

Automotive World MAGAZINE

Issue 50 | February 2024

Automotive is at the forefront
of 2024's leading tech trends



Xpeng accelerates AI applications | **Toyota finally moves on electrification** |
Volvo pushes ESG messaging | **VW Truck & Bus** CEO weighs in on macro trends |
Motional gauges AV trust levels | **Scania** explores biogas



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Published in February 2024 by:

Automotive World

est. 1992

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ISSN: 2634-9531
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Cover image courtesy of Mercedes-Benz



Automotive is at the forefront of 2024's leading tech trends

Will Girling explores how Capgemini's top five technology trends for 2024 could relate to the automotive industry

From [four-dimensional cabin designs](#) to [virtual production environments](#) and [flying taxi services](#), the automotive industry is permeated by technology that's turning science fiction into science fact. But what could the future hold?

On 5 December 2023, global IT and engineering services consultancy Capgemini gave a media briefing on what it considers the top five technology trends to watch in 2024. These were generative AI, quantum tech, semiconductors, batteries, and space tech. Specifically, it projects that these will all reach an “inflection point” in the next 12 months.

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It's critical to protect [the chips and data in cars] against future quantum attacks

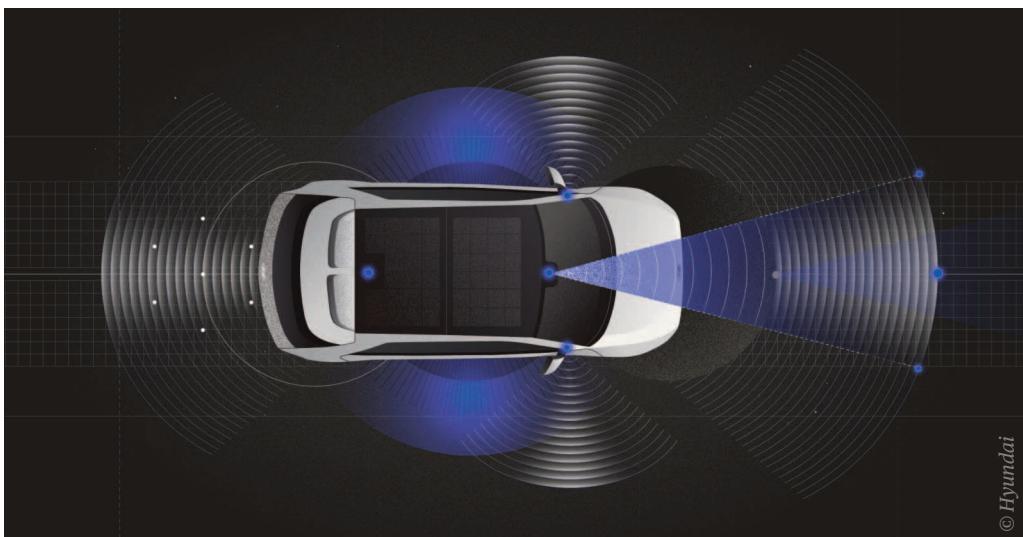
Although the event was not focused strictly on the automotive industry, commentators from the company explained to *Automotive World* why each trend has either direct or implicit relevance to the sector.

Generative AI

Valued at US\$11bn in 2023, the global generative AI market is now expected to reach US\$118bn by 2032, according to Precedence Research. “Generative AI has become very popular in 2023,” said Robert Engels, Head of Lab for AI Futures and Insights & Data at Capgemini. However, for it to reach the next stage, engineers must learn to solve “hallucinations”, where AI algorithms ‘confidently’ present incorrect solutions based on biased or unrepresentative data.

For Engels, an effective resolution will primarily require specialisation, both in terms of use and data. “The applications for the technology have been very general purpose, making it difficult to use them in areas where being exact matters. Generative AI is based on language models, not knowledge.” In the year ahead, he forecasts three points of development: refocusing on specific, task-based applications; combining probabilistic models with deductive/inductive logic; and in-the-field deployment through edge computing.

Developments in automotive indicate that the industry is already following Engels' trajectory. From car design studios using [text-to-image generators](#) to experiments using generative AI as a tool for [fleet decarbonisation](#) and [dealership marketing strategies](#), a range of industry-specific applications are emerging. However, these solutions remain largely at the trial stage and must continue to prove their value in 2024 and beyond.



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Quantum tech

Automakers like [Hyundai](#), Ford, and Volkswagen have already started to explore the use of quantum computers as problem-solving tools, particularly in the development of autonomous vehicles (AVs). However, Julian Van Velzen, Head of the Capgemini Quantum Lab, stated that 2024 could mark the “next stage” of its development and ascendance over classical computing.

“Quantum computers are good at small data, big compute problems,” he told *Automotive World*. Potential areas of interest for electric vehicle (EV) development include chemistry (such as metal corrosion and battery research) and multi-physics (thermal fluid modelling), as well as optimised routing and scheduling for commercial vehicle fleets. “Additionally, quantum sensing may be used in AVs for advanced sensor technology, for example enhanced LiDAR systems or new navigation systems.”

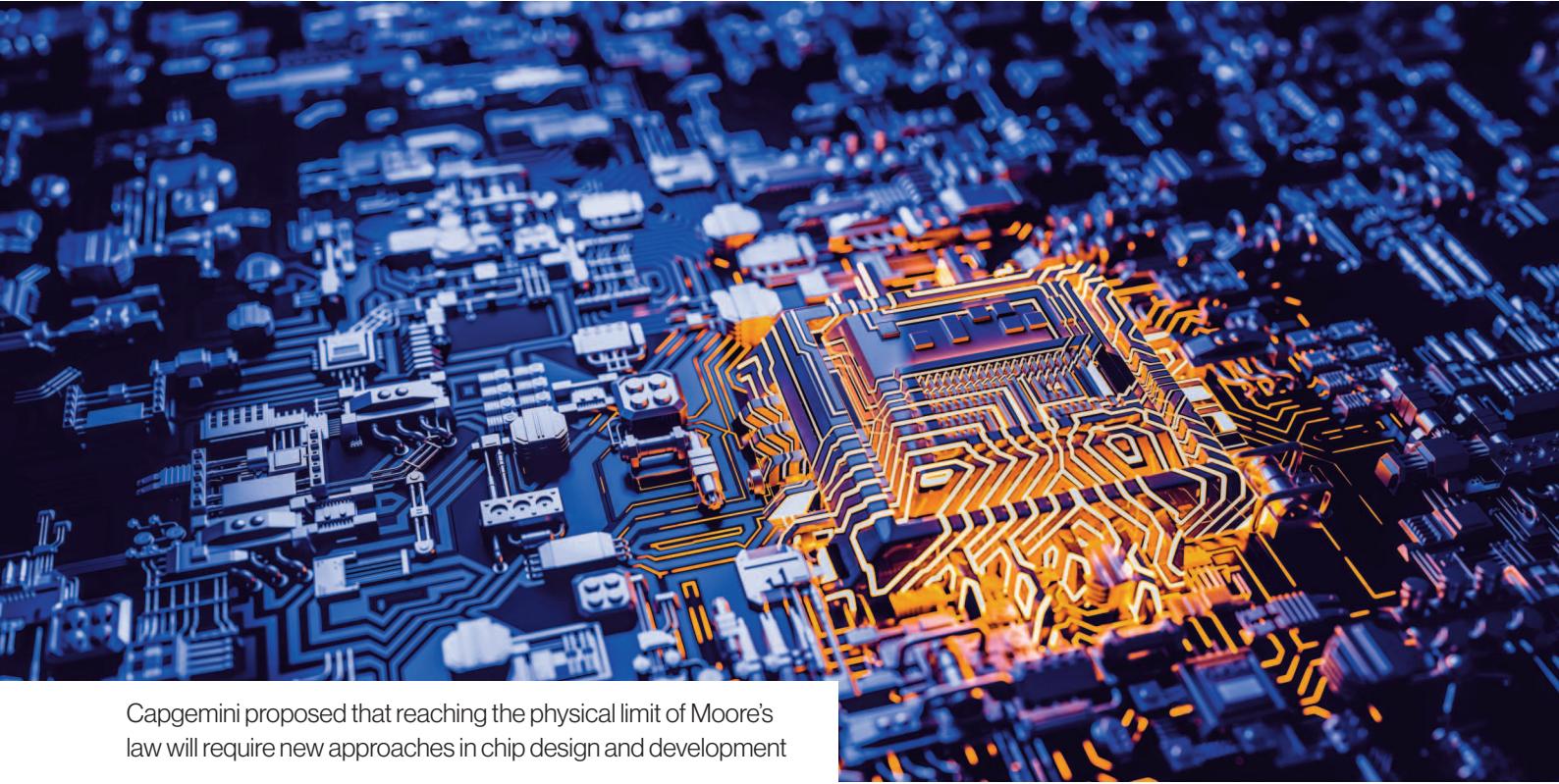
Despite these benefits, OEMs should be aware that quantum technology also enables cyber criminals to exploit vulnerabilities in connected vehicles

much more easily. “Because of the massive amount of data and chips in cars, it’s critical to protect them against future quantum attacks,” Van Velzen emphasised. “Car makers should therefore implement quantum-safe technology, such as post-quantum cryptography or crypto agility.”

This will inevitably be guided by the anticipated 2024 publication of the National Institute of Standards and Technology’s Post-Quantum Cryptography regulations. With these, companies will finally have a framework on which they can base their quantum tech roll-out.

Semiconductors

Capgemini estimates that semiconductors are now the most traded commodity in the world, ahead of crude oil and vehicles. The automotive industry is a key purchaser, although securing stock has been [difficult in recent years](#). As supply chains finally start to catch up with demand, Sanjiv Agarwal, Vice President of Global Semiconductor Industry Leader, anticipates the total chip market exceeding US\$1tr by 2030.



Capgemini proposed that reaching the physical limit of Moore's law will require new approaches in chip design and development

However, semiconductor technology itself is also on-course for a major transformation. Moore's law, the theoretical principle that chip computing power doubles every year, could be reaching its physical limit. Capgemini notes that semiconductors can now be as small as 2nm and have capacitors the size of only a few atoms. Going forward, chip companies may need to experiment with 3D stacking and innovative lithography to unlock further power gains and address specific use cases.

"We're seeing an evolution where car manufacturers are having one-to-one conversations with chip makers to build dedicated products to fit their purpose," observed Pascal Brier, Chief Innovation Officer. This goes hand-in-hand with an increased demand for software on chips, which could facilitate next-gen ADAS functionality.

Consumption demographics for semiconductors, added Agarwal, could also change depending on a regional industry's commitment to internal combustion engines (ICE) versus battery EVs. The average

number of chips per vehicle are 400 and 2,000 respectively. "The kind of technology used in these cars will be different. ICE will consume less advanced semiconductors, whereas EVs will use the latest generation." Therefore, 2024 could start to create a wider divide between the overall sophistication of these powertrain options.

Batteries

Similar to the rise in the quantity of semiconductors, Florent Andrillon, Climate Tech Global Lead, stated that EV batteries will experience rapid growth. Capgemini estimates that EVs will account for around 20% of the global vehicle sales in 2023—up from 14% the previous year. As indispensable components that also make up one third of each EV's overall cost, batteries will play a critical role in the development of e-mobility.

As electrification progresses, two lithium battery chemistries—nickel-manganese-cobalt (NMC) and lithium-iron-phosphate (LFP)—are

emerging as the industry standards, representing 60% and 30% of the market in 2023 respectively. LFP is almost 33% cheaper to manufacture than NMC, which could explain its rapid growth from just a 6% market share two years earlier. Although predominantly produced in China, Andrillon expects OEMs in Europe, Korea, and the US to step up their efforts in the short term.

In addition, the proceeding year could see the standard chemistry mix evolve as the industry confronts challenges concerning the scarcity and price of key minerals. “We don’t expect solid-state to be ready for production in 2024,” Andrillon clarified. However, he does anticipate the energy density of sodium-ion improving to the point of making it a strong contender. Sodium trades at 10% the cost of and is 1,300-times more plentiful than lithium, according to *The Financial Times*. As such, Capgemini predicts that the first factories producing sodium-ion batteries at scale will start appearing in 2024.

Space tech

Meanwhile, space technology is being disrupted by private actors developing innovative new services, such as SpaceX’s Starlink and low earth orbit (LEO) satellites. Patrice Duboé, Chief Innovation Officer for Aerospace & Defence, informed *Automotive World* that this could affect AVs in two ways.

First is the advance of navigation technology. “Autonomous driving would not be possible without GPS. Moreover, very high precision GPS is not just reserved for the military anymore,” he said. Using Hypergeolocation satellites,

positioning accuracy can be enhanced to within 4cm—a substantial improvement on the industry standard of 10m. This could have a significant impact on both the safety and performance of AVs.

Secondly, LEO constellations position satellites at around 600km instead of the 36,000km typical for

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Vehicles can now be connected everywhere on the planet, on every road

geostationary orbit. Duboé explained that this creates seamless connectivity that can enable all AVs to be connected from anywhere with very low latency (less than 50ms) and high bandwidth (“several hundreds of Mbps”). “Vehicles can now be connected everywhere on the planet, on every road,” he claimed.

This next-gen connectivity would also allow automakers to deliver many new high-bandwidth vehicle services as AVs become customers’ [third living space](#) for work and recreation. 2024 may see NASA’s first moon mission in more than 50 years, but it’s clear that the automotive industry should also consider space as part of its immediate future.

Kei cars for Europe?

A regulated and financially supported kei style market for Europe could stimulate demand for small affordable cars which OEMs are struggling to develop quickly, writes Ian Henry

In an intriguing move at the start of December, Luca de Meo, Chief Executive of Renault and current president of European trade body ACEA, called on European authorities to adjust market regulations to create a European version of the Japanese kei car segment. Kei (or keijidōsha to give it its full name) means light automobile and refers to cars which have a maximum width of 1.48m, a maximum length of 3.4m, a maximum engine size of 660cc and 47kW maximum power. The segment was created in 1949 to give as many Japanese people as possible an affordable means of personal transport as the country rebuilt after the Second World War. If judged by its longevity, this policy appears to have been a success as the *kei* segment accounts for 35-40% of the market.

