ADVANCED PROPULSION CENTRE

Coventry University

Can AI Fill the Automotive Skills Gap?

A Needs Assessment of the UK Automotive Industry

Document Version:
Overview Report

March 2025

FOREWORD

In today's fast-paced innovation landscape, it is more important than ever for universities to play a responsive and enabling role in addressing real-world challenges. This short research project, commissioned by the Advanced Propulsion Centre UK (APC), exemplifies the agility with which academic institutions can support industry by providing timely, targeted, and impactful insights.

The focus of this rapid-turnaround study; "Can AI fill the Automotive Skills Gaps? A Needs Assessment of the UK Automotive Industry", reflects the urgency and complexity of the workforce challenges facing the UK's automotive sector. As technologies evolve and AI becomes increasingly embedded across business functions and production systems, skills and capabilities that are required to adapt, lead, and innovate, are shifting just as quickly.

This project has provided a valuable opportunity to engage directly with industry experts, stakeholders, and practitioners to identify critical skills gaps, workforce perceptions, and future planning requirements. It has also explored the broader barriers facing AI adoption in industry, and highlighted the vital role that continuous professional development, training and policy guidance, must play to support transformation across the sector.

Universities have a unique role to play in this ecosystem, not only through education and research, but as facilitators of industry collaboration and policy dialogue. At Coventry University, we are committed to conducting research that is both applied, and responsive, to bridge the gap between insight and implementation.

Professor Richard Dashwood

Vice-Provost Research and Enterprise |
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FOREWORD

This report, “Can AI fill the Automotive Skills Gaps? A Needs Assessment of the UK Automotive Industry,” offers timely and critical insights into how artificial intelligence might help address the persistent and evolving skills challenges facing the UK automotive sector.

Produced by a research team at Coventry University, the study draws on a rich combination of interviews, workshop engagements, and workforce surveys. It presents a nuanced assessment of the sector’s most pressing needs and barriers in recruiting, training, and up-skilling workers to meet the demands of an industry undergoing rapid technological transformation. In addition to mapping current skills challenges, the report explores how AI is currently being used in the industry and how it is perceived by employers and practitioners. Importantly, it highlights the need for stronger collaboration between universities and industry partners to bridge critical gaps in digital literacy, foundational capabilities, and confidence around emerging technologies. These are essential if AI is to be effectively and ethically deployed to support workforce development.

As AI continues to reshape the nature of work, this report asks not only whether it can help solve skills shortages, but also whether it should, and under what conditions. Its insights are especially valuable for policymakers, educators, employers, and technology leaders seeking sustainable and inclusive responses to labour market pressures.

I commend the research team for their thoughtful, methodical approach. I hope this report will contribute to ongoing conversations, and most importantly, action, on one of the defining challenges facing our sector and society today.

Professor Elena Guara

Associate Pro-Vice Chancellor Research |

Professor of Pervasive Computing |

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EXECUTIVE SUMMARY

This report addresses the UK's automotive sector widening skills gap.

As this industry advances towards smarter, greener, and more connected mobility, Artificial Intelligence (AI) is rapidly becoming fundamental to innovation. However, the pace of AI development and sectorial permeation has also led to widespread misunderstandings about what AI truly offers, in particular, AI's role in enabling new business models, reshaping workforce needs, and driving transformation is often under- explored or misinterpreted.This insight paper, developed as part of the Advanced Propulsion Centre UK (APC) Insights programme, intends to provide some clarity and bring to bear evidence on the perceived state of play for the skills gap at a critical time. It is hoped that the research conducted and reported here will guide future conversations and encourage stronger collaboration between industry and academia. The urgency is real: without action, the UK risks falling behind in a globally competitive, fast-moving market.

This report set out to:

- identify the most pressing skills gaps in the UK's automotive workforce and explore how AI and digital technologies can be harnessed to help address and close these gaps.
- map the barriers, perceptions, and needs that shape industry uptake of AI and emerging technologies.
- provide a data-driven foundation for future skills development strategy.
- highlight the emerging digital capabilities required to secure the sector's future.
- offer practical, collaborative recommendations to inform action and investment.

A key theme emerging from this research is the need to align educational programmes with real-world industry needs, especially in areas like AI, automation, and electrification. These technologies are reshaping the automotive landscape and demand for digitally literate, agile, and cross-skilled talent has never been higher. But it's not just future graduates who need support.

The research also highlights the need for mid-career up-skilling and continuous professional development, enabling today's workforce to keep pace with rapid technological change. Many organisations also reported barriers to AI adoption, including uncertainty around use cases, implementation costs, and workforce readiness. These perceptions must be addressed through clearer communication, tailored training, and shared success stories, especially for SMEs navigating complex transitions.

Equally, the skills of the future won't be purely technical. Success in this next phase of innovation will require hybrid knowledge, blending engineering with digital fluency, AI ethics, data analysis, and systems thinking. That's why interdisciplinary learning models will be vital for future-proofing the workforce. This report also surfaces strong appetite for a coordinated, national task-force, uniting academia, industry, and government: To align industrial needs, education reform, and policy development in a more structured and sustained way.

