

Automotive Supplier Outlook 2025

Volume 1: Companies A - D

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As we approach the end of yet another eventful year, we take the opportunity to assess the industry's current state by reflecting on the significant events of the past year and exploring the outlook for 2025.

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Introduction

S&P Global Mobility has engaged senior executives from 42 suppliers in the automotive supply chain for an end-of-year interview initiative. This initiative seeks to gather valuable insights on the challenges faced in 2024 and the strategies being formulated for 2025, prioritizing genuine experiences over elaborate strategies. This report is the first of four volumes published in late 2024.

Key discussion points encompass significant trends impacting suppliers, such as shifts in demand dynamics, supply chain resilience, and technological advancements. The report underscores the critical importance of sustainability practices and regulatory compliance for maintaining competitive advantage.

Furthermore, it highlights the necessity for strategic partnerships and collaboration to effectively navigate market uncertainties. The discussions also explore the ramifications of geopolitical factors and economic conditions on supplier operations, urging stakeholders to adopt an agile and proactive approach to future challenges.

Overview

Challenges faced by automotive suppliers in 2024

The interviews conducted for this report reveal that 2024 has been marked by significant challenges for the automotive supply chain. Ongoing supply chain disruptions have posed serious difficulties for many suppliers, particularly in sourcing raw materials and components. These issues have been exacerbated by geopolitical tensions and the residual effects of the COVID-19 pandemic, which have led to production delays and increased costs. As a result, companies have been prompted to reassess their supply chain strategies to navigate this complex environment effectively.

Additionally, the transition to electric vehicles (EVs) has introduced its own challenges. Suppliers are faced with the need to adopt new manufacturing processes and integrate advanced technologies, which require substantial investment and adaptation.

Developments in the automotive sector

Despite these challenges, the automotive sector has seen notable developments. The momentum for EV adoption continues to grow, with suppliers investing in new technologies and infrastructure to support this shift. Key developments include improvements in charging infrastructure and efforts to incorporate renewable energy sources into manufacturing processes.

Moreover, there is an increasing focus on Advanced Driver Assistance Systems (ADAS), as suppliers aim to enhance vehicle safety and performance. Sustainability has also become a priority, with many suppliers exploring opportunities for recycling rare earth elements and implementing environmentally friendly practices. This shift is driven not only by regulatory requirements but also by changing consumer preferences, as sustainability becomes a more significant factor in purchasing decisions.

Outlook for 2025

Looking ahead to 2025, suppliers express a cautiously optimistic outlook. Many executives believe the industry is poised for transformative change, with substantial growth opportunities in the EV market and related technologies. However, this optimism is tempered by the recognition of ongoing challenges, particularly in supply chain management and regulatory compliance.

Executives emphasize the importance of agility and innovation in addressing the evolving landscape. Companies that can adapt to changing market conditions and consumer preferences are likely to position themselves as leaders in the industry. Collaboration among suppliers, manufacturers, and technology providers will be essential in addressing the complexities of the supply chain and facilitating the transition to electric mobility.

Key issues to address

Several key issues warrant attention as the industry moves forward. The need for robust cybersecurity measures in connected vehicles is increasingly critical, given the growing reliance on digital technologies. Additionally, suppliers must continue to invest in workforce development to ensure they have the necessary skills to support the transition to EVs and advanced technologies.

ADS-TEC Energy

ADS-TEC Energy designs and manufactures battery-based platform solutions for the future energy industry.

We spoke to Dennis Müller, senior vice president – product marketing and communications, ADS-TEC Energy.



Key takeaways:

- **Challenges:** The 2024 electric vehicle charging industry experienced a consolidation due to financial pressures and slowing adoption, decreasing demand. This emphasized the need for differentiation, while regulatory compliance also caused installation delays.
- **Developments:** The emphasis on charging station reliability reflects the industry's focus on customer experience. In Europe, battery-backed ultra-fast charging is gaining popularity for its cost-effectiveness.
- **Outlook for 2025:** Strong drivers for EV adoption persist, with battery storage solutions becoming essential in grid-constrained areas. ADS-TEC Energy is optimistic about growth in 2025, particularly among charge-point operators and convenience stores in the US and Canada.
- **Emerging issues:** As states advance beyond the National Electric Vehicle Infrastructure (NEVI) charging program, a balanced approach is essential for expanding networks. Rising electricity costs emphasize the need for affordable solutions, with battery-buffered charging offering key advantages in the evolving EV landscape.

The following is an edited transcript of the conversation.

S&P Global Mobility: What were the most significant challenges your business encountered this year?

Dennis Müller: The EV charging industry in 2024 was, in large part, characterized by increasing consolidation of hardware companies and charging network providers due to financial pressures and the slowdown of EV adoption in major markets. The impact was a decrease in overall demand for EV charging.

In an environment in which DC fast chargers were perceived as more and more commoditized, it became more important to highlight the differentiating factors and unique added value of charging solutions. As a provider of battery-based charging solutions, this was a positive for ADS-TEC Energy as our products provide unique benefits to customers and the infrastructure system, as a whole.

Another challenge for our industry is regulations. In some cases, deals get delayed because installation cannot take place because of regulatory compliance requirements.

What was the most positive development you witnessed in your sector in 2024?

Several developments stand out:

We've seen a lot of focus on charging station reliability, which has demonstrated that the industry is striving for the best possible customer experience. This is significant in a nascent industry with many players and processes that are still being established.

While it is clear that we must invest more in grid infrastructure build-out, it has also become clear that overall demands on the grid require businesses to look at other ways to harness power. Demand is coming not just from EVs, but also from AI computing, data centers and production onshoring for supporting the needs of EVs, battery-storage systems provide a flexible option.