Kei cars tend to be boxy, such as the Honda N-Box which is the best-selling car in Japan. The Nissan Sakura, which has adopted some of the angular features of recent full size car design, has been named as Japan's car of the year for 2022-23. In the 1990s, Suzuki's Cappuccino applied the regulations to a roadster. A small number of kei cars appear in the UK as private imports, but the Japanese companies have never tried to import them officially: European consumers have tended to move away from the smallest segments, with the A-segment seeing fewer and fewer players. The smallest mainstream European car, the Fiat 500, is 3.57m long and 1.63m wide, notably longer and wider than kei cars; the replacement Fiat 600 is

even bigger at 4.17m long and 1.78m wide.

Below the A-segment in Europe, there is a small market segment of minicars or quadricycles, which are even smaller than kei cars; the Citroen Ami (2.41m long and 1.39m wide) is the current most prominent example. The Ami (which will be joined soon by versions from Fiat and Opel) is made in Morocco, with Stellantis planning to make around 40-50,000 a year across the three brands. In France models from Aixam, Ligier, Microcar and others are also sold, and these *voitures sans permis* (VSP) can be driven without a driving licence. But VSPs are rarely sold outside France.

At first glance the evidence for a European kei segment is not especially promising, but a direct mimicking of the Japanese is perhaps not the way to go. It is difficult to envisage the EU sanctioning a new car segment with lower safety standards; but it could create a new segment by mandating a certain ratio of each OEM's sales to have, for example, a reduced maximum speed (eg 50km/hr) and a lower maximum power and battery range capacity than current entry models. Such vehicles could be sold as specifically urban-oriented models, with free parking, reduced road tax and insurance, for example. Whether local urban authorities will be happy to offer free parking or central governments happy to forego road tax is another matter.

But a change in regulations to facilitate a new segment could well help, especially if this favours small EVs. Interestingly, early release pictures for the electric replacement for the Twingo provide an indication of what Luca de Meo is hinting at in his call for a new segment. The first images of new Twingo suggest that it has adopted some of the aspects of the kei segment, such as cube-like styling to maximise interior space. In reality, such cars would have to comply with European rules and not just crash regulations. Future rules



Sales of the latest Honda N-Box began in October 2023

will require on-board cameras to be able to read road signs to enable new technologies such as Intelligent Speed Assistance (ISA) and Emergency Lane Keeping System (ELKS). Meanwhile testing bodies like Euro NCAP will certainly not support any reduction in safety standards.

But small vehicles should not mean any consequential reduction in safety standards; the Nissan Sakura achieved 5 stars in the JNCAP tests (the Japanese equivalent to Euro NCAP) by dint of its seven airbags; the Sakura moreover can reach 80mph and has a reported 112 mile range from a 20kWh battery—so the challenge is on for the European OEMs to do something similar. It is worth noting that de Meo has claimed that early data on the use of Dacia Spring EV show that it is driven no more than 20 miles a day at an average speed of 16mph, reducing the need for a 100kWh battery.

European OEMs have begun to work on cheap entry level models, such as with the Citroen eC3, built on the new Smart Car platform which was developed for emerging markets. Peugeot and Opel versions are expected to follow, with the aim of bringing vehicles to market at less than €20,000 (US\$22,000). Volkswagen is also understood to be in discussions with Renault over using Renault's new Twingo as the basis for a small entry model of its own. Such moves are, however, being driven not by legislation or impending regulatory change but by the undoubted fear of Chinese competition, even if tariffs on Chinese imports are raised. A regulated and financially supported kei style market for Europe would likely stimulate demand for smaller affordable cars which OEMs are struggling to develop quickly; however, whether the EU or European governments have the spare funds to help this market segment is another matter.

The opinions expressed here are those of the author and do not necessarily reflect the positions of Automotive World Ltd. Ian Henry is Director of AutoAnalysis, an independent automotive research and consulting company based in London. The AutomotiveWorld.com Comment column is open to automotive industry decision makers and influencers. If you would like to contribute a Comment article, please contact editorial@automotiveworld.com

OCEANSIDE



Unveiled

CES tech barometer: AI is everywhere

Software and AI dominated the messaging at Vegas, but what happened to the AVs? Megan Lampinen reports back from the show floor

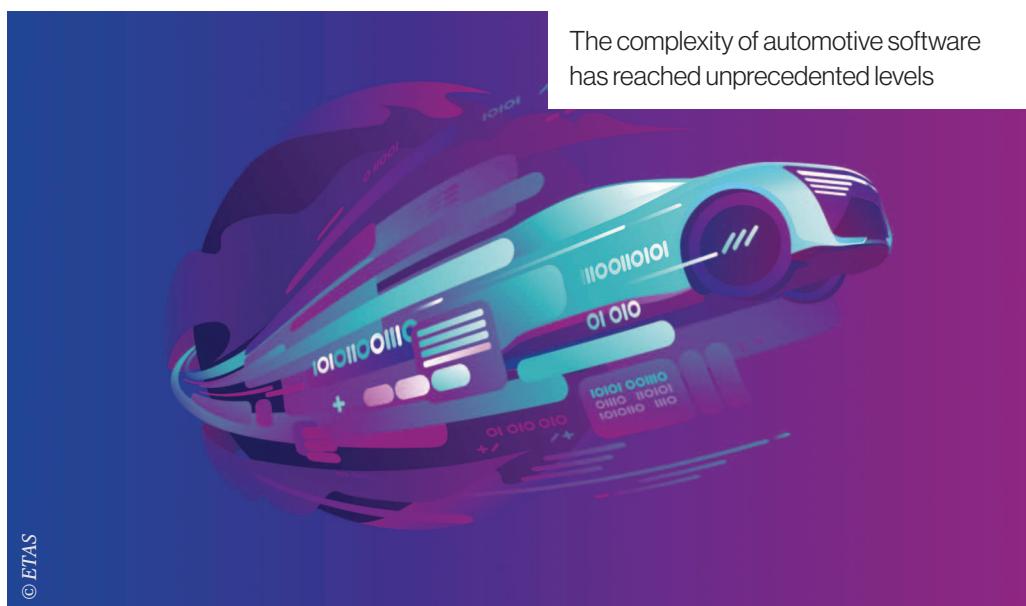
CES is one of the most important innovation events of the year and claims to be the only trade show to showcases the entire technology landscape. Run by the Consumer Technology Association and held in Las Vegas, it brings together players across numerous sectors to highlight potentially disruptive innovation. Within the mobility landscape, CES has come to serve as an innovation barometer, reflecting the dominant trends in the quest for clean, efficient, and safe mobility.

AI everywhere

Artificial intelligence (AI) could represent either the biggest threat or the biggest opportunity for the world as it enters the Fourth Industrial Revolution. While it will likely prove neither bogeyman nor saviour, AI does represent a huge opportunity for technological progress within mobility. Little wonder, then, that it dominated the announcements, booth displays and conversation at CES 2024.

"It's hard to see any press release or keynote that didn't mention the word AI at least once," notes Pedro Pacheco, a Vice President of Research in Gartner's CIO Research Group. While AI was indeed everywhere, the quality and authenticity varied widely. "Some was the real deal, but much of it was hype," he cautions. It's important to distinguish one from the other: genuine AI could lead to breakthroughs while hype hinders progress by setting unrealistic expectations and potentially consumer backlash.

Within the CES mobility displays, much of the AI was directed towards creating more intuitive and personalised user experiences within the vehicle. For instance, Cerence teamed up with Nvidia to develop a large language model, CaLLM. Trained with Cerence's rich dataset composed of billions of tokens, CaLLM paves the way for a new level of digital assistant. Capabilities on display include natural conversations that preserve context from one interaction to the next, acting on commands and

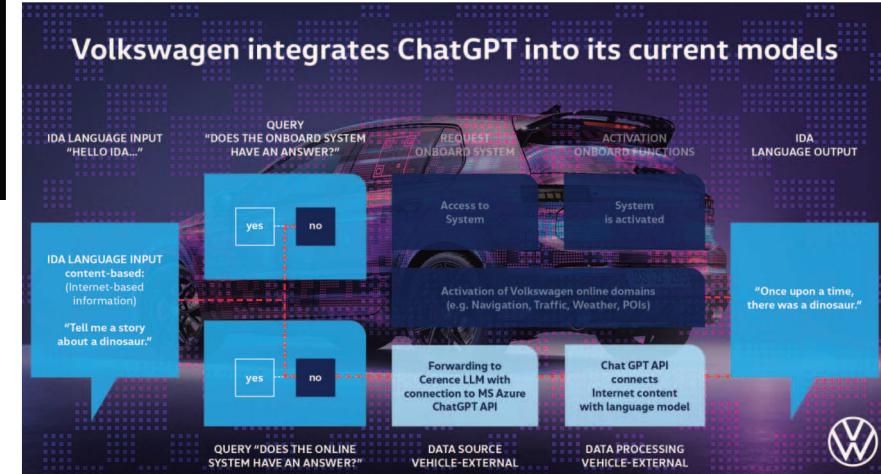




© Volkswagen

suggesting next steps. Pacheco heralds the use of LLM within digital assistant applications like this as “the beginning of a disruption, with major change in terms of HMI.”

Volkswagen showed off how Cerence Chat Pro allows it to integrate ChatGPT into the backend of its voice assistant to push the boundaries of what is possible. That now includes using the IDA voice assistant to control the infotainment, navigation, and air conditioning, as well as to answer a wide range of auto-specific and general knowledge questions.



The likes of Harman, Qualcomm and Mercedes-Benz were talking about how AI could and is reshaping the in-vehicle experience. Even Turkish electric vehicle (EV) start-up Togg focussed on the AI radio tailored to individual preferences. The end game for many is to turn the car into

the third space, referring to the concept of a living area separate from home and work. “The industry is coming to a point where the voice assistant is doing tasks for you, not just answering questions,” emphasises Pacheco. “This will be a step change in turning the car into a real third space. It’s not there yet, but it could be one day when the voice assistant becomes a real personal assistant.”

Software development

With a growing interest in AI comes the need for more software expertise and efficient software development. “If players want to be successful with a software-defined vehicle (SDV) in the future, they need to develop their applications at least ten times faster,” ETAS Chief Executive Thomas Irawan tells *Automotive World*. “Imagine if it took three years to get a new feature on your smartphone.” Numerous vendors had their own take on what adjustments were needed to existing software development strategies and their own tools to speed development.

Bosch and Qualcomm drew considerable interest with their announcement of a new cockpit and ADAS integration platform based on the Snapdragon Ride Flex system-on-chip (SoC). Designed to support mixed criticality workloads, it allows for infotainment and ADAS functions to co-exist on one single SoC. This marks a considerable advance in vehicle architecture, as mixing the two domains has traditionally been “seen almost as sacrilege,” observes Pacheco. He goes on to suggest that “centralised architectures will become more centralised until we



The MBUX Virtual Assistant transforms the car-driver relationship with natural, conversational interaction



Mercedes Drive Pilot

have just one HPC.” That simplification leads to cost savings and faster software development.

Automated vs autonomous

While the SDV is squarely on the cards, it’s another story for driverless vehicles. CES has been demonstrating driverless vehicles now for more than a decade, but the lack of noise on this front in 2024 spoke volumes. Aptiv had its usual pavilion but nothing revolutionary



© BMW Group

Within BMW's Personal Pilot function, the Here HD Live Map provides critical information about the car's environment and its route ahead

to share. Vay wasn't on the show floor, but it was showing media around its new Vegas command centre for a coming teleoperation rental car delivery service. Notably, this use case features a limited operational design domain, with teleoperation only on delivery and pick up of the car, leaving the consumer to drive themselves to and from their destination.

"SAE Level 4 has practically disappeared from the show," notes Pacheco. Peaks and troughs of interest are not unusual, and given the recent news from Cruise and the financial struggle seen at Argo, it's understandable if momentum is cooling at the moment. Pacheco also suggests that "fears of economic instability are making investors more cautious, which is a problem as these companies still need a lot of funding."

On other hand, many are going full steam into Level 3. Here Technologies recently secured some significant wins on this front with both BMW and Mercedes-Benz. Specifically, the Here HD Live Map is playing a central role in the Level 3 functionality within the BMW

Personal Pilot and Mercedes Drive Pilot. “Right now, the industry is generally at Level 1 and 2, but we are innovating in Level 3,” Here’s newly appointed Chief Executive Mike Nefkens tells *Automotive World*. “Really locking in Level 3 driving will be a game changer for the user in the cockpit. It is a completely different experience.”

Electric vehicles

While CES has attracted a growing presence from automotive players over the years, it is not and has never been a motor show. It is all about technology, though, and that technology is increasingly finding a platform inside EVs. Visitors would find it hard to wander far before running into one of the many EVs on display in the West Hall of the Convention Centre. Honda and Sony offered a new version of their Afeela electric sedan collaboration, while Mercedes unveiled its electric CLA Concept. There were also EV launches from Kia, Togg, Fisker, Volkswagen and Vinfast, with plenty of e-scooters thrown in as well.

