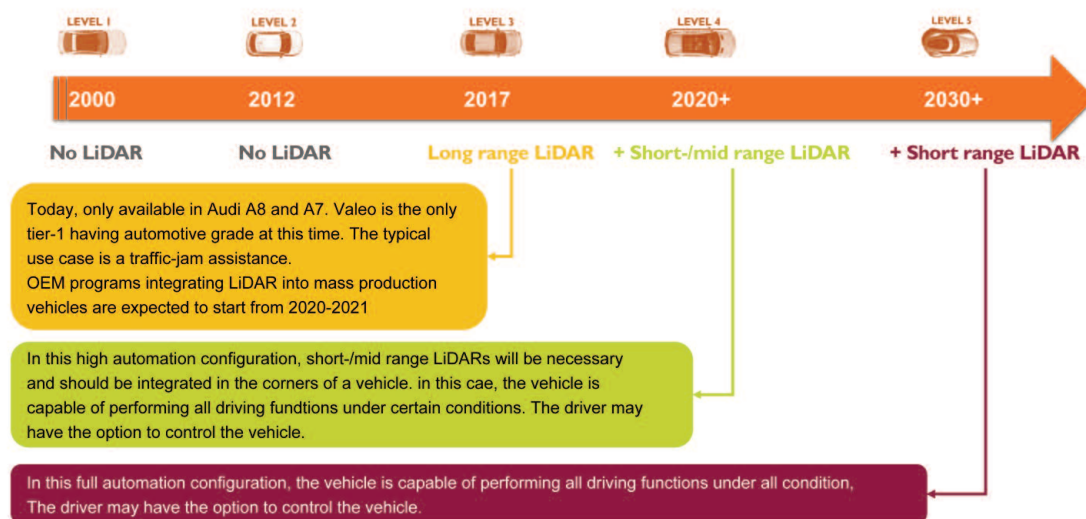
to automakers today. But the 2019 shuttering of Oryx Vision, an Israel-based LiDAR start-up, has demonstrated the difficulty of making a business out of LiDAR. With the self-driving car widely agreed to be more years out than previously predicted, and with the drying up of investment interest in the wake of the novel coronavirus disease (COVID-19), what will it take to survive in the LiDAR space?

Grab your partner

"LiDAR companies that will survive are those that are currently partnering with automakers and Tier 1s," says Alexis Debray, Technology and Market Analyst at Yole Developpement, a technology consultant with expertise in sensing. Luminar's recent partnering with Volvo is a key example, and the

Time-to-market: LiDAR for ADAS vehicles - Integration roadmap

Source: LiDAR for Automotive and Industrial Applications report, Yole Developpement



Source: Yole Developpement

Series production of some LiDAR will begin soon

company is also collaborating with Toyota and Audi. Meanwhile, Softbank-backed, Israel-based Innoviz, a solid-state LiDAR developer, has partnered with BMW for its future models, with the Level 3 enabled iNext EV potentially arriving on roads as early as 2021. A spokesperson for BMW confirmed to *Automotive World* that work with the

group was ongoing, and that together they are making “good progress,” but could not provide further details.

In December 2019, Silicon Valley-based Quanergy announced a partnership with Geely that aims to develop and commercialise solutions for the

broad development of both smart city and autonomous vehicle systems: one will not work without the other, said Chief Executive Louay Eldada in a statement.

“The development of both LiDAR and automated driving has proven to be much more complex than anticipated by OEMs,” said Debray, “and will therefore still require a lot of time and R&D. LiDAR companies that have not been able to raise enough money or

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The development of both LiDAR and automated driving has proven to be much more complex than anticipated by OEMs... LiDAR companies that have not been able to raise enough money or generate enough cash will not survive for long



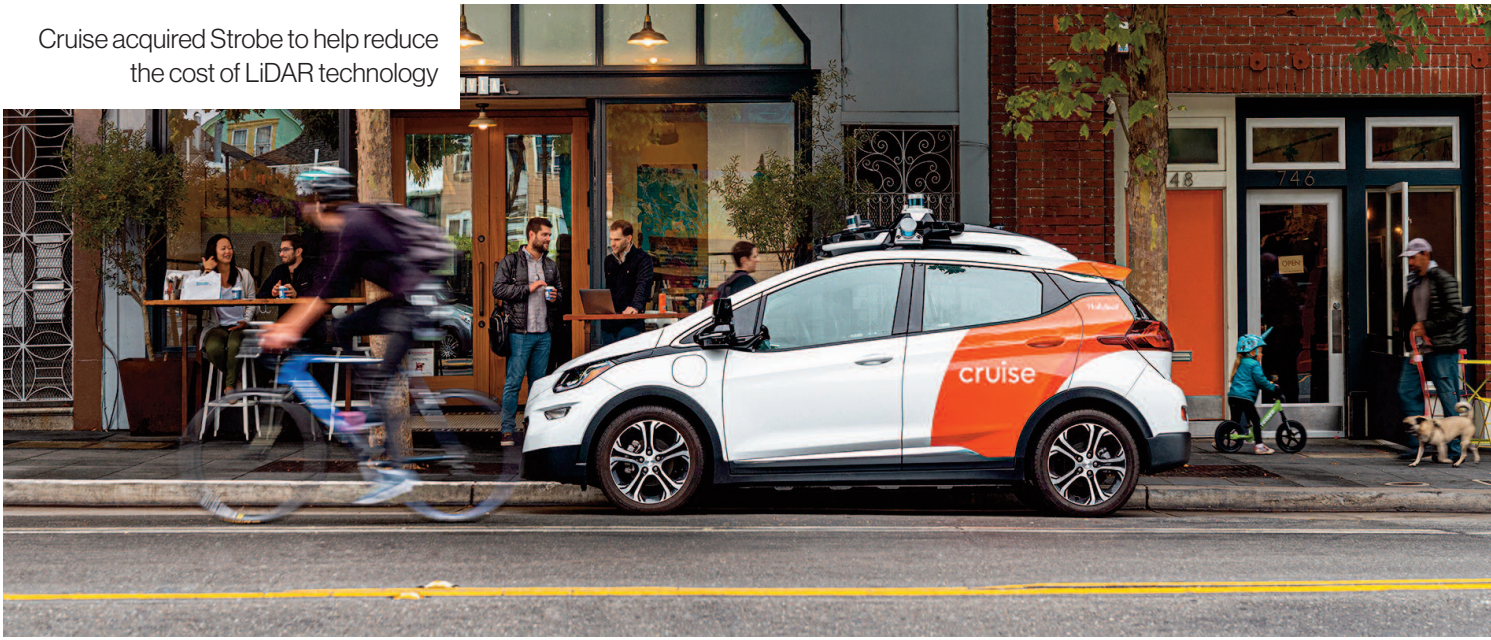
generate enough cash will not survive for long.” Computing and processing are also important aspects of automotive LiDAR, he added, and the system must be able to deliver useful data to the car. This potentially creates space for software and data specialists, but without solid partnerships, the cash-burn between now and the era of commercialised autonomy will surely be too much for many to handle.

Focus on cost

The main challenge for LiDAR, says Pierrick Boulay, also Market and Technology Analyst at Yole Développement, remains clear: it must evolve from its high price, low volume model to a low price, high volume one. “This must be done while maintaining revenue streams, or at least while starting to generate revenue,” he says. “Velodyne, which invented the real-time 3D LiDAR 15 years ago, has started this transition. Moreover, the automotive market is especially difficult since it requires several years of qualification and cost pressure. The involvement of Tier 1s is key to bringing LiDAR to cars.”

As things stand, he adds, LiDAR costs remain some ten times more expensive than cameras, and costs could rise further. This is despite the emergence of solid state LiDAR, which compared with its mechanical counterpart technology has helped realise some cost reductions whilst eliminating moving parts. “The first embedded LiDAR used by Audi used a mechanical scanning approach with an edge emitting laser at 905nm and avalanche photodiode arrays, but the cost was more than US\$600,” he says. “The next LiDARs used by BMW and Volvo are expected to be even more expensive.”

Cruise acquired Strobe to help reduce the cost of LiDAR technology



That said, Boulay believes that short-range LiDARs with no mechanical scanning could be cost effective and increase safety in harsh weather conditions within the next two to three years. This will come at the cost of performance and complexity when compared with long-range LiDAR, but for the purposes of advanced driver assistance systems (ADAS), it could provide LiDAR companies with a much needed source of revenue, and a way to develop deeper relationships with automakers.

Early LiDAR-enabled ADAS applications could give a clearer picture of which sensors work best in different situations. LeddarTech, a Quebec-based sensor developer, argues It should not be assumed that LiDAR can handle every sensing challenge: “LiDAR cannot detect colours or interpret text,” wrote Preeti Prasher, ASIC Test Engineer, LeddarTech, in a blog post. “Consequently, it is extremely difficult, or even impossible, for LiDAR to identify traffic lights or road signs.” Conversely, camera-based systems can

handle these tasks with a high degree of success, and have a distinct advantage in these situations. Meanwhile, radar can complement both technologies in adverse weather, as cameras can be impaired by snow and fog, and LiDAR range can be affected. Therefore, successful LiDAR companies might aim to produce solutions that lend themselves to holistic integration.

With such varied approaches in business plans and some variations in technology, it is unclear who in the LiDAR segment will survive. Further consolidation is likely, possibly among the self-driving developers not developing their systems in house: Argo, Cruise and Aurora have already snapped up Princeton Lightwave, Strobe and Blackmore respectively. Those remaining companies that can establish big partnerships will benefit from some financial security and R&D funding at a time when budgets are being slashed. But with further innovation clearly yet to be realised within the space, one bright idea could yet put an unknown player on top.

Mild hybrids— a multi-billion euro growth opportunity alongside e-mobility?