In Europe, we've been seeing a lot of positive momentum for battery-backed ultra-fast charging systems at businesses that need to optimize costs while attracting customers, such as supermarkets and drug store chains. Benefits such as speedy installation and lower overall TCO [total cost of ownership] are making ultra-fast battery-buffered charging more appealing than traditional DC fast charging.

We're also seeing interest in the additional revenue streams provided by our ChargePost product, which is currently available in Europe. ChargePost delivers EV charging, but also has a massive LCD screen that can be used for advertising. In addition, the ChargePost's bi-directional battery also allows charge-point operators to cap peak electrical loads or feed power back into the grid.

Looking ahead to 2025, how do you perceive your business prospects and the overall outlook?

The underlying drivers in the shift to EVs have not changed and will continue to push the mobility transition along with the continued uptake of renewable energy in the energy system.

In the EV charging realm, we see that many of the easy-to-install locations with sufficient grid power capacity and real estate — such as along interstate highways — have already installed charging stations. As we move beyond those locations to more grid-constrained areas, which are expensive and difficult to upgrade, battery storage-based solutions are in many cases the only viable solution from a financial and installation time perspective. Therefore, we are confident about our outlook in 2025 and beyond.

In the US and Canada, we have been seeing positive momentum with charge-point operators, as well as convenience stores and multi-family residential buildings.

Is there any specific concern or emerging issue you would like to highlight?

In the US, many states will move beyond the first round of the federally funded NEVI EV charging station program. After having allocated the funds of the first round to the buildout of the alternative fuel corridors along interstates and highways, states' focus areas in the second and third rounds are still unclear. Here, it will be important to take a balanced approach, continuing to address the medium- and heavy-duty electrification needs, while also building out the network in urban areas, at multi-family housing and in rural communities, as well. Only this way will we achieve an ever-denser network that boosts driver confidence.

In every country, the cost of electricity is increasing dramatically; in Germany and other parts of Europe, for example, it's up to 15% per year because everyone wants to extend the grid. However, the transition to e-mobility will continue for sustainability reasons but also because batteries are more cost effective than combustion engines. Ultimately, it's cheaper to drive an EV than a vehicle with a combustion engine. There needs to be more focus on how to provide affordable electricity, and battery-buffered charging is one solution. In addition to easier install, a major benefit for battery-backed solutions is that they allow operators to avoid exorbitant peak-demand charges, which can be crippling to a business.

Government policies and regulations play important roles in the future of the EV industry. Within a changing political landscape in the U.S. and Europe, we will continue to support the needs of customers, ensure our technology maps to relevant standards and pursue a sustainable future.

Ambarella

Ambarella, Inc. is an American fabless semiconductor design company specializing in low-power, high-definition (HD) and Ultra HD video compression, image processing and computer vision processors, driving innovation in security, drones and automotive applications.

We spoke to Senya Pertsel, automotive senior director, Ambarella.



The following is an edited transcript of the conversation.

S&P Global Mobility: What were the most significant challenges your business encountered this year?

Senya Pertsel: The automotive market slowdown, along with cost pressures, is causing OEMs to reassess or delay development of ADAS [advanced driver assistance system], and particularly autonomous systems above Level 2+.

What was the most positive development you witnessed in your sector in 2024?

Global OEMs have been convinced by the performance levels achieved in the Tesla FSD [full self-driving] systems, as well as those from leading Chinese OEMs, that the future of AD/ADAS [autonomous driving/advanced driver assistance system] software is in fully AI-based architectures. This inflection point among global OEMs is helping to accelerate the adoption of advanced, modern ADAS/AD SoCs [systems on chip] and AI software architectures.

Looking ahead to 2025, how do you perceive your business prospects and the overall outlook?

Ambarella is optimistic, and we expect the development of AD/ADAS systems to further accelerate as the market settles on target feature sets and architectures for those systems.

Is there any specific concern or emerging issue you would like to highlight?

Automotive development cycles need to adapt to the changing competitive landscape and the efficiencies, flexibility and opportunities that are enabled by the software-defined vehicle.

Ansible Motion

UK-based Ansible Motion specializes in technology for simulating human-experienced vehicles, offering advanced Driver-in-the-Loop (DIL) simulators with unique motion and immersion solutions. In 2022, the company was acquired by AB Dynamics plc.

We spoke to Dan Clark, managing director of Ansible Motion.



Key takeaways:

- **Challenges:** The automotive industry is adopting DIL simulation, but long lead times and investment concerns necessitate education and partnership for effective implementation.
- **Developments:** Demand for driving simulators is rising globally, with increased DIL simulation adoption by tyre manufacturers, enhancing early feature validation and engagement in vehicle development.
- **Outlook for 2025:** Forecasting 20% annual growth, we're expanding our product line and relocating to a larger Simulation Centre to enhance capacity and service offerings.
- **Emerging issues:** Growing pressure to reduce costs drives demand for integrated vehicle development, emphasizing the need for seamless integration of DIL simulation with traditional testing methods.

The following is an edited transcript of the conversation.

S&P Global Mobility: What were the most significant challenges your business encountered this year?

Dan Clark: The automotive industry is truly starting to embrace the transformative power of Driver-in-the-Loop (DIL) simulation as a key element in virtual development programmes. This means a healthy sales pipeline for us — but it's a rather long process. Some of the sector's most prominent OEMs are only just starting to consider their first DIL system purchase, so the lead time for converting an enquiry into an installed system is still unusually long for an industry that's outwardly keen to embrace virtual technologies that will reduce development times, cost, and environmental impact. Customers know what they want their simulator to achieve, but don't necessarily know what it looks like in terms of the deployed technology. Add to this that DIL simulators are significant investments, which need a multi-year ROI [return-on-investment] outlook, and there's a real need for technology education, trust, and partnership to be developed.

