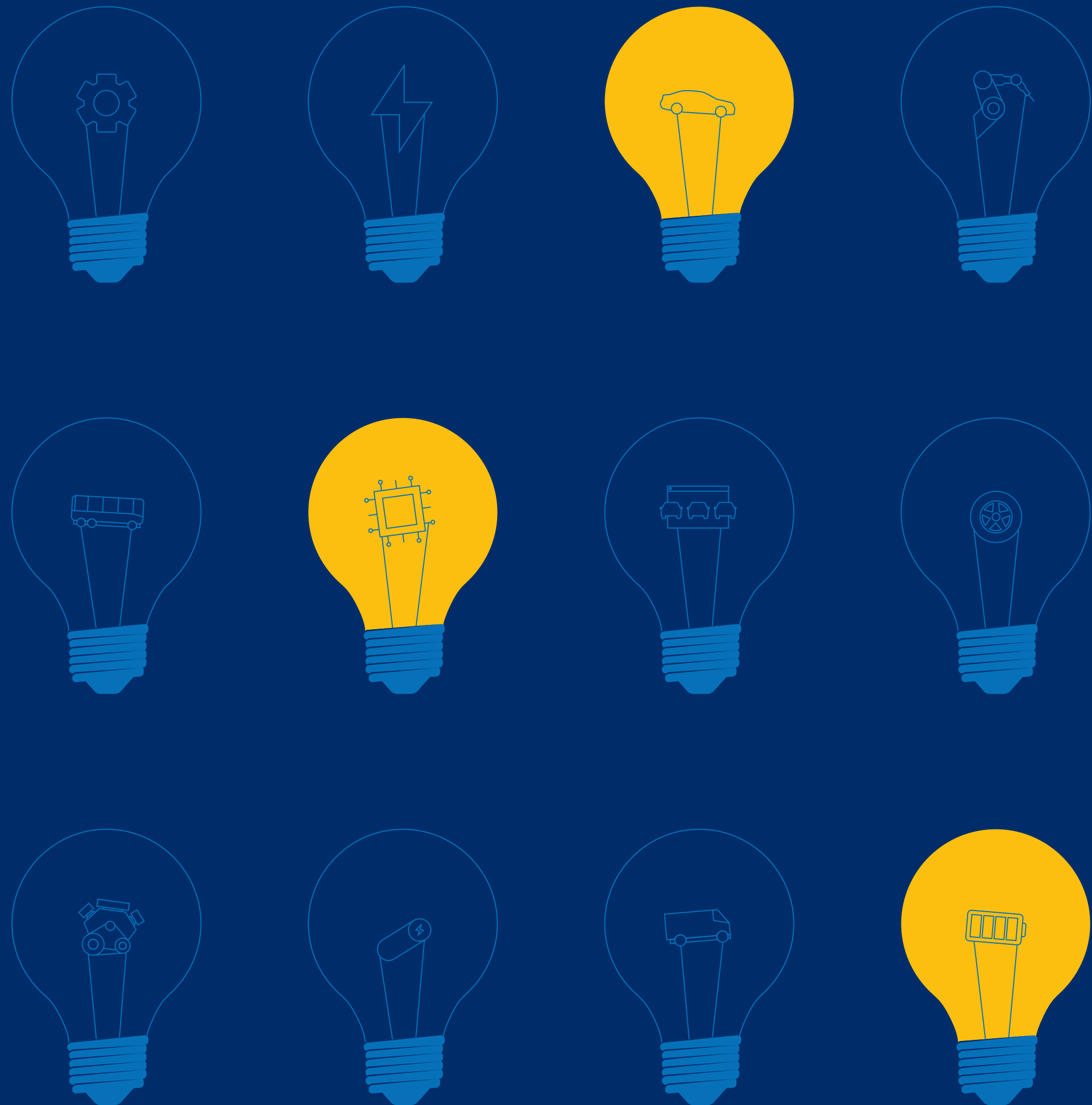




**DRIVING UK
AUTOMOTIVE
INNOVATION
- INSIGHTS FROM
INDUSTRY**

The automotive sector is driven by innovation – continually developing new technologies to make mobility safer, greener, easier to use and more appealing to consumers.