Experts from McKinsey & Company
explore the technological and market
opportunities within the rapidly changing
powertrain landscape



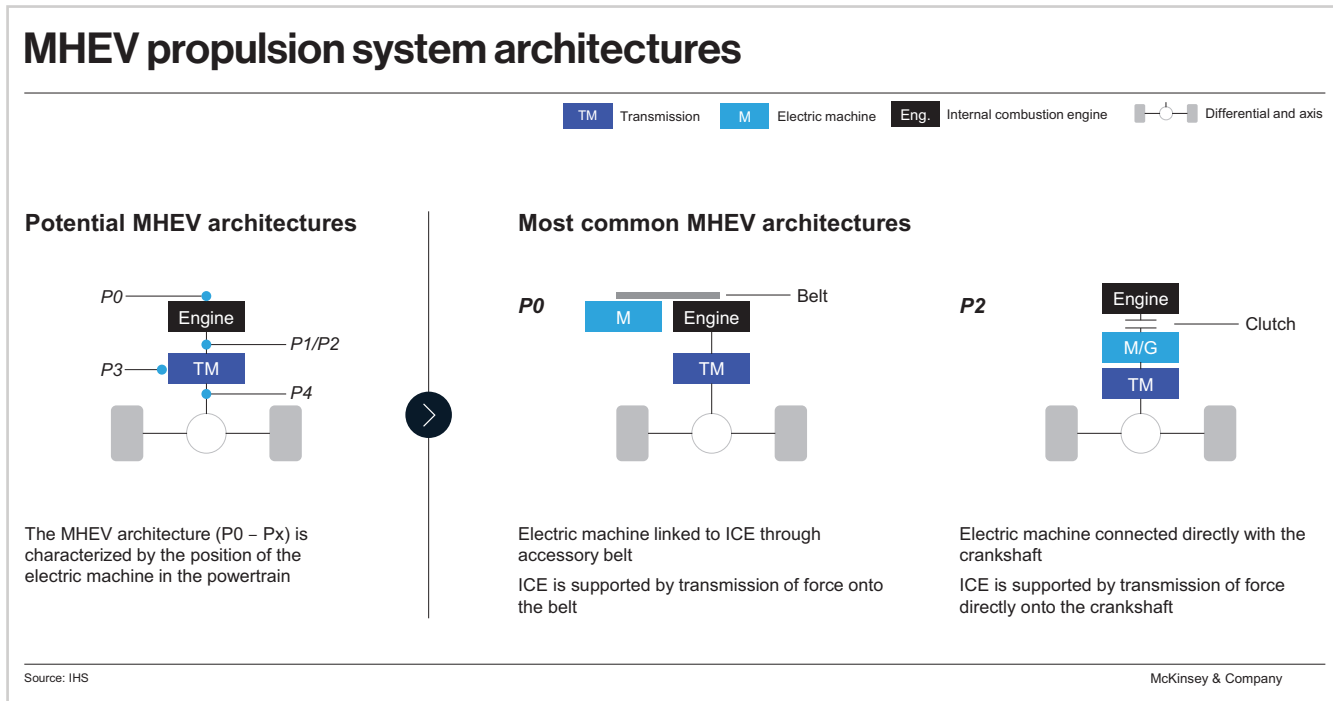


The powertrain landscape is changing fundamentally across global automotive markets and electrification—the transition from combustion engine-powered powertrains to electric powertrains—is at the heart of this development. Optimistic forecasts expect between 30% and 50% electric powertrains by 2030 in most regions. This includes battery-powered electric vehicles (BEVs), plug-in hybrid electric vehicles (PHEVs), fuel-cell electric vehicles (FCEVs), and hybrid electric vehicles (HEVs). Mild hybrid electric

vehicles (MHEVs) represent a technological leap in the other part of the automotive market—that is, vehicles solely based on a combustion engine. What technological and market opportunities can be expected from this technology in the rapidly changing powertrain landscape?

From today's viewpoint, combustion engine-based powertrains will remain dominant at least for the coming decade—yet with significant differences across key markets as the speed of electrification varies. In

Exhibit 1: MHEV propulsion system architectures



Europe and China, the share of electric powertrains* could increase to about 45 to 50% by 2030. In the US, electrification could take place at an initially lower pace, with later acceleration to a share of about 35% electric powertrains by 2030. The COVID-19 pandemic is accelerating electrification in Europe and China due to additional government incentives, unchanged stringent regulation, and an increased appetite for sustainable mobility. In contrast, COVID-19 is slowing down electrification in the US due to relaxed regulation, low oil prices having a significant impact on gasoline prices, and several delayed or halted EV model launches by US-based OEMs.

Mild hybrid technology brings higher efficiency and lower running costs to combustion engines and could therefore provide promising opportunities for OEMs, suppliers, and customers until electric powertrains become ubiquitous.

‘Mild hybrids’ typically refers to vehicles with at least one electric 48-volt (48V) motor that assists a classic internal combustion engine (ICE) and a 48V battery that is charged by an electric generator recovering excess mechanical energy. Mild hybrid technology can be combined with both gasoline and diesel engines; however, diesel mild hybrids only play a role in Europe.

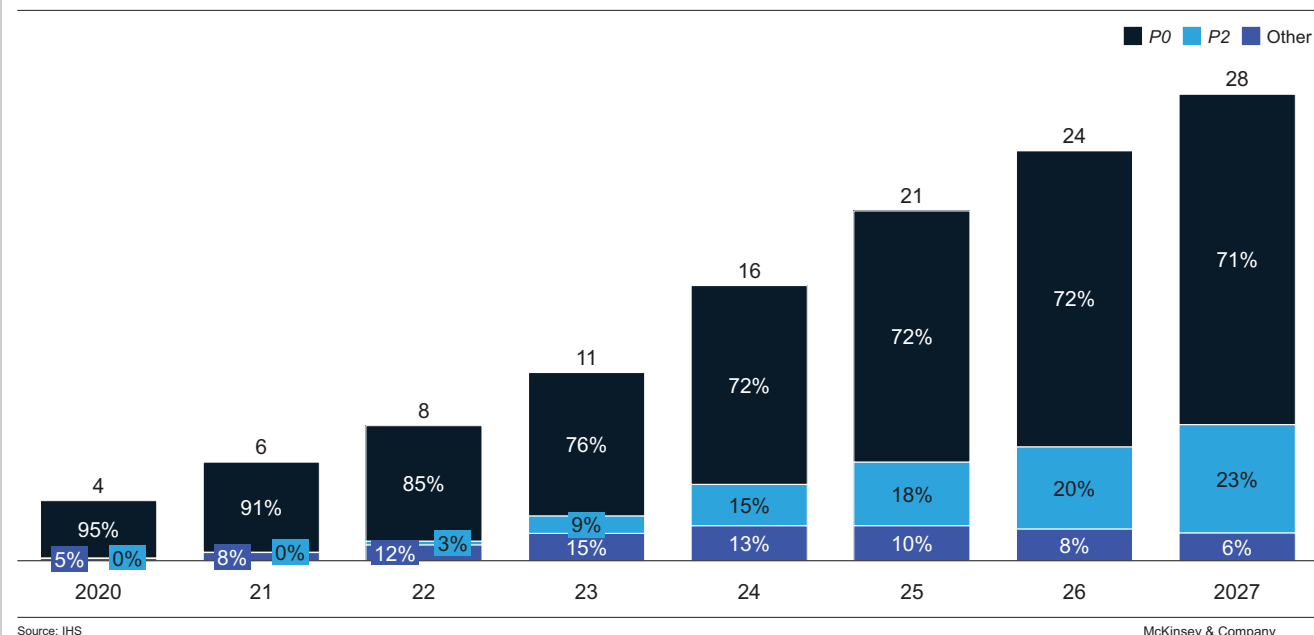
MHEV architectures

There are different powertrain system architectures for mild hybrids, as shown in Exhibit 1, but two architectures are most relevant. In the P0 architecture—by far the most common architecture—the 48V motor is linked to the combustion engine with an accessory belt. In the P2 architecture, the 48V motor is connected to the crankshaft. As Exhibit 2 shows, current projects reflect a much lower production volume of the P2 architecture in the

Exhibit 2: MHEV global production projection

MHEV global production projection shows two dominant designs

Total global production by propulsion system design, in million units



near future, but its importance could increase as batteries and engines become more powerful in the coming years. Other architectures, such as the P1 architecture—similar to the P2 architecture but with the 48V motor directly connected to the combustion engine—have not made their way into the mass market yet.

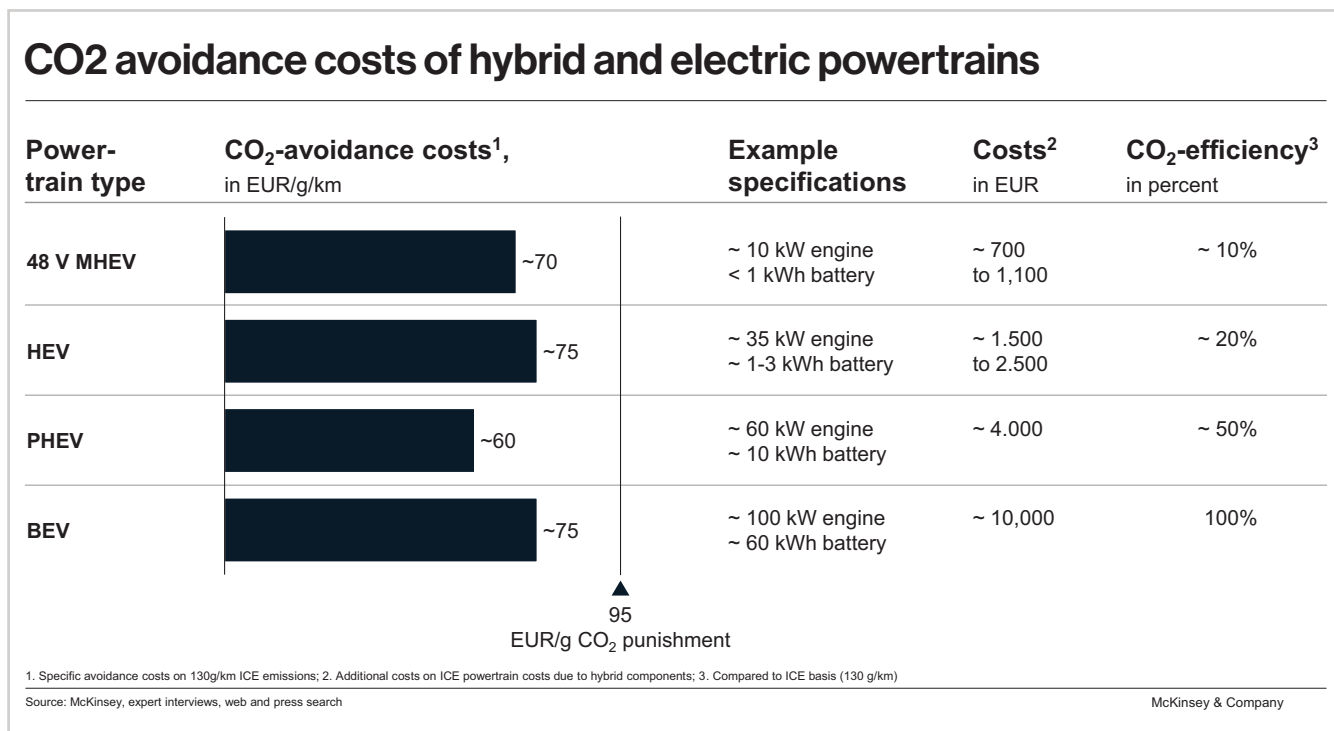
What all MHEV architectures have in common is that the ICE setup remains mostly unchanged—hence, MHEVs require the same components as existing ICE models, plus additional 48V components. This includes the 48V motor and generator, the inverter, the 48V battery (typically <1 kWh), and the DC-DC converter that connects the 48V electric system to the conventional 12v electric system. Altogether, typical MHEVs currently cost about €700 to €1,100 per vehicle on top of the ICE base.