What was the most positive development you witnessed in your sector in 2024?

We've seen unprecedented demand for our driving simulators from OEMs, tier 1 suppliers, and motorsport brands across China, Korea, North America, and Europe. Notably, more tyre manufacturers are embracing DIL simulation — Nexen Tire joined Continental and Michelin as Ansible Motion customers in 2024. Acceptance and adoption of DIL simulation is broadening across the industry, driven by a need to reduce physical prototyping and the opportunity to define, refine, and validate features and brand attributes much earlier in the development cycle when implementing changes is most cost-effective. More broadly, we see acceptance of our solutions as recognition of the real power of DIL simulation — enabling real people to stay connected to the vehicle development and evaluation process during increasingly virtual design and development programmes.

Looking ahead to 2025, how do you perceive your business prospects and the overall outlook?

We're forecasting 20% annual growth over the next three years as the market transitions into the next phase of the simulation adoption curve — driven by innovations in EVs [electric vehicles], CAVs [connected and autonomous vehicles], ADAS [advanced driver assistance systems], and key components such as tyres — as well as repeat business from existing customers as they expand their operations with multiple DIL systems. We are significantly expanding our product line with new offerings to meet different use cases as well as expanded performance capabilities across the board. In addition, we will be moving Ansible Motion's operations to a new state-of-the-art, purpose-built Simulation Centre located in MotorSport Vision's new motorsport business park adjacent to the Snetterton racetrack in Norfolk. The new Simulation Centre will double the size of our current facility and manufacturing capacity as well as housing permanent road-car and motorsport simulators for demonstrations, rental, and consultancy work.

Is there any specific concern or emerging issue you would like to highlight?

Increased pressure to reduce testing time and costs means the focus on ROI is intensifying. Demonstrating the practical, tangible value of DIL simulation technologies becomes increasingly crucial. Customers want an integrated approach to vehicle development and testing at every stage of the process, and while our wider vehicle testing business in the AB Dynamics Group offers end-to-end solutions independently, our current focus is on how these laboratory, track testing, and simulation tools can integrate more seamlessly — dovetailing traditional vehicle development workflows with emerging virtual development and sign-off methodologies. The emergence of virtual development tools and techniques, such as DIL simulation, needs not be disruptive, and we are keen to offer solutions that support efficient and balanced vehicle development ecosystems for our customers.

Ansys

Ansys, Inc., headquartered in Canonsburg, Pennsylvania, is a prominent American multinational company that develops and markets CAE [computer aided engineering] and multiphysics engineering simulation software. Its innovative solutions support product design, testing, and operation for customers worldwide.

We spoke to Judy Curran, senior chief technologist, Automotive at Ansys.



Key takeaways:

- **Challenges:** In 2024, the automotive industry faced cost pressures and delays. Ansys partnered with OEMs [original equipment manufacturers] and suppliers to emphasize simulation as a vital tool for accelerating design, reducing physical prototypes, and driving innovation amid challenges.
- **Developments:** Growing adoption of simulation technology across all automotive development phases empowers engineering teams to innovate faster, reduce costs, and manage the complexities of EV [electric vehicle] design and ADAS [advanced driver assistance systems], ensuring compliance with regulations and accelerating production.
- **Outlook for 2025:** Ansys is poised to leverage simulation, AI, Digital Twin, and HPC [high-performance computing] to enhance efficiency and innovation in automotive, supporting faster, cost-effective product development while maintaining quality and regulatory compliance amid rising competition.
- **Emerging issues:** The shift to software-defined vehicles necessitates new development practices to manage complex interactions. Ansys is committed to helping OEMs digitally design and validate these systems, ensuring simulation remains a foundational tool for safe, sustainable automotive development.

The following is an edited transcript of the conversation.

S&P Global Mobility: What were the most significant challenges your business encountered this year?

Judy Curran: This year, the automotive industry experienced significant cost pressures, launch delays, and increased complex technologies. They are grappling with stretched resources, conflicting business requirements, and regulations. With Ansys, a key challenge has been redirecting the automotive OEM and supplier focus from business pressures to realizing that simulation is a significant enabler in this time. We've partnered with many customers to adapt to these various challenges, accomplish accelerated design, reduce dependency on physical prototypes, and develop new business with innovation.

What was the most positive development you witnessed in your sector in 2024?

The most positive development has been the growing adoption of simulation technology across more phases of automotive development from concept design to production and beyond. Additionally, seeing more engineering teams utilize simulation, it is no longer just for the dedicated CAE teams. We've seen our customers leverage simulation to innovate more quickly, reduce costs, and address the increasing complexity of EV design, ADAS, and software. Simulation is empowering engineers to meet stringent regulations and accelerate production, which is a critical advantage given the industry's current demands.

Looking ahead to 2025, how do you perceive your business prospects and the overall outlook?

Heading into 2025, we are optimistic about the role of simulation, combined with digital enablers like AI, Digital Twin, and HPC, in driving efficiency and innovation in automotive. As OEMs and suppliers continue to embrace digitization and

virtualization, Ansys is well-positioned to support the industry's needs for faster, cost-effective product development, particularly as competition increases and resources decrease. Our multiphysics, multidomain simulation solutions will address these challenges while also helping to maintain quality and meet regulatory standards.

Is there any specific concern or emerging issue you would like to highlight?

An emerging issue is the new development practices required for software-defined vehicles. This trend requires ongoing innovation to manage the rising complexities of software and hardware interactions. With increased pressure on launch timelines and quality standards, OEMs must find effective ways to design and validate complex, interdependent systems digitally for the initial launch, as well as for over-the-air software updates. Ansys is committed to enabling this shift, ensuring that simulation continues to evolve and serve as a foundational tool for safe, sustainable automotive development.