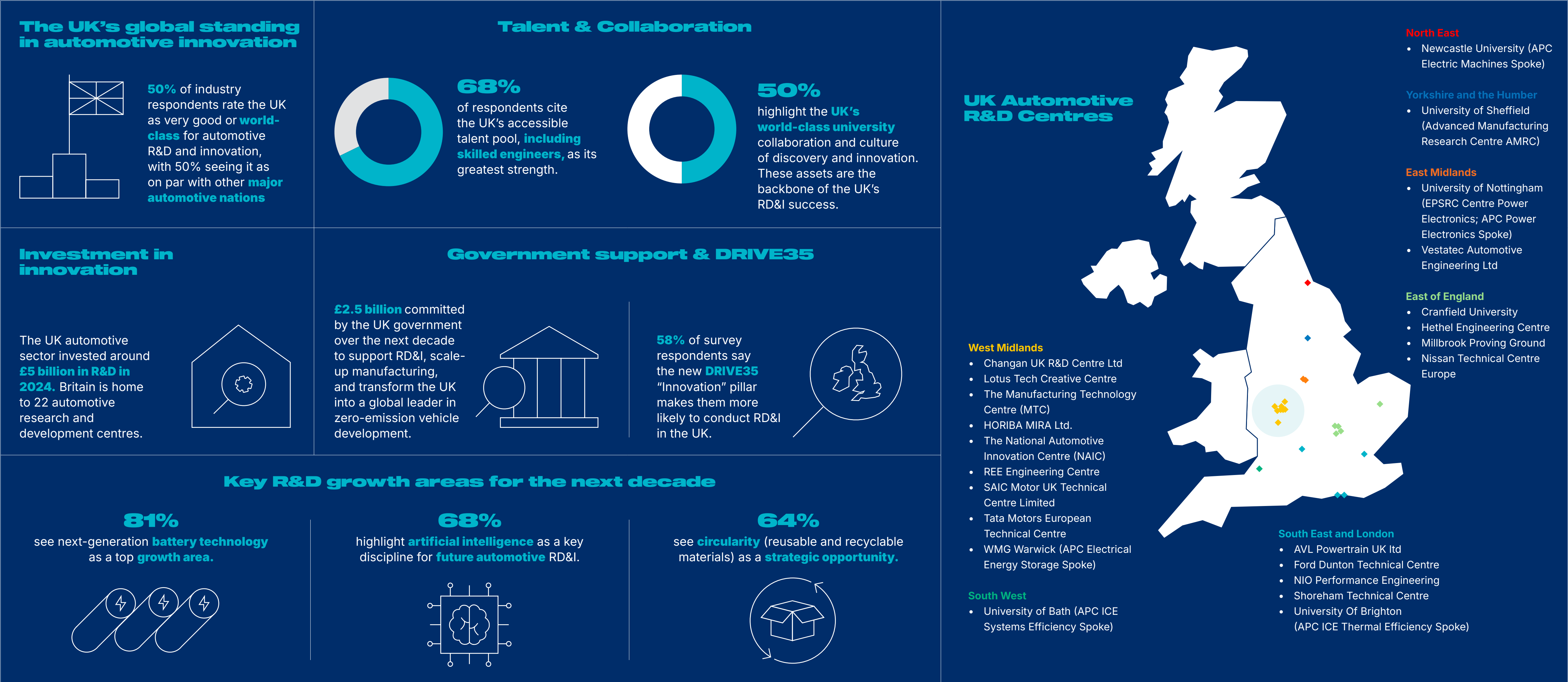
The UK’s Research, Development and Innovation (RD&I) sector has long been considered one of the best in the world. The UK is a great place to innovate, with a stable, supportive innovation ecosystem, excellent links between academia and industry and longstanding government recognition. We need to remain at the forefront of innovation, R&D and business development – to secure economic growth, stay globally competitive and secure future jobs for the UK.



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UK AUTOMOTIVE R&D AND INNOVATION LANDSCAPE



THE ROLE OF INNOVATION IN UK AUTOMOTIVE

From the invention of the catalytic converter to fuel injector technologies, the UK automotive industry has long been at the cutting edge of technology and innovation developments. The sector remains a significant driver of research and development, in 2024 investing around £5 billion in Research, Development and Innovation (RD&I). Britain is home to 22 separate automotive research and development centres¹ thanks to the UK’s world-class reputation as a place to develop new technology. In the latest Automotive Council UK International Competitiveness survey, of all the factors that influence investment decisions, university-industry collaboration was rated as the UK’s biggest strength. Britain is also rated more highly than the majority of EU nations on university-industry R&D, and above average globally. This is complemented by its unique motorsport pedigree, which drives competitive and ‘challenge-led’ engineering, helping to spur innovation across the entire sector.

