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**Lynk & Co to
reshape cities
with ownership
alternatives**

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An aerial photograph of a city street, likely in London, showing a mix of historic architecture and modern urban planning. The street is lined with trees and has a red-paved pedestrian area. A large, ornate building with a dome is visible on the left, and a tall, classical column stands in a park area on the right. The image is used as a background for the article title.

Lynk & Co to reshape cities with ownership alternatives

Alain Visser doubles down on service vs product in his vision of future mobility. By Megan Lampinen



The traditional concept of vehicle ownership may be holding back the smart cities of the future. That's the view of Lynk & Co, which has been offering a new approach to mobility with its subscription-based business model, through which customers can also share out their vehicle when they are not using it. Chief Executive Alain Visser, who claims to have come up with the expression 'Netflix for cars' back in 2016, is more adamant than ever that society requires a fresh approach to transportation.

"Rather than selling cars we need to have a different shape of mobility, and that will impact what cities look like," Visser tells *Automotive World*. The majority of the brand's customers live in and around big cities, and urbanisation will only accelerate in the coming years. With that in mind, Lynk & Co commissioned a study, conducted by Ipsos, into the impact on cities if there were fewer cars on the road and more shared mobility.

So, what does such a city look like? "It's much greener, with more living space and much more playing space," says Visser. "It's a more relaxed, calmer city. At the same time, it is lively with people walking or biking around."

The survey canvassed more than 8,000 respondents across London, Paris, Berlin, Rome, Madrid, Amsterdam, Stockholm, and Brussels. Findings were shared in the report *Cities Reimagined by Lynk & Co*. While views varied by region, there was overall a strong desire among Europeans to use vehicles more efficiently. With statistics suggesting that the



Alain Visser
Chief Executive Officer, Lynk & Co

average car is in use only 4% of the time, there is plenty of room for improvement.

"A car is generally someone's second biggest purchase in life after a house and yet it is the least utilised," says Visser. "As more people realise that, they will start to question whether [ownership] is a wise decision."

Solutions

Shareable mobility is proposed as one solution not just for addressing vehicle standing time but also improving efficiency and easing congestion. Attitudes towards car-sharing in the study were similar throughout the eight markets but varied notably when it comes to the

respondents' age, with the younger generation much more likely to support it.

What does this mean for the evolution of vehicle ownership? While Visser concedes that the majority of people still want to buy or lease a car, he sees "the first signs of people becoming tired of the century-old concept in the Western world of going to a dealership, selecting a car, evaluating the zillion options, negotiating the price, and then waiting months for delivery. According to our data, people are going away from that, but there is no company at an international

level serving these people who want to do something very different." That's the gap which Lynk & Co hopes to fill.

Service vs product

Down the line, Visser believes that the move towards autonomous driving could eventually put an end to traditional vehicle purchasing and ownership. "With autonomous driving, there will be a shift to mobility as a service rather than mobility as a product or as a car. When you want to go somewhere, you will summon a car with your app and it will be like Uber without a driver."

The most common wish across the eight cities is to replace parking spaces with more greenery (57%), followed by places to rest (32%) and wider sidewalks (28%)



The whole notion of service vs product has been under debate for some time. Visser has steadfastly been advocating that automakers strive to become service providers. “The question for the car industry is do you want to be Boeing or Air France. Most have decided they want to be Boeing, which I find quite strange. Today you don’t fly to Paris with a Boeing, you fly with Air France. When heading into the city centre, you take an Uber, not a Toyota Prius. It’s the service provider that matters, not the product.”

He very clearly wants Lynk & Co to be “the service brand with a product, rather than the product brand with a service.” In the long run, this will ensure its survival. “In 20 or 30 years, most consumers will not buy cars anymore,” he predicts. “I’m convinced that car ownership is going to fade out.”

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I’m convinced that car ownership is going to fade out

Near-term options

Visser’s vision is at least two decades away. In the interim, Lynk & Co’s subscription-based business model could be a near-term solution. He describes subscriptions as “the plug-

in hybrids of the service world”, with the idea that the market will eventually be all-electric and all service based. While many companies have been throwing around the term ‘subscription’ lightly, often to reflect any sort of lease, Lynk & Co believes its one-month offering hits the sweet spot.

“It’s predominantly psychological,” explains Visser. “The one-month aspect makes it a very simple short-term decision, a small hurdle to sign a contract. At €550 (US\$569), it’s an expensive test drive. With one month, you see it not as a commitment but as a service that you test, and then you decide if you continue or not.”

For this particular company, subscriptions cover not just the car costs but extras like cinema tickets,





Lynk & Co is keen to tap into the desire for ownership alternatives

restaurant discounts and priority status for events. While the marketing material never explicitly states this, Lynk & Co would appear to be presenting itself as a lifestyle brand. “You can copy a product, a service, and a price, but you can never copy an experience,” Visser asserts. “With these aspects, we try to create an experience for our owners. You can build a company online but you can’t build a brand online, so we need these physical experiences so people feel part of it.”

Who’s left standing?

The move towards greater utilisation of vehicles may be good news for city dwellers, but it could hit new vehicle sales volumes hard. In fact, Visser expects a “massive decrease” in the volume of cars needed in the long

run. “That’s why many of our competitors don’t like us,” says Visser. “The car industry does not want car-sharing to work because the KPI of the automakers is to sell more cars; and the more you share, the less cars you’ll sell. We are proving that it can work.”

Not all brands will survive this reinvention from product to service, but Visser is bullish for Lynk & Co’s prospects. He has plenty of plans for the future, but they will require collaboration with outside partners that bring new capabilities: “It would be arrogant to say we can do that all ourselves,” he concedes. “Today we offer a different sort of car ownership. It’s enough for now, but in the future it won’t be. You will need to offer different services, but also utilisation of different products. We will need to expand.”

Ford on new mobility: nothing is off the table

Megan Lampinen reports back from the new edrive investment event at Ford's Halewood, UK plant



Like most automakers, Ford is investing heavily in the technologies that will shape new mobility, namely connected, autonomous, shared and electric (CASE). It's a global transformation and Ford is very much a global company, but the spotlight most recently turned to the UK where the company is allocating an additional £150m (US\$184m) to produce more electric drives (edrives) at its Halewood plant. It's a hefty investment, securing employment for 500 people and solidifying the UK operations as a pivotal contributor in the global e-

mobility transformation. The announcement event also offers an opportunity to address Ford's wider positioning as a new mobility provider and what's involved in that reinvention.

"Full electrification touches every part of the industry, not just the powertrain," says Tim Slatter, Chairman of Ford UK. "Almost the whole industry changes, including the way we design and develop products, the way we manufacture them with more vertical integration, the way we go to market, and the services we can offer customers. The industry is being turned upside down."

And Ford is determined to come out on top.

In-house expertise

To do that, it is taking more production expertise in-house. While Halewood currently produces transmission components for internal combustion engine (ICE) vehicles, it is transitioning into an e-mobility hub. In October 2021 Ford made an initial commitment of £230m in Halewood to deliver 250,000 electric power units a year by 2024. The units consist of an edrive motor and gearbox, which replace the engine and



Images © Ford

transmission in an ICE model. This marked its first in-house investment in electric vehicle (EV) component manufacturing in Europe.

The additional £125m in funding announced on 1 December will increase capacity at the facility by 70%, and it's going to need that extra output. Ford plans to turn out two million EVs globally by 2026. Halewood's output will support 70% of the expected 600,000 EVs it will sell in Europe by that time. The units are specifically allocated for the upcoming electric Puma, E-Transit Custom, E-Tourneo Customer, Transit Courier and

Tourneo Courier. They will not go into any models to come out of Ford's EV joint venture with Volkswagen. The Halewood-made edrives will be shipped out to the vehicle assembly lines at Ford Otosan plants in Romania and Turkey.

Brexit won't make that any easier. "We were one of the proponents of having a

cooperation agreement for free trade between the UK and the EU," Slatter tells *Automotive World*. "For us, the important thing is the stability of that agreement. Our message to government is, 'Let's nurture that agreement. Let's make sure it's stable so investments like this have a secure, long-term planning horizon and that the

“

Full electrification touches every part of the industry, not just the powertrain



UK is a stable partner for a multinational company like us’.”

Brexit is just one of Halewood's supply chain headaches at the moment. The whole industry is struggling to secure parts and materials at the moment. “One reason we made the investment here is to unlock those supply constraints and give us greater control over e-drive production, quality and cost,” adds Slatter.

For the long haul

Ford has been a major employer at Halewood for six decades and doesn't plan to go anywhere. Investments in new mobility technology should go far in future-proofing. “We made decisions a few years ago that created jobs for people not born yet,” says Lee Meyers, Halewood Plant Manager. “Many people close to retirement now are passionate that this place is there for their kids and their grandkids.” With the investment secured, his challenge is to now install the new equipment and train the workforce with minimal impact on current production. He also needs

to monitor the changing balance between ICE and EV production needs. “In future, the company may need us to react to new opportunities,” he notes. No date has yet been set for the ending of ICE products.

Staying competitive and flexible is no easy balance. “We have to win business. That means working with our trade union partners on what benefits the long-term future of the plant,” Meyers tells *Automotive World*. “It also means we look at any innovative ways we can save on energy, cut costs and address corporate responsibility. We are open to all opportunities to make sure the production process befits the product and the manufacturer.”

While Ford's model line-up is getting cleaner and more connected, so too are its factories. Ford of Europe is aiming for carbon neutrality by 2035 but at Halewood's new electric power unit, the aim is to create a carbon neutral energy supply for its production start in 2024. Electricity and gas already come from renewable sources and plans are underway to install solar panels, which will

generate up to 1,782 MWh. Other investments in support of carbon neutrality include electric locomotives to shunt heavy loads and EV charge points for employees. These all require additional investment, potentially significant amounts. “It’s not about the business case; it’s about doing the right thing,” says Kieran Cahill, Ford’s Vice President of European Manufacturing.

Meyers also has his eye on Industry 4.0 and has been using more diagnostic and efficiency tools. “With a focus on intelligent connected facilities we need more data sites. It’s about turning that data into good knowledge on which we can act,” he points out.

Open minded

Across Europe, EV sales jumped 22% in the third quarter of 2022, the strongest growth of all powertrain types. With the UK and Europe poised to ban new ICE engines in 2030 and 2035, respectively, those numbers should only grow. The new Euro 7 regulations, though, proved a “disappointment,” according to Cahill. “We made an EV commitment and now the industry is asking us to invest more money into old technology.” However, the proposal put forward by the European Commission in November 2022 is far from finalised, and the end rule may take a slightly different form. Slatter says he and the team continue to monitor developments on this front



The Halewood plant is growing increasingly cleaner and smarter

but points to Europe’s commitment to phasing out ICE as a move that “commits the industry to a decarbonisation path.”