KIA PV5 concept



The Kia Concept PV5



The new Afeela EV

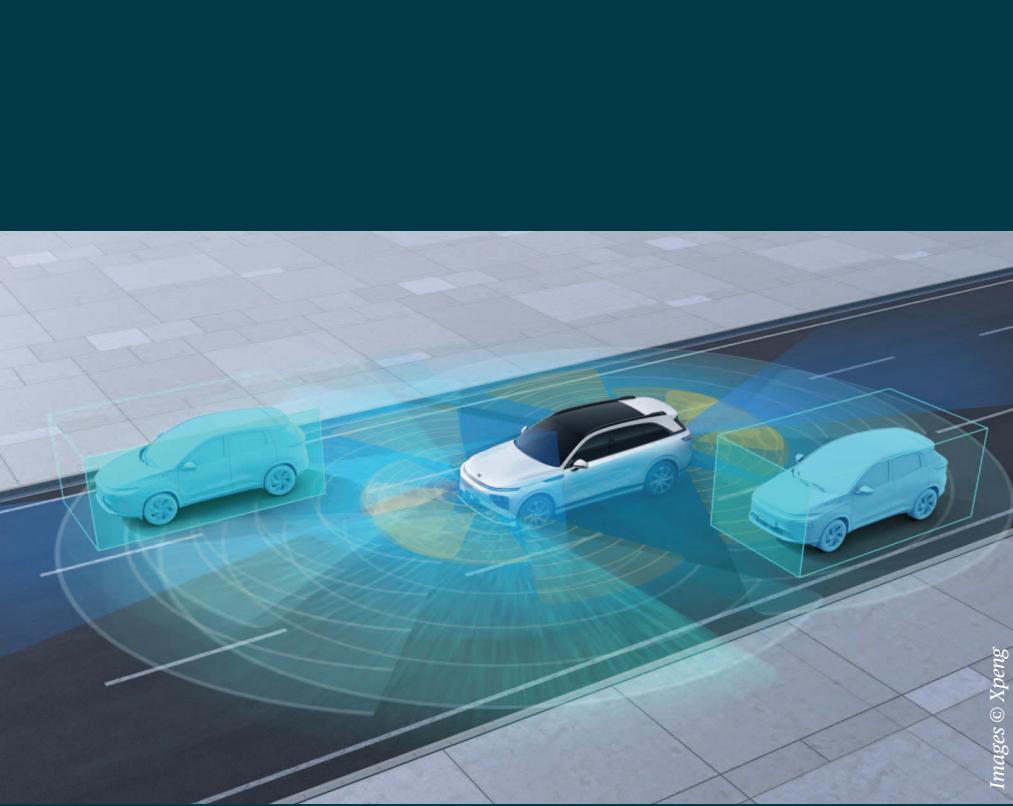


Mercedes electric CLA Concept

© CES

“There was a lot of talk about EVs as always, but I haven’t seen anything revolutionary,” concludes Pacheco. “It’s more automakers and tech vendors making announcements of their EV ambitions; nothing disruptive.”

What is disruptive, however, is the overall transformation of the mobility sector as it repositions from its historic roots in sheet metal to a future founded on software. Perhaps the fact that many of the latest announcements and unveilings seem less than startling confirms that the transformation is solidly underway.



Images © Xpeng

Xpeng positions for AI-defined mobility

Xpeng's focus is shifting from software to artificial intelligence. Megan Lampinen hears more

Software is steadily taking over responsibility for more vehicle functions and providing the foundation for connected cars and autonomous driving. The software-defined car has been widely regarded as the future of mobility, but recent advances in artificial intelligence (AI) could raise the bar even further.

"You used to hear about software-defined cars, but now we propose that AI is redefining cars," Xpeng's Chief Executive and Co-Founder, He Xiopeng, told media at the company's Technology Day in October 2023. "The next five years belong to full autonomous driving and a new era of smart cars, and AI will start to define the vehicle."

That's a bold prediction and carries significant consequences for industry players. Xiopeng suggests that if AI penetrates 50% of a car's capability, then "a significant number of automakers will become obsolete." Xpeng is determined to avoid this fate, and that means relentless and rapid innovation.

Tech highlights

"Technology and mobility go hand in hand," says Liyun Li, Director of Xpeng's Autonomous Driving Centre. "We have a track record of serving the world with technological innovation."



Xpeng Technology Day

In 2020, the OEM became the first in China to achieve semi-autonomous highway driving, which it brands as Navigation Guided Pilot (NGP). More recently it launched an extended version, City NGP, which also tackles urban environments. Reliant on high-definition (HD) maps, the aim was to roll out City NGP to more than 50 cities across China by the end of 2023.

NGP is Xpeng's response to Tesla's Autopilot, and what it believes could represent the final step before full self-driving. Li tells *Automotive World* it is a potential industry game-changer. He also highlights the importance of the more recent ADAS feature, AI Valet Driver. This system can remember a specified route after it's been driven once and then autonomously drive it in the future.

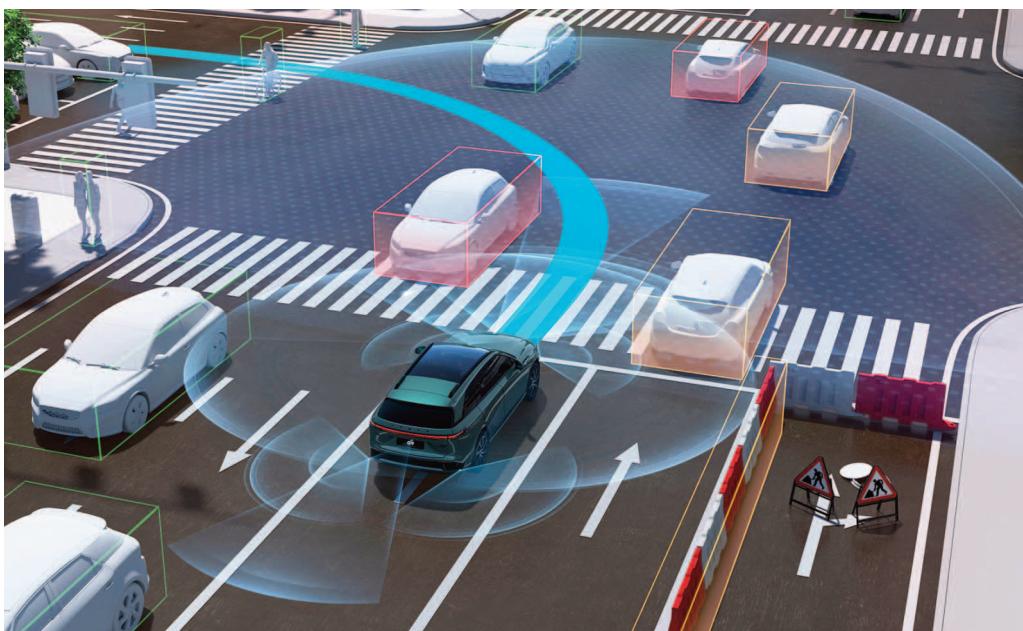
Such advanced capabilities are powered by deep learning neural networks and AI. "We're excited to share the ultimate architecture for our full-scenario ADAS: XBrain," Li elaborates. It is supported by

XNet2.0, the next-gen perception architecture with spatiotemporal understanding, and XPlanner, the neural network-based planning and control system, to enable more human-like learning, thinking and actions.

Li is also particularly proud of SEPA 2.0, the company's full-vehicle intelligent evolutionary architecture. Xpeng spent five years and billions of Yuan developing it. "We believe it is the ultimate technical architecture for high-end smart electric vehicles (EVs) before autonomous driving."

EV technology in general has been the focus of considerable R&D. "The very nature of battery-powered travel requires technology," he observes. The G9 model introduced an innovative powertrain system using China's first 800-volt mass-production silicon carbide (SiC) platform.

"We're aware that users' needs for EVs are changing, and we must strive to develop innovative capabilities that bring high value and experience to customers." Li



points to charging as an example of the practical and useful nature of Xpeng's EV innovation, noting that

“

If you're not at the forefront of developing practical, useful innovations that help our industry evolve, you will be left behind

range anxiety remains one of the biggest concerns for EV drivers, and one of the biggest barriers to purchase. “You just need to look at

the ultra-fast charging capabilities enabled by the 800-volt SiC platform on the G9, which gets drivers in China from 10% to 80% charged in just 20 minutes. That's more than 120 miles in five minutes.”

Looking forward, he sees further innovation opportunities for EVs with smart technology: “The next stage of electrification is intelligence. Rich scenarios and demands will be realised by enabling technology and system architecture to work out the most efficient and enjoyable way to travel as you drive. If you're not at the forefront of developing practical, useful innovations that help our industry evolve, you will be left behind.”

At its heart

“In short, AI is really important,” Li tells *Automotive World*. “We expect AI to disrupt the existing automotive technology system as human-machine co-pilot and AI-powered autonomous driving gather steam and reshape our driving habits.”



The XNGP-equipped G6 incorporates Highway NGP, City NGP and a memory-based parking function

The automaker plans to establish a corporate-level team on ‘intelligence’ to unify the development planning for ADAS, smart cabin, and E/E architecture functions. It has already started applying AI-generated content (AIGC) in its R&D. As a result, the efficiency of coding has increased by 15%. “Our design efficiency has also benefited from using AIGC,” Li adds. The company is simultaneously pursuing partnerships within the AI space, including expanding its existing relationship with Nvidia. The G9 features Nvidia’s Drive Orin high-performance compute, which boasts 508 trillion operations per second (TOPS) and allows it to tackle multiple driving scenarios.

“We are a technology company at heart, which means that AI is not only integral to our products but also embedded within our R&D and processes,” he emphasises. “As technology trends continue to evolve, we will venture into a new era of AI-powered vehicles. Xpeng will be among the most active advocates of this evolution, where we expect to reap substantial benefits.”

What drives innovation?

A self-proclaimed technology company, Xpeng is jockeying for leadership not only with four-wheeled mobility but also eVTOL and robotics. Xiopeng said the company was positioning itself “as an explorer and a revolutionary leader of future mobility.”

Most automakers are aware of the risks of technology for technology’s sake, and innovation is generally directed at addressing specific regulations, environmental concerns, consumer preferences, etc. At Xpeng, Li says it’s all about providing “the best possible driving experience.”

The R&D team alone accounts for about 40% of the company’s entire workforce. “Moving forward, we are fully committed to deepening our in-house R&D capabilities even further and strongly believe that continuing to develop core technologies in-house is the surest way to address our customers’ evolving needs in the long term,” he concludes.



Volvo Cars: Gen Z wants strong ESG messaging from car brands

Winning over younger consumers could depend on automakers showing a deep commitment to social, personal, and ecological responsibility. By Will Girling

Generation Z is proving itself to be a demographic out of step with previous attitudes to car ownership. In 2020, only 25% of 16-year-olds in the US held a driving licence—down from 43% in 1997, according to the Insurance Information Institute. What was once considered an important life milestone is slowly losing significance.

While an April 2023 report from McKinsey & Co found that use of a private vehicle remains the most commonly used form of transport for those under 30, this demographic is also the most likely to utilise a diverse mobility mix. The consultancy concluded that public transport, ride-hailing, car-sharing, and micromobility will all gain market share at the expense of privately owned vehicles.

“Gen Z is young, and when it comes to large investments like a car versus other things in life, such as experiences and travel, data suggests that the latter are generally higher on their agenda,” states Anna Maria Saméus, Head of Market Intelligence at Volvo Cars. As such, the OEM is closely examining how to keep its brand fresh and exciting for future generations.



Saméus claims Volvo Cars' forthcoming EX30 has both "the lowest carbon footprint of any Volvo car to date" and "strong interest" from Gen Z

Changing attitudes

Gen Z's relative indifference to vehicle ownership is directly related to the macro trends that are shaping the world around them, particularly sustainability and the ubiquity of technology. "Many cities are changing their infrastructure focus from streets and cars to pedestrian areas and other modes of transportation, as well as implementing new regulations such as congestion charges, CO2 targets, and reduced parking spots," Saméus tells *Automotive World*. As tech-savvy consumers with the highest statistical access to smart devices of any generation, members of Gen Z can choose to utilise shared and micromobility options that fit into these new urban layouts.

The rising costs of modern car ownership are a further incentive for them to explore alternatives. In Europe, the average price of an electric vehicle (EV) is double that of an equivalent internal combustion engine model. While finance tools can maintain accessibility to an extent, and

[evidence suggests](#) that younger customers are more comfortable using them, prevailing economic factors could also make them increasingly unattractive. "This is especially evident now with increased interest rates and relatively high inflation," adds Saméus. In this increasingly difficult market, conveying brand relevance to Gen Z's lifestyle is essential.

She acknowledges that Volvo Cars' heritage based on safety and practicality may not immediately appeal to younger customers "not in the family stage". However, there is evidence that Gen Z appreciation for the company is growing. In a cross-industry survey conducted by US market researcher the Harris Poll in February 2023, the automaker was ranked as the fifth most popular brand for the demographic overall—in terms of the automotive sector, it was second only to BMW. Saméus believes that fostering enthusiasm will depend on three brand attributes: smart technology, sustainability, and urban design.



Volvo EX30 interior



Meeting Gen Z focus points

Volvo Cars already has a reputation for technological sophistication in the electric era. “Our cars are becoming increasingly smart and seamlessly part of the digital ecosystem,” says Saméus. “This is important for Gen Z, being the first generation born into a digital lifestyle from childhood to adulthood.” The EX90, the opening movement of a wider strategy to create an all-electric and software-defined line-up by 2030, was unveiled in November 2022. The car was the automaker’s first to feature hardware suitable for [SAE Level 4+ autonomous driving](#), although it does not claim to have unlocked this functionality yet.

However, Volvo Cars’ approach to smart tech extends beyond vehicles themselves; the company isn’t letting advances in shared mobility platforms pass it by. In cities across

Sweden, customers currently access the automaker’s digital car-sharing solution Volvo On Demand. Managed from a smartphone app, users can create an account that allows them to rent a Volvo car for as long as they want, including as little as one hour. The company claims each car on the platform can effectively replace 11 privately owned vehicles, reducing urban congestion/pollution and allowing pedestrian-centric infrastructure to replace sprawling parking lots, etc. Vehicles offered include battery, hybrid, and gasoline models.

Sustainability was also a key consideration during the construction of Volvo Cars’ all-electric EX30 model, which Saméus claims has both “the lowest carbon footprint of any Volvo car to date” and “strong interest”

from Gen Z. Currently scheduled for launch in H2 2024, the car features a minimalist design to mitigate production waste and contains a percentage of recycled materials in both its interior and exterior. Saméus particularly highlights its “sporty” appearance and small SUV footprint suitable for urban environments as key attractions for Gen Z.

Brand philosophy

The future of mobility ushered in by Gen Z, states Saméus, is likely to become one where having access to a car is more important than owning one. In this new paradigm, the relationship between Gen Z customers and automotive brands will evolve, and Volvo On Demand could indicate a method by which OEMs can embrace rather than resist the change. However, this could ultimately become table stakes as this more environmentally conscious consumer group gains prominence.



Volvo On Demand allows users to rent a Volvo car for as long as they want, including as little as one hour

experience, be seamlessly connected, and feature increased “smartification” for the next generation. By combining this ‘tech first’ approach with a willingness to research and accommodate Gen Z’s primary concerns, the automaker understands that a modern car brand must effectively convey a philosophy in addition to offering the best products.