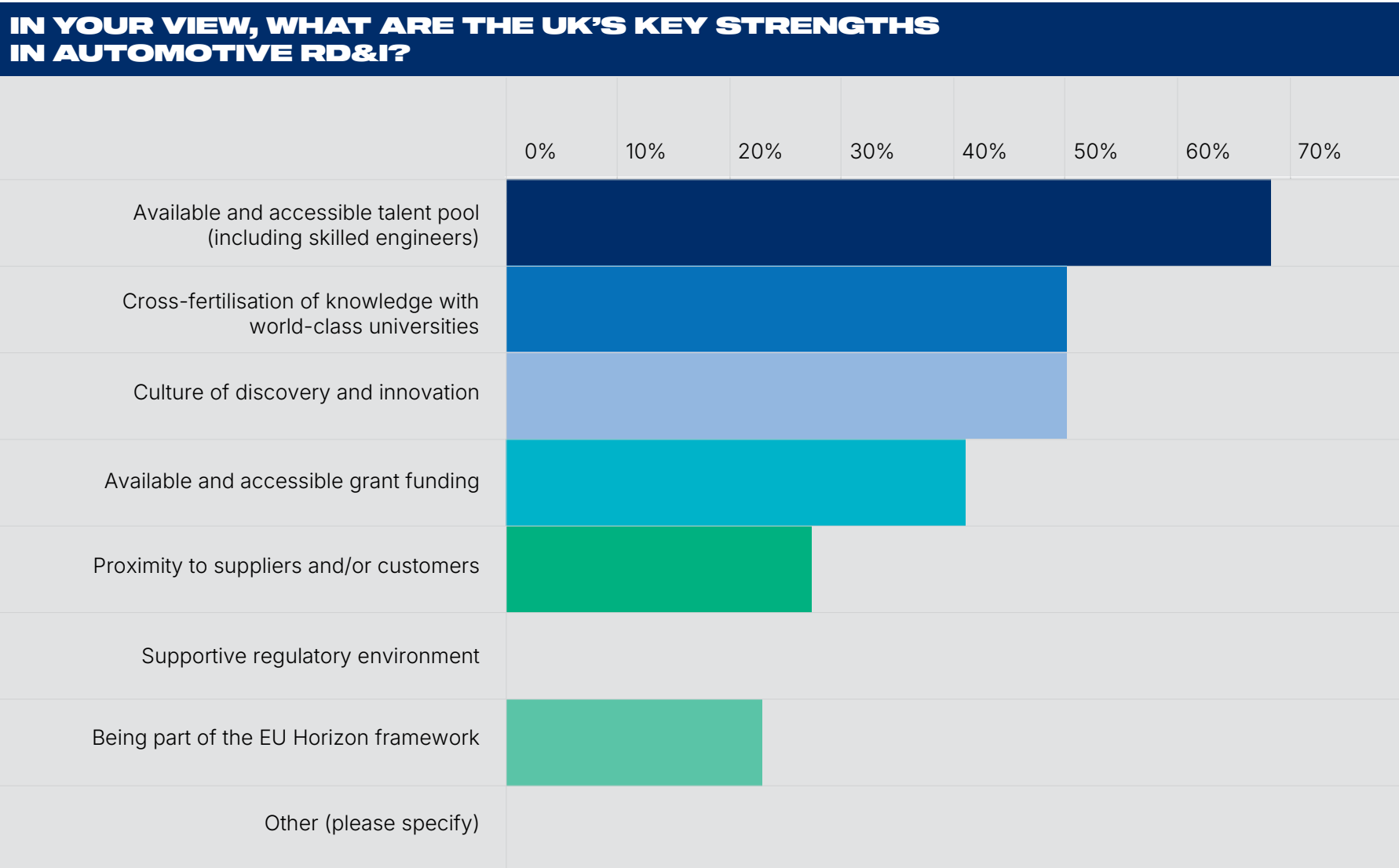
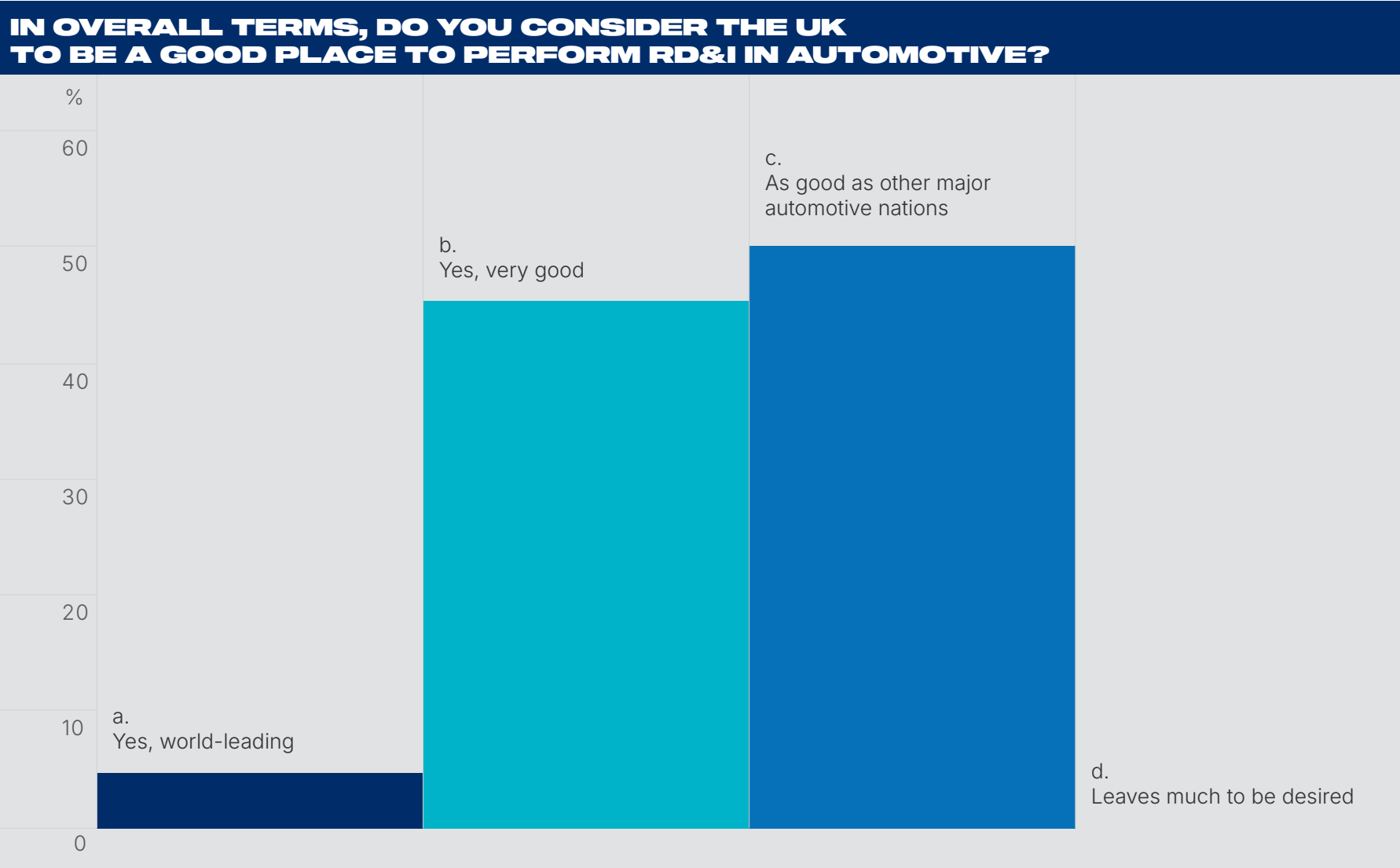
The shift to electrified vehicles and other geopolitical challenges have brought the UK automotive sector to a crossroads. While there is global recognition of its RD&I capabilities, the competitiveness of the industry is not guaranteed. The government’s new Modern Industrial Strategy and sector plans, backed by the £2.5 billion DRIVE35 programme, is therefore a positive development. The programme’s three funding pillars – Transformation, Scale-Up, and Innovation – are designed to support projects across all technology readiness levels, from early-stage R&D to commercial manufacturing. Both government and the industry must use this crucial moment to remain at the forefront of RD&I trends internationally.