We extend our sincere appreciation to the many leaders, experts, and professionals from across the UK automotive ecosystem who contributed to this research. Your input has been invaluable, and your willingness to collaborate across boundaries is a clear signal of what's possible when we work together.

We encourage all stakeholders to engage with the insights presented in this report, take decisive action, and play an active role in building a robust, future-ready UK automotive workforce.

Deepak Farmah

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INTRODUCTION

The UK automotive industry is at a pivotal moment, facing significant challenges and opportunities as it navigates the integration of Artificial Intelligence (AI) and other emerging technologies.

This overview report, created to accompany the full "Can AI Fill the Automotive Skills Gap?" report, provides a condensed summary of the key insights and recommendations derived from extensive research, industry conversations, and stakeholder engagements. The aim is to offer clear and actionable recommendations for addressing the skills gaps that threaten the sector's competitiveness and innovation potential.

As the automotive sector advances towards smarter, greener, and more connected mobility solutions, the role of AI has become increasingly central. However, the rapid pace of technological change has also led to widespread misunderstandings about AI's capabilities and its implications for the workforce. This report seeks to clarify these issues by presenting insights and practical recommendations that can guide industry leaders, policymakers, and educators in their efforts to build a future-ready workforce.

The research underpinning this report was conducted by a dedicated team at Coventry University, commissioned by the Advanced Propulsion Centre (APC). It involved a rich combination of interviews, workshops, and surveys with industry professionals, capturing a wide range of perspectives on the current and future skills needs of the UK automotive sector. The findings highlight the urgent need for stronger collaboration between industry and academia, targeted training and development programs, and a supportive policy environment that fosters innovation and resilience.

In addition to mapping the most pressing skills gaps, the report explores the broader barriers to AI adoption, including issues related to digital literacy, infrastructure, and workforce readiness. It also emphasises the importance of diversity and inclusivity in driving innovation and adaptability.

By addressing these challenges head-on, the UK automotive industry can position itself at the forefront of global technological advancements, ensuring long-term sustainability and growth.

1. METHODOLOGY

In addition to reviewing available literature, this overview and the full report are informed by three methods of primary data collection.

An overview of these methods is presented here, with more detail available in the full report.

DCA-1: SEMI-STRUCTURED INTERVIEWS - INDUSTRY STAKEHOLDERS

One-to-one interview consisting of 20 questions grouped into sections: ‘own industry/ education experience’, ‘existing and future industry skills and workforce needs’, ‘barriers/ challenge factors’, ‘risks/threats to industry’ and ‘recommendations’.

Questionnaire design guided from applied user research methods, including the Needs Assessment Model [1], to identify core areas of need and barriers for future intervention planning activities.

13 professionals were interviewed to capture in-depth insights of industry needs. Professionals were identified for suitability via discussions with organisations/ network leaders. Those identified were invited to interview via email invite. Interview criteria included Seniority-in-role, time-in-industry, role-in-sector, leadership responsibilities and discipline area.

DCA-2: INDUSTRY STAKEHOLDER - STEERING GROUP WORKSHOP

Stakeholders reviewed early findings and took part in two priority mapping exercises, guided by the Needs Assessment Model [1]**.** Stakeholders took part in two activities during the workshop.

The first activity consisted of stakeholders reviewing early themes from DCA-1 and were tasked to prioritise skills. The second activity consisted of an AI overview, after which, stakeholder were asked to map opportunities for AI use against the skills identified in the first-half of the workshop.

10 x stakeholder participants attended the steering group workshop.

Stakeholders included professionals that were interviewed in DCA-1 and new invitees. Professionals invited to interview in DCA-1, were invited to take part in the stakeholder workshop. New invitees were identified following criteria used in DCA-1 and were invited via email.

DCA-3: WIDER INDUSTRY WORKFORCE ONLINE SURVEY

A survey to capture wider data of workforce behavioural and learning insights of perception, acceptance, current use of, and future fore-sighting of AI skills and capabilities in the automotive industry was created and distributed openly.

Survey design guided from the Technology Acceptance Model (TAM) [2], to indicate barriers, measures and objectives to inform future planning of behaviour change and/ or learning development interventions.

21 responses to online survey from automotive industry workforce. An open invitation to industry to take part in the survey was cascaded via social media channels (*LinkedIn* and *Lemmy*), stakeholder email invitation to share with their own networks and distributed across internal and external network channels relevant to the automotive industry.

2. KEY INSIGHTS

Here, we present some of our findings and observations gathered from our study on AI and other emerging technology and their impact on the skills gaps within the UK automotive industry. This section synthesises the diverse perspectives and data collected from industry experts, stakeholders, and practitioners, providing an understanding of the current landscape and future needs

Our research highlights the broad potential for AI to revolutionise various aspects of the automotive sector, from enhancing productivity and efficiency to enabling new business models and innovation. However, it also underscores a significant gap in AI-related skills and confidence among the workforce.