MHEV advantages

MHEV powertrains can deliver efficiency gains of up to 5-15% compared to regular ICEs. This efficiency gain results from the recovery of energy during braking and the electric efficiency gained from having a 48V wiring system compared to a 12v wiring system. Connecting peripheral components via the 48V wiring system reduces the power loss due to electric resistance—an advantage of growing importance given the increasing connectivity in cars.

The efficiency advantage of MHEVs is relevant for both OEMs and consumers. For OEMs, ~5-15% higher efficiency means lower CO2 emissions at manageable additional vehicle cost. The CO2 avoidance costs of MHEVs total around €70 per g CO2 per km (Exhibit 3), landing in between those of PHEVs and BEVs. Thereby, MHEVs offer

Exhibit 3: CO2 avoidance costs of hybrid and electric powertrains



an attractive way to reduce the average CO₂ emissions of OEMs' product portfolios.

For consumers, this efficiency advantage pays off in the total cost of ownership (TCO). Although the additional costs for MHEV technology result in a slightly higher purchase price, the running costs are lower due to less fuel consumption. Equipped with MHEV technology, gasoline powertrains become an interesting alternative to diesel powertrains for consumers with a high annual driving mileage since they provide similar advantages (lower running costs for fuel that offset a higher engine cost at a certain mileage).

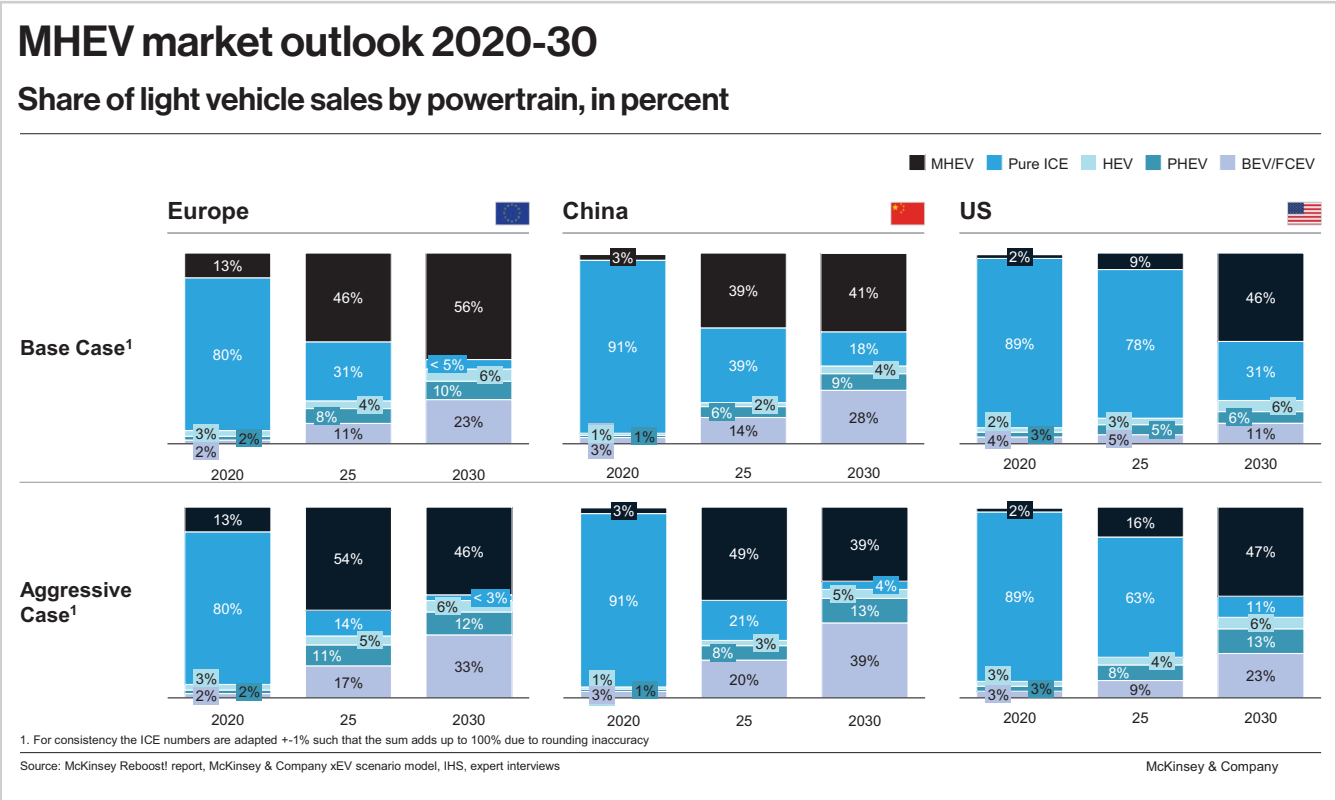
MHEV market share development

The 48V MHEV market share is clearly increasing and expected to provide significant growth over the next

decade. In Europe, MHEVs are expected to almost completely replace pure ICE vehicles by 2030 and see their market share increase to more than 45% of the total light vehicle market. In China, MHEV market share could rise at a similar pace, reaching about 40% of the total light vehicle market by 2030. And in the US, where the transition from pure ICE to MHEV technology is going to occur later, the MHEV market share could still reach levels of more than 45% by 2030 in a market where the share of combustion engines is still higher than in Europe and China.

Of course, MHEVs are more relevant in Europe and China than in the US since CO₂ regulation is much stricter in these regions than in the US. In addition, diesel vehicles are becoming increasingly expensive, given tightening emissions regulation (e.g., the upcoming Euro 7 norm) that requires extensive after-treatment systems. Gasoline-powered 48V MHEVs

Exhibit 4: Outlook for MHEVs in the light vehicle market 2020-2030 under different electrification scenarios



could step in here since they provide similar fuel efficiency advantages at manageable additional cost (the cost for 48V MHEV technology is typically lower than the price difference between a gasoline and a diesel engine).

Future opportunities for OEMs

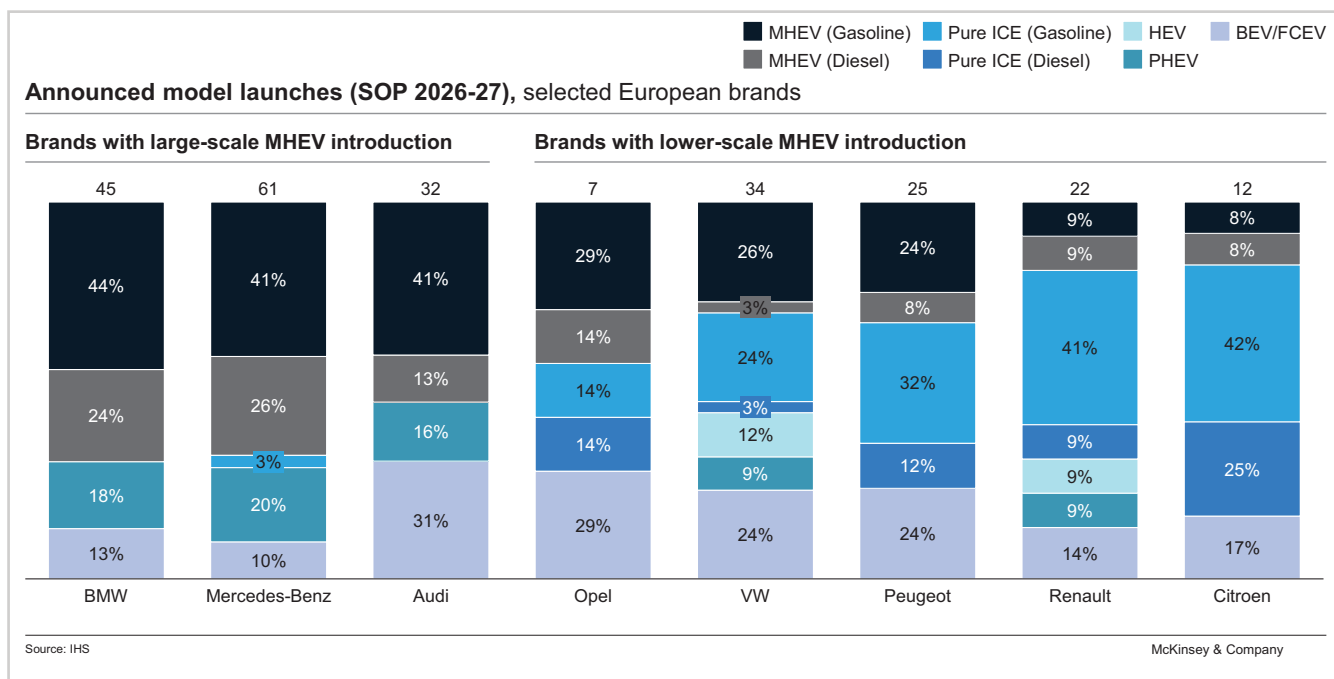
For many OEMs, the higher fuel efficiency is a critical lever they can pull in order to comply with decreasing CO2 fleet emissions targets (e.g., 95g to 59g CO2 from 2021 to 2030 in the European Union). Recent moves OEMs have made to introduce 48V mild hybrid technology into existing ICE vehicle portfolios (e.g., VW Golf, Audi A4, BMW 3 Series, Mercedes-Benz C-Class, Fiat 500, Volvo 60-/90 Series, Kia Ceed, Ford Kuga) on a large scale

underline the potential of this technology.