A recent SMMT survey of vehicle manufacturers, suppliers and technology companies shows that a majority of respondents have a positive view of the UK, with 50% believing it is performing on par with other major automotive nations, 50% of industry respondents rate the UK as very good or world-class for automotive Research, Development and Innovation (RD&I).

The results suggest that the UK retains several core strengths. The most prominent is its available and accessible talent pool, cited by 68% of respondents. This is bolstered by collaboration with world-class universities and a culture of discovery and innovation, both mentioned by 50%. They provide a strong foundation for RD&I, particularly in emerging areas such as software-defined vehicles (SDVs), battery technology and AI-driven manufacturing. These elements form a solid foundation for RD&I, although other factors, including grant funding and supplier proximity are seen as secondary contributors.

Recent government-backed initiatives are designed to harness these strengths. The DRIVE35 fund, for example, commits £2.5 billion over the next decade to support RD&I, scale-up manufacturing, and transform the UK into a global leader in zero-emission vehicle (ZEV) development. The programme includes £500 million dedicated to long-term R&D and has already funded projects involving major UK-based OEMs, as well as SMEs in connected and automated mobility (CAM)².

01 <https://smtweb.lon1.cdn.digitaloceanspaces.com/wp-content/uploads/2025/08/SMMT-Motor-Industry-Facts-July-2025.pdf>
02 <https://www.apcuk.co.uk/news-events/news/drive35-innovation-and-scale-up-in-the-automotive-sector/>



CASE STUDY

AEM: Developing motors without rare earth materials

Super Speed Reluctance Drive - A high power, efficient electric motor, capable of 30,000rpm speeds - without permanent magnets.

The aim of the project was to produce a class leading electric traction system capable of meeting or beating the power, efficiency and cost standards of global OEMs and Tier 1 suppliers - all without the supply chain challenges associated with rare earth elements and Permanent Magnets (PM).

AEM has developed motor and controller hardware that is now confirming simulations that can match or beat current motor designs in passenger car applications. “Drop-in” solutions can now be created that match the installation and speed requirements of PM machines, with improved performance, efficiency and lower costs. Without the restrictions of PM motor speed limits, AEM’s, bespoke SSRD solutions can run to 30,000 rpm and further improve power density and costs.

Reluctance machines have been in existence for over a century, but it is only with the benefit of modern power electronics and AEM’s patented motor technology that reluctance machine topology has been exploited to its fullest potential in passenger car applications. AEM has overcome challenges in the manufacturing and power electronics elements of the project, implementing innovative and scalable production solutions of compressed coils, and configuring base PE components into new formats, enabling groundbreaking motor control strategies.

When combined these technologies provide customers with production solutions for the next generation of EV powertrains: the SSRD. AEM’s, compressed coil technology can also be utilised by other motor manufacturers to maximise the performance of their motor designs.



CHALLENGES: COST, REGULATION, AND ECOSYSTEM GAPS



Significant challenges persist, however, the most pressing of which is the uncompetitive cost environment, which received the highest weighted average score. The energy cost crisis in the UK is hitting the automotive industry particularly hard amid the EV transition. While prices have increased across Europe in the last five years, the UK has been hit especially hard due to the structure of the UK energy and electricity markets. Data from the Department for Energy Security and Net Zero (DESNZ) shows that for large industrial energy users the UK has the highest electricity prices in Europe, and on average more than double (112%) other countries³. This reduces the competitiveness of the UK automotive industry, increasing production costs.

It is essential that the UK addresses the cost of energy crisis, via the British Industrial Competitiveness Scheme (BICS) but also in wider electricity market reforms to reflect the true cost of renewable electricity passed to consumers and businesses.

Other barriers include an unattractive tax credit regime, high regulatory hurdles and difficulty attracting the right skillsets. The latter issue may point to the challenges of a changing workforce as the sector increasingly competes with other industries to attract workers where this may not have been the case to such an extent in the past. Almost 200,000 people work directly in automotive manufacturing, and with production shifting dramatically towards electric vehicles and digitalisation over the next decade, Britain needs a new generation of engineers, designers, fabricators, as well as access to skills not seen in large quantities in the sector, such as data analysts and software designers.

The UK automotive industry is recognised for its highly skilled workforce – a trait referenced as a key competitiveness criterion for investment with early insights into the latest UK Competitiveness Index (through the Automotive Council) placing labour and skills as a top priority for international investors.