Ford’s plans for an all-electric line-up in Europe by the end of the decade put it in step with the regulations and prevailing attitudes prioritising sustainability. It also demands continued innovation. Some players, for instance, are looking to [lease the batteries on their EVs](#) separately from the vehicle sale. Others are offering their EV models [on subscription basis](#). “We continue to look at all the different go-to market options that are available to us,” emphasises Slatter. “We must remain very open minded about how to manage our way through this transition.” He points specifically to the opportunities for new services and a longer-term, fuller relationship with customers, moving away from the historical one-off transactional interaction approach. “Everything is on the table, and we are determined to be a winner,” he adds. “After all, that is why we are making this investment here at Halewood.”

In global brand push, good design is universal—Nio

Nio's Vice President of Design takes Megan Lampinen through his vision of the electric, autonomous vehicle of the future



Developing a strong global brand design strategy for a line-up of new luxury cars is hard enough.

Adding in design responsibility for the brand logo, the supporting electric vehicle (EV) battery swap stations, brand experience centres and a wide range of lifestyle products makes it a gargantuan task, but one that Kris Tomasson was excited to take on. He joined Chinese start-up Nio in 2015, tasked with overseeing all creative activity since its inception.

“We wanted a DNA that was recognisable,” he asserts. “We had a clean sheet of paper, with no history to influence us, but we had to design something ownable and unique.” Early on he set out four key design principles: everything needs to be pure, human, sophisticated and progressive. “Those four words are straightforward to communicate and translate well into other languages. They are a great tool for our designers. We always look at everything through that filter.”

Over time and with each new iteration, he suggests, the Nio model line-up has become increasingly true to those four pillars. Emphasising the humanity aspect, he notes: “Our cars are shaped as beautifully flowing objects; not cut in a mechanical way.” He also flags the virtual assistant Nomi, adding, “It has character and a soul.” Notably, Nio likes to refer to Nomi as a “digital companion” and has promoted its emotion engine as key to establishing an engaging relationship between the user and the vehicle.



Kris Tomasson
Vice President of Design, Nio

Global and holistic

While Nio has its roots in China, the home of its founder William Li, it is very much positioning as a global brand and currently in the midst of a European offensive. Speaking to *Automotive World* at the Waldorf Astoria in central Berlin, around the corner from Germany's first Nio House, Tomasson notes: “There was a conscious decision that we wanted to be a global car brand—nothing tailored specifically for any region. The idea is just to create the best design we can.”

His creative team is split between Munich (with 70 employees) and Shanghai (90), but draws on individuals from around the world, and Tomasson describes the resulting group as “a melting pot”, adding that the aim is always to “create a



Nio's logo evokes the road leading to a new horizon

“

There was a conscious decision that we wanted to be a global car brand—nothing tailored specifically for any region

beautifully designed product that appeals to everyone. The way people perceive good design is becoming more universal.”

The design approach is not just global but also holistic. That means the branding has to be felt across all touchpoints, and there are many. Notably, Nio's original mission statement is not such much about cars in particular, but rather the vague target of 'building a joyful lifestyle'. As Tomasson clarifies, “We are not talking about cars or products but spreading joy to our users. We started as a car company but expanded to a complete ecosystem.”

An ecosystem driven by design

Today, that ecosystem includes Nio Power, Nio Service, Nio House, and Nio Space, which provide everything from EV charging and battery swap to vehicle repair and maintenance. On top of the car-related businesses, there is the Nio Life brand, which has created eight categories of products including apparel, luggage and bags, home, food, technology products, etc. There is no limit, Tomasson says, on how extensive the ecosystem can grow. If it makes sense, the team will incorporate it.

But how applicable are design skills among such disparate items? Tomasson is able to draw upon previous experience at BMW, Nike, Gulfstream and Coke for the challenge. “I cut my teeth at BMW, so I had a good understanding of premium high-quality design, of surfacing and proportion—all that makes a good car a good car. With Nike, I learned about lifestyle and appealing to users.” Similarly, his experience with luxury jets at Gulfstream is helping with the development of design concepts for a future of autonomous driving. “Nio represents an opportunity to bring my many years of design into one place,” he adds. “This is a company driven by design.”

A clean, sustainable, and autonomous future

Nio’s upmarket range of vehicles are all electric, which invited fresh design opportunities. “From a design standpoint, electrification enabled a lot to happen,” says Tomasson. To start with, it freed up considerable



Nio EL7

interior space; so much so that he estimates Nio’s models offer inside space equivalent to cars one class up from them. Space, he suggests, could redefine the concept of premium motoring. “The traditional way of signalling that a car was premium was based on the length of the hood, i.e. the size of the engine. But as we are electric, we don’t have an engine. We can redefine future premium as creating space. Short overhang, long wheelbase—those are signature cues of what a premium electric car will be.”

The long-term aim is not just zero tailpipe emissions, but a sustainable vehicle. Tomasson and his team are constantly looking into new sustainable materials, such as karuun. This is an environmentally friendly alternative material to plastic that is made out of rattan, and Nio uses it on the interior of its ET7



Nio ET7 design highlights include Double-Dash daytime running lights, integrated X-Bar, and 3D heartbeat taillight

model. In fact, Nio co-developed the material and is the first company to use it in production. “Looking at it, you would never think it was a sustainable material,” he points out. “It is beautiful to touch and integrates well into the living room experience.”

The model line-up is also highly automated and marketers have pushed hard on the advanced digital offering. The company has built up the full-stack Nio Autonomous Driving (NAD) capability with perception algorithms, localisation, control strategy and platform software developed in-house. Nio

intends to expand automated driving use cases to eventually cover highways, urban areas, parking and battery swap.

The end game, though, is a fully autonomous experience and it offered a glimpse of what that might look like with the concept car Eve. “That was our vision of a complete autonomous future,” 135Tomasson tells *Automotive World*. With no driver’s seat or steering wheel, this mobile living space sought to redefine what a vehicle interior could be but, at the same time, create a beautiful and dynamic exterior. “We have already



taken some inspiration from that car into our model planning,” he adds.

Tomasson has big plans for vehicle interiors in general, which he describes as “a neglected” part of vehicle design: “Maybe it comes from my background in planes, but the notion is to make the interior a more liveable space.” Back in the 1930s, he points out, cars copied home interiors, with generous use of wood and even curtains on the windows. “There was a conscious effort to make a mobile living space like the home, but somewhere that went by the wayside, maybe industrialisation played a role.

Nio is making a conscious effort to bring that back again.”

This is just one area that has Tomasson excited about the future of vehicle design. “One of my core philosophies is ‘leave no stone unturned’,” he says. “There is no aspect too big or too small for our attention, from the window switches to the badge on the bonnet. Everything can be improved.” In the wake of electrification and automation developments, huge changes in vehicle design could be on the way: “With EVs and AVs there has never been such a great opportunity to change the architecture of the car,” he asserts.

Subscribe here: are vehicle feature add-ons in demand?

Elle Farrell-Kingsley explores where subscription-based features stand in the market

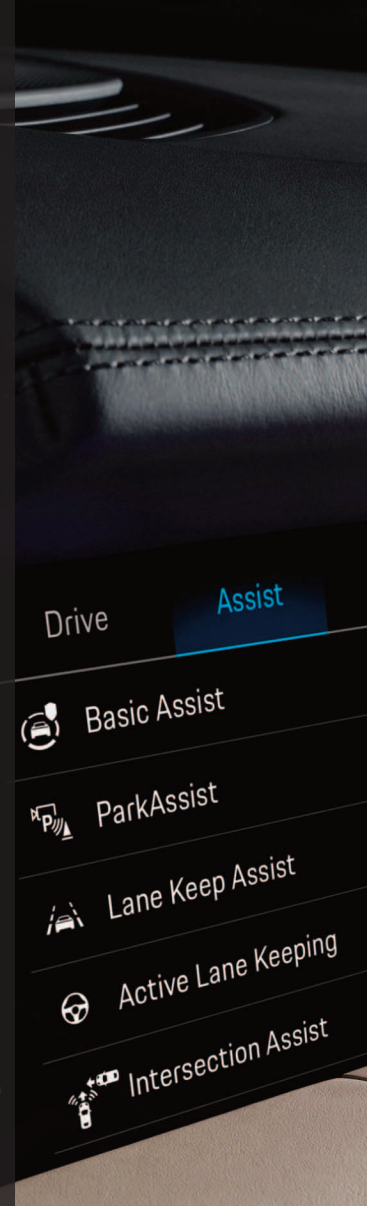
“Car manufacturers are always exploring new ideas for ownership models, and I am confident we will see more concepts emerge in the years to come,” says Scott Kunes, Chief Operating Officer at Kunes Auto Group. However, he notes that “subscription models, are not new. They’ve been around for at least ten years, from flex buy to car-sharing and upselling features.”

Private vehicle ownership is on the decline, with [car-sharing](#) and [subscription-based models](#) on the rise. Subscription-based features have similarly flourished. Automakers are now looking to profit by charging customers monthly or annual

subscription fees to access certain features within the vehicle. Instead of immediately committing to a product, consumers can try out different technologies and services to discover what they prefer.

This has been made possible by an increase in car internet connectivity, which enables over-the-air (OTA) software updates such as those [pioneered by Tesla](#) in 2012. Car companies can now add new capabilities and tweak vehicle software from a distance.

OEMs that have rolled out a feature subscription model include Audi, BMW, Cadillac, Porsche, and Tesla. “Next up for the automotive industry





are microtransactions—software subscriptions added to monthly car payments for services like heated seats, Netflix and more,” says Joe Fuca, Chief Executive of Software-as-a-Service (SaaS) growth company Reputation. Fuca has spent more than 30 years in the tech sector.

Feature-based market

Porsche’s Function on Demand (FoD) subscription plan—currently only available in the all-electric Taycan Cross Turismo—gives owners two options: upfront purchase of a car feature or a monthly subscription fee for its use. This is possible for Porsche Intelligent Range Manager

(PIRM), Power Steering Plus, Active Lane Keeping, and Porsche InnoDrive features. The PIRM optimises the car’s navigation system to maximise range and minimise charging stops. The outright purchase of this feature would cost US\$474, while a monthly subscription is US\$12 after a three-month free trial period.

Tesla also made its full self-driving (FSD) feature available as a subscription to North American customers on 24 November 2022. Owners with Basic Autopilot can access FSD for US\$199 per month, while those with Enhanced Autopilot can enjoy the feature for US\$99 per month. Tesla notes: “These features are designed to become more capable



A glimpse into Tesla's FSD programme

over time; however, the currently enabled features do not make the vehicle autonomous.”

Similarly, Cadillac offers Super Cruise active driving assistance for a monthly subscription fee, which promises hands-free driving and automated lane changes. After a three-year free trial expires, customers in the US can purchase a stand-alone Super Cruise plan for US\$25 per month that facilitates the hands-free driving. They can also add further bundles such as OnStar and Connected Services—which provides access to in-vehicle apps, a remote key fob, and diagnostic notifications—for a collective US\$15 per month.

Lexus, Toyota, and Subaru have begun to charge owners for the ability to lock or start their cars remotely through an app. In some BMW car models, automatic high-beam headlights can be unlocked OTA with a subscription payment.