A 2020 survey from First Insight found that 73% of Gen Z consumers were willing to pay a premium for more sustainable products. Indeed, Saméus states that “ethics and social responsibility are prioritised in Gen Z consumption patterns.” However, the EX30 demonstrates that automakers do not need to sacrifice affordability in the pursuit of sustainability. Launched on 7 June 2023 with a starting price of €36,000 (US\$39,289), the model is around 55% cheaper than the average EV. Therefore, she concludes that “Volvo Cars’ strong overall profile within social, personal, and ecological responsibility”, in addition to its price accessibility, could make it a solid brand fit for young drivers.

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Ethics and social responsibility are prioritised in Gen Z consumption patterns

For Volvo Cars to remain an exciting and relevant brand, Saméus emphasises that its products must continue to deliver a truly digital



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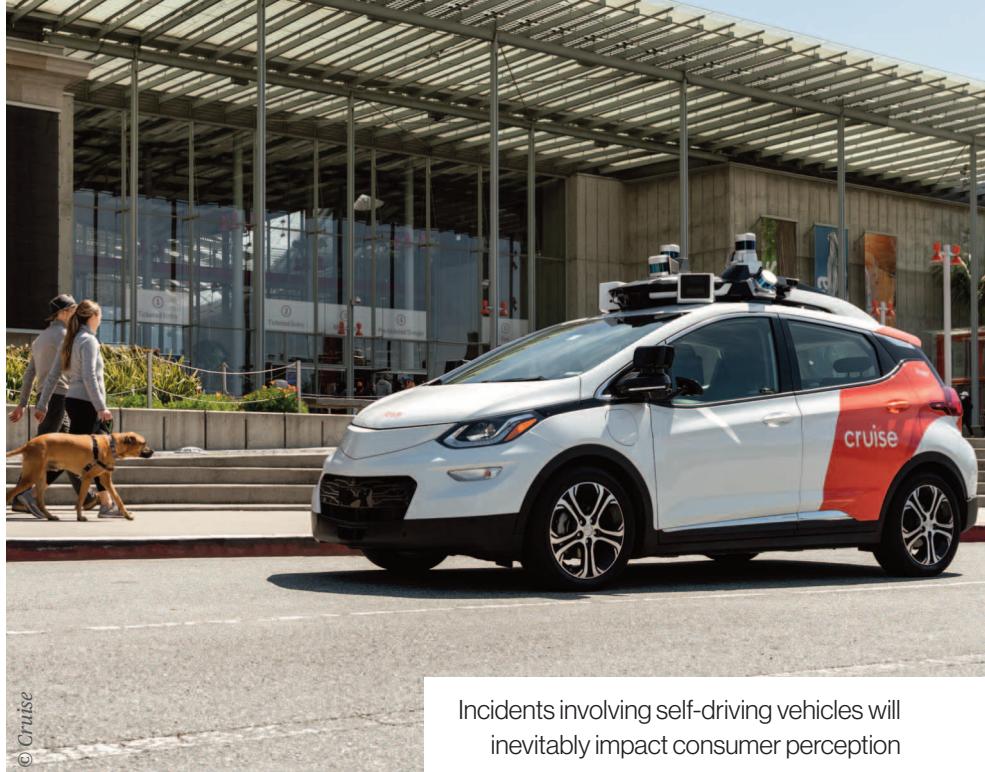
Experience vs headlines: what shapes trust in AVs?

Motional's latest Consumer Mobility Report sheds light on the public perception of autonomous vehicles.

By Megan Lampinen

Autonomous vehicle (AV) safety has long been a subject of industry debate: are computer drivers safer than humans? Proponents respond with a resounding ‘yes’, usually backed up with the observation that vehicles are never drowsy, drunk or distracted, and supported by numerous miles of safe self-driving in both the real world and simulation. But setbacks are inevitable, and the technology is far from perfect. In 2018, pedestrian Elaine Herzberg was struck and killed by a self-driving Uber test vehicle in Arizona. More recently, in October 2023, a pedestrian in California was dragged several feet by a Cruise self-driving car after being hit by another vehicle.

Events like these can prompt a knee-jerk reaction: Uber sold off its self-driving unit, and Cruise grounded its robotaxi fleet, sacked nine key executives, and laid off one-quarter of its workforce. These incidents alone are unlikely to derail the promise of a self-driving future, but they could nudge the industry towards a more consumer-centric approach. Self-driving technology developer Motional has been closely following consumer attitudes towards driverless vehicle technology and publishing the results in a yearly Consumer Mobility Report. The fourth and latest study, released in late 2023, found that safety remains the top concern, but one that can be addressed through experience and education.



Incidents involving self-driving vehicles will inevitably impact consumer perception

It's all about exposure

Safety was the biggest concern around AVs for 74% of the 1,000 US consumers polled in the study. Other leading concerns were also safety-related: 50% flagged the vehicle’s reaction time to unexpected occurrences on the road, while 44% were concerned about the possibility of the vehicle making a mistake. At the same time, 82% reported that distracted drivers are the greatest threat to road safety. Others cited road rage (62%) and inexperienced or bad drivers (54%). 49% of respondents regard AVs as a solution to drunk driving.

While trust remains an issue, there are tools to tackle it. “What I found most promising is that exposure significantly reduces safety concerns,” explains Akshay Jaising, Motional’s Vice President of Commercialisation. Of those who have ridden in an

AV at least once, 40% expressed concerns around safety. That figure jumps to 60% for those who have never experienced an AV. As Jaising sees it: “Consumers that have taken just one autonomous ride are 33% less likely to have safety concerns. Imagine how much that number will drop after five or ten rides.”

In fact, exposure to AV technology was found to have the biggest influence on consumer perception of AVs. The growing number of pilots taking place across the US should provide opportunities for that sort of exposure, but only for a segment of the population. “There is still a long way to go, and most people today do not have access to robotaxis,” Jaising tells *Automotive World*. “What they hear and see on the news is their only reality. That underscores the importance of our education efforts, as well as our safety-first and transparent culture.”

Generational differences

Consumer trust levels in AVs varies widely by both generation and region. Taken as a whole, 55% of survey respondents had little or no understanding of what AVs are or how they work. For baby boomers, that figure is 70%. Younger generations, including Gen Z and millennials, expressed less concern over safety. 39% of Gen Z and 32% of millennials

Around half of millennial and Gen Z respondents from California and Nevada—both states with robotaxi pilots—said they are likely to try an AV. Jaising sees this as “a strong majority when you consider the limited access and exposure to the technology.” Even if a pilot is running in a state, the number of vehicles and geographic spread of the service are both relatively small. Notably, three-quarters of residents in California and Nevada didn’t know they had access to the technology.

villages for pilots or commercial deployments. In the Motional study, 40% of baby boomer respondents saw a role for AVs in providing transportation for those who can’t or find it hard to drive. “We [too] see AVs serving that exact purpose, so it’s encouraging to have that need resonating with future riders,” adds Jaising.

A practical solution

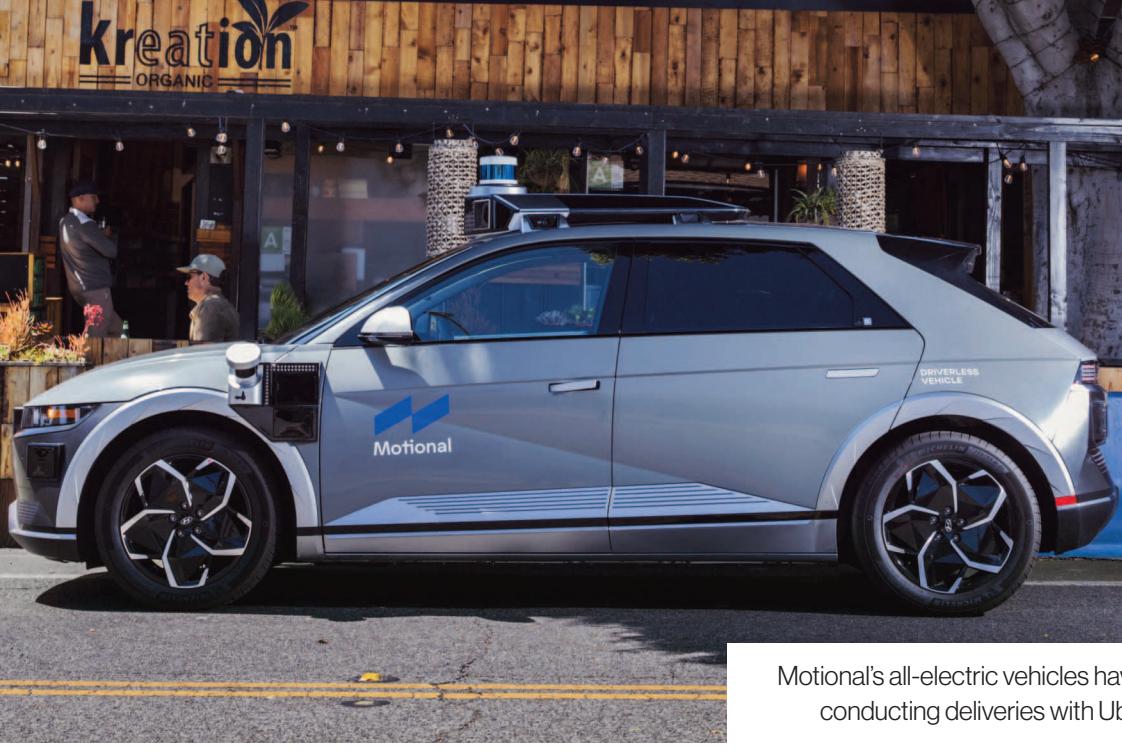
The potential reasons for using an AV are many and varied, but general trends are emerging. Far from seeking a thrill ride, most users are looking for a practical solution to everyday problems or annoyances. “In 2022, when we asked respondents why they would choose an AV, many of the reasons related to preferences around having alone time or seeking more personal space,” observes Jaising. “This year, we saw not having to tip as a big motivator. I imagine that’s due to economic concerns and tipping culture fatigue, but it also shows that consumers are thinking practically about how this technology can improve their daily routines.”

“It’s natural that consumers would be more comfortable accepting a delivery from a robot rather than getting into an AV when experiencing driverless technology for the first time

are only slightly concerned or not concerned at all. The same can be said for just 21% of baby boomers and 23% of Gen Xers. “It’s not a surprise that younger generations are more likely to try an emerging technology,” Jaising says. “That’s probably true for many industries.”

Looking beyond younger consumers, there could be a real opportunity for AV use among older demographics who perhaps cannot drive or have difficulty driving. Several self-driving players, including Voyage, which was later acquired by Cruise, have specifically targeted retirement

Consumers in the latest study also voiced interest in autonomous delivery applications, particularly millennials. “It’s natural that consumers would be more comfortable accepting a delivery from a robot rather than getting into an AV when experiencing driverless technology for the first time,” he suggests. Notably, Motional is pursuing both autonomous delivery and ride-



Motional's all-electric vehicles have been conducting deliveries with Uber Eats

hail services with Uber. "We're providing consumers with multiple entry points. They can experience a delivery, get more comfortable with the technology and then be more apt to try an autonomous ride," adds Jaising.

Shaping strategy

Despite the headline safety incidents, developers like Motional remain adamant that AVs offer numerous potential benefits to communities. The elimination of human error is a huge one, but so too is the convenience of travel for those not able or willing to drive themselves. For those consumers aware of self-driving vehicles, many recognise their potentially beneficial impact. When asked what technologies will have the most positive impact on society, 17% said AVs. The segment was second only to AI-

powered functions like ChatGPT (33%), ranking higher than 3D printing (15%), space travel (12%), IoT (10%), augmented reality (9%), and blockchain technology (5%).

But there is still some way to go before realising that societal benefit through successful business models, and this is where Motional's consumer research can help. "We're always evaluating consumer perception and feedback, whether it's through this survey or a research study we've conducted related to certain user experience features. All that data helps inform our product development, including how we autonomously communicate and interact with the customer as part of the end-to-end experience. These learnings are invaluable as we move forward with a customer-centric mindset."

This particular survey polled US consumers exclusively, as Motional is currently focussed on expanding across the country. In future, the survey scope could extend to international markets if launch plans head in that direction. In any market, the long-term success of AVs will depend on safety and consumer trust. Recent headlines certainly won't help, but first-hand experience will. "People that aren't able to experience an AV directly could be much more apt to dismiss the technology if they see just one negative report," he concedes. "As an industry, we have to earn their trust through our operations."

Companies like Motional are working closely with communities as part of an on-going process. As Jaising concludes, "We're never done."



Images © Monolith

AI advances battery validation

AI that learns from real-world test data is a reliable means for solving the intractable physics of batteries that current simulation and test planning tools can't, writes Richard Ahlfeld

The promise of artificial intelligence (AI) is simple: greater product development efficiency and faster time to market. Cars are becoming more complex and yet engineering teams don't have more time. By using test data to train self-learning models, today's visionary engineering leaders are reducing testing time and simulations for products with even the most intractable physics, like electric vehicle (EV) batteries, increasing competitiveness and speeding up time to market.

“Battery independence at any cost”

In the discussion surrounding the battery value chain, the spotlight frequently falls upon the sources and provisions of battery materials and components. Nevertheless, an emerging challenge within the automotive sector is notable: the ability to assess batteries to guarantee exceptional performance, durability, and safety.

In a landscape marked by surging customer demands and competitive pressures to enhance range and charging efficiency, engineering teams are grappling with a host of challenges as they navigate the path to product launches. Paramount among these challenges are concerns regarding battery longevity, protracted charging periods, and limited operational range. These aspects present not only hurdles but also opportunities where machine learning and AI can make a significant impact.

Battery testing is extremely complex, involving thousands of design scenarios that all require a very long time to test. As the physics of complex products like batteries become more and more intricate and time-consuming to understand, engineers find themselves in a dilemma; they either conduct excessive tests to cover all possible operating conditions, or run insufficient tests that risk the omission of critical performance parameters.

One is time-intensive and risks losing the competitive edge while the other risks brand reputation and customer safety. Through conversations with battery R&D leaders at many global OEMs, it has become evident that engineers are feeling increased pressure when it comes to guaranteeing the thermal performance—as well as the life and health—of EVs in real-world scenarios. Designing these products is a delicate balancing act between multiple parameters, which takes both time and highly advanced tools to achieve.