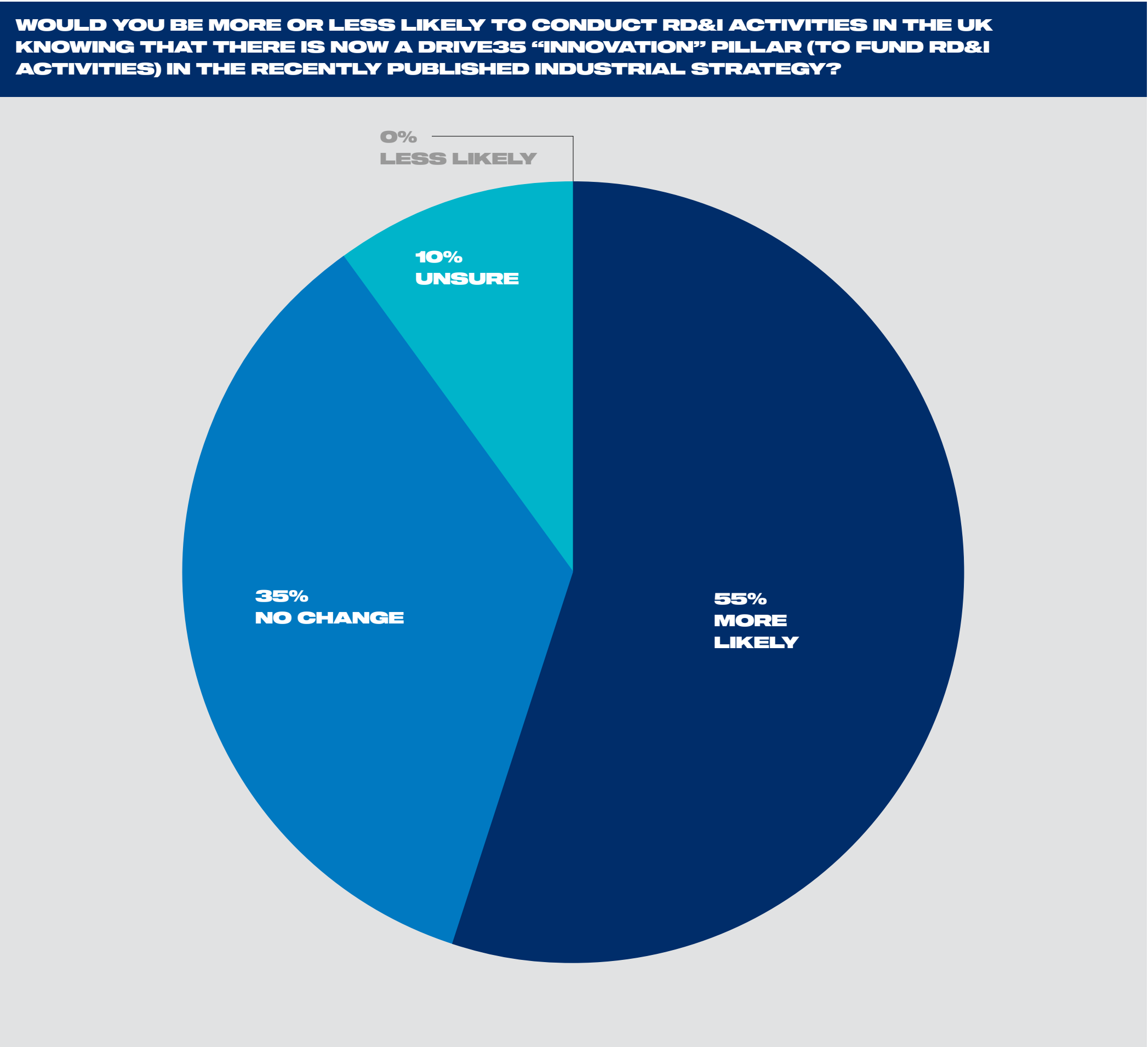
The survey results further highlight broader issues such as the economic competitiveness of the UK and retaining business in the country to commercialise their products and services, pointing to systemic challenges that could hinder long-term growth.



03 https://www.gov.uk/government/statistical-data-sets/international-industrial-energy-prices?utm_medium=email&utm_campaign=govuk-notifications-topic&utm_source=2161a7e3-d361-4d2f-a8d7-64099dee3f9a&utm_content=daily

POLICY IMPACT: DRIVE35 AND STRATEGIC SUPPORT

Encouragingly, the DRIVE35 ‘Innovation’ pillar appears to be a positive influence, with 58% of respondents indicating it would make them more likely to conduct RD&I in the UK. This suggests that targeted policy initiatives can have a meaningful impact on industry sentiment and decision-making. DRIVE35 builds on the success of the Automotive Transformation Fund (ATF) and Advanced Propulsion Centre (APC), which previously attracted more than £6 billion in private investment. It also aligns with the UK’s Modern Industrial Strategy, which aims to double annual business investment in advanced manufacturing from £21 billion to £39 billion by 2035⁴.



⁰⁴ <https://uk-business-connect.org.uk/wp-content/uploads/2025/07/FullDeck-DRIVE35-%E2%80%93Driving-Research-and-Investment-in-Vehicle-Electrification.pdf>

CASE STUDY

Ohme: Supporting domestic energy grid flexibility and decarbonisation

EV home charging company Ohme, which works with manufacturers, leasing companies and dealerships, specialises in smart charging technology using deep connectivity and real-time data to charge when electricity is cheaper and demand is lower, helping to cut costs and carbon.

In September 2024, the company helped to facilitate a seven-month Ofgem Winter Crowdflex trial, part of the UK’s largest domestic energy grid flexibility study led by the National Electricity System Operator for Great Britain (NESO). Participating EV drivers were given financial incentives to plug in their EVs whenever they were parked at home, enabling Ofgem to demonstrate how households can reliably support the grid and lay the foundation for a smarter, more decentralised energy system, helping to deliver on government’s Clean Power by 2030 (CP2030) action plan.