Furthermore, BMW has released a subscription for features in addition to autopilot driving, such as real-time traffic alerts, navigation map updates, and Amazon Alexa car integration. One service that has drawn much attention includes a [subscription service for heated seats](#), available in the UK, Germany, South Korea, New Zealand, and South Africa for approximately US\$18 per month. Many BMW owners oppose the idea of paying extra for something that's already installed in their vehicles, causing some drivers to resort to grey-market type services which unlock paywalled features for a one-time fee.

Not quite there?

The subscription feature approach has not always been favourable amongst consumers. Reputation's analysis of more than five million customer reviews in its 2022 Automotive Report found that pricing

is a significant driver of negative consumer sentiment, and microtransactions are seen as another unnecessary monthly charge. In fact, according to an April 2022 Cox Automotive survey, 75% of consumers said they were not willing to pay an annual or monthly subscription fee for most items on their next vehicle.

“It is not surprising that the public has reacted negatively to subscription services,” says Fuca. Specifically, 92% said heated and cooled seats should be part of the purchase price; 89% said remote start should be as well. As for safety features, the response was equally instructive: 89% said lane-keeping assist should be included, and 87% said automatic emergency braking should be too.

Consequently, Fuca believes manufacturers and dealers must stay more in touch with what their customers do and don’t want. Kunes acknowledges this pitfall: “Some ownership models have more success than others, but most concepts fall short,” he says. “Many subscription packages put forward have resulted in a dip in consumer confidence. Car prices continue to rise, and people want to own what they are paying for, especially if the features are already built into the vehicle.”

An investment

Nevertheless, “subscription-based models make sense for automakers because the cars can be customisable, allowing car owners to change their mind on various features once they see the value,” Fuca tells *Automotive World*. Indeed, Stellantis announced in 2022 that it plans to generate US\$22.5bn in incremental annual revenue from software

services and subscriptions by 2030. As such, the automaker said it expected “a majority” of its new vehicles to be capable of OTA updates as soon as 2024. Similarly, General Motors expects its in-car subscription services to reach US\$25bn by the end of 2030.

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It is not surprising that the public has reacted negatively to subscription services

However, Fuca notes that the perception of subscription models presents an ongoing challenge for manufacturers. “Automakers should monitor feedback across all channels—from reviews and ratings to comments on social media—to understand consumer sentiment and the reasons behind it.”

Part of the issue is timing: “With [record inflation](#) and [supply chain shortages](#), the [price of a car](#) is already at an all-time high,” he concludes. “Clear, articulate details around the value added by a subscription model will go a long way.”



Put Down Phone



In-cab monitoring: from Big Brother to little helper

Smart camera technology could significantly reshape the workplace of commercial drivers.
By Megan Lampinen

The commercial vehicle environment is fundamentally a workplace, and as such comes with unique opportunities and challenges. Employers are keen to optimise efficiency and safety, which feed directly into their bottom line. Advances in telematics and connectivity are not only helping to create safer drivers—with fewer incidents and less downtime—but also attracting new ones and making the job generally more attractive.

Driver coaching

Driver coaching solutions are gaining ground as they become smarter and less intrusive. This market segment has been evolving rapidly but the idea is to monitor driving behaviour, issue alerts over any potentially unsafe actions, and recognise and/or reward safe driving. With greater applications of artificial intelligence (AI), in-cab monitoring could significantly reshape the workplace of commercial drivers.

Internet of Things (IoT) specialist Samsara offers a Proactive Driver Coaching retrofit system that combines a vehicle gateway—which provides connectivity to the cloud and GPS data—along with an in-cab dash camera with AI capabilities. When risky behaviour is detected, it issues a voice alert. Coaching also comes in the form of nudges, in which drivers are alerted to proactively self-correct risky behaviours on their own, before a safety event happens. “This nudge capability provides a way for a fleet manager to give a driver multiple chances of correcting their behaviour,” says Ingo Weigand, Vice President of Product Management at Samsara. “You could say, I’m okay if

you follow too closely once or twice within a certain timeframe, but you shouldn’t do it three times because that means you didn’t correct the behaviour.”

Nudges have been resonating with drivers, spurring much more engagement and even a feeling of empowerment. “Drivers see the camera and the system as a partner and a driver assistance rather than a tool that monitors them,” Weigand tells *Automotive World*.

Technology providers like Samsara also frequently offer a range of management capabilities around the data gathered, allowing fleets to evaluate safety statistics across different metrics. “We have a comprehensive set of tools to configure a safety score that uses inputs, events and certain behaviours to figure out how risky a driver might be,” says Weigand. “Fleets can use that to give drivers a sense of accomplishment when following best practices.”

There’s also a gamification element on offer, and the Samsara Driver App enables drivers to compete with peers for potential rewards. “Staying safe provides a good baseline for rewards programmes and other mechanisms that drive engagement and retention,” he adds. Operators have used various reward methods, ranging from the safest driver of the month recognition programmes to financial prizes, such as Amazon gift cards on a quarterly basis.

The overall impact of these systems can be significant. One customer in the US combined some of Samsara’s functionalities to structure its own safety programme, which was found to reduce preventable accident costs



Seeing Machines' Guardian system uses advanced eye and face tracking software to detect driver distraction

© Seeing Machines

by over 80% and improve driver retention by 15%. Another fleet deployed Samsara's mobile phone detection features and within the first 30 days, saw an 80% reduction in mobile phone usage. "If you think about all the downstream impacts of having a phone in the cab, distraction-related incidents and insurance cost increases, it's a pretty impressive result," notes Weigand.

Incentives to adopt new technology

Seeing Machines is another big name shaping the future of the commercial vehicle workspace with its smart technology. Specialising in advanced computer vision, the Australian-based company designs AI-powered monitoring systems to improve transport safety. "It's a super-exciting time for in-cabin monitoring at the moment," says Mike Lenné, Chief Science and Innovations Officer.

The company started in the mining industry nearly a decade ago and moved to over-the-road trucking about eight years back. It is also present in passenger cars and light commercial

vehicles. "Managing safety risks like distraction and drowsiness has been a primary focus for the industry, both in passenger and commercial vehicles," Lenné tells *Automotive World*. "In-cabin technology can help deliver opportunities not only around safety but also efficiency for commercial vehicles."

Hours of service is a case in point. Most parts of the world have firm rules on the number of commercial driving hours allowed and the number and length of driver breaks in a given period. The National Heavy Vehicle Regulator in Australia is considering whether or not operators who use driver monitoring systems should be granted some flexibility with regard to their work rate schedules.

It's all down to the link between a driver's drowsiness level and the timing of government mandated breaks. Seeing Machines has been researching this with Volvo Trucks, Australian operator Ron Finemore and Monash University, with trucks by Ron Finemore using Seeing Machines' aftermarket Guardian driver monitoring system. Early findings suggest that the relationship between when the drivers are tired and when they are required to take their breaks is not always aligned. This is particularly noticeable with night-time shifts. "The prospect of potentially allowing flexibility in scheduling and work rest schedules under various regulations is a super-exciting opportunity for commercial vehicles. It is another incentive for operators to pursue this sort of technology," Lenné explains.

The project represents the largest in-depth study of truck driver behaviour in the world and saw researchers observe 120 truck drivers for nearly

12 months. Data collection is now finished and experts are analysing the results. “I would hope within the next six months we would have some pretty concrete findings,” he says.

Change management

Moving ahead, technologies like those explored above will continue to mature and penetrate greater slices of the market, but an element of change management will be required. “It is critical that the systems are supporting drivers; not tapping them on the shoulder every 30 seconds,” cautions Lenné. “This is not about surveillance, this is about monitoring, and applying an algorithm to identify behaviour that potentially could take your truck off the road. It’s about protecting you as the individual and other road users in the vicinity.”

Acceptance of this technology in the cab may hinge on the specific approach of the fleet manager. “If you put a camera in front of me at my desk, I’m going to ask questions,” says Lenné. “Especially if someone hasn’t explained to me what’s going on.” He suggests that change management approaches will vary by company, noting: “Typically there are a number of people within an organisation who have a particular passion for safety and/or this type of solution and they are incredibly valuable in that onboarding and change management process.”

Weigand also flagged the importance of addressing the ‘Big Brother’ concerns among drivers. The perception of these systems, he says, “is definitely evolving quickly. Many drivers now think about the cameras the same way that they think about other driver assistance systems. If

you think about it, vehicles already have an alert for other things, like if you don’t clip in your seat belt. That said, we do work frequently with customers around change management efforts.”

“

In-cabin technology can help deliver opportunities not only around safety but also efficiency for commercial vehicles


Attitudes tend to change once the benefits of these systems become clear. Drivers are quickly converted once they can turn to video evidence that exonerates them in the case of a disputed collision. “It definitely takes change management for folks that haven’t seen the benefit or haven’t been in a risky situation, but there are also early adopters that are already excited and have spent their own personal funds to put a dash camera in place, in some cases,” says Weigand.

Moving forward, he expects to see an increase in the use of AI and automation technology to help understand more behaviours and complicated, risky situations that evolve on the road: “Over time, these systems will become a better partner to the driver.”



DAF designers target optimum work and living space

Understanding fleet operator and driver needs is at the core of designing a comfortable and effective workplace. By Michael Nash



Creating a home away from home, where drivers can work in comfort as well as rest, relax and go about general daily activities, is a defining aspect of truck design. But there are numerous challenges facing design teams when attempting to deliver the perfect workplace, and each driver has individual needs.

“It is our mission to offer the best place to drive, work, sleep and relax for a truck driver,” DAF Trucks Design Director Bart van Lotringen tells *Automotive World*. “This is by no means an easy task. The overall space available is confined and we have to organise all functions in a symbiotic way. We are the architects of the home of the driver, as they spend days and sometimes weeks on the road.”

Basic architecture

When starting work on a new truck, Lotringen and his team focus early efforts on basic functionality, ensuring that the driver can easily and comfortably operate the steering wheel, pedals and gear shifter. Ergonomics clearly plays a key role here, and as Lotringen notes, is one of the most important considerations during the early phases of truck design. “It is crucial that the driver can comfortably keep eyes on the road and hands on the wheel,” he emphasises. “That, in fact, is the starting point for cab interior design. Therefore, ergonomics plays a big role in the early phases by defining the master plan of a range of trucks when using our user-centred design approach.”

The next factor to consider is the operation of the truck, which has a direct impact on the way in which the cabin, or workplace, is formed.

Designing a truck for long haul operation is quite different from designing a distribution truck for urban areas. For example, seats must be extremely comfortable and provide support for the driver over long distances, and spaces for relaxation and sleep must be included. Storage becomes an essential consideration in long haul trucks too, as drivers will need to keep their belongings, like clothes and wash bags, inside the vehicle if they are traveling for several days. Other basic functionalities like phone charging and a retractable table for consuming food will also need to be built in.

In contrast, for trucks that travel over shorter distances like those used for urban goods delivery, smaller seats may be chosen in order to maximise payload, and areas for relaxation or sleep are not necessary. The workplace becomes more simple, designed specifically around driving. However, cab design may be slightly different to facilitate ingress and egress, allowing the driver to quickly jump out when delivering a product. Other factors, such as cabin position in relation to the ground and step arrangements, are also considered early on. “Once this basic architecture has been set, we then start to focus on the details and, again, ergonomics play an important role here,” Lotringen adds.