Every OEM has the challenge of specifying and developing the best battery system for their technology, and they need to go to market with total confidence in how it performs. Engineering a battery pack requires a huge amount of testing—years in some cases—because it's a complex new technology and in many areas unproven in the field. Balancing key characteristics of an EV battery system such as range, recharge rate, and life-time requires months of validation testing across thousands of scenarios and conditions.

According to the head of testing at a European carmaker, competitive pressures are driving the company to invest more and more time, money,



Battery testing is extremely complex, involving thousands of design scenarios

and effort into battery testing. However, a US\$30m investment is nothing when you consider the vulnerability to the China-based supply chain. In their words “We have to find independence at any cost.”

Escalating test costs

Many players perform battery tests across thousands of channels, generating terabytes of data per week. The capital costs of building a battery lab capable of testing hundreds of cells are huge, including rows and rows of environmental chambers, battery cyclers, and high-voltage power sources. They're running out of test stands and don't know what optimal tests to run, and certainly don't have the ability to learn from this vast amount of data as quickly as they need. For perspective, the annual cost of testing 300 cells can



range anywhere from US\$1m to tens of millions depending on the scope and complexity of test scenarios.

The competitive pressures of the market, however, are driving these huge investments to continue at a rapid pace. As more EV models are introduced, OEMs are racing for improvements in battery performance to capture market share as the landscape changes. In addition, European and North American-based manufacturers feel locked into a battery supply-chain dominated by China, which is driving even more urgency and investment.

For battery testing, the fundamental assumption that “more is better” is a fallacy. Expanding test capabilities to test more cells in parallel appears to be a good strategy on the surface, but it doesn’t actually shorten the testing process for ageing, nor does it give a better understanding of cell performance and overall ageing characteristics. A better approach is to focus energy and innovation into a more efficient test plan that explores the right combination of conditions to provide an understanding of battery performance with the fewest test steps and test stands possible.

This is where AI and machine learning come in. Through the ability to learn from data, test engineers can understand behaviour characteristics that are so complex, that without the right tools it is incredibly difficult to decipher. AI that learns from real-world test data is a reliable and effective means for solving the intractable physics of batteries that current simulation and test planning tools don’t efficiently solve.

Applying theory to the commercial world

Earlier this year, researchers at Stanford, MIT, and the Toyota Research Institute conducted experiments applying machine learning techniques to battery testing. The goal was to use AI techniques to reduce the number and duration of tests required to identify the lifecycle of electric vehicle batteries. Traditionally, EV batteries are exhaustively tested to understand the state of the battery health and charge after thousands of charging and discharging cycles under various conditions. Because of the large parameter spaces and high sampling variability, an extremely

large number of tests are required to find the expected battery lifetime from a given charge protocol.

By combining multiple AI algorithms, the researchers were able to find the expected lifetime of batteries using a fraction of the tests that traditional methods would require. Where conventional approaches took upwards of 500 days to complete the testing, the teams at Stanford, MIT and Toyota Research were able to apply an iterative, active-learning approach to complete the same result in only 16 days, showing a reduction of nearly 98%.

The Monolith team, looking to validate the Stanford-led research with a commercially available tool, downloaded the data to put the research into practice. Using internal software, Monolith engineers showed reductions in the number of tests required for identifying battery lifetime and finding the optimal charging cycle by 59% and 73% respectively. It should be noted that the approach used general-purpose test optimisation tools designed for analysing and making recommendations on any design space, as opposed to applying a model built specifically for the research data.

Although data-driven AI models can significantly reduce testing effort and complexity, there are limitations. Self learning models trained using test data from a given cell chemistry can give a more accurate and complete understanding of performance over different conditions. However, the models are derived from that specific cell chemistry—if the chemistry is changed, new models must be trained.

Relieve stress and power the EV revolution

With these kinds of results, it's clear that AI is emerging as an intriguing accelerant that can cut time to market significantly for breakthrough products and technologies. Arguably, the biggest opportunity is in validation testing of highly complex,

“

Balancing key characteristics of an EV battery system such as range, recharge rate, and life-time requires months of validation testing across thousands of scenarios and conditions

dynamic systems with non-linear behaviour, i.e. EV batteries. By embracing AI and machine learning principles, engineering teams can navigate the intricate challenges of understanding—and validating—the intractable physics of EV batteries more efficiently, leading to streamlined development, optimised designs, and faster time to market.

About the author: Richard Ahlfeld is Chief Executive and founder of Monolith

Macro challenges: VW Truck & Bus shares recipe for survival

VWTB's CEO Roberto Cortes weighs in on economic headwinds and tailwinds in the commercial vehicle sector.
By Megan Lampinen

Economic factors have a huge impact on the automotive industry. From unemployment and disposable income to interest rates and Gross Domestic Product (GDP), it all influences how many vehicles—and what types of vehicles—are purchased in a given period. For commercial vehicles (CVs), even small changes in the forecast could have a big impact on transportation requirements and hence vehicle demand.

Traton's Brazilian division Volkswagen Truck & Bus (VWTB) has led the local market for 20

years, serving as a pivotal piece of the wider Volkswagen Group. It closely monitors the local and global macroeconomic picture to prepare for what lies ahead. For 2024, that's a mixture of tailwinds and headwinds—and huge opportunities.

GDP, interest and inflation

When it comes to upcoming macroeconomic challenges, VWTB President and Chief Executive Roberto Cortes flags the impact of war, particularly in Ukraine, and potential parts

shortages, especially with semiconductors. While these have had a notable impact on the global CV industry throughout 2023, Cortes is not particularly concerned. "The tailwinds are stronger than the potential headwinds," he tells *Automotive World*.

One of the more significant tailwinds for 2024 is the potential growth of GDP, which has a direct correlation to the truck and bus industry. Brazil's economy took a big hit from COVID-19, with real GDP growth falling to -3.3% in 2020. The following years saw growth

recover, reaching 5% in 2021 and 2.9% in 2022, with 2023 expected to end on 2.6%. That's been driven in part by the agricultural sector. "We saw an all-time record harvest in 2023, which is a good sign for 2024," explains Cortes. "Agriculture depends heavily on trucks, both our medium trucks in the field and our extra-heavy trucks for transportation. A good harvest gives us a lot of hope."

The truck and bus businesses should also benefit from continued lower inflation. Brazil has had periods where it struggled to control inflation, with rates ranging from 5% to 10% between 2013 and 2022. "The good news is that we do not expect inflation to pick up," Cortes states. When inflation is high, central banks usually increase interest rates. This can trickle down and make it more expensive to finance vehicle purchases. "For inflation of 4% we have an interest rate above 12%. The real interest rate nowadays is therefore about 8%, which is a problem. That



Roberto Cortes,
President and Chief Executive, VWTB

said, it has been reducing every quarter: it started at 13.75% and since dropped to about 12.25%. We hope that in the coming quarters it will become a single-digit interest rate."

Short term vs long term

Outside of its home market, VWTB faces additional challenges in different parts of

the world. The truck maker has operations in 30 countries and is pushing hard to expand its presence. "We are strong in Brazil and want to be strong in all the 30 countries in which we are active and even enter new markets. We don't want to depend on Brazil," says Cortes.

Two years ago, it began assembly operations in the Philippines and more recently it entered Jordan and Qatar. It's also been expanding in Africa. In early 2024 the company plans to open its first assembly line in Argentina. Many of these regions face challenges of their own. The Middle East, for instance, is at the heart of the Hamas/Israeli conflict. Argentina has been battling inflation in excess of 100% and has currency controls in place. But as Cortes sees it, these are short-term headwinds.

"Problems are not new in the world. We hope that things improve but always make our





VWTB is expanding outside of Brazil

investments based on the long term,” he explains. Pointing specifically to Argentina, he notes that this is the third largest market for VWTB and, despite the economic challenges, it needs to be present there. “Some years we may struggle, but things are cyclical. Normally we realise good returns on investment.”

Regulation and legislation

Safety and environmental concerns mean frequent changes to automotive rules and requirements. These can be regarded as either an

opportunity or a challenge. Brazil brought in the Euro VI emission standard in January 2023, entailing significant investment costs for automakers like VWTB. The move to Euro VI and the related pre-buy activity took a bite out of 2023 industry volumes, with total truck and bus registrations through October 2023 down about 10% and production down 37%.

“The new technology hurt us in 2023; it had a major impact,” Cortes admits. “With every emission upgrade, costs increase. People need time to understand the technology and to be convinced that the higher

price brings advantages. But we take advantage of the changes to make improvements to our products. As a result, the total cost of ownership (TCO) of the new technologies is normally better than the prior one.”

Looking beyond Euro VI, VWTB is preparing for an electric future. It launched Brazil’s first locally designed and produced electric truck, the e-Delivery, in 2021. Like most electric vehicles (EVs), this one carries a higher price tag than its diesel equivalent but is cheaper to operate throughout its lifecycle: “With fewer repairs and lower fuel costs, the real benefit with EVs



Changes to the economic forecast could have a big impact on transportation requirements

is seen in the TCO. The only issue we have is around economies of scale. We have a million diesel producers and very few suppliers for EV parts, but this will change in the future."

Mitigating risk

Some challenges are simply unavoidable and the best any automaker can do is limit their impact. "Brazil has more extreme ups and downs than other parts of the world," notes Cotes. "It's important for any company to be able to quickly adjust to the new reality in an agile manner."

Much of VWTB's agility comes from its pioneering supply chain model, known as the Modular Consortium. At its Resende facility, the truck maker has brought in eight key supply partners, each of which take responsibility for large modules. The approach drastically reduces supply chain complexity and risks. "Each of our supply partners can adjust very quickly because we are pretty close to them," he elaborates. "With this

partnership, we can cope with any ups and downs and try to minimise the potential impact. Even this year, with the 10% drop in industry registrations and 37% decline in industry production, we posted a very reasonable return on sales because we had space to breathe."

In light of the production reduction, VWTB temporarily cut one of its two production shifts. Using a government furlough scheme meant it didn't need to permanently terminate jobs. As of 6 November 2023, it was able to reinstate that second shift. "By doing this we could adjust our costs to the new reality without having any excess people." In managing risks, Cortes emphasises that it's also important to keep fixed costs low: "When the revenue falls, you have room to manoeuvre, and you have to have a good breakeven point."

Combined, he believes these approaches represent "the recipe for survival in a difficult environment. And unfortunately, difficult environments are pretty common in emerging markets like Brazil."

How could rising labour costs affect US automotive industry?

Strike action in the US has precipitated wage increases even for non-union labour, but the challenges of electrification persist. By Will Girling

With the global 2021/22 inflation surge sparking a cost-of-living crisis in many countries, it is perhaps unsurprising that H2 2023 witnessed a flurry of labour strikes in the US automotive industry.

Industrial action initiated in September by the United Auto Workers (UAW) underlined worker dissatisfaction with conditions at the Detroit Big Three (GM, Ford, and Stellantis). Frustrated that record profits were being posted amid wage stagnation and concerned about electrification's effect on manufacturing, as well as the

increasing use of non-unionised labour, the union brokered a new deal within six weeks.

While the UAW has demonstrated the benefit of industrial action for workers, can automakers and their suppliers sustain increasing labour costs while market uncertainty threatens to slow sales during the electrification shift?

The criticality of cost

Prior to the strike, Mark Barrott, Partner at management consulting firm

Plante Moran, anticipated a drawn-out battle into early 2024 as the UAW and automakers struggled to reach terms. This was due to the union's ambitious demands, including an end to tiered wage systems that disadvantage veteran workers and a 46% salary increase. Essentially, workers wanted to benefit from the cost optimisation unlocked by the ramp up of electric vehicle (EV) production. "Full volume EV manufacturing at scale could cut up to 40% of costs through simplification, fewer parts, etc," says Barrott. "The OEMs wanted to keep those savings as capital to grow the electric industry." On the



opposite side, the union thought it should go to workers.

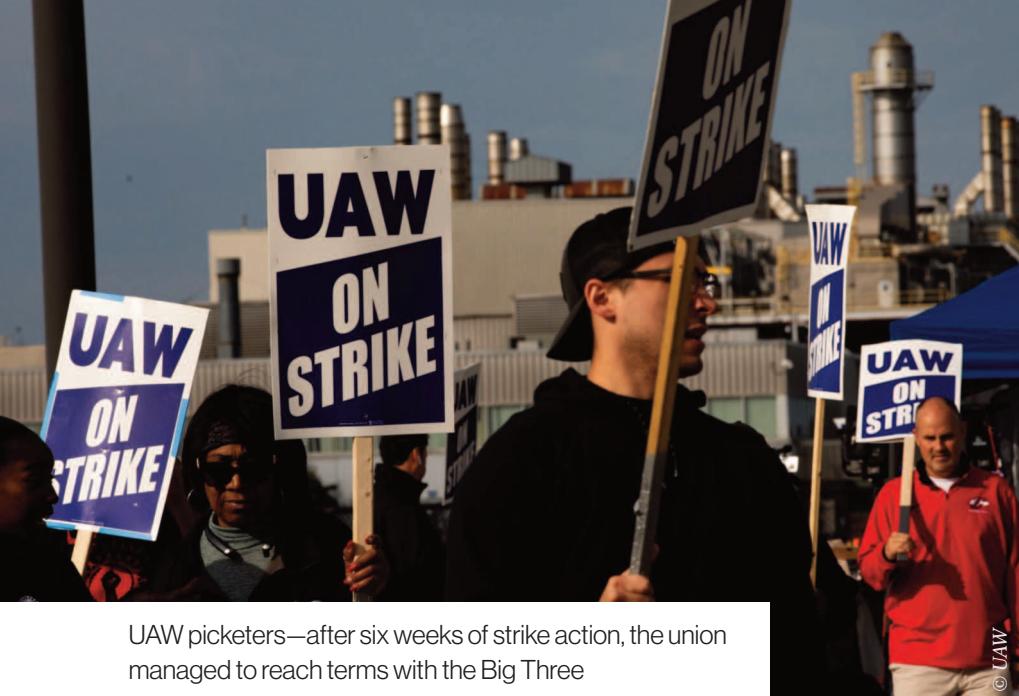
Barrott partially attributes the strike's fast results to the UAW's "escalatory strategy", although he notes that it did not get everything it asked for—tiered wages were indeed scrapped, but the Big Three granted only a 25% wage increase. More important, he believes, is what the strike revealed about the criticality of cost margins to the US industry during electrification. For example, he relates that Ford's new US\$8.8bn labour deal will add an estimated US\$800-US\$1,000 of extra cost per EV—small

enough for it to still claim a healthy profit on each unit during high volume production. "This is the prize that OEMs are protecting. That's why, when those deals were put on the table, they took them."