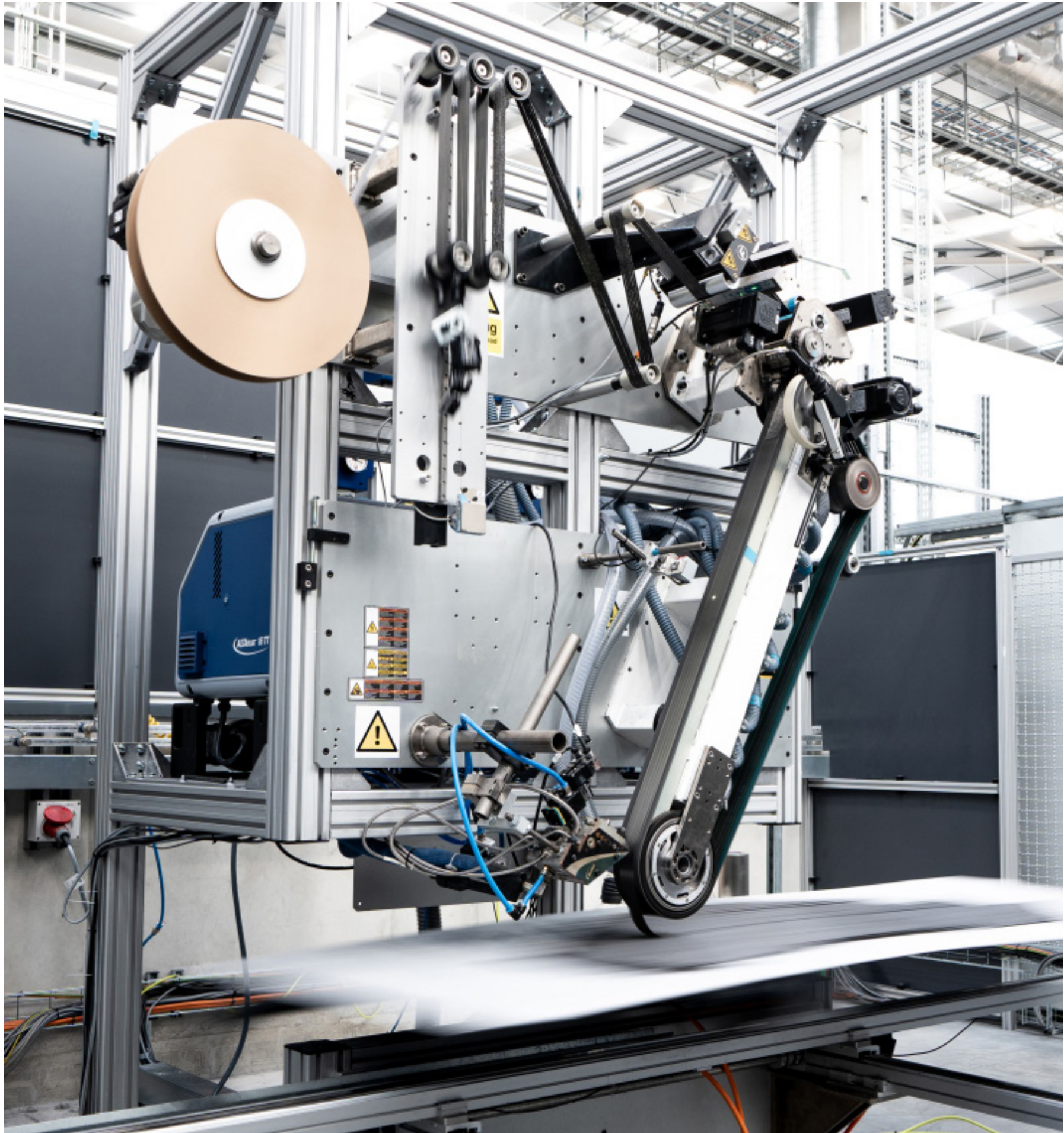
During the trial, Ohme drivers received £400,000 in incentives, with overnight plug-in rates rising by 42% and daytime plug-in rates by 53% compared with pre-trial levels. According to Ohme, grid flexibility services are estimated to save consumers an annual £10 billion in energy costs by 2050, and customer engagement is essential in generating more flexibility and helping the energy system meet peak demand, reduce costs and lower carbon emissions.

IMPROVEMENT PRIORITIES: FUNDING, COLLABORATION, AND EUROPEAN ALIGNMENT

The UK has long been seen as a good place to conduct RD&I; however, businesses have struggled to move from the RD&I phase to commercialisation of products and services in the UK. There is a clear sentiment of the need for support moving beyond the RD&I stage to commercialisation. When asked to identify how the UK could improve its support for automotive RD&I, the most frequently mentioned areas of support were the need for industrialisation support, innovation incubation platforms, collaborative problem-solving initiatives and Innovation Funding Programmes. There is a need to take the great work that is happening in the UK in the RD&I space, as highlighted by the case studies in this report, and drive it on towards successful commercialisation. It is a real positive that this has been recognised and reflected in APC funding programmes via DRIVE35, and the industry is keen to work with the government to ensure its success. To support this, the government needs to enhance and support this aim by ensuring policy frameworks remain stable and supportive over the next decade. Part of that work can be done by de-risking investment in the sector by using the National Wealth Fund and British Business Bank to support international investment funding and making sure the UK is a competitive place to invest and remain to develop profitable technologies and businesses.

There may be cautious optimism at the recent Industrial Strategy and DRIVE35 funding announcements but this this may be tempered by concerns the UK will not address these long-standing barriers effectively.

It is positive that, after much delay, the UK is associated again with the Horizon Europe programme. With that programme coming to an end in 2027, the UK has an opportunity to set out what it would like to see from its successor – the Framework Programme 10. The UK government should seek association with the successor programme so as not to lose access to the large funding and business collaboration community it provides.



CASE STUDY McLaren: Transforming high-rate composite manufacturing

The ASCEND project aimed to develop technology, materials, and automation methods to enable higher-rate, more efficient, and sustainable manufacturing of complex composite products. It was a pioneering cross-sector collaboration, supported by Innovate UK and the Aerospace Technology Institute (ATI), bringing together aerospace precision and automotive innovation.

In aerospace, Automated Rapid Tape (ART) technologies are used to build tailored carbon fibre structures – such as aircraft fuselage and wings – through a process called tape deposition, allowing optimised design and reduced material waste. The ASCEND project sought to develop a high-rate version of ART, revolutionising this method for automotive applications.

The innovative method designed as part of the ASCEND project unlocks faster, more consistent manufacturing suitable for high-volume automotive production. With lightweighting central to McLaren Automotive's DNA, the application of ART enables the creation of carbon fibre structures that are lighter, stiffer, and stronger, while generating less waste and improving part-to-part consistency.