Another key ingredient for creating the driver workplace is the windscreen. This area will have a notable impact on the driver, with larger windscreens and windows resulting in a greater field of vision and more exposure to daylight. New European legislation on truck mass and dimensions has allowed DAF to use larger windows while also

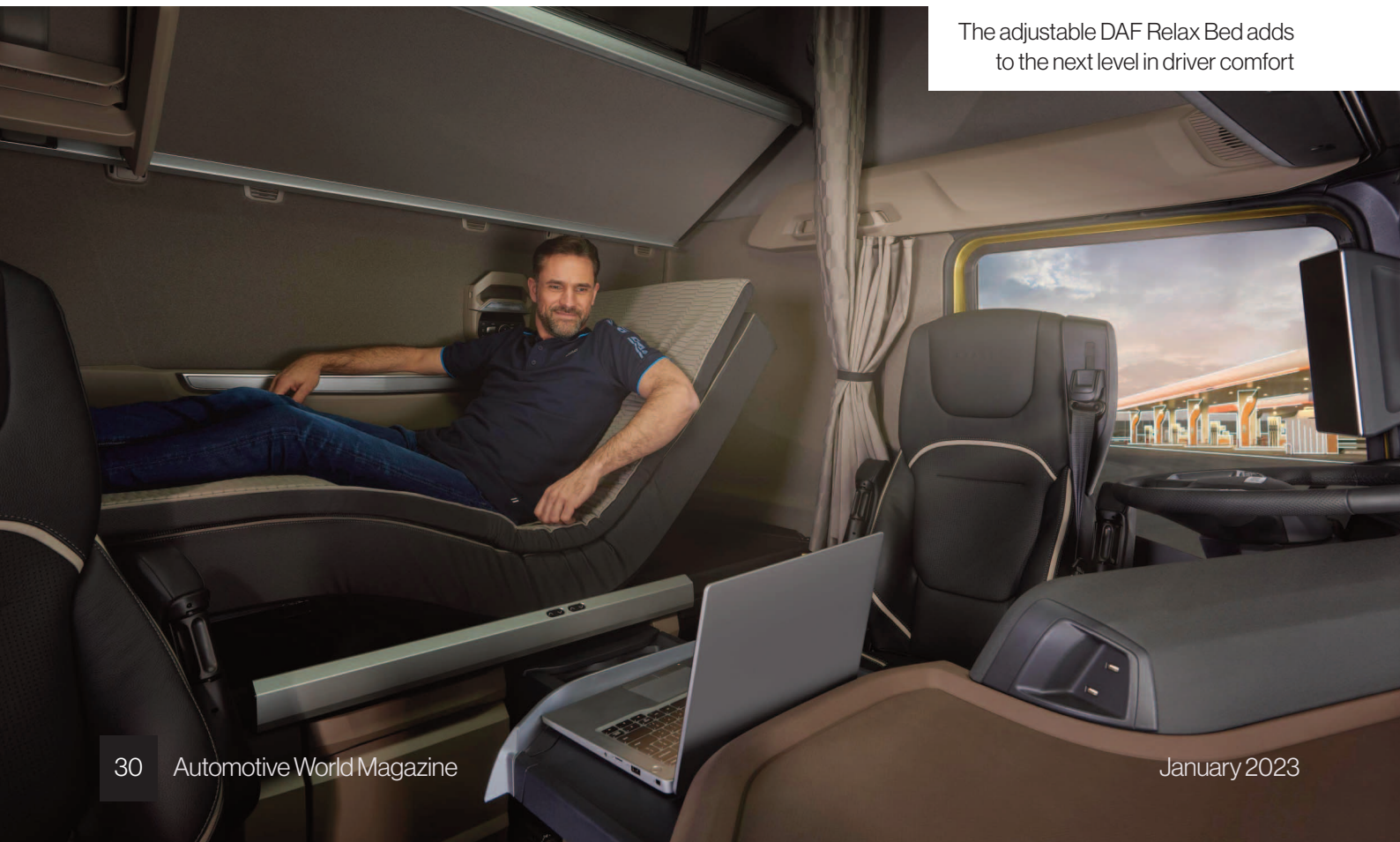
enhancing aerodynamics, resulting in a 10% improvement in fuel efficiency. “Our windows can now be 33% larger, and we are replacing mirrors with cameras,” he confirms. “Our Digital Vision System for seeing almost everything around the truck is ensuring better driver and road user safety. And there is also a paradigm shift in spaciousness of our cabs by adopting the new law on mass and dimensions, allowing for a larger interior space—a staggering 12.5sq m on our XG+ model.”

Reducing strain

Digital tools are playing an increasingly important role in the driver workplace. Depending on the truck operator and the job of the truck, information provided to the driver on screens could be integral for operating the vehicle. Lotrungen lists screens among the “finer details” of the driver workplace, placing

particular importance on the location and layout of the digital instrument cluster. He also suggests that there should be careful consideration regarding the presentation of information on screens, as this could be catered to specific fleet operators and even individual driver needs, with the goal of making the workplace more effective. Only information that is useful to the driver should be displayed to avoid a bombardment of distracting notifications.

As in passenger vehicles, trucks today typically have more than one screen, with some offering entertainment services to the driver during rest and relaxation periods. But during work hours and operation, the screens that present important information need to be placed strategically to ensure drivers do not avert their gaze too far from the road. The safety aspect, Lotrungen argues, is a vital component of designing the driver



The adjustable DAF Relax Bed adds to the next level in driver comfort

workplace: “Digitalisation is a strong trend in the human machine interface (HMI) and how we integrate the fleet management systems of the transport companies with our trucks and services. But it is also present in the algorithms that we design for advanced driver assistance systems (ADAS) to make driving safer. Ultimately, it is all about reducing unnecessary strain on drivers so that they can focus on their tasks in a safe way without distraction.”

While screens are increasingly prominent in the cabin, Lotringen thinks that physical buttons and switches must still be included in the cabin. “We must ensure critical vehicle functions remain at the fingertips of the driver with physical switches,” he affirms. Screens can be brilliant at providing certain bits of information when required, Lotringen clarifies, but if a driver needs to scroll through menus to turn on the air conditioning system, for example, the workplace becomes less efficient and less safe.

Attracting new drivers

Designing the perfect driver workplace is a difficult task, with so many different factors influencing the makeup of the cab. But Lotringen believes it can be made easier with the help of the experts—the drivers themselves.

“We involve drivers and operators in what we call ‘customer councils’, during which they will co-create a new design over a period of a couple of years and help us make the right decisions,” he reveals. “They are the representative of their many colleagues and are very good at judging the appropriateness of a new



Storage facilities are particularly important for long-haul models

idea for their work based on their daily practice. A designer should be empathetic with the driver, using their creative abilities towards improving the workplace.”

By involving drivers and fleet operators in the design process, Lotringen suggests that the finer details of the workplace can be ironed out, and that his team can gain a greater understanding of customer needs. In the future, he hopes to use the knowledge gained from these “customer councils” to attract the next generation of truck drivers.

“We want to design trucks with benchmark levels of driver comfort so the profession appeals to men and women, with the aim that they see truck driving as an aspirational career choice,” he says. “The designer, or the architect, has to bring it all together in an appealing and intuitive way; one that makes a driver feel immediately at ease when they enter the vehicle. We as truck designers can influence and improve the life and work of drivers, and I am most proud if drivers recognise when we truly help them in their job.”



Industry 4.0 opens door to 'work from home' manufacturing

**Factory workers remotely
manipulating production
machines using VR, AI, 5G and
digital twins? It's coming soon.
By Megan Lampinen**

Intelligent, digital technology on the factory floor promises to dramatically reshape the automotive manufacturing ecosystem. Today, software platforms are helping automakers adjust to the challenges around new technology trends, greater manufacturing complexity, demand volatility, and growing calls for customised vehicles. These smart systems provide a wide range of insights into what's happening within the factory and in the supply chain. Increasingly, they could even help with workforce shortages and working conditions.

Between 2019 and 2021 the number of people in the US who primarily work from home tripled from about nine million to 27.6 million, according to 2021 American Community Survey estimates released by the US Census Bureau. The COVID-19 pandemic accelerated the use and development of all sorts of remote-working technologies, including systems that could provide greater insight into what's happening on the shop floor. At the height of COVID lockdowns, many facilities were forced to send the majority of

their employees home. Those with the right systems in place could carry on almost as usual.

Blackhole vs business as usual

Plex Systems, a software as a service (SaaS) manufacturing company, has seen first-hand the benefits such technology provides. It specialises in cloud-based Manufacturing Execution Systems (MES), which can provide traceability and tracking capability as products are made and transported around the plant. For companies new to this, it's a relatively asset-light commitment. "To leverage Plex, all you need is a device that can access the internet, such as a tablet, a phone or a PC," says Jerry Foster, Chief Technology Officer and Co-Founder. "Just put those devices in the right places on the shop floor so that the workers can access Plex where they need to. There's no capital expense. Everything is operational expense because it's a subscription-based solution."

One of its biggest customers, a Tier 1 automotive supplier, sent all employees home at the start of the pandemic, with the exception of those working on the production line. Half of the company's facilities used cloud-based software like Plex. Half of them did not.

"Those plants that used Plex could continue working as if nothing happened even when the bulk of workers were sent home," Foster notes. "Their plants continued to function.

Departments like procurement were able to purchase things from home, and staff in quality and accounting were also unaffected by the change. Generally, everyone was able to do what they needed to, even outside of the plant or office."

On top of that, managers and executives had real time visibility into everything that was happening. With that sort of insight, they were able to make decisions to drive the company, even from home.

In contrast, Foster describes the other plants that didn't use cloud-based software as "black holes." As he elaborates, "The corporate leadership had no idea what was happening in those plants. They had to rely on phone calls and email reports. All the information was hours old as opposed to real time. There was a huge discrepancy between the on-premise plants and the cloud-based plants working from home."

No limits

As highlighted here, cloud-enabled software allowed businesses to survive incredible disruption, but the full impact is far from realised yet. Plex believes that advancements in remote monitoring and automation mean, at some point, factory workers too may be able to work from home, remotely operating machinery using digital twins.

"We are on an exponential ramp towards smart manufacturing and digitalisation," Foster tells

Automotive World. "Today, you need people physically on the manufacturing line pressing buttons. But in the future, we could send those workers home as well."

The combination of digital twins, 5G networks, artificial intelligence (AI) and augmented reality offer a Metaverse-like potential to make that vision possible. Foster suggests in the future, a line worker could stand in their living room wearing virtual reality goggles and interact with a digital representation of a machine. As they interact with the digital machine, it would send signals to the physical twin in the plant, which would carry out the action that the worker was requesting from their living room.