When looking at announced upcoming model launches, one can observe two different MHEV footprints in the production portfolio of European auto brands (Exhibit 5). Manufacturers of some brands—especially those with premium brands—count on large-scale MHEV introduction during this decade. Given that the upcoming ICE engine launches are likely to be the “last generation” and many will be equipped with 48V technology, these engines are likely to remain in the market for a long time.

In contrast, manufacturers of another set of brands plan to introduce MHEV on a much lesser scale and still heavily rely on pure diesel and gasoline engines. While manufactures may initially focus their introduction of

Exhibit 5: Announced EU model launches with SOP in second half of the decade



MHEVs on Europe in order to comply with tightening CO2 emissions limits, over time, the same MHEV vehicles will also be sold to other markets in which MHEVs are not yet highly present.

Since MHEVs require 48V components in addition to ICE vehicle components, the MHEV market offers enormous growth potential to suppliers. Given the increasing number of MHEV models launched and expected growth of global MHEV production (Exhibit 2), the demand for MHEV components is increasing rapidly as well. Overall, revenue from components for MHEV powertrains is expected to grow by about 80% from 2018 to 2025 (Exhibit 6), which represents the fastest growing powertrain component market.

Market opportunities for suppliers

Moreover, the market for 48V components is not as fragmented or

competitive as the high-voltage (HV) components market (i.e., for BEV and PHEV components). The HV market shows a high competitive density with typically more than 15 suppliers of typical HV components battling aggressively for market share in a growing market (yet with growth rates of only 20-25% compared to 80% for MHEV). In contrast, there is typically only a handful of suppliers in the 48V components market, which for many product categories offers high double-digit growth. To profit from this opportunity, suppliers should work to leverage their system competence in ICE powertrains to design innovative MHEV components.

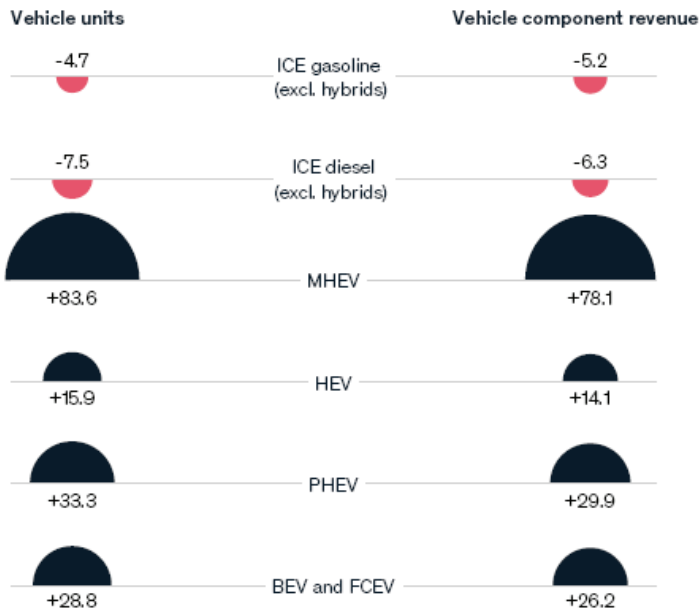
Outlook

From McKinsey's perspective, MHEVs will play a major role in a balanced powertrain portfolio for the next decade. While electric zero-emission powertrains will dominate in the long run, there is a long transition period

Exhibit 6: Expected compound annual growth rate (CAGR) for number of produced vehicles and vehicle component revenue by powertrain

Dynamic growth industry - global powertrain revenue exceeds global vehicle units with very different dynamics for different powertrain technologies

Granularity of growth, 2018-25 CAGR, percent



Source: Revenue forecasts based on vehicle volumes from IHS Markit Alternative Propulsion Forecast, August 31, 2019; McKinsey Center for Future Mobility

McKinsey & Company

during which combustion engine-based powertrains still hold tremendous opportunities. No matter whether the upcoming combustion engine-based powertrain generation is a pure ICE or MHEV powertrain, it is likely to be the last one and could live longer than previous generations.

OEMs will have to make a strategic choice to either focus solely on zero-

emission vehicles or to bring advanced 48V combustion engine-based powertrains in addition to electric powertrains into the market. Managing the complexity of the powertrain portfolio should therefore be a key priority of OEMs.

**Powertrains that enable driving a significant distance electrically, i.e., without a combustion engine.*

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How has COVID reshaped the US industry outlook?

Dykema shares insights from its survey into the US economy and automotive market outlook for the remainder of 2020 and into 2021. By Megan Lampinen

The novel coronavirus (COVID-19) pandemic has dominated automotive industry decision making and performance for the past six months as players across the value chain scramble to adjust to a rapidly changing environment. Much of the US industry came to an abrupt standstill in March, suspending production operations in response to stay-at-home orders, health concerns or supply chain disruptions. Business has slowly been gaining lost ground as social distancing replaces full lockdown, but just how long will it take to return to pre-pandemic levels of activity?

respondents had a negative outlook, 28% were neutral and just 18% were positive. The longer-term forecast for 24 months out is more positive, with just 13% of automotive respondents predicting a negative outlook for that time period and a notable 46% predicting a positive.

Compared to other sectors, automotive players are more cautious. A separate Dykema survey of merger and acquisition industry participants conducted in June 2020 asked the same question to players across various industries. The respondents were

“

The consensus is that we will not return to 2018/19 levels for at least two and a half to three years from today

Dykema, MICHauto and The Right Place recently surveyed automotive businesses and professionals, along with other industries, across the US to gauge their current challenges and outlook. The feedback from automotive players will help to better understand the full impact of the pandemic and explore how COVID-19 will shape the future of the automotive industry.

Economic outlook

The survey uncovered a decidedly negative outlook among automotive companies for the US economy over the next 12 months. While 54% of

significantly more bullish on the US economy over the next 12 months, with sentiment evenly split between positive (34%), neutral (36%) and negative (30%). The 24-month outlook was much more positive (76%). “The difference in perspective among respondents in the two studies is down to an expectation that it will take the automotive industry a bit longer to recover from the COVID than other sectors of economy,” explained Thomas Vaughn, Member at Dykema. “It is consistent with what I’m seeing with predictions for production volumes over the next three to four years, all of which are pointing to a slow growth and recovery for the auto industry.”

COVID-19 AUTOMOTIVE OUTLOOK FLASH SURVEY

U.S. Economic Outlook



46% of total respondents have a negative outlook of the U.S. economy over the next year, dropping to only **13%** over the next 24 months.

56%

of total respondents believe U.S. light vehicle production will strengthen in 2021 compared to 2020.



25% of automotive industry respondents believe U.S. light vehicle production will weaken in 2021 compared to 2020.



50% of total respondents have accessed the Paycheck Protection Program.

16%

of total respondents have accessed the Employee Retention Credit Program.

Forecast for the Automotive Industry



45% of automotive industry respondents foresee decreases in supply chain orders over the next six months. Automotive industry respondents are more optimistic concerning the rate of new supply chain orders for 2021 and beyond.

COVID-19 Impact on Automotive Operations



84% of automotive industry respondents were required to suspend or curtail operations in the U.S. due to a government-ordered shutdown, along with nearly **50%** shutting down operations in Mexico.

20%

of automotive industry respondents were required to suspend or curtail operations in the U.S. due to COVID-19 related issues after reopening, compared to only **5%** in Mexico and **5%** in Europe.



Revenue Impacts



44%

of total respondents believe company revenues will decline more than **20%** over the next year, and another **44%** expect declines between **1%** and **20%**.

54%

of automotive industry respondents believe revenues will decline more than **20%** over the next year, and another **43%** expect decline between **1%** and **20%**.

In what ways have you seen or expect to see the COVID-19 pandemic impact automotive businesses during the next 12 months?



54% material increase in expenditures for increased health and safety measures.

50% suspensions of existing orders.

45% elimination or consolidation of suppliers.

More than half the survey respondents were automotive industry participants, including OEMs, Tier 1 and 2 suppliers, technology and services vendors, or other automotive product suppliers

Production impact

Going into 2020, the automotive industry was already bracing for a contraction in light vehicle sales following years of record growth. When COVID hit, 84% of automotive survey respondents suspended or shutdown operations. Notably, the US COVID policy was set at state level, not national,

resulting in considerable variations. "There was a lot of uncertainty when this first happened," observed Glenn Stevens, Executive Director, MICHauto and Vice President, Automotive and Mobility Initiatives, Detroit Regional Chamber. The first issue to arise was who constituted 'an essential company', and hence was authorised to continue production. "With 50 states

each issuing different orders, things decentralised very quickly," he added.

Once companies received permission to restart production, they still faced obstacles due to the varied return to work policies. A manufacturer in Ohio may be allowed to open but its raw material suppliers in Arizona or California were not. "We saw a disruption along the general

supply chain around getting materials and components,” noted Vaughn. “Even if you were able to go online, you may not have the inventory to go back online with.”

However, most companies that did reopen, stayed open. Dykema found that just 20% of automotive industry respondents reported that they were required to suspend or curtail operations in the US due to COVID-19 related issues after reopening. The figure was even lower at 5% in both Mexico and Europe. Stevens believes this is because the re-openings were organised and thoughtful.

Importantly, companies realised they needed to devise safety protocols to adjust operational procedures to social distancing and continued health concerns. The likes of Ford, General Motors, Magna and Lear

emerged as pioneers in this aspect, sharing their blueprints with the industry. GM, for instance, has developed an automated kiosk for temperature scanning, software for contact tracing and a mobile app for touchless printing. “We developed an extensive playbook for a safe return to work for our employees, and we’re seeing very good success,” said Jeffery Hess, GM Medical Director. Stevens is optimistic on the impact of steps like these: “These protocols are still working. There have been issues but a lot less than expected because of them.”