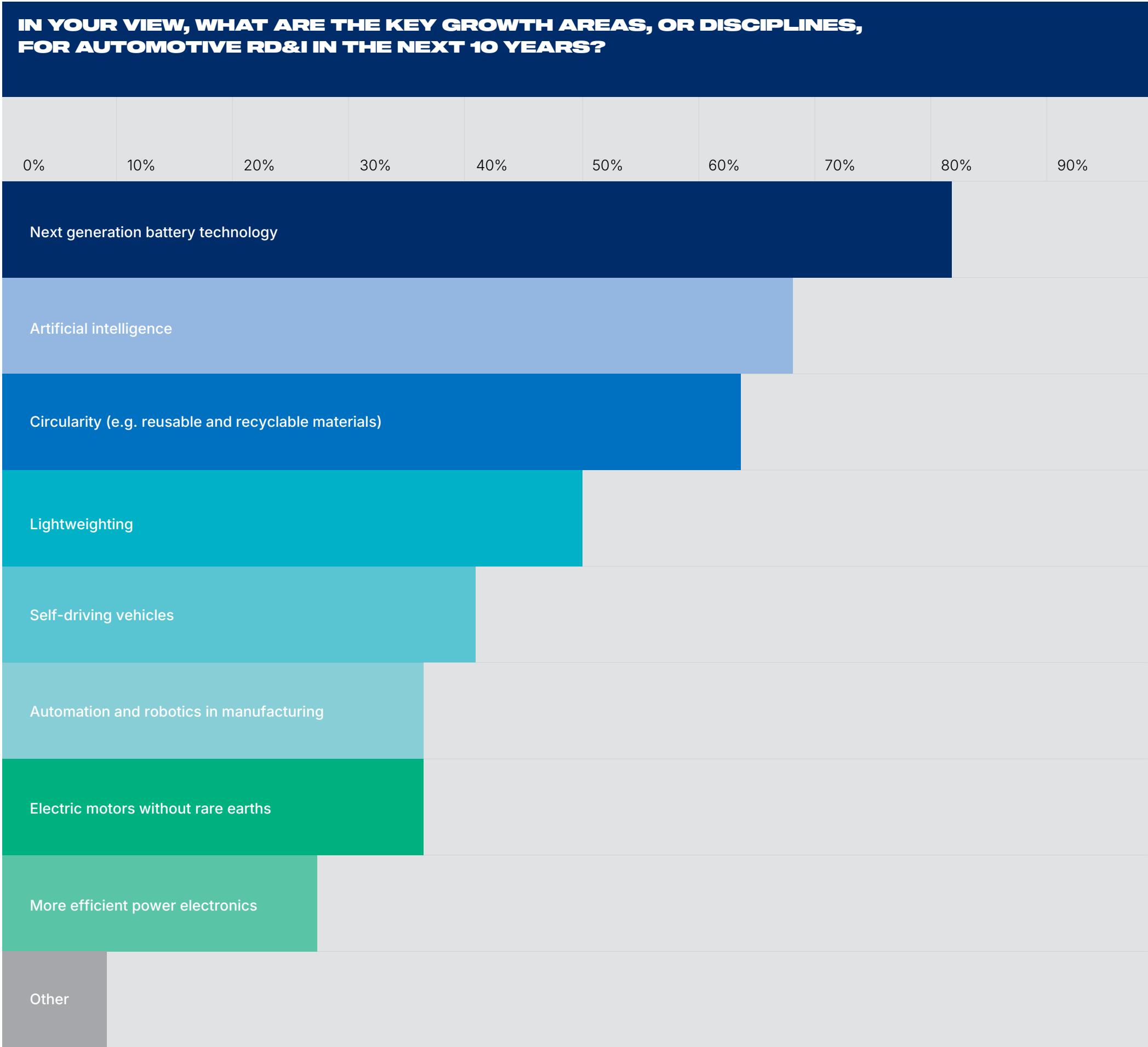


The project also enhanced supply chain capabilities, enabling the production of optimised materials and machines that meet the demands of high-rate processing and intensive duty cycles. Shared performance and sustainability goals between aerospace and automotive sectors created a unique opportunity for knowledge transfer across supply chains.

This automation solution strengthens the value proposition of in-house manufacturing, offering a cost-effective and sustainable route for composite production. It has the potential to displace heavier materials traditionally used in both sectors, positively impacting vehicle attributes and lifecycle performance.

Successful application of this technology is expected to increase productivity by 25% in automotive and 40% in aerospace, where manual validation currently contributes to higher in-process waste.

LOOKING AHEAD



Looking ahead, the sector sees next-generation battery technology (81%), artificial intelligence (68%), and circularity (64%) as key growth areas over the next decade. Other emerging priorities include lightweighting, self-driving vehicles, and automation – highlighting a forward-looking industry eager to embrace transformative technologies.

The Faraday Institution has previously stated that the UK must move quickly if it is to capitalise on the opportunity to become a world-leader in next generation battery technology development, with actions such as attracting inward investment to establish new gigafactories, strengthening and broadening the battery component manufacturing supply chain, investing in refining facilities and capabilities, and confirming long-term support for research in next generation battery technology to name a few⁰⁵. With that in mind, the £452 million investment as part of the Battery Innovation Programme in the Advanced Manufacturing Sector Plan is very welcome and must progress without delay.

A recent Advanced Propulsion Centre (APC) report highlights the areas that AI could revolutionise certain areas of the automotive sector, including enhancing productivity and efficiency to enable new business models and innovation. However, despite this enthusiasm and support for its use, the report highlights an AI-related skills gap in the sector, with the need for targeted interventions⁰⁶.

Circularity offers a strategic opportunity for UK automotive to drive economic growth, enhance supply chain resilience, and secure access to critical materials, especially in areas like EV battery lifecycle management. The government’s launch of the Circular Economy Taskforce and its upcoming strategy signal a commitment to fostering investment, job creation, and industrial development. For the UK to remain competitive, especially with the EU’s Circular Economy Action Plan already in motion, swift and ambitious action is needed to establish a clear framework that enables the automotive industry to lead in circular innovation⁰⁷.