This sort of capability is something Plex could help realise, and the company is in fact already going down that path. About a year ago, Plex was acquired by Rockwell Automation, which has a huge presence with the hardware and controllers on the shop floor. "Rockwell has some really cool solutions in the digital twin and 3D augmented reality space, and is making real progress in digitising and virtualising those physical artefacts on the shop floor," he adds. "The combination of the cloud-based MES that Plex provides and the AI-enabled controllers and digital twins that Rockwell's providing could accelerate that future of smart, remote manufacturing. It's crazy stuff."

Electreon CEO: wireless charging to dominate in five years

E-mobility needs to move from reinventing the gas station to reimagining charging. Megan Lampinen explores the momentum behind inductive technology



Images © Electreon



One of the biggest headwinds for electric vehicle (EV) uptake has been the charging experience. EV models on the market today require a plug-in charger for use either at home or a public station. The idea of going wireless with induction charging has been floated for years, promising benefits such as a reduction in battery size and cost, extended driving range, reduced pressure on the grid, and the ability to charge multiple EVs simultaneously. While a number of big-name companies are working on the technology and running pilots, traction has been slow. That's starting to change.

"In five years, wireless EV charging will be the dominant form of charging infrastructure globally," predicts Oren Ezer,

Co-Founder and Chief Executive of wireless charging specialist Electreon. "Wires and cables will never appear on the busy streets of mega cities like Paris or along New York's 5th Avenue. Inevitably, EV charging will become less of the charging stations that people are accustomed to today and more of the invisible coils below major highways and busy streets for charging EVs as they move."

Israel-based Electreon has been developing Dynamic Wireless Power Transfer (DWPT) technology that can wirelessly charge EVs while stationary or driving. It has been running pilots in Israel, Germany, Italy and Sweden, focussing primarily on trucks and buses. In February 2022, it won the Michigan Department of Transportation's RFP for the

inductive vehicle charging pilot and plans to deploy its technology in central Detroit. This will mark the first shared public Electric Road System (ERS) in the US.

"It is becoming clearer to the public, policymakers, and fleet operators that the current plug-in approach has its limitations, particularly as it relates to electrifying fleet vehicles such as buses and trucks, which are the biggest polluters," says Gene Gurevich, Electreon's Vice President of Policy. "These vehicles require large and expensive batteries and charging that will not disrupt operational demands. A bus or a last mile delivery vehicle cannot wait to charge at a station. Wireless electric roads address many of these challenges."



Energy transmission from the road requires the installation of coil segments beneath the driving surface

A slow build

If the potential benefits for wireless are so attractive, what's been holding back development? "For years people have seen wireless EV charging as something futuristic and not practical," observes Gurevich. "We are all creatures of habit and find comfort in doing things the same way they've always been done. When it comes to charging infrastructure, this has meant reinventing the gas station for EVs instead of reimagining charging infrastructure."

Electreon is pursuing a vision in which inductive charging eliminates range anxiety and slashes battery

capacity requirements, making the e-mobility transition more sustainable overall. It's a bold vision, and there have been many lessons along the way. "We have broadened our understanding of the complexity of each project specifically in public roads and learned how to collaborate and work with numerous stakeholders to efficiently execute projects," Gurevich tells *Automotive World*. The company has also made technological refinements to improve robustness and resilience in various weather conditions with different use cases.

While Electreon has been finetuning its technology and expanding its geographic footprint, new EV models have arrived with longer ranges, consumer awareness has improved, and governments around the world have introduced EV purchase incentives. All of these are helping the case for EVs more broadly and wireless charging indirectly. More recent legislative developments should also help, such as the passage of the Infrastructure Investment and Jobs Act (IIJA) and the Inflation Reduction Act (IRA) in the US. States like New York and California recently passed laws to ban gasoline-powered cars by 2035. "There are many letters and quotes from US mayors and state departments of transportation seeking innovative solutions like wireless charging to enable the transition to EVs, and we're seeing demand increase internationally as well," he points out.



Dynamic wireless charging is a particularly good fit for bus fleets

Outlook

However, Gurevich admits that challenges still remain to scale wireless charging deployments. Part

of the problem is that policy and investments are still focused on traditional charging station deployments. “In addition, we need continued collaboration from automotive OEMs and fleet owners that could benefit from wireless charging technology,” he adds.

“There is high demand globally for wireless charging and our technology is ready to meet it,” he emphasises. The company is currently working with more than 60 global partners—including Ford, Stellantis, Iveco and Volkswagen, along with government entities and transportation management companies—to refine the use cases, demonstrate the technology and its benefits, and scale its adoption beyond pilots. “As each roadway is deployed, we create further opportunities for additional use cases, which substantially diminish the barriers to entry over time,” Gurevich says. “In the future, with each additional commercial application of our technology, we will be able to create more efficient, electrified cities.”

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In five years, wireless EV charging will be the dominant form of charging infrastructure globally



Will China dominate the luxury vehicle segment?

The Chinese market's drive to combine high quality with scenario-based tech applications could give it a competitive edge. By Will Girling

Analysis conducted by McKinsey & Co in July 2022 found that the global mainstream vehicle market has largely stagnated, with little growth expected up to 2031. Conversely, the luxury sector is expected to grow between 8% and 14% per year. Consumer spending for low-to-medium-income earners has been and will continue to be restricted by geopolitical events, such as

the pandemic and the cost-of-living crisis. However, higher earners are not experiencing similar constraints. McKinsey separates 'luxury' into four tiers based on price: US\$80,000-US\$149,000, US\$150,000-US\$299,000, US\$300,000-US\$500,000, and US\$500,000+.

Despite the luxury segment's healthy economics, [some new entrants to the market](#) are choosing to avoid the luxury label. Italian start-up Aehra, for example, prefers "high premium" as this indicates high quality materials, finishings and

performance but without extravagance or superfluity. According to Chief Executive Hazim Nada, the price range for this segment is US\$160,000 to US\$180,000.

However, McKinsey concludes that Europe will not be the centre of the global “luxury growth engine”—it will be China. The consultancy predicts that China, already accelerating development in the US\$80,000 to US\$149,000 price band, will redefine luxury with a focus on digital technology, connectivity, and autonomous features.

Super-premium

Headquartered in Beijing, BeyonCa is a Chinese start-up founded in 2021 and backed by several big-name investors like Renault and Dongfeng. The company’s first vehicle, the all-electric GT Opus 1, is expected to enter mass-production in 2024. Weiming Soh, Founder and Chairman, has indicated that the series model will be priced at Yuan 1m (US\$140,000).

“We’ve spared no effort to infuse qualities that will define a super-premium electric vehicle (EV),” says Dirk van Braeckel, Chief Design Officer. But what does super-premium mean? The company doesn’t consider it a synonym for luxury, which is the domain of marques such as Rolls Royce and Bugatti. Instead, BeyonCa explains to *Automotive World* that its vision can be most easily determined by what the GT Opus 1 is benchmarking against: the BMW 7-Series (costing between US\$87,795 and US\$160,495 depending on trim) and the Porsche Taycan (US\$82,700 to US\$187,600).





Weiming Soh
Chairman, BeyonCa

“With these cars, customers are used to a high standard in style, fit and finish, and very importantly, handling and tuning,” says a spokesperson. “What they lack are smart features, which are found aplenty from brands like Tesla, Nio, and Xpeng.” It is by bringing these two worlds together that BeyonCa hopes to carve a niche.

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The AI engine will also trigger the car’s autonomous driving function to take control and shepherd the user to safety

Tech serves a purpose

The GT Opus 1’s grand tourer shape is a break away from the highly favoured SUV, which McKinsey believes will ultimately come to dominate the majority of cars at this price point. It also noted that technologies attracting consumers in the Chinese EV market today include SAE Level 4 features, human-machine interfaces with third-party app support, and fast charging options.

To date, BeyonCa has not released a detailed spec for the final production model GT Opus 1. However, it is known that the vehicle will feature a 130kW battery that can accommodate ultra-fast 300kW charging and an artificial intelligence (AI)-based smart cockpit.

Much the same as Aehra, BeyonCa wants to avoid excess. Soh tells *Automotive World* that its approach is deeply practical: technology should always serve a user-centric purpose. The automaker does this by consolidating and integrating advanced technologies, with a methodology shift from function-driven to scenario-driven. “This path



GT Opus 1



© BeyonCa

captures the art of car making and the technologies to transform vehicles and services into a synergistic whole,” he says.

Personal health guardian

For Soh, this philosophy is best exemplified by the GT Opus 1’s personal health guardian function. Utilising the aforementioned smart cockpit, uniquely developed sensors perform continuous and comprehensive monitoring of the driver’s health status while in transit. “The AI engine in the car keeps track of our users’ health data and detects anything out of the ordinary, such as cardio issues,” he says. BeyonCa confirms that this will also be a feature in all of its future vehicles.

The company plans to reveal more about the underlying technology in due course. However, Soh gives an indication of what happens if a health issue takes place: “If there is an abnormality, our AI-powered user interface will initiate a dialogue to make sure the user is okay. When necessary, the AI engine will summon

a ‘cloud doctor’—a real medical doctor that will provide professional medical advice.” The doctor would appear on the car’s centre screen, with the healthcare team managed by Tim Guo, an experienced cardiologist and Chief Health Officer. “When this takes place, the AI engine will also trigger the car’s autonomous driving function to take control and shepherd the user to safety,” adds Soh.

In this scenario, BeyonCa states that it will seamlessly integrate multiple technologies and in-cabin sensors. The result will be to provide a highly accurate and comprehensive health tracking capability, with the AI engine taking action when an incapacitated driver might be unable to make critical decisions.

BeyonCa did not explain how the baseline system data is integrated, nor what happens if someone other than the owner gets behind the wheel. However, if the production model meets the expectations of the original concept, this unique example of in-vehicle innovation could validate McKinsey’s prediction that China will secure a significant lead in the US\$80,000+ market by the end of the decade.

Decarbonising vans makes economic and environmental sense

Shell Fleet Solutions believes electrifying vans presents an opportunity for greater fleet optimisation. Will Girling hears more

© Ford

At the end of September 2022, New York became the second US state after California to adopt 2035 as the deadline for sales of new cars and vans powered by gasoline and diesel. It now matches the EU's target. However, the UK has committed to implementing this half a decade sooner—by 2030.

With decarbonisation now a priority for many territories, companies operating in the medium vehicle sector might consider electrification a major challenge. However, planning ahead of the regulations and realising the benefits of electric vehicles (EVs) will place fleet operators in a strong position for a new era.

Misconceptions of electrification

Joint research conducted by Shell and Deloitte—'Navigating Fleet Decarbonisation: A guide to driving a successful transition'—found that 95% of more than 150 surveyed fleet owners considered EVs a long-term solution. However, 42%



also stated they were uncertain about the costs of transitioning.

Aysun Akik, General Manager of Shell Fleet Solutions Europe and Africa, tells *Automotive World* that the high expense of EVs is a common misconception. “If you’re just talking about initial vehicle costs, perhaps. But this isn’t true across a vehicle’s overall lifespan,” she says. In fact, there is a compelling business argument for electrification in addition to its environmental benefits.