As for the production outlook, 56% of respondents believe light vehicle output will improve next year compared to 2020 levels. “For the most part, volumes are expected to strengthen,” said Stevens. “That said, the consensus is that we will not return to 2018/19 levels for at

least two and a half to three years from today.” However, 15% of respondents believe 2021 will be flat, while 29% expect further decline. “That 29% stood out for me,” said Vaughn. “It suggests that a substantial proportion of players are concerned about what’s coming in 2021. There are quite a few naysayers out there.”

Revenue decline

The near-term outlook for revenue is decidedly more pessimistic: 54% of automotive industry respondents expect their company’s revenue to decline more than 20% over the next year, with another 43% expecting declines of between 1% and 20%. Less than 4% expect an increase in revenue. “There is a definite sentiment about revenues being down, with very little about them being up,”



General Motors developed new workplace safety technology

INNOVATIONS FOR WORKPLACE SAFETY

- Thermal Scanning Kiosk
- Workplace Contact Tracing
- Touchless Print

When COVID hit, 84% of automotive survey respondents suspended or shut down operations

observed Stevens. “The key here is the incredible amount of uncertainty.” This uncertainty touches everything from the timing and availability of a potential vaccine to the return of schools and child care.

Even before the pandemic, the automotive sector had been preparing for a downturn. Last year saw a number of hefty job cut plans outlined by German companies, including Daimler and Continental. A survey by the Association of German Chambers of Commerce and Industry (DIHK) released in February this year found that more than half of Germany’s automotive suppliers are planning to cut jobs. Most of these cuts have been linked to a slowing economy and the move from internal combustion engines to electrification. “Companies were already making moves to tighten up,” said Stevens.

Many of the survey respondents have taken advantage of government stimulus programmes. The most popular was The Paycheck Protection Program (PPP), with approximately 50% of respondents receiving a forgivable PPP loan offered by the Small Business Administration (SBA) under the CARES Act. “The PPE loans were



widely popular because they were easy to apply for and understand,” observed Vaughn. Other government stimulus programmes were not as successful. Just 16% of respondents used or plan to use the refundable Employee Retention Credit (ERC), 10% an Emergency Income Disaster Loan or grant (EIDL) and 4% the Main Street Lending Program.

What to watch

All of the supply chain disruption and financial pressure caused by the crisis could lead to an uptick in liability issues and litigation. Laura Baucus, Member at Dykema, warned that companies should expect employee litigation around PPE and safety protocols, as well as potential contract litigation. “Whenever you shut down and

then ramp up quickly, there will be substantial increased costs and impossible quality issues that each side may be looking for recovery on,” she said. “It may come down to the contract in place. My advice is to take a second or third look at existing contracts and orders.”

That said, Vaughn was keen to emphasise the numerous positives for the industry that are emerging. July saw job gains of 1.8 million across the US, and the latest unemployment claims fell below 1 million for the first time in five months. “We are starting to see signs of recovery,” he said. “Automotive sales last quarter were stronger than expected, which supports respondents’ long-term outlook. The big unknown right now is when we get COVID under control and start to stabilise business activity.”

How to make cities ready for autonomous vehicles, and AVs ready for cities

It is vital that cities prepare to accommodate AVs, and that AV technology be developed for safe deployment in cities, writes James Hodgson





For any disruptive technology, targeted at any market, there must be a 'killer app': a concrete use-case with a well-defined ROI to dictate investment, M&A, and go-to-market strategies. For autonomous vehicle (AV) technologies, that 'killer app' is the Mobility as a Service (MaaS) opportunity. While improving driver safety through better obstacle detection and collision avoidance can be achieved with active safety technology, only a comprehensive AV system can kickstart MaaS into the mainstream, driving down the cost per mile of shared mobility modes to near parity with car ownership.

This is the reason that Intel's Mobileye has valued the MaaS opportunity at US\$160bn by 2030, over three times their estimation of the value of the self-driving system market by the same year, an expectation matched Intel's US\$900m acquisition of Moovit. In its own words (in late 2019), "MaaS will govern the self-driving productisation pace. The consumer AV market will be timed by self-driving system productisation and consequent cost/value optimisation steps within MaaS. Developing MaaS and driving it to quick convergence is critical to secure our self-driving system product fit, and to dominate the consumer [i.e., passenger vehicle OEM] AV ramp up ahead of the industry learning curve."

Therefore, not only does the nascent MaaS market need AV technology to scale, but the AV

technology needs the MaaS 'killer app' to mature into the mainstream. Critically, the MaaS paradigm is one that will grow exclusively in the context of cities. Therefore, it is vital that cities be made ready to accommodate AVs, and that AV technology be developed for safe deployment in cities.

Making cities ready for AVs

Any observer of the AV ecosystem will have become accustomed in recent years to an inbox filled with announcements by AV pod manufactures and municipal or city governments, outlining how a handful of experimental prototypes, equipped with full time backup drivers, will operate a small number of fixed routes on public highways. These engagements have been focused on testing consumer perceptions of AVs, while also identifying any weaknesses in the AV software or hardware components. In order to move out of this testing and prototyping rut, cities can take the following positive steps.

Engage with IEEE P2846: One of the biggest barriers to the rollout of AVs in cities is risk, as driving is a multi-agent problem, involving a variety of decisions and counter-decisions, manoeuvres and counter-manoevres by all the road users involved. In the city context, these road users include not only other vehicles but also vulnerable pedestrians and cyclists, moving in multiple directions in scenarios involving various occlusions, etc. It is vital that cities move beyond naïve



Mobileye has valued the MaaS opportunity at US\$160bn by 2030

sentiments of AVs ending all collisions—a distortion sometimes persisted by robotaxi technology developers—and work with AV deployers to develop deterministic safety models.

Such deterministic safety models depend on a number of assumptions and variables, and by working with AV developers to define what these variables should be in their city, city governments can have their own say in defining the trade-off between efficiency and risk in the rollout of AVs. The IEEE P2846 working group builds upon the responsibility-sensitive safety (RSS) model originally developed by Mobileye, and provides city governments with the best opportunity to shape the risk-reward balance of AVs in their own cities without requiring them to become too deeply involved in dictating hardware architectures,

software architectures, or any of the other remaining ‘nuts and bolts’ of each AV system that may ultimately end up being deployed in their city.

Digital twins: While deterministic safety models are the best way to provide verifiable evidence of the safety of an autonomous system, simulation tools have also proved useful in the development and testing of AV components, allowing for rapid prototyping in the digital domain. At the same time, many city governments have begun investing in digital twins of their cities in order to boot resilience, helping to identify potential bottlenecks in the event of a widescale evacuation, or the environmental impact of approving a new building to be constructed, etc. Having developed these digital twins, these models can also help AV deployers to prototype and

test vehicles in the digital domain on a specific recreation of the actual deployment city. This is particularly relevant in cities with known problem areas, road features which are known to cause complications for all road users.

Clearly elaborate AV objectives: What is each city looking to achieve through the introduction of AVs? What transportation problem areas are cities hoping AVs will alleviate? How would cities like to see AVs incorporated into the current mix of different mobility modes? By clearly elaborating their objectives for AV deployments, city governments can help AV deployers optimise their deployment in their city. For example, in 2019 the UK government published its Future of Mobility: Urban Strategy, which outlined a long-term vision for personal mobility in urban environments. It includes a set of principles for how new mobility modes (such as AVs) should be introduced. For example, emphasising the importance of smart mobility modes integrating with public transit modes and giving preference to active transit. Understanding city government expectations for how AVs should operate (outside of typical concerns about risk and liability) can help deployers to build a better business case for deploying into a new city.

One of the biggest barriers to the rollout of AVs in cities is risk



Making AVs ready for cities

In practice, the bulk of the work still required for the successful introduction of AVs into cities is on the part of AV developers. Indeed, the lesson of history suggests that a go-to-market strategy requiring significant initiative on the part of city governments is suspect at best.

For example, the vehicle-to-everything (V2X) market has been held back for over 20 years by limited first mover advantage—vehicle-to-vehicle (V2V) applications require a significant installed base,

therefore it was hoped that installation of V2X modules in infrastructure would enable a host of vehicle-to-infrastructure (V2I) applications to encourage adoption of V2X modules in cars. Suffice to say, this market dynamic did not exactly manifest as hoped. Why should cities with stretched budgets commit significant resources to enable an unproven technology for the sake of the automotive industry? If a safety focus on reducing collisions did not save V2I, it can't be expected that city governments will come to the rescue of AVs on their own initiative and at the taxpayer's expense.

No, the onus is ultimately on AV developers and deployers to make their systems safe for city deployment, and their AV applications relevant for the transportation headaches common to all cities. Priority number one should be provable safety through deterministic safety models, such as that being developed by IEEE P2846. A probabilistic, black-box approach accompanied with a promise that it definitely works is not going to wash with city governments any longer, and the more AV deployers can involve each city government in the exercise of balancing assertiveness and safety, the easier they will find it to expand their geographic footprint.

About the author: James Hodgson, Principal Analyst at ABI Research, conducts research relating to the field of autonomous driving and smart mobility, with a focus primarily on quantitative forecasting and analysis in the areas of advanced driver assistance systems (ADAS), autonomous driving, and connected infotainment

INTERVIEW:

Paul Champion, Chief Executive, TRL

Freddie Holmes speaks to the head of the Transport Research Laboratory about real-world autonomous vehicle testing

Mainstream autonomous vehicle (AV) research has evolved from a point where tests were performed on private test tracks and closed competitions like the DARPA Robotics Challenge, to real-world trials on busy public roads. Getting to this point has taken significant investment from a wide array of stakeholders and public bodies, and viable applications are finally becoming clear.

The AV industry remains in its infancy, but more cities than ever are beginning to support real-world test beds. Proponents for the technology argue that if such vehicles are ever to

operate safely without human support drivers, they must be given the chance to experience normal traffic conditions. [The risks of deploying a 'half-baked' solution have been made clear](#), but activities in this space continue with vim.

The Transport Research Laboratory (TRL) is a Wokingham, UK-headquartered consultancy where a team of technical specialists has been scouting safer, cleaner and easier forms of transportation for nearly 90 years. It has been closely involved with the UK government's push to trial AVs on public roads, and was a key collaborator in [the StreetWise trial that recently concluded in London](#).