Aptiv PLC is an Irish-American automotive technology supplier based in Dublin. It originated from Delphi Automotive Systems, which was once part of General Motors.

We spoke to Benjamin Lyon, senior vice president and chief technology officer, Aptiv



Key takeaways:

- **Challenges:** Aptiv addresses significant challenges in electric-vehicle adoption, including original equipment manufacturer struggles with software complexity in transitioning to software-defined vehicle architectures and escalating cost pressures. The company is adapting to regional market differences and offers flexible solutions to support OEMs' evolving needs.
- **Developments:** In 2024, Aptiv enhanced automotive safety and autonomy through AI integration, featuring a radar-based object classification system that is five times more effective than traditional methods. These developments support the anticipated growth in Level 2 autonomy and above by 2030.
- **Outlook for 2025:** Aptiv's 2025 outlook is supported by its diverse portfolio for digital transformation across industries, including advanced driver assistance system (ADAS) solutions, smart vehicle architecture for software-defined systems, and secure over-the-air updates through Wind River, enabling efficient software management and deployment.
- **Emerging issues:** AI can improve the automotive user experience by personalizing climate control and entertainment, enhancing safety through driver monitoring, predicting maintenance needs from vehicle sensors, and facilitating device integration for communication and content streaming.

The following is an edited transcript of the conversation.

S&P Global Mobility: What were the most significant challenges your business encountered this year?

Benjamin Lyon: While the pace of EV adoption varies across regions, the electrification transformation continues in alignment with the global long-term forecast. Aptiv is well-positioned at the intersection of industry megatrends — safety, sustainability and connectivity — with technology that is not only transforming the automotive industry but expanding into sectors such as aerospace and defense, telecommunications, medical and industrial end markets.

One of the most significant challenges our partners face is the transition to a software-defined vehicle architecture. OEMs are struggling to build, deploy and maintain the complex software required for these vehicles. Aptiv is well-positioned to help, as we lead the industry with the development of smart vehicle architecture (SVA), helping customers around the world move beyond hardware-defined, legacy architecture and into the software-defined future with a modern, sustainable platform. SVA abstracts software from hardware, reduces complexity and cost, and enables advanced features with high degrees of automation.

In addition to the technical hurdles, there is increasing pressure on OEMs to reduce costs, particularly as they transition to EVs. The tightening margins in the EV market pose a challenge for our partners as we work to provide cost-effective solutions. Some of the ways we address cost concerns for OEMs is by implementing SVA, which lowers the total cost of ownership throughout the vehicle lifecycle, utilizing a scalable ADAS platform, and leveraging AI/ML to optimize sensor utilization and enhance perception capabilities. These solutions work in conjunction with Aptiv's acquisition of Wind River, which provides edge-to-cloud software expertise and containerized solutions that streamline development and deployment.

Another significant challenge revolves around the need for AI adoption across the industry to unlock its full potential. We are addressing these challenges through significant investments in developing and deploying AI-powered solutions, focusing on enhancing safety, personalizing user experiences and optimizing system performance. We are building expertise in advanced AI algorithms, data acquisition and management, and explainable AI to stay at the forefront of this evolving field. We are also leading the way in ADAS, where AI and ML enhance safety and driver support, particularly in challenging conditions. Our AI-powered perception systems integrate various sensors to create a comprehensive understanding of the vehicle's surroundings. And we are streamlining software development processes through AI, leading to faster development cycles and improved software quality.

Another opportunity we have been navigating is adapting to regional differences in EV adoption and customer demands. For example, China is a rapidly growing EV market with a preference for full-system solutions, while Western markets are experiencing an EV slowdown. This requires us to tailor our offerings and strategies to meet the specific needs of each region.

We are also navigating the evolving make versus buy decisions of OEMs. As OEMs increasingly consider vertical integration and in-house software development, we are adapting by offering both full-system and partial solutions. This flexibility allows us to meet our customers where they are and support them regardless of their level of in-house development.

What was the most positive development you witnessed in your sector in 2024?

The most positive development in the automotive sector in 2024 was the integration of AI to advance safety features and enable higher levels of autonomy. Aptiv is a leading force in this development, using AI across our products and solutions, from ML-enabled radars to L2+ automated driving systems. A prime example of our success with integrating AI is our radar-based object classification system, which is five times more effective than traditional systems due to AI and ML. This advancement allows vehicles to better identify and predict the behavior of objects, a critical aspect of ADAS and autonomous driving.

AI is also being used to create more natural and humanistic driving behaviors, leading to a smoother and safer driving experience, especially in challenging situations. By 2030, almost half of the global automotive market is expected to reach Level 2 autonomy or above. We are well-positioned to benefit from this trend with our AI-driven solutions and focus on scalability, openness and cost reduction.

Looking ahead to 2025, how do you perceive your business prospects and the overall outlook?

Aptiv's business prospects are looking very bright as we head into 2025. We are well-positioned to provide comprehensive solutions that address the shared needs of customers across various industries undergoing digital transformation, including automotive, aerospace and defense, telecommunications, medical and industrial markets. Our diverse portfolio of hardware, software and toolchains can serve those looking for more advanced safety and automation, high-performance computing, secure lifecycle management and enhanced updatability.