Electric vans (e-vans)—up to 3.5-tonnes by gross vehicle weight—are often eligible for government-sponsored purchase incentives. As such, Aysun believes they should appeal to fleet managers’ urgent need to reduce the total cost of ownership. While high electricity prices may deter some potential EV buyers, she notes that “savings can be made on fuel consumption and maintenance costs, but also on fleet leasing plans. The longevity of e-vans could extend them beyond the typical agreements for internal

combustion engine (ICE) vans.” The British Vehicle Rental and Leasing Association’s Spring Budget 2021 noted that average lease term for the latter is four years.

It should also be noted that entire fleets do not need to be electrified immediately: fleet owners should consider which use cases are most appropriate and adapt accordingly. E-vans are highly applicable for short-haul road movements, such as warehouse and supermarket logistics in urban areas.

Furthermore, with over 320 cities across Europe implementing low emission zones (according to the Clean Cities Campaign's 2022 report), e-vans fit naturally into new planning models.

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There is a compelling business argument for electrification in addition to its environmental benefits.

Charge points

[Range anxiety](#) has been a common concern about EV adoption since they started gaining serious momentum in the 2010s. Aysun states that current e-vans have an average range spec of around 170 miles. “In terms of use cases for which they would be suited, last-mile logistics is an obvious fit,” she adds. In other words, the range of today's e-vans are already perfectly suited for this application.

However, range anxiety isn't just about increasing mileage; it's also about being able to recharge confidently. While the performance capabilities of e-vans might make them immediately deployable, the availability of charging points

remains a challenge. “All first-time EV drivers will probably worry about the ease of recharging initially. That's why it's important for companies to explore and unlock new opportunities,” states Aysun.

Solutions for charging at home, at stations, and at workplaces all currently exist. However, although expanding, the current accessibility of each option is not yet universal.

ubitricity, a member of the Shell Group, is aiming to change this by offering on-street charging that utilises lampposts as an extension of EV charging infrastructure. The company's 5kW charge point for the UK market, known as Chelsea, can be seamlessly integrated into a lamppost column or even a bollard without the need for major groundwork. “We've been working with city councils to create 50,000 of these charge points by 2030,” Aysun tells *Automotive World*.

Shell also recognises that charge points represent an opportunity for innovation, particularly when it comes to helping e-van fleet operators stay on top of costs. “We have a lot of charging capacities available today: fast chargers, ultra-fast chargers, etc., that allow fleet managers to minimise down-time and optimise their workforce. After all, if the vehicles aren't moving, they're not adding value,” says Aysun.

Accelerate to Zero

Shell is preparing to develop and expand a comprehensive charging network across the UK by 2030, an important project for the company. This will include 100,000 station charging points (11,000 of these will

be rapid chargers at charging hubs, forecourts, supermarkets, and other locations). “At this capacity, 90% of drivers would be only ten minutes away from a charge point at any time,” states Aysun. However, Shell also wants to provide solutions that go beyond basic infrastructure and address more specific fleet operator needs.

“Wherever a customer is on their decarbonisation journey, they need a partner to support them,” she says. “Regulations pushing for net-zero carbon are making them consider whether their ESG strategy is sufficient, if it even exists at all.” Indeed, according to Shell-Deloitte, 46% of global fleet owners either have no decarbonisation targets or are simply unsure how existing targets translate to their fleet.

As such, the company’s Accelerate to Zero programme provides a four-phase journey (diagnose, build, deploy, realise) to help fleet operators understand their goals, build a robust plan, implement the right solutions, and track results. Using data analytics, Shell can help to determine which EVs to use, how to maximise transport routes, optimise charging profiles, and more.

“Instead of simply ordering e-vans and then potentially waiting years for them to be delivered, what else could companies do in the meantime to operate their fleet in a cleaner way? That is what Shell Fleet Solutions can help them determine,” says Aysun.

Opening a dialogue

The electrification of e-vans will be as much about analytics and informed partnerships as purchasing new



technology. By opening a dialogue, Shell believes it can demonstrate that pursuing net zero can itself be an effective business plan.

Therefore, Aysun wants to dispel the notion that decarbonisation is an inherently expensive venture or that the state of charging infrastructure makes fleet operations impractical. In fact, she concludes that operating e-vans can yield solutions that have a positive impact on cost. “How can drivers modify their behaviour to maximise range? How can planners optimise routes and schedules to account for down time? In many ways, the challenges of EVs are actually opportunities for greater fleet optimisation.”

The Shell-Deloitte research found that 68% of fleet owners expect pressure to decarbonise to increase over time. By planning ahead of the upcoming regulations with a partner that understands the sector, they will be able to unlock the full value proposition that e-van fleets represent.



Images © Ford

D-Ford takes human-centric design to the next level

Ford's human-centred design company is working to solve today's driver problems and anticipate future ones. By Megan Lampinen



For commercial drivers, their vehicles play a central role in their business success.

These vans and trucks rack up high mileage and often double as mobile offices. In many cases, drivers are working to high-pressure efficiency targets where every second counts. Monitoring the changing needs of this segment is no easy task.

Ford is the leading commercial vehicle brand in both the US and Europe, and plans to keep that title. To do so, it must not only respond to user feedback but also anticipate it. That task falls to D-Ford.

D-Ford serves as Ford Motor Company's Global Innovation 'start-up lab' focused on developing human-centred design. "We're putting the customer right at the heart of our design process," says Usha Raghavachari, Lab Director at D-Ford. She set up the division in 2019, bringing together an eclectic bunch of software developers, engineers, data scientists, product designers, and business model specialists. "We are working to deeply understand the needs of the customers we're trying to serve," she tells *Automotive World*. "At the same time, we look at signals of what is going to change in their world in the future. We put those two together in our process and create new products and services."

Super stalking

The idea is to develop vehicles that allow businesses to do what they are best at—whether that is delivering parcels, managing construction sites, providing plumbing services, or setting up broadband—in a profitable

way. D-Ford's role is to figure out how to support them in becoming more efficient, productive and safe.

Commercial customers' needs vary widely. To fully understand the needs of different use cases, the team at D-Ford will shadow drivers. "We have spent a considerable amount of time doing what I call 'super stalking' research. That's basically where we go to the depot and jump in with a driver," Raghavachari explains. The team member will spend all day with the driver, seeing the ins and outs of their tasks and how they use their vehicle.

In some cases, the research uncovers pain points that drivers are attempting to address themselves, often disastrously. Delivery companies are a case in point. They want to maximise the number of daily drops and meet various targets around efficiency. To meet these targets, some drivers have come up with unsafe hacks. One driver, for example, would sit at a 45-degree angle in his driver's seat so he could get in and out more quickly. This same driver would also click in his seat belt but just hook it over his shoulder, as the van would not move if the belt was not buckled. It's an environment where every second counts, but it resulted in back pain and unsafe driving.

"We want to help companies achieve their efficiency goals but also come up with ways to make the driver's job easier," she emphasises. "Delivery companies have a massive driver turnover rate and are finding it harder and harder to recruit and retain them. They all now want to be the company of choice." The right vehicle could make all the difference.



An innovative steering wheel tilt feature lets drivers create an angled desk when parked, suitable for mounting a laptop or eating lunch

Delivery Assist

The latest Ford Transit Custom is the result of in-depth research from the D-Ford team. The electric powertrain made it possible to push the wheels out to the edges of the vehicle, providing slightly more space in the cabin and making it easy for drivers to jump in and out. Designers also moved the shifter up into the dash, which helps with entry and exit, as does the flat floor.

But perhaps the most interesting aspect is the Delivery Assist experience. “In essence, this is a set of automations created specifically to make drivers’ lives easier, based on what we observed them doing all day, day in and day out,” says Raghavachari. The idea is that it will reduce cognitive load, improve efficiency, speed up deliveries and boost security and safety.

When the vehicle is put in park, the hazard lights go on automatically to alert surrounding people and vehicles that the vehicle is stopping. When the engine stops, the windows close automatically. When the driver exits the vehicle and shuts the door, the doors automatically lock and the alarm is activated. “Right now, delivery drivers are doing all of this manually, or worse, they’re not doing it at all. They leave the engine running and sometimes their van is stolen,” she points out. With Delivery Assist, it all happens automatically.

The level of detail considered by the design team is notably granular. For instance, if the windows were partially open when the vehicle was stopped, they will be returned to that same position when the engine is turned back on. Small changes like these materially speed up delivery and improve efficiency. “Also the cognitive burden for the driver is dramatically reduced; they absolutely loved it,” adds Raghavachari.

Mobile Office

The Transit Custom's Mobile Office option pack is also the result of feedback from business users.

"Drivers spend hours and hours in their vehicles. They're using them as an office to do their invoices, as a canteen to eat a meal, or even a place to nap. It's almost like their home," she observes. As usual, when the vehicle failed to provide what they needed, drivers would improvise. The D-Ford team found one driver who had converted the vehicle door into a storage space for condiments and cutlery. Another driver had removed part of the vehicle's centre console and wedged a bit of old cabinet in there to prop up his laptop.

Raghavachari describes these responses as "points of inspiration" for her team to consider a changing need for which they should cater. Such inspiration led to the Mobile Office suite, which includes 5G connectivity as well as a foldable, tilting steering wheel that can be used as a laptop stand. A flat-topped table can be brought out for meals, while dimmable LED lighting facilitates late-night paperwork. "This vehicle can be the driver's office. It can be their McDonald's stop at lunch," she reiterates. "It also gives them the flexibility to put in devices and store them."

Where next?

As well as 'super stalking' the team are also harnessing data from all the connected Ford vehicles on the road today. Raghavachari estimates that figure at well over a quarter of a million at the moment, and expects it to hit a million by mid-2023.

"We are combining these human insights with real-time data on what is happening in the vehicle," she notes.

"In the future, rather than the delivery driver telling us what he wants, we will be putting suggestions to the driver. 'Hey Dan, we notice you're doing this every morning between nine and ten, would you like us to automate it for you?' We're going to be much more proactive in how we propose those automations."

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In the future, rather than the delivery driver telling us what he wants, we will be putting suggestions to the driver

The team is also positioning for changes in the wake of increased electrification and connectivity. For instance, the E-Transit features optional Pro Power Onboard, which enables customers to transform the vehicle into a mobile power source. "Approaches like this make the planet a little bit healthier because we're removing lots of diesel-powered things on the job site and replacing them with clean energy from the vehicle's battery," she says. "We are exploring many angles around this."

How to navigate prolonged electronics supply constraints

Just one hiccup in the chain can cause significant disruption for automakers, warns Supplyframe. Megan Lampinen hears more



A huge imbalance between supply and demand continues to plague the global electronics value chain. For automotive manufacturers it means parts shortages, price increases and long lead times. It's not unusual these days for automotive microcontrollers to have lead times of a year or more. Automotive-grade semiconductors are not much better, with lead times averaging more than nine months, according to supply chain experts Jabil and Supplyframe. Their estimate for

automotive-grade integrated circuit lead times is somewhere between 40 and 60 weeks.