The Smart Mobility Living Lab (SMLL) is a real-world testing environment in London

The study found that consumers in the city are becoming more comfortable with the notion of riding in an AV, and marks an important step in finding suitable applications for the technology. The rhetoric might seem that cities are fighting tooth and nail to get AVs on their streets, but the reality is that most municipalities remain cautious for now. Before any firm investments are made, the technology must demonstrate the ability to solve specific pain points, be that traffic congestion, staffing issues facing overnight public transport services, or universal access to mobility for the city's occupants.

As Paul Campion, Chief Executive of TRL, told *Automotive World*, city authorities must ask not how AVs can be accommodated, but whether AVs are the right solution.

Could you describe TRL's background in road safety and more recently, AVs?

From the very early days, TRL has been associated with the way that road safety is built in to the fundamental design and structure of the environment—TRL invented the zebra crossing, for example. With respect to the planning for AVs, we are involved in the very latest studies, and helped to shape the PAS 1881 standard that aims to support the safe testing of such

vehicles. TRL's long-term expertise and passion for safety are expressed in precisely that guidance, which helps cities think about roads in the context of evolving technologies.

We are also closely involved with the Smart Mobility Living Lab (SMLL), a real-world test and development environment that is part of Test Bed UK. Through this, there are currently six new mobility test beds across the country which are being used to test connected and autonomous vehicles. We do not have the authority or desire to put anything on public roads that is not street safe, and while we work with many regulatory authorities around the world, we have nothing to do with enforcing any regulations.

Has regulation stifled or spurred the development of AVs?

The UK has pursued 'agile regulation' because it has recognised that regulation is not simply about a set of rules for

things you cannot do. As we enter radically new areas of technology and innovation, an absence of regulatory barriers could mean we do a disservice to the companies involved.

The truth is that we don't know what the future of these products and services will look like, and so companies might invest time and money in developing solutions that eventually become unacceptable in a social or legal context. It is far better to have an open dialogue between regulators and industry so that the infinite degrees of freedom that technology affords can be guided by what will become regulatory and socially acceptable. That way, investment is focussed on things that are commercially viable.

How important are real-world tests, and how does TRL collaborate with local authorities?

Real-world test beds are a new way of enabling public authorities and the commercial players that work with them to



There are greater benefits to automation than convenience



ensure these vehicles will be effective, safe and efficient. TRL is immersed in the design, set up and implementation of these public tests, and the authorities ensure that we comply with local regulations.

We have worked very closely with Transport for London (TfL) and the relevant London boroughs because they must be satisfied that we are not doing something that goes against their legal obligations or interests. If you were to walk, cycle or drive through the SMLL in London, for example, you would not even know you were in a test bed—it is simply an area of standard public roads.

It is also incredibly important that we work alongside insurance companies. It is often overlooked that autonomy cannot happen

until the AV can be insured. You need a forward-thinking and innovative insurance industry, and thankfully we have that in the UK.

What have you learned from the numerous public tests in which TRL has been involved?

We have learned that all the challenges and problems of urban life are present in London in particular, but also that the city is small enough for all stakeholders to work together. We have also learned that it is not really about the technology. The real challenge is far more significant and interesting than simply: “I have a robotaxi, so how can I make everyone want a robotaxi?”

It is tempting to focus on the excitement of robotaxis, but it is a small subject within a wider set

of questions, such as: how can autonomous driving technologies create a better realm of living; how do they work within the complicated network of products and services; how do they integrate within the energy system; and how do all these different sectors come together to create this new world?

We have a set of technological possibilities that have not been available before, and we should be asking whether robotaxis are the right solution, and if so, in what context.

What other applications for autonomy are showing promise?

I believe that autonomy is likely to be introduced within a more niche set of use cases, such as

The StreetWise trial took commuters along a busy route in London

logistics. The logistical challenge of moving goods in and out of a city is fundamental, and autonomy can probably play a role here sooner than it can with a robotaxi.

Think about overnight truck freight, which not only requires drivers to work night shifts but keeps locals awake. There is often concern around how automation might impact employment here, but the driver's job is not really to drive the truck: it is to ensure that the goods are safely delivered to where they are needed on time, and that the correct paperwork is signed for. We call it a driving job currently because there is no alternative, but if the truck drove itself, the job would still be there because of those fundamental customer service duties.

The same thinking could be applied to a district nurse, who is required to hold a driving license and will spend a significant portion of the day driving to see patients. However, that is clearly not a 'driving job' at all—the job is to be a nurse. And if healthcare providers are able to employ those who do not hold a driving license, that might open up access to a whole new set of highly-skilled people that are currently excluded from the opportunity. If the car is doing the driving, those nurses will feel fresher and have more time to

do their real job, which is caring for people. There are many jobs where driving tends to dominate the work day, and we need to investigate use cases in which autonomy can be applied to release some of those constraints.

How might cities adapt as a result of automation in coming years?


We need to find out how automation can best serve society and how to allocate the space inside our cities, which will not see any significant change.

I'm sure that at some point in the future we will have full SAE Level 5 autonomy, but that could be some time away, and it will likely be quite expensive.

These vehicles will not be able to do anything that a chauffeur cannot, and so we need to be careful when it comes to understanding the economics of those business models. More realistically, we will have technology that is perhaps not quite ready to tackle normal city streets as they are, and so dedicated lanes might be needed. However, a city would rightly ask: is this really the best use of our road space and budget?

I'm optimistic that automation will bring many other benefits in addition to robotaxis; it will enrich the way jobs are carried out, create new economic opportunities, and will be one of the ways in which cities can negotiate the challenge of climate change.





Apollo Tyres: COVID-19 response case study

**This global tyre giant offers an interesting case study into one company's efforts to not only survive the crisis, but thrive within it, writes
Megan Lampinen**

CCOVID-19 has impacted all players along the automotive value chain, abruptly halting operations and sending companies scrambling to secure capital and cut costs. With an economic downturn hot on the heels of a health crisis, some industry watchers think it could take four to five years before sales volumes return to pre-pandemic levels. Most automotive manufacturers and suppliers have been quick to adapt to this rapidly changing environment.

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I haven't met so many of my staff in the past as I have since the lockdown and this is because of virtual meetings

*Neeraj Kumar,
Apollo Tyres*



Apollo Tyres offers an interesting case study into one company's efforts to not only survive the crisis, but thrive within in. The multi-billion dollar global tyre producer rapidly took decisive actions to minimise the impact on business—raising funds, reallocating expenses and shifting product launches online. Above all, it was determined to continue innovation. London-based Neeraj Kanwar, Managing Director at Apollo Tyres, talks through the company's crisis response and how it has positioned it stronger than ever for the new normal.

Can you highlight some of the ways in which Apollo managed to raise capital during the crisis?

I am pleased to say that global private equity giant Warburg Pincus showed confidence in our growth prospects, management and invested by purchasing compulsorily convertible

preference shares in the company. This helped us raise capital.

What early steps did you take to address costs?

We quickly shifted gears to adapt to the new normal. The first step we took when the lockdown kicked in was to take salary cuts at the top level and halt pay rises across the company. We renegotiated our contracts, reduced our engagement with consultants and deferred all discretionary spends. Our focus was on conserving costs.

We also decided to reduce what we call 'bad' costs. We looked at rationalisation and optimisation of our real estate across our key markets. On the supply chain side, we went for optimising freight and storage costs. Another key decision we took was to continue with our planned factory openings and

product launches—we just had to go digital for this. We held virtual opening ceremonies, virtual dealer-meet conferences and virtual product launches. They have been powerful and successful and at a fraction of the cost of live events.

Leadership. We also added an extension to our existing facility in Gujarat, India. As technology is one of our key pillars of growth, we have not sliced our R&D expenses. While we have rationalised our investments, planned capex will continue

What other more general changes to your business practice could stick around even after the immediate health concerns abate?

I haven't met so many of my staff in the past as I have since the lockdown and this is because of virtual meetings. As a company, we will continue to become more digitised. Moreover, we launched more than 30 online courses since mid-April. E-learning is becoming a way of life for all of us. I have been logging onto the Apollo Virtual Academy to learn. Our HR team continues to roll out programmes spanning industry knowledge, business skills and COVID-19 specific programmes, and I am glad to see the number of people taking up courses going up every week.

Outside of in-house training, can you flag some of the more significant virtual successes for Apollo in recent months?

Our Europe region successfully concluded the virtual launch of the new Vredestein Wintrac and the new Vredestein visual identity. This was a phenomenal success. A typical launch would cost us around €1m (US\$1.18m), but the team's virtual launch was done at a fraction of the expense and at the same time we engaged with ten times more partners in trade and media compared to the usual launch, where we generally engage with around 400 people. The APMEA Sales & Marketing also successfully connected with more than 1,500 dealers via a webinar across India, further strengthening our relationships with the dealer

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We will continue to invest and expand our digitisation process even after we go back to the pre-COVID environment

You mentioned 'bad' costs, but what constitutes 'good' costs and how have you handled these?

R&D and innovation are our 'good' costs and we will continue to invest in this area. Despite COVID-19 and economic hardships, we decided to press ahead and open our seventh manufacturing unit in the world, located in India. Our first tyre rolled out from the new Andhra Pradesh greenfield facility on 25 June. The digital launch of the event was attended by the Supervisory Board and the Senior

towards our newest greenfield in Andhra Pradesh.

Will any of the temporary cuts or closures made during the crisis prove permanent?

We haven't gone for any temporary or permanent redundancies because of COVID-19. However, we had announced our intention to specialise the Enschede facility, in the Netherlands, to manufacture speciality tyres, which would lead to certain job losses. This was done before COVID hit us and this would be a permanent move.

network while eliminating costs such as travel, boarding and lodging. Using virtual learning and e-launches have been a welcome outcome in these challenging times. We will continue to invest and expand our digitisation process even after we go back to the pre-COVID environment.

How big a financial impact will COVID have on your business this year and when do you expect to return to pre-pandemic levels?

We are still living in uncertain times and it will be difficult to put a figure on the financial impact that will be there on our business. However, there are some positive signs. We have noted an extremely buoyant demand in the aftermarket, with record sales being witnessed in June in India. The market in Europe is also seeing a spike. As for the future, we are hoping that we would return to 90% of pre-COVID levels in Q2 if there are no further surprises. Meanwhile, we will continue to conserve costs as much as we can and continue to invest in technology and brand.