Let me give you a few specific examples:

- We're seeing a significant shift in the automotive industry toward higher levels of autonomy and more sophisticated safety features. Our Gen 6 ADAS platform exemplifies our leadership in this space, as it brings together advanced 360-degree perception systems with radar, camera, lidar and ultrasonic sensors, along with driver and cabin monitoring. These features are enhanced by AI and machine learning to deliver a truly comprehensive ADAS solution across vehicle platforms.
- As modern systems become increasingly complex, there's a growing need for more advanced computing solutions and a shift towards software-defined architectures. Our SVA is a great example of how we are tackling this challenge — it simplifies system design, reduces costs, enables advanced features with higher levels of automation and provides flexibility by abstracting software from the underlying hardware.
- Continuous OTA updates are essential for connected industries to maintain security, introduce new features, and stay ahead of the competition. Aptiv's acquisition of Wind River has allowed us to excel in providing secure lifecycle management solutions. Our expertise in containerization technology allows for modular and flexible software development and deployment, making it possible to implement seamless and secure OTA updates tailored to specific customer needs. Our investments in Wind River VxWorks OS and Helix Hypervisor, combined with our deep understanding of 5G network slicing, enhance our OTA capabilities even further. We can prioritize data traffic to ensure efficient updates, making the most of the high bandwidth and low latency that 5G offers.

Aptiv is in a strong position to capitalize on these industry trends and deliver real value to our partners, thanks to our global scale, local expertise and dedication to innovation. Our modular, hardware-agnostic approach and cloud-native architecture offer customers the flexibility to build for the future. We're focused on seamless integration, continuous feature updates and smooth interoperability. Our emphasis on security, integration of AI and machine learning and comprehensive DevSecOps approach allows us to deliver cutting-edge solutions across a range of industries.

Overall, I'm incredibly optimistic about Aptiv's future. We are strategically focused on meeting the evolving needs of connected industries with our diverse portfolio of hardware, software and toolchains, and our global reach and commitment to innovation will help us continue to grow and succeed.

Is there any specific concern or emerging issue you'd like to highlight?

One of the most significant concerns facing the automotive industry today is harnessing the full potential of AI to enhance user experience within vehicles. While we are already seeing AI being used for things like driver monitoring systems (DMS) and in-cabin monitoring, the possibilities for AI to revolutionize the in-cabin experience extend far beyond these initial applications. Having the right foundation and the right tools will be crucial for the industry to fully unlock these opportunities.

AI has the potential to:

- Personalize comfort and convenience. AI can learn from driver and passenger behaviors to personalize climate control, seat settings and even entertainment preferences. This could mean a car that automatically adjusts the temperature and music to your liking, creating a truly customized driving experience.
- Enhance safety. Beyond DMS, AI can continuously monitor driver alertness and fatigue levels, providing timely warnings or even intervening to prevent accidents. This could lead to a significant reduction in accidents caused by driver error.
- Predict maintenance needs. AI can analyze data from a variety of vehicle sensors to predict potential maintenance issues before they become major problems. This would shift the automotive industry from a reactive to a proactive approach to maintenance, leading to less downtime for drivers and potentially lower repair costs.
- Seamlessly integrate with devices. AI can make the integration between smartphones and other personal devices much more seamless, enabling personalized content streaming, communication and even productivity features within the vehicle. This would create a more connected and enjoyable in-cabin experience, allowing drivers and passengers to stay productive and entertained while on the road.

In essence, AI has the potential to transform vehicles from mere modes of transportation into personalized, intelligent and highly responsive spaces. By investing in the development and deployment of the right AI technologies and integrating them seamlessly into vehicle systems and architectures, the automotive industry can unlock a future where the in-cabin experience is as sophisticated and personalized as any other aspect of our digital lives.

Bo

Founded in 2019, Bo develops high-performance electric scooters.

We spoke to Oscar Morgan, co-founder and CEO.



Key takeaways:

- **Challenges:** We are navigating regulatory hurdles as vehicle legislation harmonizes across Europe, grappling with limited investment capital, and production surges from shifting US tariffs.
- **Developments:** Positive regulations in more Irish cities are boosting micromobility, leading operators to achieve sustainable profitability and driving significant growth in e-scooter and e-bike usage.
- **Outlook for 2025:** Highly positive.
- **Emerging issues:** Early-stage investment recovery is vital for future opportunities, while promoting e-bikes and e-scooters can significantly enhance urban quality of life.

The following is an edited transcript of the conversation.

S&P Global Mobility: What were the most significant challenges your business encountered this year?

Oscar Morgan: We are facing ongoing regulatory challenges as vehicle legislation harmonizes across Europe, alongside reduced availability of investment capital. Additionally, surges in production due to changing US tariffs and increased shipping costs stemming from the current conflict in the Middle East further complicate our operations.

What was the most positive development you witnessed in your sector in 2024?

The rollout of positive regulations across more Irish cities is fostering a supportive environment for micromobility. Several operators are now achieving sustainable profitability, while the uptake and utilization of e-scooters and e-bikes continue to rise significantly.

Looking ahead to 2025, how do you perceive your business prospects and the overall outlook?

Highly positive — aligned to a macro requirement to increase efficiency in transport, reduce the cost of transport and increase quality of life without environmental impact.

Is there any specific concern or emerging issue you would like to highlight?

The recovery in early stage and higher risk investment is a concern. As interest rates drop, this occurs naturally; however, it is essential that investment appetite exists at the early stage to maintain a funnel of later stage investment opportunities.

People need to value taking direct personal action to improve their city and reduce their environmental impact. It is a behavioural change to shift from a car to an e-bike to e-scooter and is reliant on people trying something new. The key aspect is that we are aware of no other change that can improve your quality of life overnight to nearly the same order of magnitude.

Ceres

Ceres, based in Scotland, is at the forefront of creating thin-film holographic optical elements for transparent displays and augmented reality.

We spoke to Andy Travers, CEO of Ceres Holographics.