The UAW's success in landing a quick deal has subsequently had a ripple effect outside the US' unionised heartlands of Michigan, Ohio, and Indiana. In November 2023, UAW President Shawn Fain announced that the organisation will push to organise workers at 13 non-union OEMs located in the South, including Tesla and Mercedes-Benz. Later that same

month, Volkswagen and Honda both announced salary hikes of 11%, Toyota granted 9%, and Hyundai stated it will raise wages 25% over the next four years.

Barrott considers Tesla unionisation to be an unlikely prospect, as attractive benefits currently enjoyed by employees like stock option eligibility could be rescinded for those pushing for a union. There is also historically little appetite for labour organisation in the non-union South—workers at Nissan's Smyrna, Tennessee plant voted overwhelmingly against doing so in March 2023. However, the pay raises offered



UAW picketers—after six weeks of strike action, the union managed to reach terms with the Big Three

There is also a possibility that political attitudes to the IRA's financial scale will change after the 2024 US presidential election, further weakening EV demand through higher prices. Barrott does not consider this likely: "Regardless of how one feels about its content, the IRA was designed to onshore manufacturing—both sides support that." Despite being cautiously optimistic about the future of EVs, he acknowledges that US automotive is set to face significant near-term headwinds. In this difficult atmosphere, how could the added strain of rising labour costs affect the industry's direction?

A battle for labour

significant reduction from the previous year (US\$65,000), driven in no small part by Inflation Reduction Act (IRA) subsidies and [Tesla's price war](#), it is still higher than the US\$48,334 average for a gasoline model. "Fundamentally, automakers need to start making EVs for the mass market, not just the high end."

New models like Chevrolet's Equinox EV, which is scheduled to enter production in Q1 2024, could be the start of a more affordable and productive era. Barrott calls it "feature rich" with a range (250 miles) and price point (starting from US\$34,995) to match customer needs. "If it doesn't sell like hot cakes, then we might have a problem with the consumer." US interest rates currently stand at 5.33%, up from 0.05% in early 2022, which a December 2023 report from McKinsey & Co found increased the average annual cost of vehicle ownership 12%. Therefore, purchasing a vehicle may be a decision many customers delay or [reconsider entirely](#).

by OEMs with a non-union workforce are clear attempts to reinforce this sentiment by making unionisation appear unnecessary. "The cost of living is generally lower in the non-union areas, so they're getting a good deal."

Satisfying wages amid industry headwinds

The difficulty with which US automakers must contend is satisfying the wage increases demanded by workforces as they struggle to make EVs profitable. Sector-specific losses up to 2023 are estimated at [US\\$6bn for Ford alone](#).

"Legacy OEMs still lose money on every EV they produce, predominantly because they're not operating at full volume," states Barrott. High upfront purchase costs are the primary challenge: in the US, the average EV transaction price in 2023 was US\$53,469, according to Cox Automotive. Although this is a

A significant component of the UAW strikes was concern that the increasingly streamlined EV manufacturing process—using Gigacasting, skateboard architectures, simplified powertrains, etc.—could be achieved with a gradually diminishing labour force. For some, this presages mass layoffs as automakers seek to balance wage increases.

Barrott is optimistic that current trends suggest this will not happen. This is not to say that a greater degree of automation will not gradually permeate the industry, particularly in areas like battery cell manufacturing facilities. However, vertical integration and the desire to bring manufacturing in-house could mean labour reductions in one

sector are compensated for in another. “For example, components like e-axles that come from Denso and Dana could be made at GM and Ford using union labour.” Such actions may be enough to convince unions that automakers perceive workers’ long-term value to e-mobility. He cites US\$40bn of new investment in EV plants, which was ratified as part of the UAW settlement, as evidence of this commitment.

More noteworthy, Barrott continues, is the geographic centre of the US industry moving slowly towards the non-union Southeast, where wage rates are lower on average. As



A pre-production model of the Chevy Equinox EV, scheduled to enter production in Q1 2024

they penetrate these more rural and less population dense areas, automakers may find it increasing difficult to find skilled

workers. This, he suggests, is already happening. “Toyota has announced a US\$8bn battery plant in North Carolina that will require 3,000 workers. To meet that demand, it will have to ‘steal’ them from existing auto suppliers, and those companies will respond by raising wages to try to retain them.”

It should be noted that the difficulty in securing talent is not restricted to the South. In Ohio, Barrott notes that Honda is taking workers from its own suppliers and then “complaining that their production rates aren’t high enough.” Therefore, rather than negatively affecting automaker workforces, electrification may spark a battle for labour in the US that ultimately proves beneficial in terms of wage growth. The real strain, he concludes, is likely to be felt by suppliers, which will face skill gaps, high material prices, and increasing labour costs as they struggle to prevent workers being poached by their own clients.





Toyota—finally making waves in EVs

New Toyota management is steadily taking the company in a new direction, with EVs to the fore, writes Ian Henry

Having led the market in hybrids for many years, with the Prius almost synonymous with the segment, Toyota has been somewhat behind the curve with regard to electric vehicles (EVs). It has seen the Chinese in general, but also Tesla and its European competitors, steal a lead here. Although it is not giving up on hybrids, and still sees potential for fuel cells, it has now recognised it needs to move further and faster into EVs.

Toyota's lateness into EVs is partly a function of trends in Japan, where between 2016 and 2021 EVs accounted for only around 0.5% of the market; EVs took 1.7% share in 2022, and 2.3% in 2023 (based on data to September). In addition, Japanese public policy has not focused on reducing vehicle emissions in the way that it has in Europe and China and there has been no legislation or incentives in Japan to encourage OEMs to switch to EVs, nor for consumers to buy EVs. The charging network is reportedly woefully underdeveloped. This has led Japanese vehicle manufacturers as a whole, and Toyota specifically, to continue to focus on hybrids and on small internal combustion engine (ICE) vehicles, notably kei cars for the domestic market.

The commitment of Akio Toyoda, former Chief Executive, to the combustion engine and to motor sport also led to the company remaining wedded to ICE technology; hybrids were seen as the way to cut vehicle emissions in markets where this was demanded more than in Japan. Now that Akio Toyoda has moved aside, new Toyota management is steadily taking the company in a new direction, with EVs to the fore.



Toyota's only EV at the moment is the bZ4X

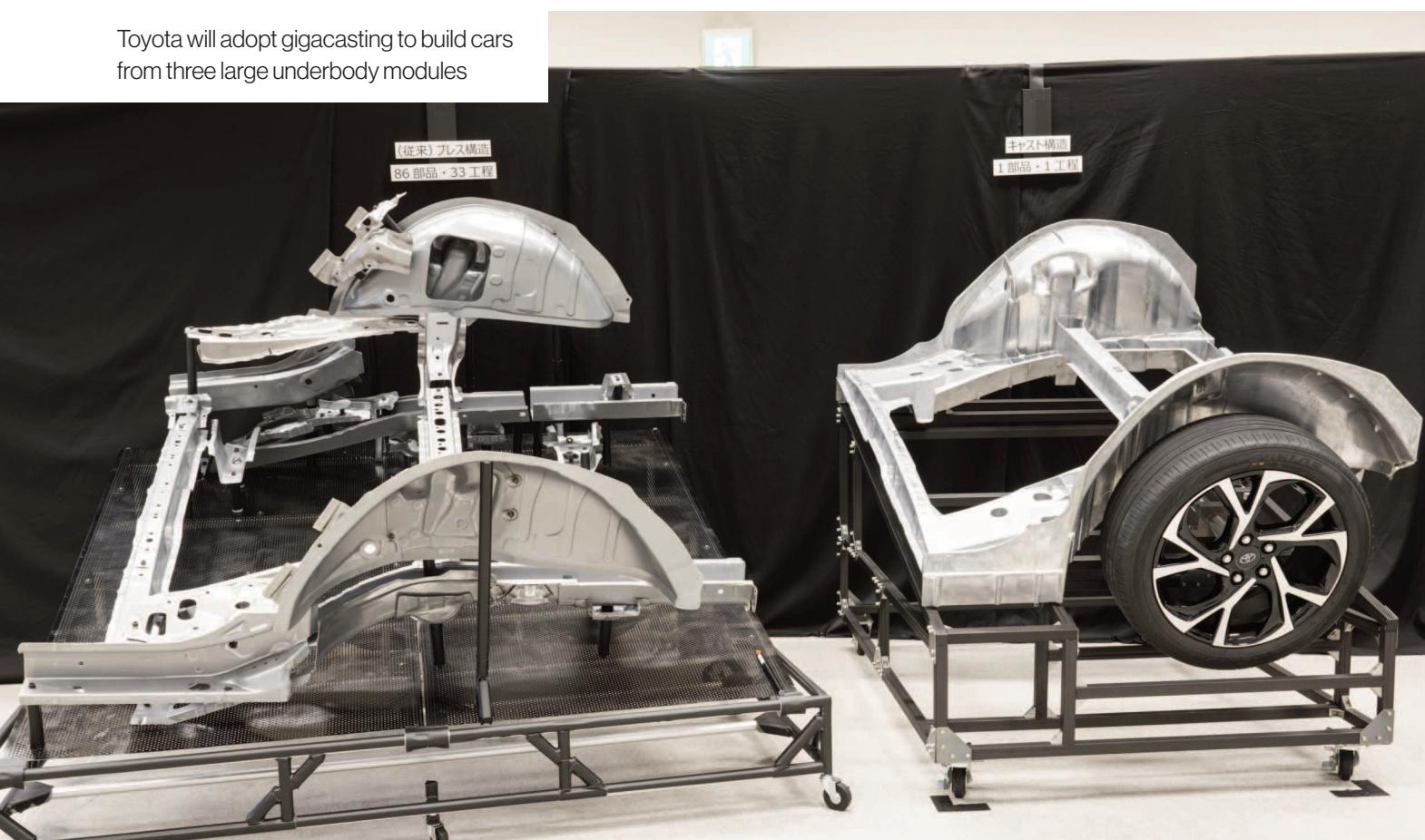
After a period of uncertainty regarding its EV plans, things are becoming clearer; although EV production should begin in the US in 2025 at its factory in Kentucky, the major changes will be in Japan. Here Toyota is redesigning its manufacturing systems to optimise production for EVs. Following Tesla's lead, it will adopt gigacasting to build cars from three large underbody modules. Other key features of the new Toyota production set-up will be increased digitalisation to optimise factory layouts: each of the three gigacast modules will be fitted with components before the three modules are joined together; cars will drive themselves through the factory; and robots in the logistics areas will save on people driving vehicles onto trucks and trailers for example.



This new manufacturing system is expected to cut production times in half and cut equipment costs by a quarter; the company expects productivity on the new assembly lines to double. Moreover, investment and development

resources are expected to halve. Ambitious plans certainly, but are they achievable? Quite probably knowing Toyota, but quite when all this will be in place is another matter. By 2030, Toyota plans to be making 3.5 million EVs and it wants half of

Toyota will adopt gigacasting to build cars from three large underbody modules





Toyota is redesigning its manufacturing systems to optimise production for EVs

these to be made in the new generation factories which Toyota is reconfiguring from existing plants.

At the centre of the new manufacturing processes—which will be designed using virtual technology—will be giga-casting; the company is currently understood to be testing the process on the existing bZ4X EV at its Myochi factory in Japan. A 4,000 tonne press from Japanese supplier Ube Group makes the under rear section in one piece, saving 86 separate parts and 33 individual processes, highlighting the potential improvement in manufacturing efficiency.

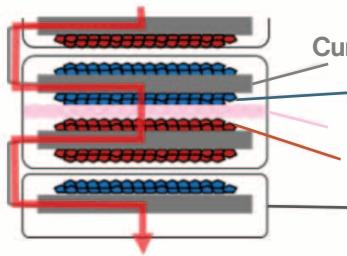
In addition, new paint processes will be adopted for gigacastings and in some cases a resin finish within the casting could save painting; paint booths for new EVs will be much smaller, cutting paint use, energy and emissions in the process. On the final assembly lines, currently in demonstration and test phase at the Motomachi factory in Japan, cars will move along automatically, guided by cameras and lidar sensors. And in another sign of its commitment to EVs, in March 2023

Toyota reported that it had switched more than of its R&D staff and their budgets onto EVs, batteries and related software projects.

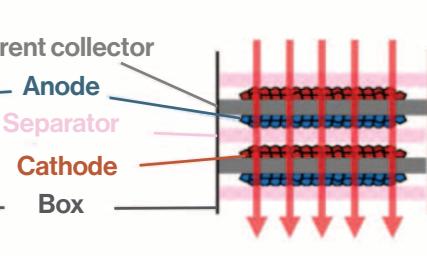
Future Toyota EVs are also expected to use a new generation battery cell, called bipolar LFP; this is expected in 2026 or 2027 and should boost power density through combining anode and cathode terminals. Provisionally this could boost battery range by 20% (to over 370 miles) and cut costs by 40%. Toyota is also working on solid state batteries which will likely appear in 2027 or 2028, reportedly giving a range of over 620 miles. While it waits for its new batteries to be production ready, it will source batteries from CATL, BYD and LG, and a joint venture in Japan with Panasonic.

Before its new production vision can be realised, Toyota will have to make EVs within existing, albeit somewhat modified, factories. Moreover, given its ambitions to make 3.5 million EVs by 2030, it will have to move fast to catch up with Tesla and BYD. It sold just 24,000 EVs in 2022, but expects to reach 190,000 EVs in 2024, and 600,000 a year later. Although it has

<Monopolar battery>



<Bipolar battery>



Toyota plans to launch a high-performance battery that combines a bipolar structure with a high nickel cathode in 2027-2028

numerous hybrids in its portfolio, the only full EV in its line-up at present in the bZ4X. 2024 should see more Toyota EVs and indeed the first Lexus EV. Toyota branded EVs will be made in facilities in Toyota City and Lexus models will be made in Kyushu. An electric Hilux pick-up is to be made in Thailand during 2024, and its Chinese factories are due to

launch a number of EVs. A three-row electric SUV will be made in Kentucky from 2025.