From an industry perspective, did the crisis uncover any fundamental flaws in the supply chain model? How might it evolve in the wake of COVID?

Coronavirus and recent trade wars have made one thing clear—the current supply chain model in the automotive sector is unsustainable. The automotive industry as a whole was too

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We are hoping that we would return to 90% of pre-COVID levels in Q2 if there are no further surprises


reliant on China. What lockdown and COVID-19 have revealed is the need for an alternative to this. Automotive companies have been attracted to China as it is a low wage destination for production costs, but business leaders should now look at parallel supply chains to buffer and mitigate future disruption.

Do you see this pandemic as a near- or long-term challenge for the automotive sector?

Every challenge brings an opportunity with itself. The industry must be agile and flexible to adapt to the new normal for business continuity. We are already witnessing innovations to business models to address this. Not only are the automakers going for more online sales with the likes of click and collect, but they are also introducing subscription models.

In what way might the current situation open fresh opportunities for yourselves and the automotive sector in general? As I mentioned, we have adapted ourselves to a new way of working. We are also looking at expanding our businesses and conserving costs. Finally some green shoots are appearing. In June, we saw new sales in India peaks across major categories, clocking the highest ever sales revenue in aftermarket and creating a new record. Meanwhile, in the truck segment in Europe, June was our best-selling month ever, with 31 new customers across the region. During April and May, we gained a significant share of the market in tractor drive radial tyres and increased our share of account with several key automakers. I would say that both for Apollo and for the sector in general, we can be hopeful.

Autonomy and shared mobility prompt charging innovation

A white car is parked on a city street. A large blue rectangular overlay covers the left side of the image, containing the main title and a sub-headline. The car's front end, including the headlights and grille, is visible on the right side of the image. The background shows a blurred city street scene.

Automatic charging wouldn't just improve convenience, but could also better enable shared mobility and autonomy. Wireless is one solution, and matrix charging is another. By Xavier Boucherat



The vast majority of electric vehicles (EV) rely on the plug as a means of charging, and for most, this is perfectly acceptable: plugging in a car involves as much effort as re-fuelling one. But this hasn't stopped some parties from exploring alternative methods, which could address future problems and requirements for fleets, along with with creating a completely seamless experience for customers.

Chief among these is wireless charging, most recently seen in Oslo, Norway, where Jaguar Land Rover has partnered with Momentum Dynamics for the ElectriCity project. 25 compatible I-Pace SUVs will take advantage of charging plates installed throughout the capital, and help to create an emission-free taxi fleet by 2024.

Momentum Dynamics has stressed the importance of wireless charging for the commercial vehicle (CV) industry, including busses: strategically placed, wireless chargers offer frequent bursts of charging throughout the day with no driver action required. Compared with a single, daily burst of charging at a depot, this potentially improves battery longevity and eases pressure on the power grid. What's more, it could provide a charging solution for autonomous fleets, which without a driver would lack the means to plug in a vehicle.

However, the technology remains some years out. Wireless charger costs remain high, vehicle compatibility remains low, and efficiencies are generally lower

compared with plug-in charging. In addition, the experience is accompanied by its own challenges: wireless charging generally requires a high degree of alignment between vehicle and plate, which could prove tough for larger vehicles like buses.

A third way?

One company exploring an alternative approach is Easelink, which has developed an automatic conductive charging solution it calls 'Matrix Charging', allowing both 22 kW AC and targeted 50 kW+ high-power DC charging. The system consists of two components: a vehicle unit on the vehicle underbody, and the charging plate in the parking space surface. Once the vehicle is parked above a charging plate, the connector is deployed to make a physical connection.

The company stresses the robustness of the solution, with no moving parts outside of the connector housing, along with a charging efficiency comparable to plug-in charging. It also solves the alignment challenge presented by wireless via selective activation of contact pins to compensate for parking misalignments. Hermann Stockinger is the Chief Executive of Easelink, and as he explains, mobility is being driven by three major trends: powertrain electrification, mobility as a service (MaaS) and autonomous driving. Matrix Charging has been developed to meet the needs of all three.



The vision behind the technology is to turn all EV parking time into charging time

Application basis

Easlink is based in Austria, where from 2025 onwards, all new taxis and rental cars must be emissions free. There it is participating in a consortium with two major taxi offices, the city of Vienna and more, with the goal of piloting e-taxis using Matrix Charging. From there, it wants to help create a framework for successful electrification of taxis.

“In order for electric taxis to operate in a similar way to conventional vehicles, automated conductive charging is a key factor,” suggests Stockinger. “With chargers at stands, we can use existing standing times, and if the connection and disconnection from the network is automated, vehicles can be charged semi-dynamically: vehicles can connect to the grid, disconnect, move forward, connect again, and so on, all without a driver having to jump out of a vehicle to plug and unplug.”

Other projects are already live. The company has worked with Energie Steiermark, an Austrian energy supplier, to power vehicles in its fleet since 2018, and has also provided a number of proof of concepts for interested automakers. In May 2020, a partnership with the city of Graz put Matrix Charging to work for a car-sharing service, which Stockinger says is providing valuable real world

“These trends are forcing OEMs to adapt their powertrain configurations as well as charging system setups. As a tech company, Easlink is closing the missing link by developing automated charging for EVs,” he says. “The vision behind the technology is to turn all EV parking time into charging time.”

Matrix charging could offer the same automatic capabilities seen in wireless charging, whilst solving efficiency challenges



performance data and user feedback ahead of standardisation.

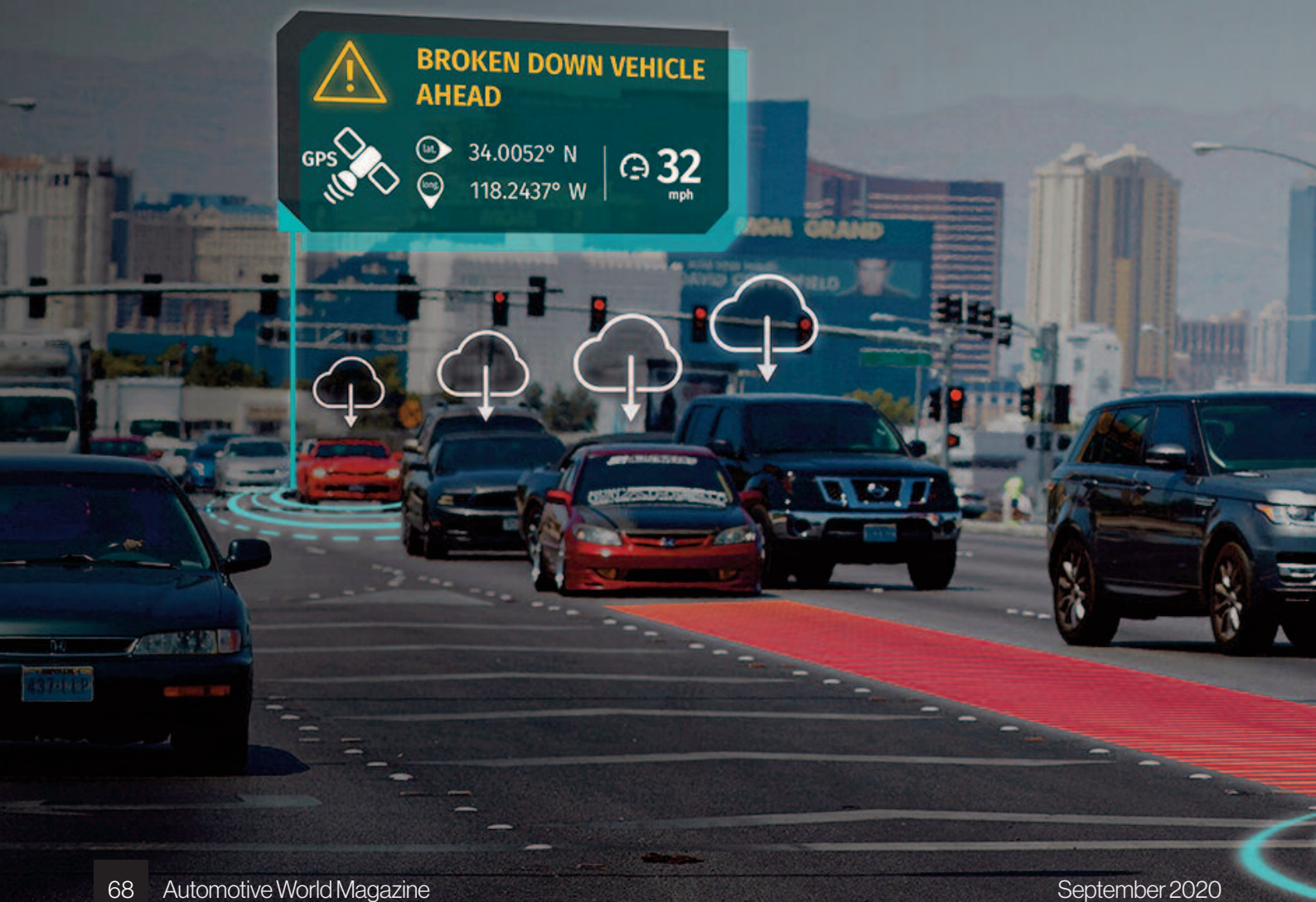
“The rise of EVs, the development of autonomous driving and user desire for convenience make automation indispensable,” he says. “A worldwide standard for automated charging is needed to establish compatibility of the electrical vehicle with charging infrastructure, and this is what Easelink wants to build.” A high scalability rate of Matrix Charging, he adds, can be achieved through licensing models within the automotive and infrastructure

industries. Serial production is scheduled to start in 2023.

For now, however, the technology remains in early stages. It seems indisputable that industry megatrends and the new business models that will subsequently emerge—such as MaaS—will call for new charging solutions. The fundamental challenge of electrifying fleets remains very much ahead of automakers, and the continued scaling of plug-in solutions remains certain, but early innovation in the field could one day benefit some applications greatly.