Key takeaways:

- **Challenges:** Amid ongoing uncertainty over EV [electric vehicle] and AV [autonomous vehicle] strategies, US and European OEMs [original equipment manufacturers] are hitting the brakes on next-gen features, all while macroeconomic headwinds keep the automotive industry in a slow lane.
- **Developments:** With a surge in interest for advanced display technologies and HUDs [head-up displays], the spotlight is on enhancing safety and user experience, as regulators and insurers rally to combat distracted driving.
- **Outlook for 2025:** The 2025 horizon looks bright as Asian OEMs in China, India, and Korea lead the charge with rapid model rollouts and feature innovations, pushing Western OEMs to fast-track their EV development plans.
- **Emerging issues:** The industry's pivot to user-centered design is an exciting evolution, spotlighting functionality and safety as in-vehicle displays become more sophisticated — an ideal canvas for innovation with safety always in focus.

The following is an edited transcript of the conversation.

S&P Global Mobility: What were the most significant challenges your business encountered this year?

Andy Travers: Continued uncertainty among US and European OEMs around EV and AV plans has led to delays in decisions on next-generation features. Plus, general macroeconomic pressures continue to impact the automotive industry.

What was the most positive development you witnessed in your sector in 2024?

We have seen an increase in interest, projects, and prototyping around advanced display technologies and features, and HUDs focused on enhancing safety and the user experience. We've also seen a greater focus by regulators, insurance providers, and the industry ecosystem on safety, particularly regarding distracted driving.

Looking ahead to 2025, how do you perceive your business prospects and the overall outlook?

The outlook for 2025 is very positive, especially with the growth and speed of new model rollouts and feature innovations from Asian OEMs in China, India, and Korea. This is driving Western OEMs to accelerate their development plans, particularly in the EV sector.

Is there any specific concern or emerging issue you would like to highlight?

The industry shift towards more user-centered design is an exciting evolution, and we are encouraged by the emphasis on enhancing functionality and safety. As in-vehicle displays become more sophisticated, there's a tremendous opportunity to innovate while keeping safety at the forefront.

Commercial Fuel Solutions

Commercial Fuel Solutions Ltd. designs and manufactures fuel storage and transfer systems for various industries.

We spoke to Robin Fatcher, founder & CEO.



Key takeaways:

- **Challenges:** The recent government change has stalled numerous projects we've been involved with, including HS2 [High Speed 2 railway] and the Lower Thames Crossing, causing significant disruption and delays.
- **Developments:** The arrival of Rho marked cylinders in the UK revitalizes hydrogen storage and transport, overcoming post-Brexit challenges with Pi marked cylinders and enabling us to deploy hydrogen solutions once more.
- **Outlook for 2025:** Our outlook includes spearheading change in commercial fuelling with low carbon technologies.
- **Emerging issues:** The growing number of startups offering non-compliant hydrogen products on UK roads highlights a critical knowledge gap in technical requirements. This poses safety risks and tarnishes the reputation of hydrogen as a viable fuel.

The following is an edited transcript of the conversation.

S&P Global Mobility: What were the most significant challenges your business encountered this year?

Robin Fatcher: The change in government has led to disruption and delays to a large number of projects, which we have had involvement with. HS2 and Lower Thames Crossing for example.

What was the most positive development you witnessed in your sector in 2024?

The emergence of Rho marked cylinders on the UK market for hydrogen storage and transport. Post-Brexit, the UK moved away from accepting Pi marked cylinders, making it difficult to obtain suitably rated cylinders for hydrogen transport. Now that Rho marked cylinders are starting to be made available, we are able to deploy hydrogen cylinders again.

Looking ahead to 2025, how do you perceive your business prospects and the overall outlook?

Strong. We are driving change with low carbon-fuelling technologies and leading decarbonisation in commercial fuelling; the industry has responded well to this.

Is there any specific concern or emerging issue you would like to highlight?

There is a lack of knowledge when it comes to the technical requirements for moving hydrogen on the UK's roads. A growing number of start-ups are placing product on the market, which is either not compliant or is being used incorrectly. This is really concerning not only for the obvious safety reasons but also as it leaves users with a negative experience, which is damaging to the reputation of hydrogen as a fuel.

Cyclic Materials

Established in 2021, Cyclic Materials is a cleantech company creating a circular supply chain for rare earth elements (REEs), transforming end-of-life products into essential raw materials for electric vehicles and wind turbines. It is scaling its technology globally to support electrification.

We spoke to Ahmad Ghahreman, CEO, president and co-founder of Cyclic Materials.



Key takeaways:

- **Challenges:** The company is on the hunt for passionate talent to drive sustainable innovation and scale their technology worldwide.
- **Developments:** Cyclic Materials is advancing REE recycling with new technologies, securing a \$3.6 million grant and \$53 million in Series B funding. This support reflects investor confidence as they work to scale operations for efficient recovery.
- **Outlook for 2025:** With Series B funding, they plan to develop infrastructure in the US and Europe to support sustainability and supply chain stability.
- **Emerging issues:** China controls a significant portion of the global REE supply. To improve supply chain resilience amid geopolitical tensions, domestic recycling needs to scale, supported by government initiatives and regulations that promote sustainable sourcing and circularity in critical materials.

The following is an edited transcript of the conversation.

S&P Global Mobility: What were the most significant challenges your business encountered this year?

Ahmad Ghahreman: Cyclic Materials is the only advanced recycling company that simplifies the recovery of REEs and critical materials for end-of-life products. In the past year, we grew our team from 12 to 50 employees, and our biggest challenge was finding the right talent to support our world-class operations. Securing talent who is not only committed to a sustainable future but also possesses the technical acumen and customer knowledge to navigate this emerging market can be difficult.