The insights gathered reveal a strong demand for targeted training and development programs that can equip employees with the necessary skills to leverage AI technologies effectively. Additionally, the need for collaboration between industry, academia, and government is emphasised as a crucial factor in bridging these gaps and fostering a more AI-ready workforce.

Furthermore, the section explores the broader capabilities required to support AI integration, beyond just technical skills. It addresses the importance of infrastructure, strategy, policy, and compliance in creating an environment conducive to AI adoption.

The insights also point to a desire for greater diversity and inclusivity within the industry, recognising that a varied talent pool can drive innovation and resilience. By presenting these key insights, we aim to inform and inspire stakeholders to take decisive action towards building a robust, future-ready automotive workforce.

A more comprehensive review of these insights, as well as the data from which they are drawn, is available in the full report.

AUTOMOTIVE COMMUNITY INPUT

The report gathers information from a range of sources, with primary data coming from the people in the UK Automotive industry through interviews, survey responses and stakeholder workshops. A variety of people donated their expertise and time, from people who have been in the industry for just a few years, to those with over a decade of experience.

Their exposure and confidence in AI was also varied, with some having very little experience to those that work daily with AI or create AI-powered tools.

INDUSTRY ATTITUDE TO AI

Most people in the sector expressed a positive attitude to AI, with only a small percentage having any negative views and none very strongly.

At the same time, most believe both that their organisation needs to do more R&D around AI and particularly to invest more in training.

BROAD POTENTIAL FOR AI, BUT LACK OF EXPERIENCE AND CONFIDENCE

The range of potential applications for AI in the automotive industry is broad, from supporting transferrable skills and productivity to greatly increasing the speed of complex simulations.

During interviews and the stakeholder workshop, it was clear that the majority of participants focused on generative AI and often tools that give conversational interfaces to LLMs such as ChatGPT, Copilot or Gemini. This is unsurprising since most people also felt they were at most “somewhat confident”, with only a few saying they are “confident”, suggesting that the current applications of AI in the industry are each unique and not widely discussed in detail.

It may also be a driver for the desire for training and development on AI for the automotive industry specifically and hands-on practical work as the preferred method of training.

INDUSTRY DEMAND FOR AI SKILLS IS LACKING DETAIL

In survey and interview data, as well as in discussion with key stakeholders, the need for developing AI skills was regularly stated, as was the need for increased spending on AI skill development. The skills themselves were much more difficult to pin down.

Some highlight the broader surrounding topics of security, infrastructure and so on, but very few discussed the kinds of AI, the data science required or the development skills needed to go beyond using general-purpose LLMs.

When focusing on specific roles, however, participants were able to identify what problems they would like solved and with some support, could identify the broad categories of AI that might be appropriate.

A better understanding of what skills enable which AI capabilities is needed, and methods for supporting industry to gain this understanding are discussed in in the full report.

ENABLING AI AND BROADER CAPABILITIES

Whilst detail on the specifics of AI skills was low, an understanding of the broader requirements and capabilities was mostly absent. Participants generally did not identify the need for capabilities in roles other than those technical roles they expected to make use of AI.

This includes capabilities in infrastructure, strategy, policy and compliance, data protection, procurement, risk management and so on, all of which have significant impact on an organisation's ability to exploit the opportunities afforded by AI.

A DESIRE TO COLLABORATE

Participant's highlighted the need to collaborate. There was an understanding that the ongoing transformations in the industry were complex and overlapping.

Digital transformation, a transition away from internal combustion and now a rapid push toward AI mean that the skills gap is not just about difficulty

employing people with the right skills mix, but also about how leadership develop strategy and balance innovation while mitigating risk.

In the face of the difficulty, the sector is remaining positive and looking to work together, as well as with academia and government to look for new and exciting opportunities.

AN INDUSTRY PUSH FOR ENTHUSIASM AND DIVERSITY

Discussions with participants from the automotive industry during the study, regularly turned to broadening the routes into the sector and increasing the diversity of the people within it.

Ideas for how this might come about included enthusing young people and showing them the exciting modern automotive industry, making it welcoming and rethinking the routes into the industry.

The typical education route for people in the industry is through traditional undergraduate and postgraduate courses. Many believe there is a need to widen those routes to encourage more people to join, including supporting people who could transition from other sectors.

It was also suggested that a collaborative effort was needed to rethink the way that STEM is taught to encourage more people to consider the industry as a career and to consider industry-relevant qualifications at Further and Higher Education levels.

3. REFLECTIONS ON SKILLS INTERVENTIONS

During the research that forms the basis of this report, a range of potential actions to support closing the skills gap in the UK automotive sector have been identified. These are collated in *Section 5: Further Recommendations.*

In this section, two reflections on the skills gap are presented in more detail. These are both related to how skills are defined, understood and communicated and the suggested interventions are complex, requiring sector-wide involvement, but we believe they are important activities not just for closing the immediate skills gap, but for supporting the sector in more fundamental understanding of skills requirements and ensuring long-term improvements in how skills gaps are identified and closed.