In the wake of such turbulence, some automakers have been omitting certain connected features from new models while others have dramatically scaled back output. With projections that these shortages could run into 2024, a new strategy is needed. Jabil and Supplyframe believe organisations can become more resilient by prioritising commodity and category management and remembering

that short-term wins must not come at the expense of long-term needs. John Ward, Senior Director, DSI Solutions, at Supplyframe, takes *Automotive World* on a deep dive into the current situation and the outlook moving forward.

Which trends have been shaping automotive semiconductor supply and demand over the past few years?

The automotive semiconductor market accounts for about 12.5% of the total



semiconductor industry, which is estimated to be worth US\$660bn in 2022. Like other segments, its players need to address demand forecasting and planning with their vendors, ensuring long-term demand visibility—18 months or more—to suppliers for supply continuity. End-market and general semiconductor demand forecasting have traditionally been less than stellar. Hybrid models, combinations of the now more-or-less dead just-in-time component strategies and just-in-case (without triple ordering) have emerged.

Additionally, automakers are now working directly with foundries, something that was not widely done previously.

They are also increasingly partnering to develop their own chips with industry and supplier help.

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A holistic electronics picture that connects the dots is critical for the auto industry

How would you characterise the current automotive semiconductor supply chain?

For automotive manufacturers, the electronics supply chain still remains a challenge, even as some components have become more available and attractive in terms of pricing, including memory ICs. Automotive semiconductor supply constraints, particularly analogue products, which are the second-largest automotive semiconductor category, will persist into and possibly beyond the second half of 2023.

IGBTs and MOSFETs (types of transistors) are heavily used in auto body electronics, powertrains, chassis and safety, security, electric drivetrains, and infotainment systems. Lead times for high-voltage MOSFETs and IGBTs are over a year and will continue to be elevated into 2023. Through November, market pricing for power MOSFETs is forecast to climb 38%, over three-and-half times higher than the Commodity IQ Price Index baseline. Automotive-grade microcontrollers and analogue components remain troublesome to secure and highly priced. Microcontrollers have lead times stretching beyond a year. Overall, automotive-specific ICs average between 40 and 60 weeks of lead time.

How has this impacted automakers?

One example can be seen in Toyota's warning that its full-year 2022 production will likely fall below initial targets due to component shortages. In 2021, the global chip shortage robbed automakers of an estimated US\$210bn in revenue, according to

AlixPartners. Supplyframe projects the automotive semiconductor market will remain challenged into the second half of 2023 and possibly into 2024 for some products, particularly if demand does not weaken significantly on recessionary fears or realities. Some easing will occur, however, in the second half of 2023.

The latest Commodity IQ report takes a detailed dive into the ongoing shortages. What would you single out as the key takeaway from these findings?

It only requires one hiccup in the electronics supply chain to cause disruption for the automotive sector, or most other sectors for that matter. This was particularly the case for analogue power management products in short supply, which caused a ripple effect of order push-outs and even cancellations, in addition to production delays or halts.

Contingent labour availability and cost issues continue to be problematic, in addition to persistent logistics and raw material challenges, driven partly by soaring energy costs. Climate change, geopolitical upheaval, a global shortage of electrical engineering talent, and recurring COVID-19 outbreaks and containment protocols are among the myriad disruptions that further add to the macroeconomic, interconnected impacts of the complex electronics supply chain.

A holistic electronics picture that connects the dots is critical for the auto industry. That covers metals like cobalt and lithium—witness German automakers VW and Mercedes-Benz are accelerating efforts to secure

access to key battery materials lithium, nickel, and cobalt by inking agreements with top-supplier Canada—and potential shortages of some capacitors when consumer and other end-market demand resurfaces.

For automotive customers specifically, what sort of contractual changes are semiconductor suppliers implementing in the wake of the shortages?

Not unique to automakers, but we are seeing more stringent and specific language, including non-cancellable, non-returnable (NCNR) device orders and, not necessarily contractual, the requirement for 12 to 24-month demand forecasts.

Are there any other supply chain implications worth highlighting?

Automakers are having less power in terms of electric vehicle battery players as they develop modular structures upon which the former could build. This would switch things up as the automakers would then have to be qualified for the supplier, rather the opposite of the current situation.

How can specialists like Supplyframe help automakers navigate supply chain volatility at times like this?

We can help them make sense of mixed signals and disruptions and their interconnectedness. Reports of 150 or more days of inventory for certain parts are common as players wait for long-lead-time semiconductors. End markets and applications that rely on mature process nodes (>40-nanometer) will continue to be afflicted by elevated



Semiconductors are used a wide range of automotive applications

prices and lead times. All the while, for some constrained components, manufacturers are delivering inside of extended (beyond 52 weeks) factory lead times but not updating published lead times in fear of order cancellations. These are the types of mixed supply chain signals that the industry needs to interpret in a world where increasingly challenging demand-supply matching, macroeconomic headwinds, geopolitical issues, and a need for true differentiation make for unique demands, in any industry.



Catalonia jockeys for mobility leadership

From technology testing and vehicle production to networking and nurturing start-ups, it's all happening in this region in northeastern Spain. By Megan Lampinen

Spain's Catalonia region is keen to position itself at the heart of new mobility innovation and exploration. Its curriculum vitae is not lacking: a long history of vehicle manufacturing, global headquarters for the SEAT and Cupra brands, a host of modern circuits and test tracks, more than 20 automotive-related R&D centres, several universities, and a growing number of trade fairs place it competitively on the world's stage. But is this enough to secure it a leading position in CASE (connected, autonomous, shared, and electric) mobility development?

Smart cities

That's a big focus for Public Office for the Transformation of the Mobility and Automotive Industry ([OPTIMA](#)). The office advises automotive companies on the transformation towards new mobility and electrification. "Today, Catalonia plays a major role in promoting the transformation of the automotive industry towards the electric and connected vehicle industry of the future," says Tomás Megía, Executive Director at OPTIMA.

Barcelona, the capital of Catalonia, is arguably the heart of southern Europe's 5G push and has been actively promoting the development of pilot projects to test and validate 5G-related technologies. Telecoms provider Telefonica has been collaborating with local automaker SEAT on demonstrations of 5G-enabled connected car functions in L'Hospitalet de Llobregat, a municipality next to Barcelona.

"The Catalan capital, synonymous with design and the avant-garde, is today the main 5G and sustainable mobility hub in southern Europe," comments Sònia Serracarbassa, Director of the [Catalunya Convention Bureau](#) (CCB). Serracarbassa and her team are working with OPTIMA and Catalonia Trade & Investment to promote the [Catalunya Meetings & Mobility project](#), designed to attract international business events.

Developments around connected technology, particularly cellular vehicle-to-everything (C-V2X), promise a future in which vehicles can communicate with surrounding infrastructure such as traffic lights and other vehicles. It will prove a key element of the smart city of the future. The European Institute of Innovation and Technology (EIT) Urban Mobility project is all about ushering in a new era of smart cities. Headquartered in Barcelona, the project represents the largest European initiative to transform urban mobility, with a co-funding of up to €400m (US\$422m) between 2020 and 2026. The push towards more liveable urban spaces includes exploring new forms of electric and shared mobility as well as boosting the competitiveness of the mobility industry.

Gathering of experts and leaders

CES, IAA, the North American International Auto Show—the automotive industry is not short of events that bring together stakeholders and offer a platform for knowledge exchange. But Catalonia believes it has something



CTAG displayed an electric autonomous shuttle at Tomorrow.Mobility World Congress 2022

special to offer, particularly around sustainable mobility. The region is already host to Tomorrow.Mobility World Congress (TMWC). Jointly organised by Fira de Barcelona and EIT Urban Mobility, TMWC brings the wider mobility sector face-to-face to spark innovation, find solutions and create business opportunities. “This event is a great place to connect and benchmark with others, to be with potential clients, and coordinate actions to make progress,” commented Miguel Eiras, Smart Cities and Urban Transformation Global Leader at Deloitte.

Held within the framework of Smart City Expo World Congress, TMWC 2022 featured 400 speakers and attracted 20,402 in-person attendees from 134 countries during three days of debate and action. “It moved the needle on accelerating smart,

sustainable urban mobility,” commented OPTIMA’s Megía. Touching on event highlights and topic areas, he points to active mobility for citizens with the 15-minute city concept, the impact of the energy crisis, and challenges around urban mobility and mobility data sharing.

The International Mobility Congress (IMC) is another key event in the region. Held in Sitges, it brings together those within the mobility, public transport, and infrastructure sectors. “IMC analyses experiences and case studies, and lets the leading international experts speak about their field. The main players within the public transport sector get together to organise this congress which wants to position Catalonia as the centre of the debate on present and future mobility,” says Serracarbassa.

Nurturing new talent

The start-up community is a hotbed of innovation and nurturing that will be pivotal to realising the vision of a cleaner, safer more efficient mobility ecosystem. Barcelona Tech City, a congregation of numerous start-ups, recently announced the creation of a new start-up hub dedicated exclusively to automotive and mobility companies. The city has steadily been attracting a growing number of new players keen to use it as a testbed. Scooter providers Silence and Cooltra, charging expert Wallbox, solar power tech company SIARQ, and flexible bus services provider NEMI represent just some of the newcomers active in the region. In total, the city is home to more than 1,500 emerging companies, many of them founded by expats.

Thanks to Barcelona's several universities, prestigious MBA programmes, technology centres and coding academies, there is a solid talent pool on tap. The Skylab Coders Academy was recently voted the top bootcamp for programmers in the world. The region also benefits from the Professional Automotive Training Centre of Catalonia, which specialises in providing automotive training to increase the competitiveness of the industry.

Automakers have been taking a more active role in the nurturing of new talent. For example, SEAT, Volkswagen Group Innovation, and the Universitat Politècnica de Catalunya (UPC) initiated CARNET (Cooperative Automotive Research Network) in 2016 and it's still going



The Circuit de Barcelona-Catalunya is a 4.675 km motorsport race track in Montmeló, Barcelona

strong. This is a Barcelona-based open hub for industrial and academic partners from the areas of automotive and mobility research and innovation. CARNET is centred on project-based collaboration for urban mobility solutions that close the gap between academic research and industrial innovation.

What next?

Moving forward, agencies like OPTIMA and CCB are determined to ensure Catalonia remains a pivotal region for new mobility, whether in the testing of new technology, the production of vehicles or the networking of industry experts. The Automotive Industry Cluster of Catalonia (CIAC) has already brought together more than 200 companies in the sector, all of which are actively pursuing projects designed to boost the industry's competitiveness. As the global 5G network grows, the connected-car developments coming out of Barcelona should prove increasingly pivotal to realising its full potential.



Time to adopt a new approach to EV marketing

**As prices drop and infrastructure improves, there are several steps auto marketers can take to prime the market for new EV buyers.
By Jim Johnson**

At first glance, it appears that adoption of electric vehicles (EVs) in the US is going according to plan. Data from Axios shows that 4.6% of new vehicles registered in the US during May 2022 were electric, compared to just 1.9% during May 2021. Bloomberg's July report detailing how the US crossed a major tipping point of 5% of all vehicles sold consisting of EVs caused quite a stir, with the report indicating that the country should hit 25% adoption by 2025. That level of optimism is welcome news for auto brands dedicating millions of dollars in R&D and marketing toward rolling out dozens of EV models over the next few years.