Investment in the US will be significant. The Georgetown plant in Kentucky, which currently makes the Camry sedan and RAV4 SUV, will see nearly US\$600m invested to add production of the electric SUV. In parallel, US\$2.1bn will be invested in a new battery factory in Greensboro, North Carolina to supply the Georgetown factory.



Idemitsu and Toyota entered into an agreement to work together in developing mass production of all-solid-state batteries



All-solid-state battery
(Stack : prototype)



Toyota plans to launch six EVs in Europe by 2026

There are currently no EVs confirmed for European production, but these will likely be added or at least announced within the next couple of years as current model programmes near their end-of-life phases. Toyota Europe has said it will launch six EVs by 2026 and has shown concept versions of an electric SUV and Sport Crossover but it has not revealed where these will be made. Toyota has also announced the Hydrogen Factory Europe, focused on fuel cells which it intends to commercialise from 2026; it has also not confirmed where this will be, although its UK factory is converting diesel powered Hilux pick-ups into fuel cell versions.

A new Toyota is gradually emerging: in the US and China, EVs will be made in existing, but reconfigured plants; in Europe, plans remain to be confirmed. But in Japan, a very different way of designing and producing cars is being developed. Once proven, this new technology will be applied in Toyota plants

around the world. By 2030, a new-look manufacturing operation will be apparent, perhaps sooner. Given its prominence in the industry, Toyota was never going to be entirely left behind by Tesla and the Chinese; it is just somewhat surprising that it has taken quite so long to begin the process of catching up.

**update*

While it transforms its plants to make EVs, it is not entirely giving up on ICE technology. But, speaking at the Tokyo Auto Salon in mid-January, Akio Toyoda, now the Chairman of the company, said there is plenty of life in the combustion engines. Toyota is still working on improving fuel efficiency and cutting emissions through higher compression, leaner burning system and continuing with hydrogen ICE possibilities.

The opinions expressed here are those of the author and do not necessarily reflect the positions of Automotive World Ltd.

Ian Henry is Director at industry consultancy AutoAnalysis

The Automotive World Comment column is open to automotive industry decision makers and influencers. If you would like to contribute a Comment article, please contact editorial@automotiveworld.com

Is AI the answer to mitigating supply chain cyber risk?

Effective management of cyber risk requires full supply chain visibility, strong supplier relationships, and actionable data, writes Sumit Vakil

With the accelerating development of new technologies, cyber security is quickly becoming a growing threat to organisations in all industries. And the automotive industry is no different, as more and more cyber criminals seek to exploit the sector's many vulnerabilities. The connectivity of modern vehicles—with their numerous onboard systems and external connections—as well as the complexity of the global auto supply chain, make the automotive industry a perfect target for such attacks.

Growing concern in the auto industry

As reported by Resilinc, a global leader in supply chain mapping, disruption sensing, and data

analytics, there was a 32% surge in the global number of cyber attacks targeting the automotive industry between 2021 and 2022. This increasing trend is set to continue in the coming months, as Resilinc has already documented 255 cyber attacks this year so far.

What's more alarming, according to research based on interviews with C-level executives in large automotive enterprises, almost two-thirds (64%) of industry leaders believe the automotive supply chain is currently vulnerable to cyber attacks. Having been the fourth most impacted industry by cyber breaches last year, as shown by Resilinc's data, a highly complex, interconnected network of automotive manufacturers, suppliers, and service providers faces an unprecedented challenge.



Fortunately, there is a growing awareness of the urgent need for effective risk management in this area. Particularly when considering the UN Economic Commission for Europe's new vehicle safety regulations, which will come into force in July 2024. Under this legislation, all automotive original equipment manufacturers (OEMs) and their supply chains will have to put in place multi-level cyber security provisions to guard against current and future cyber threats, at the risk of having to cease production of non-compliant models. These regulations provide a robust framework for cyber security management systems and software updates and require any vehicles already in

“The visibility problem is real, given that 85% of supply chain disruptions originate from indirect Tier 2+ suppliers

development for production from mid-2022 to be compliant.

To make sure software-based components meet these requirements, OEMs will need to have full visibility into their entire supply chains. And it is safe to say that the visibility problem is real, given that 85% of supply chain disruptions originate from indirect Tier 2+ suppliers.

How serious is the risk?

A group of researchers investigating potential gaps in the automotive digital infrastructure made headlines earlier this year. They found critical vulnerabilities of varying degrees in cars produced by some of the world's biggest automakers including Porsche, Ferrari, Rolls-Royce, Mercedes, and

BMW. For instance, the ethical hackers were able to successfully access networks and find the owners' personal information and live GPS data as well as start and stop certain vehicles remotely.

Although all the flaws found have already been fixed, it is alarming evidence of the clear danger to customers' privacy and safety. Even the largest manufacturers with seemingly best practices in place haven't been able to avoid it.

lights, honk the horn, open the trunk, and interfere with the infotainment system. Tesla has since made patches to address these problems, but the risk remains.

It's not only the customers who are directly threatened but also the manufacturers, their production, and employees. In 2022, one of Toyota's critical suppliers was hacked, forcing the carmaker to halt operations at 14 factories and losing

ahead of the upcoming UN regulations mentioned above. Even more worrisome, almost a third of them claim they don't see the value of investing in cyber intelligence at the moment.

What can be done to fortify auto supply chains?

Given the risk of enormous financial losses and reputational damage, what can organisations do to minimise cyber threats and strengthen their operations and supply chains?

The foundation of minimising disruption and ensuring a steady flow of products and services is having full transparency and visibility into the entire supply chain. To proactively safeguard against cyber attacks and the potential disruption they cause, automakers need to have a full understanding of all the links in their supply networks. There are several ways to achieve this.

A crucial first step is to map the entire supply chain through multiple tiers. To ensure business continuity in the event of a disruption, it's essential to know every supplier and how their cyber security processes work. Importantly, the mapping needs to go beyond the high-volume, first-tier suppliers, given that it is often the sub-tier vendors where the issues originate. Mapping

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AI is also set to play a pivotal role in combating and mitigating cyber attacks

Another example further demonstrates that even the highest cyber security standards may be insufficient at times, putting drivers at risk. A few months ago, security vulnerabilities came to light at Tesla, a manufacturer known for investing heavily in cyber security and working closely with ethical hackers. The researchers, who [showcased the issues at a conference](#), were able to hack Tesla cars and, among others, turn off the

around 13,000 cars of output at a cost of about US\$375mn. As reported, it took months to get the vendor's operations back to normal. And in a more recent incident, the data of more than 75,000 Tesla employees was compromised in an employee-targeted attack, leading to an ongoing lawsuit.

Despite the evident risk, as many as 42% of C-suite respondents admit they do not currently have a plan in place

provides the information and visibility needed to identify those with vulnerable processes and systems and then work together to close the gaps and regularly remedy emerging security issues.

Another recommended practice is to carry out comprehensive and continuous cyber assessments of systems. These can reveal vulnerabilities that need to be addressed and pave the way for improved security measures. Through assessing and refining processes, organisations can keep their systems up to date and effectively counter hackers' attempts.

What enables businesses to respond quickly is real-time visibility into events potentially threatening their supply chain. This is why—after having mapped all of their suppliers and sub-tier suppliers—automakers should also invest in monitoring tools. The way to achieve the best monitoring results is by harnessing the power of AI that provides continuous 24x7 screening of cyber security and other potential threats. These tools, equipped with predictive analytics capabilities, can bring a new level of efficiency and rapidity, crucial for risk mitigation.

Lastly, any effective cyber-resistant strategy should include a backup plan. What should companies do in the event of a cyber breach? How will they communicate a cyber attack to customers? Is there an alternative if production is halted by a cyber attack? A company's playbook should include answers to

such questions with detailed guidelines to follow in the event of a cyber breach.

The answer to cyber risk—artificial intelligence

While today's supply chain remains primarily reactive, it is transitioning towards a proactive approach. With AI so central to the future operations of the automotive sector, the risk of exploiting vulnerabilities and disrupting operations is very real. Despite this, AI is also set to play a pivotal role in combating and mitigating cyber attacks, especially as breaches are becoming increasingly sophisticated and widespread. The risk within the automotive industry has never been this serious, but at the same time, businesses have never had access to such effective AI-powered tools to improve supply chain visibility and build resilience.

Just as advancing technology in the automotive sector enables further innovations, enhancing the comfort and experience of driving, its rapid development also brings increased risk for companies, their supply chains, and customers. The only way to combat these growing threats is for automotive manufacturers to understand all the links in their supply networks, including the people, processes, and technology involved. Effective management of cyber risk requires a multi-level strategy encompassing full supply chain visibility, strong supplier relationships, and actionable data.

About the Author: Sumit Vakil is the Chief Product Officer and co-founder of Resilinc



TV's role in marketing is evolving

Jim Johnson explains how marketers can leverage converging television formats to build their brands and sell products across all generations of shoppers



Cars and television share a natural affinity, their synergy evident in the seamless translation of engine roars and precise cornering onto the expansive canvas of the home's largest screen. Since the inception of television advertising in 1941, this dynamic relationship has propelled numerous brands and models to iconic status in the US.

Despite the evolving landscape of advertising platforms, television's indispensable role in the marketing mix endures, whether on a national, local, linear, addressable or connected scale. In 2022, the investment in television marketing across all industries exceeded US\$66bn, with connected TV emerging as the fastest-growing segment, accounting for over US\$20bn. Notably, July 2022 marked a significant milestone as monthly streaming viewership surpassed both broadcast and cable, underlining the continued prominence of television in the ever-changing media landscape.

Perhaps most importantly for automotive advertisers, research from eMarketer shows that Gen Z and Millennials make up the largest populations of CTV users, with the younger Gen Z cohort showing the most rapid growth in streaming content consumption. In terms of demographics, major metropolitan areas across the US

are seeing population losses for each generation except Gen Z, as they flock to major cities to begin their careers and experience the excitement of city life. But with city life comes alternatives to personal car ownership, and Gen Z thus far has been less interested in obtaining a driver's license than any generation preceding it. The time for auto brands to reach and influence this rapidly growing generation is now, and CTV is a great way to educate younger consumers on the many mobility options on offer from major car brands to help shape future adoption.

While it's clear that the future of television is streaming from both a viewership and marketing standpoint, how can marketers leverage all the currently available converging television formats to build their brands and sell products across all generations of shoppers? Consider the four C's—connection, content, choice, and commerce—as a framework for determining where linear broadcast and cable fit within the broader context of consumer engagement with a brand.

Connection

The concept of connection in advertising pertains to how effectively a medium links brands with consumers in meaningful

ways. Linear television remains a reliable method for reaching a broad audience through a one-to-many approach, crucial for building brand identity and sustaining top-of-mind awareness. Taking it a step further, CTV enhances reach by combining it with a targeted strategy, utilising demographics, location and in-market shopping behaviour data to concentrate on potential buyers closest to making a purchase.

Consider the context of 2022, where the US had approximately 226 million adults over 18. Assuming each buyer acquired only one vehicle per household, roughly 14 million individuals or 5.38 million households made new vehicle purchases. Employing linear TV for brand development and CTV for households displaying in-market purchase behaviour optimises the impact of television by addressing both aspects effectively.

Content

Content plays a dual role in advertising, encompassing the material adjacent to the advertisement and the content within the advertisement itself. The recent focus of linear TV buying, particularly in the automotive sector, has centred on news and sports due to their live viewership and the ability to target audiences on both national and local levels. This strategy ensures broad reach for auto brands and relevance for tier 2 and tier 3 auto advertisers.

Integrating this linear approach with CTV and digital video proves highly advantageous for in-market car shoppers by providing additional buying context. While CTV can also be purchased nationally or locally,

targeting at a household level allows auto brands and dealers to exclusively run ads alongside contextually relevant content and publishers. Surveys indicate that 50% of automotive shoppers express a greater likelihood to engage with advertisements when they are presented alongside relevant content.

Digital video units with multiple tabs offer auto advertisers the opportunity to embed content directly into the units, including third-party expert reviews for new model launches or vehicle refreshes. Nielsen reports that third-party expert content is 83% more effective at influencing product purchase considerations compared to user reviews, emphasizing the pivotal role of relevant content in aiding shoppers in making well-informed purchase decisions.

Choice

In the realm of advertising, particularly in the context of consumer choice, linear TV has not been traditionally associated with options. When opting to watch specific linear TV content, the trade-off involves enduring periodic ad breaks. This scenario is mirrored in ad-supported streaming content on platforms like CTV or OTT, unless a subscription fee is paid.

A potential middle ground for engaging consumers involves embracing interactivity within CTV and digital video units. Contemporary CTV ads often incorporate interactive elements, such as QR codes or clickable links, fostering deeper engagement. Alternatively, digital video units can be designed as entirely opt-in experiences, allowing viewers, such as auto shoppers, to

choose whether to engage with relevant ads or skip over them if uninterested. This approach empowers auto brands and dealers to ensure that subsequent video views or interactions are carried out by qualified and interested consumers who have willingly opted to receive the message, rather than being compelled to view ads to access desired content.

The aforementioned Gen Z generation, who represent the future of the automotive industry and society at large, largely express disdain for ads that “interrupt their content”, making opt-in advertising experiences even more impactful for them. Baby Boomers, by contrast, are more receptive to ads on cable or broadcast TV than those on social media or streaming TV, so keeping those options in your marketing mix for older consumers is a sound strategy.

Commerce

At the core of marketing is the pursuit of commerce, aiming to drive tangible business outcomes. Traditionally, Direct Response Television (DRTV) methods like phone numbers, text messages or web links have been instrumental in tracking these outcomes on linear platforms over the decades. However, advanced tracking on linear requires customised setups and may incur additional costs when tying ad exposure to eventual purchases.