INTERVENTION 1: CROSS-DOMAIN SKILLS FRAMEWORKS

Skill frameworks exist in many forms, from high-level descriptions and rules-of-thumb like *Bloom's Taxonomy* [3] and fundamental specifications of language such as the *Electric Revolution Skills Hub* 'Body of Knowledge' [4], to detailed sector-specific specifications of capability, such as the *Electrification Skills Network Framework* or broad taxonomies such as the *IfATE occupational maps* [5]. These frameworks are essential for promoting common language, sharing understanding and allowing collaboration. Typically deal with domain-specific skills, capabilities and knowledge, reflecting the focus of the people that worked to create them. This focus does mean they are less useful when examining cross-domain skills. Some have incorporated transferrable skills and qualities, but technical skills that come from outside of the domain are usually less well represented. AI and, more generally, digital skills fall into this category.

Looking specifically at AI skills, we can identify skills frameworks that deal with them very explicitly and in depth. Some, such as the *Skills For an Information Age (SFIA) Framework* [6], take into account the breadth of digital skills.

Others, such as the *Alan Turing Institute's AI Skills for Business Competency Framework* [7] focus on AI and the different groups of people that interact with it. Both are useful and are used extensively in digital sectors. These two sets of frameworks rarely overlap.

In the UK automotive sector, there is a both a need and desire to adopt AI and advanced digital tools, but a shortage of understanding, skill and confidence. In our workshop and discussions with stakeholders, we found that people are unsure of what is required to exploit the potential of AI even if they are generally positive about the prospect.

In the full report, we give an overview of both *SFIA* [6] and the *AI Skills for Business Competency Framework* [7] before demonstrating how industry could start the work of integrating skills frameworks from outside of the automotive sector in order to apply the same kind of coordination, formalisation and rigour that they would for domain-specific skills.

An example mapping from skills required for the role of ADAS Engineer to become AI enabled, to the role-specific and organisation-wide digital skills is given here as an example.

AI Uses	Skills Required in the role	Skills required to enable
Writing interface code can be supported by AI	Working with AI tools and prompt engineering	Managing AI service procurement
Writing AI enabled systems	Use of AI as a service	Managing AI service procurement
	Using APIs and external services	Enterprise software infrastructures
No-code prototyping	Prompt engineering	Software quality control
AI written code for non-critical systems	Prompt engineering	Software quality control
AI+RAG to query technical documentation		Managing RAG systems
		Cybersecurity and AI
Models trained to map inputs to output may prove to be a more general method and have easier to define bounds than hand-crafting solutions	AI model training	High performance computing
AI supported interpretation of specification	Prompt engineering	Managing AI service procurement
		Fine tuning
AI verification	Prompt engineering	Managing AI service procurement
		Fine tuning
AI+RAG to query technical documentation	Prompt engineering	Managing RAG systems
AI supported interpretation of standards	Prompt engineering	Managing AI service procurement
		Fine tuning
AI validation	Prompt engineering	Managing AI service procurement
		Fine tuning

Table 1 Mapping Cross-Domain AI Skills To Industry Roles [ADAS].

INTERVENTION 2: CLEAR LANGUAGE, COMMUNICATION & USER EXPERIENCE ASSESSMENT TOOL

Throughout our discussions with industry members, the problems of language and communication around skills have arisen repeatedly.

Sometimes these issues were explicitly raised by stakeholders, whilst at other times they become apparent as people struggle to define what they mean or use different language to discuss the same concepts.

We present a method for measuring the clarity and utility of language used to describe required skills, enumerate learning outcomes, and clearly communicate requirements.

This measurement tool serves as an early example of how user experience methods can address persistent challenges in language, terminology, and communication across the automotive skills ecosystem. The idea for this tool emerged during thematic analysis of interview data, where a core challenge theme on collective language was repeatedly identified.

Reflections from the industry have highlighted significant issues surrounding inconsistent use and lack of collective understanding of terminology, language, and communication used to classify or describe the skills ecosystem.

This includes standardised descriptions of roles, qualification and role levels, context of role duties and skills requirements, and synchronised descriptors of learning outcomes to inform educational providers accurately.

The measures of the tool are presented below, with detailed application provided in the full report.

Measure	Code	Question	1	2	3	4
Perceived Clarity of Language	PCL	How easy is it to understand the terms, acronyms or titles being used?	Very Unclear	Somewhat Clear	Mostly Clear	Very Clear
Perceived Usefulness of Terminology	PUT	How well do the terms and role descriptions help you understand the nature of the work or skill requirements?	Very Unclear	Somewhat Clear	Mostly Clear	Very Clear
Cross-Sector Transferability Index	CTI	How easily can someone from another sector understand or map their skills to this role/ learning offer?	Very Unclear	Somewhat Clear	Mostly Clearl	Very Clear
Qualification Transparency Score	QTS	How clearly are qualification levels or routes explained and contextualised?	Very Unclear	Somewhat Unclear	Mostly Clear	Very Unclear
Ease of Access to Learning & Training	EALT	How easy is it to find, access, and understand training or educational pathways related to this role or skill?	Very Unclear	Somewhat Unclear	Mostly Clear	Very Clear

Table 2 *'CLEAR' (Communication, Language, Education, Accessibility and Role clarity) User Experience (UX) Tool.*

4. KEY THEMES: INDUSTRY NEEDS, CHALLENGES AND SOLUTIONS PLANNING

This section provides the thematic synthesis of data collected from key stakeholders, to understand the core needs, barriers and challenges facing the automotive industry.