Our team is composed of the world's top hydrometallurgists and recycling industry experts, and our industry knowledge and proven global scaling experience are what set us apart from the competition. From our engineering teams to our sales and marketing ones, we are still actively hiring and are excited to see new talents join us to further scale our technology across the globe.

What was the most positive development in your sector in 2024?

Recycling REEs has long been considered out of reach, with most attempts resulting in low recycling efficiency and high loss of key materials. Thanks to breakthrough innovations like ours, we can now recover REEs efficiently, turning an impossible task into a sustainable solution. With growing financial support from governments, companies developing new permanent magnet recycling technologies have notably received over \$248 million of private funding to date, demonstrating strong investor support as the REE recycling infrastructure scales globally.

Cyclic Materials drove much of this momentum in the past year. We received a \$3.6 million grant award from Natural Resources Canada that supports the continued operation of our commercial demonstration facility for producing high-

purity REEs from recycled magnet material and preparing for scaling to larger operations. We also closed an oversubscribed \$53 million Series B equity round with participating investors, including Microsoft's Climate Innovation Fund and BMW i Ventures, to fast-track our international growth.

Looking ahead to 2025, how do you perceive your business prospects and the overall outlook?

REEs are vital to developing many devices and products, from data centers and wind turbines to cell phones, electric vehicles, and power tools. In 2025, we will see a massive shift in the recycling of REEs. While EVs and clean energy will remain the biggest drivers of demand and most significant sources of recycled REEs, the robotics industry will grow to become a major player in the market.

With technologies finally reaching maturity, there will be a focus on scaling infrastructure to address the 99% of REEs not being recycled today. Our proprietary MagCyclesm and REEPuresm technologies extract REEs from end-of-life products and break them down into their raw material form, mixed rare earth oxides (MREOs), with no reduction in quality for seamless integration back into production. Our two-phase recycling process uses 63% less carbon and 95% less water compared to traditional mining. We have facilities demonstrating the feasibility of our technology at a commercial scale and are now leveraging our Series B funding to build rare earth recycling infrastructure across the US and Europe.

With companies striving to meet their ambitious carbon reduction targets for 2030, the race to reduce carbon footprints and landfill waste is on. Nowhere is the drive for circularity more critical than in key metals markets, where recycling doesn't just benefit the environment — it also tackles supply chain risks and geopolitical pressures head-on. For consumers of critical metals, circularity serves as both a sustainability solution and a strategic shield. With rare earth magnets among the world's most vital materials, Cyclic Materials stands ready to deliver recycled REEs with a fraction of the carbon impact, powered by a fast-tracked, ex-China supply chain.

Is there any specific concern or emerging issue you would like to highlight?

China currently dominates the world's supply of REEs and controls 90% of all critical metal supply. With geopolitical tensions heating up, we need to scale domestic recycling of REEs and critical materials quickly enough to meet demand and improve supply chain resilience and security. Government support is required to relocate the most crucial parts of the industry and create domestic supplies that circumvent China. Regulations also play a key role in encouraging sustainable material sourcing and circularity to create a strong market.

DXC Luxoft

DXC Luxoft specializes in global digital transformation, offering services and products that enhance competitive advantage in the software-defined world.

We spoke to Luz Mauch, executive vice president of Automotive & Manufacturing, DXC Luxoft.



Key takeaways:

- **Challenges:** The automotive industry faces challenges from increased competition, regulatory demands, and economic volatility.
- **Developments:** In 2024, the automotive industry advanced through connectivity, research and development (R&D) innovation, and AI adoption; enhancing user experience, enabling new revenue streams and positioning itself for a future of intelligent, connected, and autonomous mobility solutions.
- **Outlook for 2025:** The 2025 automotive outlook features global challenges and growth opportunities in emerging Asian markets, with signs of recovery indicating a new growth phase.
- **Emerging issues:** The automotive industry faces growing cybersecurity threats and regulatory challenges. DXC Luxoft supports manufacturers with expertise in cybersecurity, autonomous driving and connected mobility, facilitating innovation and consumer trust in transformative technologies.

The following is an edited transcript of the conversation.

S&P Global Mobility: What were the most significant challenges your business encountered this year?

Luz Mauch: This year, the automotive industry has navigated an exceptionally challenging landscape marked by heightened competition, regulatory demands and economic volatility.

The rapid emergence of Chinese car manufacturers has shifted the competitive balance globally, as these companies present attractive, lower-cost options that challenge long-established American, European and Japanese brands.

This development not only increases market competition but also places strain on traditional supply chains, forcing established players to rethink their global strategies. Concurrently, sustainability pressures continue to grow, pushing automakers to meet rigorous environmental standards and invest in green technologies — such as electrification and sustainable production methods.

However, these efforts come with significant financial strain, particularly given the unfavorable market conditions. Adding to these pressures, economic uncertainty, driven by inflation and fuel price fluctuations, has dampened consumer purchasing power in key markets, shrinking demand and introducing further instability. In addition, many vehicle manufacturers are adopting a cautious approach, opting to wait and observe the macroeconomic implications of the recent US elections before committing to significant investments. Together, these dynamics reflect a pivotal moment for the automotive sector, requiring strategic adaptation, operational resilience, and forward-thinking investments to thrive amid disruption and rapid transformation. DXC Luxoft, with our deep engineering and industry expertise, is committed to supporting the modernization of the industry, helping to address challenges and drive innovation at scale.

What was the most positive development you witnessed in your sector in 2024?