A more streamlined strategy to complement DRTV involves testing a hybrid approach of both CTV and

digital video, specifically targeted at the household level. In this approach, CTV can be utilised to introduce a new model or dealership sales event, capturing the household’s attention on the primary screen—television. Subsequent exposures can then be distributed across various devices within the same household. This not only reinforces the initial CTV message but also enhances it with additional buyer context, including local inventory, offers, dealer reviews and direct calls to action such as requesting a quote or scheduling a test drive from desktop or mobile devices.

This proactive approach eliminates a step for consumers and provides auto advertisers with the flexibility to tailor follow-on messages post-CTV in alignment with the typical steps in the purchase decision process. From raising awareness on CTV to fostering consideration and conversion via personal devices, this comprehensive strategy ensures a more seamless and effective consumer journey.

In the ever-changing landscape of media, the coexistence of linear television and digital platforms is crucial for auto marketers. Effectively utilising the unique strengths of each medium to assist consumers in making informed purchasing decisions is the key to success. Embracing the “4 C’s” serves as a proactive strategy for auto marketers to connect with their customers at various stages of the purchasing process.

About the author: Jim Johnson is Vice President, Account Planning & Lead of Industry Solutions—Automotive at VDX.tv

Will biogas engines play a key role in sustainable trucking?

As diesel is phased out, Scania believes its powertrain technology can allow long-haulage carriers to sustainably cover the necessary mileage. By Lee Monks

The primary narrative for the automotive industry's future involves the end of fossil fuels and a transition to electric powertrains. Yet delivering on this aim is far from straightforward. For long-haul companies looking to maximise revenue while still becoming more sustainable, it's a worrying time. The cost of switching fleets to electric models is an obvious burden, but so too is the concern that reduced vehicle range will require a significant re-evaluation of operations. It's not just a switch from gasoline to electricity—it's a remodelling of an entire ecosystem.

Like many companies providing long-haul vehicles, Scania Trucks is trying to solve these problems for its customers. According to Ola Henriksson, Senior Product Manager for Renewable Fuels at Scania Trucks, the deployment of biogas engines provides a feasible compromise on sustainability and range. While electric trucking technology may not be quite ready, he tells *Automotive World* that biomethane can fill the void over the mid- to long-term as a carbon-neutral option.



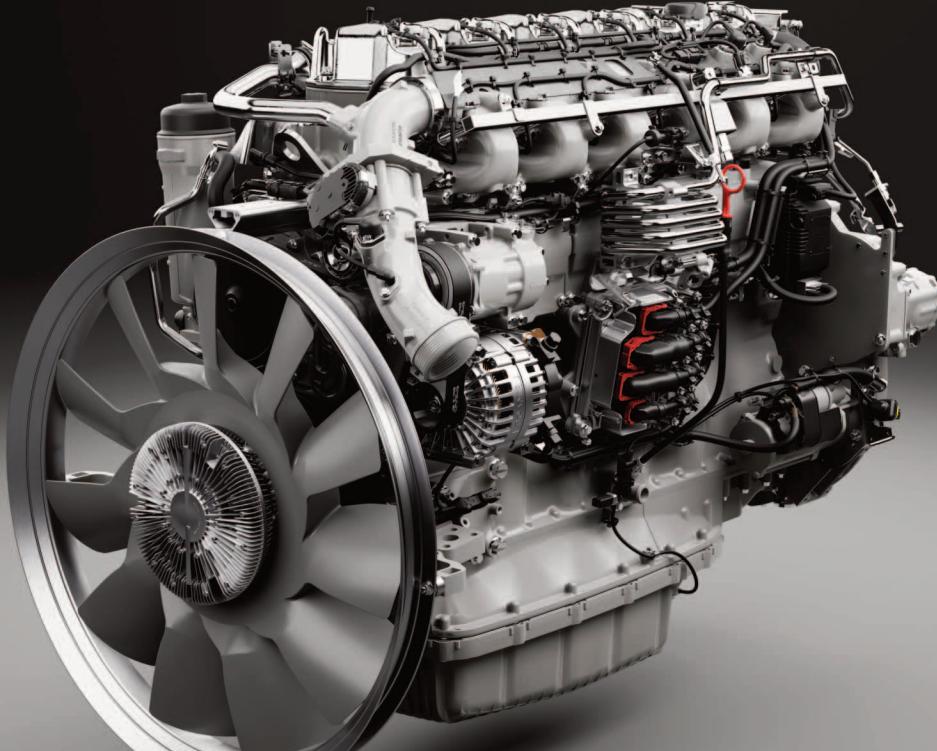


Scania continues to develop and provide electric solutions for its customers. Were biogas engines always part of your sustainability plan?

Back in the '80s, Stockholm wanted Scania to help provide sustainable traffic solutions. We developed the initial biogas engine technology at small scale. Of course, this was before sustainability became a big thing, and before the climate crisis became such an issue. Now the climate crisis is such a huge factor, we're fortunate to have spent so long developing different technologies.

When did you begin to develop biogas engine technology on a larger scale?

Eight years ago, Scania shifted to a more sustainable operating model, which kickstarted the biomethane pathway. We wanted to look beyond the vehicle and made the decision to focus on biomethane, as it was a fuel technology that made a lot of sense. We already had the technology in our portfolio but wanted to broaden the scope of its application to make us more relevant to more vehicles.



Scania's new upgraded biogas engine—along with a new gearbox and new rear-axle—delivers better fuel efficiency and enhanced driveability

Since 2016, we've significantly varied the kind of trucks we produce to the point where we now have full portfolio coverage. Basically, any kind of Scania truck ordered is compatible with biogas thanks to the Scania flexible modular system. Our modular system allows us to tailor transport solutions by seamlessly and swiftly interchanging components. It not only optimises solutions for diverse customer needs but also fuels a nimble production ecosystem.

What characterises the latest breakthrough in biogas engine technology?

The latest step we have taken has been to upgrade the powertrain, which we call the super platform. We launched a diesel version two and a half years ago with a new engine platform, gearbox, and rear-axle. With our latest biogas iteration, it's similar in some ways—new gearbox and rear-axle—but also with a new upgraded engine. This

combination not only delivers better fuel efficiency but also enhanced driveability.

The secret sauce is the gearbox: a driver benefits from faster gear changing and a wider gear ratio. This means the engine can operate in the sweet spot a higher percentage of the time, with more power. This lifts us up from 410hp to 420hp and 460hp options, which is crucial for marketplace opportunities. 410hp did the job but wasn't enough for more demanding haulage applications. We really needed to take that jump to 460hp to stay relevant, and we've done it.

Electric is obviously cleaner than biogas. How receptive are trucking companies to this option?

The bottom line for companies is efficiency. They need to be able to carry out as many journeys as possible during a working shift. We

want to keep them working as closely as possible to how they've always worked, so they don't need to reschedule and change things. With biogas, they can retain their revenue streams. That's why we describe biogas engines as a 'here and now' solution; nobody needs to wait for other technologies.

The other part of this equation is the sustainability aspect, which we baked into the strategy. We're utilising various parts of the organic waste stream, such as manure and vegetable waste, turning it into a fuel, and in doing so replacing a fossil fuel with a renewable fuel. Obviously, there's CO₂ coming out of the tailpipe, which we can't get around, but it's part of the natural carbon cycle. All biogas carbon comes from the anaerobic digestion of organic materials, which captures methane before it enters the atmosphere, so it's a green solution.

Scania also claims that biogas engines produce less noise. How is this achieved?

By combusting fuel at a lower peak pressure, biogas technology produces less noise. The lower noise levels are also compliant with some peak noise regulations, which some European cities are using. In this context, quieter engines will allow for night deliveries and better urban distribution, which is certainly a marked improvement over diesel.

What sort of range do biogas engines offer?

Range is still an issue for customers, and we understand that. Right now, you can fill your diesel tank, go all the way around Europe, and then head back to the depot with no problem. But diesel will soon be gone. We can

offer 1,800km with a full biogas tank. We know this isn't diesel levels, but it's much better than current electric capabilities. With a biogas engine, our customers can adopt a sustainable fuel with excellent range. Ultimately, biomethane ticks a lot of boxes.

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We really needed to take that jump to 460hp to stay relevant, and we've done it

Are biogas engines purely a stopgap solution until electric options provide the requisite range?

I'm quite sure this will be a long-lasting solution. Waste is an increasing problem—farming and food waste left in landfill can create huge methane leakage problems that worsen global warming. Once you have facilitated biomethane production, it will last 20-30 years, and will certainly last until there are better, more cost-efficient alternatives. At Scania, we're committed to electrification and do everything we can on that score. We have high targets, but this is a journey. We will not be limited by vehicles or batteries. We have battery factories, and we will make electrification happen. But in parallel, we will continue to use fuels already in our portfolio, such as biomethane.



Why are marketers leading the automotive industry?

Marketers are crucial to creating a distinct brand identity and experience, writes Richard Pinder

My LinkedIn feed was often filled with articles and posts bemoaning marketing's lack of gravitas compared to finance or operations and its lack of representation in the C-suite. However, when we look at industries currently undergoing significant transformations, that paradigm is shifting.

Take cars. With the world moving towards electric vehicles (EVs) and self-driving cars, every aspect of this industry is evolving, from engineering to new revenue models and distribution. And remarkably, marketers are now taking the helm of strategic decision-making.

This marks a significant shift from two decades ago, when nearly all automotive Chief Executives came from production or engineering backgrounds. Today, we are starting to see many more car company CEOs with marketing backgrounds. Notable examples include Jim Farley at Ford, Luca de Meo at Renault and Davide Grasso, the former Nike Chief Marketing Officer who now leads Maserati.

So why the change?

Car companies are highly specialised and siloed machines which have become efficient at compartmentalising the business. Engineers may focus on building better electric cars, but convincing customers to choose their product over competitors requires a difference beyond an incremental performance improvement.

As Elon Musk wisely noted, “One of the biggest traps for smart engineers is optimising something that shouldn’t exist.” Marketers excel at zooming out and envisioning the long-term goals, target audiences, aspirations, and how their product or service fits into people’s lives. They create a unique brand experience and a world in which it thrives.

In the era of electric cars, acceleration, top speed, and powertrains will no longer differentiate brands. Instead, it’s about creating a distinct brand identity and experience. Marketers (partnering with Design) are crucial in understanding and shaping this vision.

Take Luca de Meo’s transformation of Renault. In just three years as Chief Executive, he revitalised a declining brand into a potential

EV industry leader. Engineers and designers require years for product cycles, but marketers can drive rapid transformation.

This is an exciting time for an industry initially threatened by change. EVs may lack the visceral thrill of internal combustion vehicles and most share a large quantity of components in the ‘skateboard’ under the body, but the new

rental market and multiple car companies are now trying to find their version of this model.

The automotive industry’s transformation, where marketers are taking the lead, serves as a compelling testament to the value of their expertise. This isn’t just a passing trend; it’s a seismic shift in one of the world’s most significant industries.

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Engineers and designers require years for product cycles, but marketers can drive rapid transformation

wave of designers and their marketing savvy CEOs are looking at them as a giant iPhone: where the user experience is all, and the brand experience is the only real differentiator.

Moreover, marketing thinking can lead to other transformative possibilities. Gen Z’s shift towards renting rather than owning is evident in the fashion

Marketers have a unique ability to zoom out, envision new realities, and shape brands into powerful forces. This capability is invaluable in today’s unpredictable and rapidly changing landscape. As leaders in this industry recognise the importance of marketing in guiding their organisations towards success, it should inspire all marketers to dream bigger.

The opinions expressed here are those of the author and do not necessarily reflect the positions of Automotive World Ltd.

Richard Pinder is Chief Executive of Rankin Creative

The AutomotiveWorld.com Comment column is open to automotive industry decision makers and influencers. If you would like to contribute a Comment article, please contact editorial@automotiveworld.com



How will the fossil fuel ban affect the EV sector?

There's a huge grey area between 'moving away from' and 'phasing out' fossil fuels, writes Ashley Tate

Now that there is global alignment on moving away from fossil fuels, it's important to consider what this will look like in 2024 and how it will affect various sectors and industries. Fortunately, businesses and governments are increasingly acknowledging they must accelerate the use of

more sustainable and clean energies, which will have a direct impact on the electric vehicle (EV) sector.

Naturally, we must consider that the transition away from fossil fuels may occur more slowly in certain countries that rely heavily on them for economic reasons. One reason that it may

have taken so long to come to an agreement is that sustainability is not often seen as something that can go hand-in-hand with economic growth, and many countries may find it more challenging to eliminate their main exports in efforts to 'go green'. That being said, with the right support, sustainability pledges and economic growth can co-exist, and if businesses and governments play their part, it can help reduce the overall carbon footprint in the move toward net zero.

Ultimately, international alignment has always been key to taking a proactive step toward moving away from



Government support is key to EV uptake

fossil fuels, at whatever speed is suitable. Successfully making this transition is one of the major milestones in achieving net zero. However, it's important to consider that there's a huge grey area between 'moving away from' and 'phasing out' fossil fuels. 'Moving away from' could mean reducing the use of fossil fuels by 1%, whereas 'phasing out' could mean completely eliminating their use. As such, governments should be supporting organisations in their transition in the form of funding, for example, by subsidising more sustainable infrastructure and providing opportunities for funding in greener sectors, like EVs.

Businesses, in turn, should be considering how they can navigate obstructions in transitioning their business

fleets from fuel to EV, for instance. If several businesses made this type of commitment, they would be significantly advancing their

also giving themselves a competitive advantage by being able to deliver products and services with reduced or zero carbon. Ultimately, this would signal to the government that more funding is needed throughout the EV sector as businesses get behind the country's commitment to net zero.

What the world needed all along was a clear commitment from its leaders on the route to net zero, without the potential for u-turns, which was achieved at last year's COP28 conference. The pledge set out a clear commitment from international leaders to make significantly reduced carbon

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With the right support, sustainability pledges and economic growth can co-exist

country's progress in phasing out fossil fuels entirely, by slowing down the demand for fuel vehicles, increasing the demand for accessible charging infrastructure but

consumption a reality for the transport industry in the near future. This year, we now hope to see more of a shift toward EV for individuals and business fleets.

The opinions expressed here are those of the author and do not necessarily reflect the positions of Automotive World Ltd.

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The Automotive World Comment column is open to automotive industry decision makers and influencers. If you would like to contribute a Comment article, please contact editorial@automotiveworld.com