This section is structured around three high-level assessment criteria areas:

1. Skills and Workforce Needs
2. Barriers and Challenges
3. Risks and Threats to Industry

We present the high-level analysis here, with a detailed breakdown in the full report along with expanded analysis of the problems expressed by industry participants.

SKILLS AND WORKFORCE NEEDS

THEME 1: ENGINEERING AND TECHNICAL SPECIALISTS

Participant's flagged acute shortages in mechanical, electrical, power electronics, battery, and high-voltage engineers. These are foundational skill areas to the industry as indicated by the participants, without which, concerns of product development and maintenance pipelines stalling.

There were secondary concerns around the current dependency on a retiring workforce, and the current focus on international recruitment to meet immediate organisation needs.

THEME 2: SOFTWARE, AI, AND EMBEDDED SYSTEMS

As vehicles and infrastructure become increasingly software-defined, the demand for software engineers with embedded systems experience has outpaced supply.

Participants indicated that there were needs across nearly all sectors, emphasising a chronic shortage of engineers in general, but pointed to an urgent need for skilled workers and skills development in the mechanical, electrical, and power electronics disciplines. These are not emerging fields, but foundational roles essential for product development, prototyping, and quality assurance.

Participants who had leadership, recruitment and/ or workforce training responsibilities, reported having to "compromise" when hiring, due to the lack of UK-trained engineers. Other participants were forced to internally train staff or rely on a shrinking pool of experienced mid-career professionals.

This issue was felt to be particularly acute, in areas such as battery systems and high-voltage safety engineering, where skills are both rare and critical to the UK's EV transition.

THEME 3: DIGITAL LITERACY AND BASIC CAPABILITIES

Participants noted widespread gaps in digital literacy, from basic computer use and programming logic to understanding how data flows through systems. Even skilled workers lack fluency in digital tools.

Beyond high-level technical expertise, participants pointed out that digital literacy, even at a basic level, is unevenly distributed across the workforce. Many employees are uncomfortable with spreadsheets, data dashboards, or simple coding logic, and this poses barriers to up-skilling.
Employers stressed that without foundational digital confidence, workers struggle to engage with digital twins, remote diagnostics, or even workflow tracking systems.

This issue is especially concerning for front-line workers and apprentices who are expected to operate in increasingly digitised environments.

THEME 4: PROBLEM SOLVING, CRITICAL ANALYSIS & INTERDISCIPLINARY THINKING SKILLS

A complexity of modern manufacturing, where mechanical, software, and electronic systems converge, demands workers who can think across traditional disciplinary boundaries.

Several participants spoke of needing “system integrators” or “hybrid engineers” capable of navigating between different domains, understanding interdependencies, and troubleshooting emergent system behaviours.

There was also a strong demand for workers who can solve real-world problems, integrate knowledge across disciplines (e.g., software and safety), and apply systems thinking or ‘bigger picture’ processes to their planning activities.

Participants overwhelmingly indicated that they found these competencies to be missing in many graduates and new hires coming through to industry and expressed that this was linked to larger industry and education systems of ‘siloed’ or ‘‘single-discipline’ thinking with very few structured and practice-based opportunities to learn about broader interdisciplinary challenges to practice analytical reasoning with complex real-world systems.

BARRIERS AND CHALLENGES

THEME 1: MISALIGNMENT BETWEEN EDUCATION AND INDUSTRY

One of the most consistently mentioned challenges was the outdated or mismatched nature of many academic and vocational programs. Participants shared that graduates often lack familiarity with tools used in industry (e.g., MATLAB, simulation software, battery management systems), and that many training courses are too theoretical or disconnected from real product development cycles.

Employers find themselves having to “retrain” new hires, which delays productivity and undermines trust in formal qualifications.

THEME 2: LACK OF STANDARDISATION IN INDUSTRY LANGUAGE, FRAMEWORKS & TERMINOLOGY

Participants voiced frustration at the inconsistent way qualifications, job roles, and digital competencies are described. For instance, a “Level 7” qualification could refer to vastly different types of training depending on the provider, and terms like “electrification” or “engineer” are used differently across regions and sectors.

This confusion affects learners, employers, and educators alike, leading to miscommunication, recruitment mismatches, and a lack of shared national direction on workforce planning.

THEME 3: FOUNDATION LITERACY AND NUMERACY SKILL BARRIERS

Several employers noted that new apprentices often struggle with reading technical manuals, writing clear documentation, or understanding basic algebra required for diagnostics and calibration.