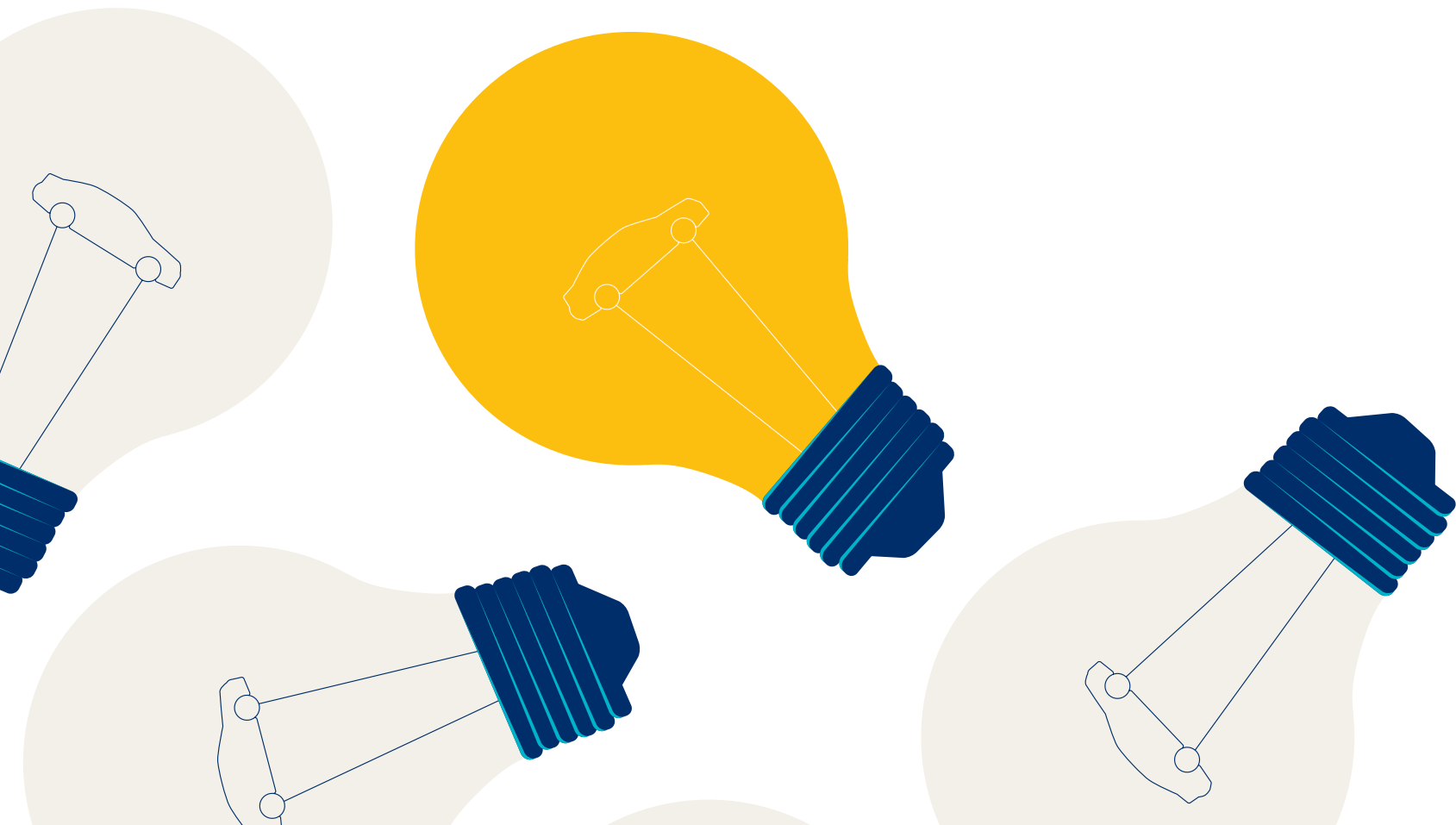
The UK government should seek association with the successor programme so as not to lose access to the large funding and business collaboration community it provides, and work with industry to identify opportunities for collaboration across the automotive and green industrial transition RD&I agenda within FP10.

05 https://www.faraday.ac.uk/wp-content/uploads/2024/09/Gigafactory-Report_2024_final17Sept2024.pdf
06 <https://www.apcuk.co.uk/wp-content/uploads/2025/10/AI-Skills-Gap-Report.pdf>
07 <https://smmweb.lon1.cdn.digitaloceanspaces.com/wp-content/uploads/2025/07/2025-SMMT-Automotive-Sustainability-Report.pdf>

CONCLUSIONS

The UK's RD&I framework has created a supportive ecosystem for innovation, however, the collective economic and geopolitical challenges of the last five years mean more must be done to supercharge the UK's investment appeal. The Industrial Strategy, with its focus on key sectors, provides the delivery framework but the UK Government needs to optimise existing fiscal incentives like R&D tax credits and Capital Allowances, and deliver long-term certainty and stability for prospective investors, while noting the long lead-in time involved in many advanced manufacturing and R&D investments.

Close collaboration between government and industry, meanwhile, is key to ensuring business competitiveness in the UK – as demonstrated by the Automotive Council and Advanced Propulsion Centre. These two initiatives provide a mutually beneficial structure that can be developed to power the UK forward as the best place to do RD&I.



RECOMMENDATIONS FOR GOVERNMENT

01 Bring down the cost of energy in the UK to attract more businesses to perform RD&I activities	02 Continue to support the RD&I ecosystem through increased support for R&D Tax Credits and government-industry collaboration	03 Support the future skills the automotive industry needs, including retraining and upskilling workers	04 Make it as easy as possible for businesses to remain in the UK and support them to traverse the 'valley of death' and move to successful commercialisation of products and services
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