This optimism doesn't come without a few reasons for pause, however. The Bloomberg analysis established trends based on 18 countries that hit the 5% adoption rate prior to the US, all of them located in Europe aside from China, South Korea, New Zealand and Iceland. Given the relative homogeneity of Europe in terms of demographics, income, and EV infrastructure compared to the US, where a single state holds nearly 40% of all EV registrations, the gap that must be overcome in the US becomes evident. Thus far, the available market for EVs represents just a small portion of the population, those that can afford an average price of more than US\$66,000.

As for price, which is the most frequently cited reason for delaying the purchase of an EV, the IEA reported that at the end of 2021, the sales-weighted average price of US\$58,000 for EVs in the US was dramatically higher than in the EU (US\$48,000) and China (US\$27,000). Couple that with the impressive list of incentives granted by countries in the

EU to entice car shoppers to purchase EVs, and it becomes clear that auto brands in the US can't simply count on precedents set in Europe and Asia to predict outcomes here at home.

Price aside, there are also challenges in sourcing rare earth metals domestically, while relying on foreign assistance is becoming increasingly difficult with geopolitical tensions rising on several fronts. Charging infrastructure has thus far been largely dependent on state and local investment, leaving large areas of the country underdeveloped. But perhaps the biggest challenge to overcome is simply convincing auto shoppers that EVs make sense for their lifestyle, especially within areas of the country where uptake has been slow thus far for any of the reasons previously mentioned.

To boost this effort organically, there is good news on the horizon for U.S.-based EV shoppers. Prices are expected to decline over the next few years as mainstream brands roll out new models, leveraging partnerships and years of manufacturing prowess (in addition to cheaper batteries) to deliver vehicles designed for mainstream consumers. Infrastructure projects are gaining bipartisan support to build out charging stations along major interstate highways in addition to rural and underserved communities around the country. But what should auto brands do in anticipation of these projects making EVs more accessible to a broader swath of the population?

In his seminal work *Crossing the Chasm*, author Geoffrey Moore builds upon the sociologist Everett Roger's *Technology Adoption Lifecycle*, arguing that a "chasm" exists between the technology-obsessed "Early Adopters" and the "Early



Majority”, which is the more mainstream segment of the population where innovations take off and become central to everyday

infrastructure improves, there are several steps auto marketers can take to prime the market for the Early Majority.

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Perhaps the biggest challenge to overcome is simply convincing auto shoppers that EVs make sense for their lifestyle

life. Given the current 5% adoption rate of EVs and their price points, it's clear we're still in the Early Adopter phase. Still, as prices drop and

Consumer education

The next wave of EV adoption from the Early Majority will occur in areas outside of places such as San Francisco's Bay Area where Early Adopters and EV enthusiasts tend to flock. This will require a highly coordinated effort from auto brands, dealers, and marketers. One way to execute from a digital video perspective could be to incorporate elements of Tier 1 and Tier 3 messaging within the same creative unit, detailing the features and benefits of EV ownership via brand-focused video messaging, while adding additional content around fulfillment and in-person consultation via local dealer maps and inventory feeds. Incorporating expert content from endemic auto sites is another proven method of gaining credibility, pushing out valuable information that

a shopper would otherwise need to gather on their own. Connecting the dots between the “why” of ownership through educational content and the “how” through dealership expertise will help Early Majority shoppers bridge the significant knowledge gap that currently exists.

Risk mitigation

The Early Majority consumer is one that is more pragmatic than the Early Adopters, who don't mind dealing with product bugs or fixes so long as they have access to the latest tech. Early Majority shoppers want complete solutions, those that are ready to use “off the shelf”, which is not quite where EVs reside today (which is why many of these shoppers may consider hybrids as a bridge vehicle before they buy a battery-electric only vehicle). Digital video featuring owner testimonials, trusted social influencer content, fuel savings, or mileage calculators would go a long way to assuaging their feelings about taking on risk.

Cashing in brand equity

While Tesla currently owns a dominant position in the EV space by virtue of its leadership position with Early Adopters, the opportunity for well-established brands to capture market share with the Early Majority is massive. For starters, they are known entities, with most shoppers familiar with a few models, local dealerships, marketing, or perhaps



The sales-weighted average price for EVs in the US is dramatically higher than in the EU and China

even as former owners. That brand equity will resonate with the Early Majority, who want to deal with brands with proven track records of success. The importance of a strong dealer network cannot be understated, as well. Having a trusted, local automotive expert in their community will provide these less experience EV shoppers a consultant to reach out to should they have any questions about charging, financial incentives, range, and any other concerns as they arise. This is a major strength for established brands to leverage over the slew of EV start-ups that have emerged over the past few years.

In summary, this is an incredibly exciting time to be involved in the electrification of America's fleet of vehicles. As the industry moves into the next phase of adoption, it will be very different than the first, and a strong connection between national brands, local dealers, and marketing partners will ensure that the Early Majority is well served.

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



TeraWatt: commercial charging hubs to soon be commonplace

The charging specialist's CEO shares her predictions for electric truck development and the rollout of supporting infrastructure.

By Megan Lampinen

The commercial vehicle (CV) sector is poised for a notable year of growth and development in 2023, according to Neha Palmer, Chief Executive of fleet charging provider TeraWatt Infrastructure. The US-based company, which emerged from stealth in May 2021, designs and operates electric vehicle (EV) charging centres for fleet operations and recently secured more than US\$1bn of institutional capital to support development and expansion. Palmer believes long-haul electric trucks are approaching cost parity with diesel faster than expected, and is convinced that fleet owners will convert in order to take advantage of the lower cost of ownership.

That carries significant implications for the charging sector. Over the coming years she anticipates a surge of private investment, the emergence of new fleet charging market entrants, and more utility partnerships focused on building the necessary charging infrastructure to support these electric trucks. “In just a few years, commercial charging hubs will be commonplace on America’s highways, making the long-haul transportation of goods without emissions a reality,” predicts Palmer. Speaking to *Automotive World*, she outlines the reasons for her confidence, and the potential obstacles to that vision.

In your view, what would mark a successful year for electric truck development in 2023?

A successful 2023 would see a transition from fleets testing the waters with electric truck pilots to planning for full-scale electrification. We would see a large number of fleets across a range of market segments successfully piloting electric trucks on their business routes

and gaining the confidence needed to scale deployments. In addition, we would see [megawatt-level charging](#) deployed in pilot projects, allowing manufacturers and fleets to work through the growing pains of this new technology. Larger scale deployments would soon follow.

When could the industry see electric long-haul trucks reach cost parity with diesel?

There is a fast-approaching wave of electric truck adoption spurred on by ESG pressures, as well as the lower operating cost of owning these vehicles over their lifespan. More than 75 of the largest fleet operators in North America have already made public commitments to reduce emissions from their fleet. Policy in the US is helping too. The investments included in the Inflation Reduction Act are expected to help long-haul electric trucks reach cost parity by as early as 2025, according to projections by Rocky Mountain Institute.

Which markets are leading the way?

California will likely be the first market to see wide adoption of EVs for long-haul trucking, as this state has enacted the Advanced Clean Trucks (ACT) rule, requiring truck OEMs to sell an increasing number of zero-emissions vehicles. The other states that have adopted the ACT rule are Massachusetts, New Jersey, New York, Oregon, and Washington. Long-haul EV adoption will likely accelerate in these areas given the ruling. Ultimately, electricity is cheaper than diesel, so the longer you drive, the better the payback. With this logic, long-haul routes should electrify most quickly. However, without off-site charging readily available, this will be a challenge.



© TeraWatt

Is this where TeraWatt comes in?

We're working to solve this by developing America's first multi-state network of charging stations along Interstate 10 (I-10) for trucks. The stations will span California, Arizona, and New Mexico, and will serve both short-haul and long-haul trucking. These developments will drive adoption of long-haul EVs among companies that use the I-10 and for local traffic near the stations.

What are the main differences in public charging requirements for trucks compared to passenger cars?

Public charging for passenger EVs helps ease consumers' range anxiety, giving them greater confidence to take longer trips and deal with the unexpected. But for organisations with trucking operations, their business depends on being able to get from point A to point B reliably. Building electric truck charging stations requires far more planning, energy infrastructure, capital, and time.

Unlike public charging for passenger EVs, planning for truck charging infrastructure needs to take into account vehicle routes, delivery

schedules, and dispatch timetables. All of this will impact where the charging centres are sited and what technology and energy assets are required. At the same time, charging infrastructure for electric truck fleets requires much higher power to accommodate their bigger batteries and higher daily mileage/utilisation.

Truck charging will also need to have higher standards for reliability compared to passenger car charging. Truck routes are planned in detail, and faulty chargers will impact a company's ability to deliver products and thus their bottom line. Further, because there's less overall infrastructure for truck charging, a truck would face significant delays if the charging station they planned to go to was down. Onsite battery storage and other resiliency measures at these truck stations can help.

Do you expect that car and truck charging will take place at the same locations?

That is unlikely. Most passenger car charging today takes place at grocery stores, shopping centres, and other existing passenger car parking locations where consumers have something to do while they charge.

The needs of commercial truck drivers are very different. Similar to how highway gas stations separate passenger cars and trucks today, trucks will need dedicated sites that can accommodate the much larger vehicles and battery packs.

What's the biggest threat to electric truck progress?

There are two threats. One is maturing the truck technology to bring down cost, increase driving range, and increase charging speed. The second, and probably the biggest challenge, is building out enough charging infrastructure that is suitable for heavy duty trucks, which have very specific requirements. You can't just pull up an electric big rig into a mall parking lot to use a low-voltage LD charger.

At this time, the grid generally does not have sufficient capacity to support concentrated, large-scale EV fleet charging. This is not a quick or simple fix, despite growing utility and government investment. Charging infrastructure capacity needs are complex and vary greatly; the upgrades to grid distribution networks are expensive and will take years to complete. Owners of EV fleets need reliable, efficient, and cost-effective ways to power their operations. However, building reliable large scale charging infrastructure requires more capital, risk management, and energy expertise than most organisations want to take on alone.

Where do you see the segment by 2030?

We would expect there to be a number of active truck charging stations along all major freight corridors to enable longer range travel

as more electric trucks get on the road. We would also expect truck charging stations in major metropolitan areas, supporting regional truck traffic.

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Building reliable large scale charging infrastructure requires more capital, risk management, and energy expertise than most organisations want to take on alone

By 2030, we want to see charging speeds that enable trucks to get back on the road as quickly as possible and most closely fit mandated driver break times. Standardisation and interoperability of megawatt chargers will increase the use cases where electric trucks make sense, because the charging time will lessen timeline impacts to current operations. This infrastructure will be a key enabler for scaling the adoption of electric trucks. Also, by 2030, we hope to see significant market penetration of EVs across all the major segments of trucking operations, from drayage and last mile to long-haul.