These basic gaps not only slow down training but also limit how far an employee can progress in increasingly technical environments.

THEME 4: FOUNDATION LITERACY AND NUMERACY SKILL BARRIERS

Whilst some training exists, participants reported that much of it is delivered in inflexible formats, such as week-long classroom sessions, which don’t align with how people learn on the job.

Instead, participants called for modular, “just-in-time” training that can be delivered through micro-learning, simulation environments, or Alternate Reality (AR) / Virtual Reality (VR) environments.

Additionally, the sheer number of uncoordinated training options overwhelms many learners, who need better guidance and curation.

RISKS AND THREATS TO INDUSTRY

THEME 1: LOSS OF UK INDUSTRY INNOVATION AND MARKET SHARE

Skills shortages in AI, battery systems, and integration will limit the UK's ability to lead in emerging technologies and compete internationally.

Participants warned that If the UK cannot supply the skills needed to compete in electrification, autonomy, AI, and integrated vehicle systems, global leadership will be lost to better-prepared countries.

Several participants expressed fears that opportunities to scale innovative start-ups or secure major OEM contracts are being lost due to skills shortages, not lack of ambition or infrastructure.

THEME 2: OVER-RELIANCE ON OVERSEAS TALENT AND OFFSHORING

Participants reported that they were having to rely on international recruitment to fill both entry-level and specialist roles, particularly in software, AI modelling and electrical systems disciplines.

While this has enabled continuity, it poses risks in terms of long-term knowledge transfer, regulatory friction, and cost control. Participants highlighted that growing visa restrictions and global competition for digital talent may soon make this strategy unsustainable.

Additionally, it was noted by a number of participants about secondary effects felt from a global push to integrate AI and automation into all sectors and disciplines to change operations, production and management tasks. International talent, who would have traditionally chosen an engineering career or education pathway, are now being attracted to pathways where AI is their focused discipline.

It was reported that this is now already starting to affect the offshoring recruitment strategy, with more less people choosing to pursue a career in engineering over the excitement and perceived future needs for skilled AI workers.

THEME 3: STRUCTURAL INERTIA AND INDUSTRY POLICY GAPS

Participants expressed a clear need for coordinated national action, but described current policy efforts as reactive and fragmented. Fore-sighting reports are often unreadable to SMEs, and funding mechanisms are too slow or too narrow to address emergent needs.

Participants expressed the need for proactive, systems-level policy thinking to align industry transformation with workforce development.

5. FURTHER RECOMMENDATIONS

Here we present our recommendations and collated suggestions gathered from extensive research, conversations, and interviews with industry members, as well as the results the survey.

This section aims to provide direction for actionable strategies to address the skills gaps identified within the UK automotive sector, particularly in relation to the integration of AI and digital technologies.

By drawing on the collective expertise and experiences of stakeholders, we present a set of recommendations designed to foster collaboration, enhance workforce capabilities, and support the sector's ongoing transformation.

Our recommendations are rooted in the understanding that effective AI adoption requires more than just technical proficiency; it necessitates a holistic approach that includes infrastructure development, strategic planning, and policy alignment.

The insights from industry leaders highlight the importance of continuous professional development, tailored training programs, and a supportive ecosystem that encourages innovation and resilience. Additionally, the need for greater diversity and inclusivity within the workforce is emphasised, recognising that a varied talent pool can drive creativity and adaptability in the face of rapid technological change.

The collaborative efforts between academia, industry, and government will be crucial in ensuring that the sector remains competitive and future-ready.

COLLABORATION

The integration of Artificial Intelligence into the automotive sector presents both significant opportunities and challenges, particularly regarding workforce skills. As highlighted by Skills England [8] and echoed in sector-specific analyses [9], a collaborative approach involving industry, academia, and skills developers is essential to navigate this complex landscape. A report from Ennis & Co [10] highlights collaboration between the sector and

academia as essential to ensuring teaching is in line with industry needs, but also innovation and knowledge transfer are to be encouraged.

Participants in this study discussed collaboration between members of the industry, around AI skills, more often than any other recommendation, with collaboration with academia and government also regularly discussed. In collaboration with academia, the hope is that as well as promoting knowledge transfer and increased research capability in the sector, it will also lead to a closer match between curricula and industry needs.

The nature of the collaboration with government that is recommended takes on a variety of forms, from giving government a better understanding of the sector to having more influence, as a sector on subjects such as investment and apprenticeship levy flexibility and cap.

ENSURE SENIOR LEADERS ARE AWARE OF THE POTENTIAL FOR AI AND PLAN FOR SKILLS ADOPTION

Senior leadership within automotive organisations must prioritise understanding the transformative potential of AI. This necessitates proactive planning for skills adoption through targeted training, comprehensive education programs, and strategic recruitment initiatives. Skills England suggests [8] that leaders should engage in continuous learning to stay abreast of AI advancements and their implications for workforce development, and part of their remit is to support this activity, one which is supported by other expert analysis.