As a trusted global partner for the automotive industry, in 2024, we witnessed a transformative leap forward, primarily driven by advances in connectivity, innovation in R&D and the adoption of AI. The integration of IoT [internet of things]

and advanced connectivity features has not only elevated the user experience but has also paved the way for new, data-enabled revenue streams, at the same time redefining what vehicles can offer in terms of personalization and features. Meanwhile, robust R&D investments, particularly in the area of cross-domain standardization and aiming at increasing the reusability of software assets and the efficiency of development activities, have continued to drive innovation despite economic challenges, underscoring the industry's commitment to long-term transformation. Additionally, the gradual adoption of AI has proven transformative, overcoming technical and regulatory barriers to significantly enhance vehicle functionality and the efficiency of the product development life cycle. Together, these developments represent a bright, forward-looking shift in the industry, one that positions it well for a future defined by intelligent, connected, and increasingly autonomous mobility solutions.

Looking ahead to 2025, what is your overall outlook for the industry and where do you see the most opportunity for growth and change?

Looking ahead to 2025, the automotive industry's outlook is shaped by both global challenges and promising growth prospects. Geopolitical will undoubtedly play a major role in shaping market dynamics, affecting everything from supply chains to regulatory policies. Despite these uncertainties, emerging markets, especially in Asia, offer substantial opportunities for expansion, with increasing consumer demand and infrastructure development driving global diversification efforts.

Additionally, early signs of market recovery indicate that the last quarter of 2025 could mark the beginning of a new growth phase, reversing recent downturns and opening pathways for renewed expansion.

This year holds the potential for the industry to navigate geopolitical complexities while capitalizing on high-growth regions, setting the stage for a period of innovation and strategic adaptation; we will also bring the power of automotive-specific deep domain expertise and more than 125,000 skilled talent across 60+ countries, focused on supporting the automotive industry in its mission-critical work.

Is there any specific concern or emerging challenge or opportunity you would like to highlight?

One pressing challenge in the automotive industry is the rising importance of cybersecurity. As vehicles become more connected, they show a larger attack surface and become increasingly vulnerable to cyber-attacks, necessitating advanced cybersecurity solutions to protect data integrity, vehicle functionality and passenger privacy. Additionally, navigating complex and evolving global regulations — for example regarding emissions and safety standards — remains challenging. In parallel, automakers continue seeking to achieve standardization for efficiency while still delivering customized user experiences. Ensuring consumer trust and widespread adoption of transformative technologies like autonomous driving will also be essential for future growth, as acceptance will dictate the pace of innovation. In this landscape, DXC Luxoft stands uniquely positioned to support vehicle manufacturers, leveraging deep industry expertise and specialized centers of competence in crucial areas, including Automotive Cybersecurity, Functional Safety, Autonomous Driving, Digital Cockpit, and Connected Mobility. For example, we bring together advanced technologies and tools to enable the development of automotive infotainment systems for in-car entertainment and personal assistance that are unique, immersive and future-ready. Our autonomous driving solutions incorporate the design of autonomous driving systems, in-vehicle embedded software development, and software testing of self-driving functions. Our connected vehicle platform and applications enable vehicle manufacturers and their partners to accelerate the development of new services and business models for mobility and the next generation of connected mobility ecosystems. This comprehensive approach allows DXC Luxoft to partner effectively with vehicle manufacturers, helping them navigate and capitalize on the evolving challenges and opportunities of the automotive industry.

Dynisma

Dynisma designs and manufactures advanced driving simulators.

We spoke to Simon Holloway, commercial director at Dynisma.



Key takeaways:

- **Challenges:** Meeting the surging demand for the company's driving simulators has been challenging.
- **Developments:** Automotive OEMs are embracing digital development for efficiency and cost reduction.
- **Outlook for 2025:** The 2025 outlook is strong, with a full production schedule and solid partnerships, positioning Dynisma for significant growth in market share and operational capacity.
- **Emerging issues:** Smoother export processes into Europe and better access to UK Export Finance are crucial for meeting international demand and sustaining growth as we scale and invest in research and development (R&D).

The following is an edited transcript of the conversation.

S&P Global Mobility: What were the most significant challenges your business encountered this year?

Simon Holloway: Our main challenges have been scaling up to meet the surging demand for our driving simulators, along with recruitment and expanding our facilities. We've grown significantly, with over 100 specialists now working at our manufacturing and technology campus in Bristol, UK.

What was the most positive development you witnessed in your sector in 2024?

This year, we've seen automotive OEMs embracing digital development to reduce time-to-market and cut costs, which is a very promising shift. Additionally, the growing interest in electric vehicles has created some uncertainty, leading to quick adjustments in powertrain choices and vehicle redesigns. Internationally, more large European automotive companies are partnering with UK-based businesses, which has been a positive change, though it requires navigating cultural and language differences. At Dynisma, we're focused on a clear value proposition for the automotive industry: Innovate faster, prototype smarter. Our DMGs [Dynisma Motion Generators] allow OEMs to simulate diverse driving scenarios with near-perfect correlation to a real-world vehicle, saving development time and money and reducing CO2 emissions.

Looking ahead to 2025, how do you perceive your business prospects and the overall outlook?

The outlook for 2025 is very promising. We have a robust order book and a strong sales pipeline almost fully booked for 2025 production. With solid partnerships across the automotive and motorsport sectors, and recognition as one of the Sunday Times 100 Fastest Growing Businesses, we're set to continue innovating and expanding. This is shaping up to be a year of significant growth for us, both in market share and in operational capacity.

Is there any specific concern or emerging issue you would like to highlight?

One key concern is ensuring smoother export processes into Europe, ideally without the need for extensive financial underwriting. Greater access to UK Export Finance would also help us meet growing international demand. As we scale and invest in R&D, robust export financing support is essential to sustain our momentum and expand globally.

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