ADAS nomenclature standards pave way for autonomous driving

Efforts to standardise the terminology around advanced safety technology is much more than a pedantic dictionary exercise: it's pivotal to AV success. By Megan Lampinen



Advanced driver assistance systems (ADAS) could offer tremendous near-term safety benefits and set the stage for fully autonomous vehicles (AVs). But not if current levels of consumer confusion persist. While more than 90% of new vehicles sold today have at least one ADAS technology, studies have shown that many consumers are either not aware of the ADAS systems they have in their car or do not understand how they work or what they can do. If consumers don't feel comfortable with these systems, they may disable them. If they overestimate their capabilities, they will over-rely on them. Neither approach will produce the safety benefit these systems promise.

"We need to do a better job of educating consumers around these technologies," asserted Kelly Nantel, Vice President of Roadway Practice for the National Safety Council and a

Co-Chair of PAVE (Partners for Automated Vehicle Education). "That understanding will help them embrace it. These ADAS technologies are building blocks towards confidence in higher levels of automation. We have to get it right now so we can reap the benefits of AVs down the road."

Nomenclature

A big part of the consumer education piece revolves around standardised naming for ADAS. The problem is that there hasn't been any official standard. In 2018, AAA's Automotive Engineering team examined 34 vehicle brands sold in the US with the aim of identify the number of unique names manufacturers use to market ADAS. There were many. Automatic Emergency Braking alone was known by 40 different names, while the likes of Adaptive Cruise Control and Surround View Camera were linked to



20 different names each. It's a similar case for almost all of the ADAS features installed in modern vehicles.

"We cannot begin to understand a particular system if we do not know what to call it," said Greg Brannon, Director of Automotive Engineering and Industry Relations at AAA. "If we cannot decide whether we are talking about the same thing or not, how can we get into performance standards around their use or care about how they work? We can't begin that conversation."

AAA was the first to put forward a common standard for system naming based on the functionality. "This was a monumental first step," Nantel stated. The terminology was designed to be simple and specific, targeted not at engineers so much as at consumers. The SAE had previously released a 'Levels of Driving Automation' standard, defining six levels of driving automation from no automation to full automation, but these are geared at professionals in the field. "For the average driver these levels are confusing and they do not provide

any clarity," she added. AAA was particularly concerned that the SAE Level 2 automated systems could result in a dangerous over-reliance on the systems. Its research found that when systems carry names like AutoPilot or ProPilot, 30% of Americans believe they have the ability to drive the vehicle themselves.

Starting point

The recommended nomenclature list is just the starting point, and will be continually refined as new systems are developed. "This is an iterative process," clarified Nantel. "It's a first step—a big step—and the more organisations that embrace it, the stronger it becomes."

A number of other industry bodies have indeed embraced it, including the National Safety Council, Consumer Reports, JD Power and SAE International. In August, PAVE threw its support behind the movement as well. "We know that confusion about that technology reduces trust and confidence in vehicles today and

Figure 1: Sample of names advertised for various ADAS features

ADAS Feature Selection of Marketed Names	
Adaptive Cruise Control	Adaptive Cruise Control, Smart Cruise Control, Intelligent Cruise Control, Adaptive Cruise Control with Queue Assist, Dynamic radar cruise control, Distronic Plus, Traffic-Aware Cruise Control
Lane Keeping Assistance	Active Steering Assist, Audi Active Lane Assist, Intelligent Lane Intervention, Lane Departure Alert with Steering Assist, Lane Keep Assist, Lane Sense Lane Departure Warning Plus
Blind Spot Warning	Active Blind Spot Assist, Audi Side Assist, Blind Spot Information System, Blind Spot Intervention, Lane Change Alert with Side Blind Zone Alert, Lane Change Assistant (Side Assist), Smart Blind Spot Detection
Surround View Camera	Surround View System, 360 View Monitor, Intelligent Around View Monitor, Multi-terrain Monitor, Bird's Eye View Camera, Surround Vision, Top View Camera System, Wide Front View & Side Monitor

Figure 2: Proposed standard ADAS terms - Automated driving tasks

Automated Driving Tasks	Definition
Adaptive Cruise Control	Controls acceleration and/or braking to maintain a prescribed distance between it and a vehicle in front. May be able to come to a stop and continue .
Lane Keeping Assistance	Controls steering to maintain vehicle within driving lane . Ma y prevent vehicle from departing lane or continually cente r vehicle .
Dynamic Driving Assistance	Controls vehicle acceleration, braking, and steering. SAE standard definition of L2 Autonomous systems outlines this functionality.

vehicles under development for the future,” PAVE Executive Director Tara Andringa commented. “PAVE’s mission is to help everyone join the conversation about our transportation future, and providing clear, consistent vocabulary for that conversation is an important step.”

If this terminology agreement marks the first step, what’s to follow? “As we start to create a common narrative around the technologies, we can then dive into how they perform and look at whether performance is consistent across the board and how they are rated,” suggested Nantel.

Some have suggested that the effectiveness of this standard hinges on how widespread the definitions and descriptions become. For Brannon, the SAE’s official endorsement in May this year was “a tremendous boost”, as its strong global reputation lends credibility to the policy. Endorsements from other notable industry players and organisations have also been flagged. “It was a huge step forward when US Secretary of Transportation Elaine Chao and the Department of Transport acknowledge the need for it and embraced it,” said Kelly

Funkhouser, Programme Manager, Vehicle Interface Testing and Head of Connected and Automated Vehicles at Consumer Reports. “As more organisations come forward and adopt it, the easier the messaging becomes and the clearer the consumer understanding it. And that is where we will make the most progress.”

But is a voluntary standard enough to effect industry change, or should this evolve into an official regulation? Opinions will vary, but for now most of the organisations behind the nomenclature appear satisfied with its voluntary nature. “Right now is probably not the time to seek federal regulation on any topic,” said Brannon. “It is just not the way that things are being done at the moment. Instead, you will see what we’ve done here, which is a coalition of the willing. When you get industry moving forward on something, regulation becomes unnecessary. In some ways we are able to move quicker, not waiting on government to work through the regulatory process. It’s not perfect. Would we love a regulation that adopts this and makes it required? Sure, but it’s not going to happen.”

Freight technology will help US trucking through the capacity crunch and beyond

The widely-predict COVID-19 capacity crunch has arrived in the US. Digitisation will be key to keep carriers on the road, and brokers in business. By Xavier Boucherat





In the US trucking and freight sectors, the widely-made predictions of a capacity crunch have come to pass. The speed and severity with which freight volumes dropped and then rose again in the wake of COVID-19 was such that a significant amount of the trucking capacity which disappeared has yet to reappear.

What is the role of technology in meeting this challenge? Speaking in a recent FreightWaves webinar was Tom Curee, Senior Vice President for Strategy and Innovation at Kingsgate

lose work. At the same time, if carriers aren't getting access to freight or the lanes they're used to getting, it kills the dedicated resources we've developed over the last 30 years."

Technology, he said, has been huge in helping Kingsgate to engage with carriers earlier in the process. Right now, with capacity in demand, carriers are in a position to pick and choose their shippers and brokers, and whilst rate is an important consideration, so too is how effectively a company leverages technology. "Rates have to be

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Brokers need to help carriers get back to where they were before, and they're looking for partnership relationships to achieve this. The more a company can lean into this and make it a part of their DNA, the easier this capacity crunch becomes to get through

Logistics, a third party logistics (3PL) firm. He emphasised that those companies looking to survive must accept and learn to work with a turbulent environment, which can harm both shippers and carriers.

"As a 3PL, Kingsgate Logistics needs to please players on both sides of this coin," he says. "If my shippers aren't getting access to capacity, then we

competitive," said Curee, "but if two companies have a similar rate, the carrier will always go with whoever has the stronger tech base. This will make it easier to do their jobs whilst out on the road."

A truck drivers' time, for example, is extremely valuable, particularly among owner-operators on jobs. The traditional ways of contacting brokers



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and shippers—primarily by telephone—are no longer convenient. In such a busy, fragmented space, an app could provide carriers a way to establish their availability digitally, outside of office hours. Making their experience as positive as possible is more important than ever for 3PL companies, he said, and without technology, this is hard to pull off.

However, he added, the risk is that countless shippers will conclude the way forward is to develop their own app, primarily for tracking purposes. For drivers, who already work across a number of companies, this is a nightmare that’s already coming to life. Many owner-operators, he said, are already being made to work with several apps.

All-in-one?

Prasad Gollapalli, Founder and Chief Executive of Trucker Tools, a digital load tracking and freight matching software developer, said this had the potential to breed inefficiency in the supply chain. “If a small carrier is being sent from technology to technology on a single load, we have already made that carrier inefficient,” he says. Conversely, if a single app can handle a load, a carrier potentially stands to increase their average number of loads by as many as two to three per month.

As such, companies like Kingsgate have the option of third party software companies like Trucker Tools. On the one hand, explains Curee, the API gives shippers the data and tracking

they need via the system they require. On the other hand, carriers are brought into a single app and are also offered access to specialists such as fuel-optimisation experts. These are things that owner-operators understand the value of, said Curee, such as digital document management and predictive freight-matching. Fundamentally, he says, this would have been extremely difficult for Kingsgate to develop alone.

weekly miles per truck among Kingsgate's carriers to 1,600, a significant fall from last year's 2,000 to 2,200. The pandemic has made business-as-usual impossible, with social distancing and other measures making turnarounds longer.

"Excelling at this time requires deeper conversations with carriers than ever before," said Curee. Moving forward, he expects that the US

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Those brokers who cannot adopt in the wake of COVID-19 will fall behind

Care for the carrier

Now is the time for the freight sector to get a grip on these technologies and learn how to use them in securing capacity, particularly with what may be about to come. "It is going to be a very interesting Q3 and Q4," said Curee. "Conversations with our largest customers suggest volume is really going to start moving. Some of these are e-commerce companies, already having a very good year. The question is, how difficult is this going to get in terms of capacity? And how long is it going to continue?"

The challenge is exacerbated by the ongoing disruption of COVID-19, which has driven down average

trucking sector will emerge with a cleaner, more efficient freight network, but this will not come about by chance. "Brokers need to help carriers get back to where they were before, and they're looking for partnership relationships to achieve this," he concludes.

"The more a company can lean into this and make it a part of their DNA, the easier this capacity crunch becomes to get through." Gollapalli agreed, stressing that keeping carriers in business benefits the entire industry, and that digitalisation will be key in this endeavour. Those brokers who cannot adopt in the wake of COVID-19, he said, will fall behind.