This includes developing strategic roadmaps for integrating AI skills into existing roles and creating new roles that leverage AI capabilities.

INVEST IN SKILLS, MAKING USE OF THE LEVY AND SECTOR-SPECIFIC INITIATIVES

Significant investment in skills development is crucial. This includes effectively utilising the apprenticeship levy [11] and leveraging specialised initiatives such as the *Electric Revolution Skills Hub* and the *Electrification Skills Network*. These programs should focus on developing skills related to AI implementation, data analytics, software development, and advanced manufacturing processes.

The automotive sector should proactively seek out and support initiatives that provide targeted training and education in emerging AI technologies.

Government investment in skills should be encouraged and taken advantage of when available [12].

MONITOR AND LEARN FROM OTHER SECTORS REGARDING AI'S IMPACT ON JOB ROLES

The automotive sector must adopt a proactive approach to monitoring and learning from other industries that are further along in AI adoption.

This includes analysing how AI is reshaping job roles, identifying emerging skill demands, and understanding best practices for workforce adaptation.

By staying informed about AI's impact across diverse sectors, the automotive industry can anticipate future skill requirements and develop targeted training programs to address them.

INVEST IN HANDS-ON, WORKPLACE-RELEVANT TRAINING AND DEVELOPMENT PROGRAMS

Investing in training and development programs that emphasise hands-on, workplace-relevant experience is essential [13]. These programs should equip workers with the practical skills needed to effectively utilise new AI-driven technologies. While such training is already a sector priority [9], it must be intensified to facilitate up-skilling and re-skilling as AI automates tasks previously performed by humans [14]. The focus should be on extending the capabilities of existing workers and supporting them in evolving roles, recognising that a complete AI replacement for many positions is still a long-term prospect.

Workshop participants generally did not comment on the quality of current training provision, with only one participant stating that they think it needs to be improved.

PRIORITISE DIGITAL SKILLS DEVELOPMENT ACROSS THE WORKFORCE

A general increase in demand for both basic and advanced digital skills is anticipated across all sectors, including automotive [8]. This necessitates a comprehensive strategy to enhance digital literacy throughout the workforce. Training programs should encompass fundamental digital skills, such as data management and software proficiency, as well as advanced skills in areas like AI programming, data analysis, and cybersecurity.

PROMOTE TRANSVERSAL SKILLS ALONGSIDE TECHNICAL PROFICIENCY

Transversal skills, such as critical thinking, problem-solving, self-management, and communication, are becoming increasingly vital in the age of AI. Interviews, workshops, and surveys conducted for this report confirm the high demand and scarcity of these skills within the automotive sector.

These "soft skills" enable workers to adapt to evolving work environments, collaborate effectively, and make informed decisions in AI-driven contexts.

IMPLEMENT LIFELONG LEARNING AND TRAINING INITIATIVES

To mitigate the evolving nature of work, the automotive sector must implement robust lifelong learning and training initiatives. These programs should encourage continuous professional development, foster a culture of adaptability, and motivate workers to embrace new technologies and methodologies.

This proactive approach ensures that the workforce remains agile and responsive to changing business needs.

SUPPORT WORKERS THROUGH THE CHANGE PROCESS

The transition to an AI-integrated automotive sector requires comprehensive support for workers. This includes providing accessible training and development opportunities, fostering open communication about AI's impact, and addressing concerns about job displacement [11,13]. By promoting a positive attitude and mental model towards AI, the sector can facilitate a smoother transition and empower workers to embrace the opportunities presented by this technological shift. Two interview participants discussed the need for platforms that could provide the right kind of development opportunities and skills mapping.

PROMOTE POSITIVE PERCEPTIONS OF AUTOMOTIVE CAREERS

To attract new talent and address future skills gaps, the automotive sector must actively promote positive perceptions of careers within the industry [9]. This involves highlighting the innovative and technologically advanced nature of modern automotive roles, showcasing the opportunities for professional growth, and emphasising the sector's contribution to sustainable mobility.

By fostering a compelling and forward-looking image, the industry can attract a diverse pool of skilled workers. The growing digitalisation of the sector should be highlighted to younger audiences that may be enthused by the modern technology and their potential place in an evolving sector [10].

Interview participants strongly believed that enthusing younger people is essential, with many promoting earlier introduction of STEM and an update to STEM curricula in order to better represent the modern automotive industry and how it applies.

Parental enthusiasm was also raised as a potential factor, as was improving typical remuneration packages for the sector, but only by one participant in each case.

BROADENING ACCESS TO WORK AND EDUCATION

This topic was raised by interview participants in a number of ways. Diversity of gender and neurodiversity were discussed explicitly as a need in order to have the range of viewpoints required, as well as ensure sufficient entrants to the workforce.

In addition, routes through education were discussed, from changing fee structures for critically required expertise to promoting later entrants and those with the “tinkerer” mindset that might have found academic study difficult to engage with, but excel with practical problems or arrive later to the field.

BUILD AWARENESS OF POTENTIAL DISRUPTION TO INDUSTRY

Through our workshop, we discovered many industry experts are only aware of small areas of the potential impact of AI in the sector. Some have good understanding of possibilities for innovation or efficiency improvements, but usually only in narrow areas. Some are aware of missing skills in their organisation, but few said they were confident that they had an exhaustive list of those skills.

Aside from the training and development impact of this issue of shortened horizons, it also suggests there are significant risks for organisations in the sector around disruption. Looking at other sectors that have undergone rapid digitalisation, we can see some examples of how such disruption can displace existing organisations and allow technology-first companies to move in.

The well-known examples of Uber moving in and dominating the taxi sector, Airbnb moving in and dominating the hotel booking industry and so on are applicable here. [10] reports automotive OEMs becoming technology companies first, manufacturing second, which Impacts their approach to skills and their recruitment, which is an indicator that the sector may be susceptible to such disruption in its supply chain.

The recommendation for building this awareness is to ensure it is considered alongside the other recommendations. That is, to foreground the issue and make it part of the discussion in the collaboration between organisations, part of the recommended digital skills training focus and particularly part of building awareness in senior management.

CONTINUED FOCUS ON SKILLS FRAMEWORKS

As discussed in *Section 3: Reflections on Skills Interventions*, there are good existing frameworks for AI and digital skills, but they are not contextualised for the automotive sector.

During interviews and workshop discussions, it has been clear that many members of the sector are aware of some of the ways in which AI can support businesses in general, but few are as clear on how it can support the domain-specific aspects of their sector. More detail on skills frameworks is given in the full report.

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ACKNOWLEDGEMENTS

The project team at Coventry University would like to extend its gratitude to the many industry leaders, experts, and professionals who have contributed their valuable time and expertise to the research findings that are presented.

These insights and experiences have been invaluable in helping the team to identify key insights, opportunities, challenges and raise awareness of potential risk areas relating to AI and emerging technologies perceptions, use and future skills needs for the UK's automotive industry.

The research team would like to extend a special thank you to:

Arman Kevric,
Wendy Garner
Craig Suttle
Jörn Behrenroth
Jay Al Taye
Mostafizur Rahmen
Richard Lidstone
Steven Pierson
Paul Whiteside
Kenneth Clarke
LaRaine Foden
Christopher Blow
James Tallentire
Mandeep Sandhu
Ali Danisman
Marilyn Skyers
Lynda Ennis

A special thank you to the following organisations:

ADVANCED PROPULSION CENTRE UK

The Advanced Propulsion Centre UK (APC) collaborates with UK government, the automotive industry and academia to accelerate the industrialisation of technologies that support the transition to zero-emission vehicles and towards a net-zero automotive supply chain in the UK.

Established in 2013, the APC, with the backing of the UK Government's Department for Business and Trade (DBT), has facilitated funding for 302 low-carbon and zero-emission projects involving 529 partners. Working with companies of all sizes, this funding is estimated to have helped create or safeguard over 59,000 jobs in the UK. The technologies and products that result from these projects are projected to save over 425 million tonnes of CO2.

With deep sector expertise and cutting-edge knowledge of new propulsion technologies, the APC's role in building and advising project consortia helps projects start more quickly and deliver increased value, accelerating new technologies to market. The APC works to drive innovation and encourage collaboration, building the foundations for a successful and sustainable UK automotive industry.

In 2020 the UK Government established the Automotive Transformation Fund (ATF) to accelerate the development of a net-zero vehicle supply chain, enabling UK-based manufacturers to serve global markets. ATF investments are accessed through the APC and awarded by DBT to support strategically important UK capital and R&D investments that will enable companies involved in batteries, motors and drives, power electronics, fuel cells, and associated supply chains to anchor their future.

For more information: go to https://apcuk.co.uk or follow Advanced Propulsion Centre UK on LinkedIn.

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ETHICS STATEMENT

Ethical approval was sought and granted by:

Coventry University Ethics Committee, 2025.
Ethics Code: P-184176.

CITATION & REPORTING

FOR THIS OVERVIEW REPORT:

Clarke, S., Shuttleworth, J., Farmah, D., Wilson, L., Zieniute, E., Lane, R., & Kaur Dhillon, H. *Can AI fill the Gaps in the Automotive Industry? Overview Report.* 2025. Commissioned by the Advanced Propulsion Centre, UK. Commercial Report.

Release Date: July 2025. Coventry University.

FOR FULL REPORT:

Clarke, S., Shuttleworth, J., Farmah, D., Wilson, L., Zieniute, E., Lane, R., & Kaur Dhillon, H. *Can AI fill the Gaps in the Automotive Industry? An Industry Needs Assessment.* 2025. Commissioned by the Advanced Propulsion Centre, UK. Commercial Report. March 2025. Coventry University.

At Coventry University, we remain committed to working alongside industry, government, and training providers to develop the talent pipelines necessary for the future of mobility. This report serves as a call to action, one that we hope will inspire further collaboration and investment in skills development across the sector.