Maturing the UK CAM Supply Chain 2024/25

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Disclaimer

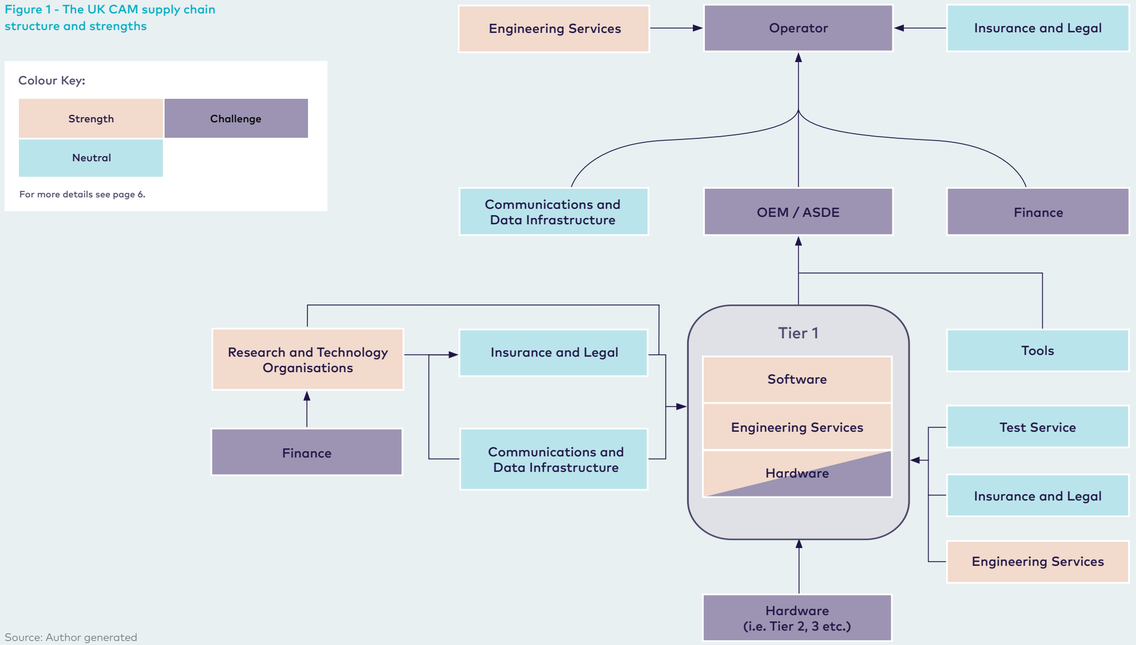
The study is based on examination of survey, CAM sector knowledge and information that is publicly available regarding organisation involved in CAM in the UK. Efforts have been made to verify data where reasonable.

1. The UK CAM Supply Chain
an overview /

The field of Connected and Automated Mobility (CAM) is a diverse and expanding sector, acting as a "system of systems" by incorporating numerous innovative solutions applicable across various fields. At its core, CAM involves integrating different technological elements to create commercial automated services provided by operators who are at the top of its supply chain (as shown in Figure 1).

However, it can be difficult for organisations to define their place within the CAM supply chain. This is because many of their technologies either originate from or can be used in related industries. In this edition of Zenzic's annual report, we explore the current state of the CAM industry's evolving supply chain. Our discussion covers various aspects, including its readiness for the market, the distribution of capabilities, and its competitiveness in a global setting.

Figure 1 - The UK CAM supply chain structure and strengths



Source: Author generated

The flow of CAM products supply within the sector combined with the UK industry's strengths (Table 1) highlights the fact that the UK possesses a strong foundation for a resilient future of mobility. Key enabling elements of CAM services are present domestically in the form of digital solutions, R&D and testing capabilities. In areas of challenge, a targeted and strategic approach to growth is needed to overcome areas of market failure and to leverage opportunities lying in neutral areas of the supply chain.

Following the previous report, changes have been observed in the Insurance, OEM/ASDE and Operators categories. While the historical strength, capability and international influence of the UK insurance sector is still recognised, limited progress has been observed in delivering a market-ready set of competitive CAM-specific insurance solutions over the past few years. This has led to the near-term opportunity for Insurance being moved to a neutral position in the UK CAM sector as seen in Table 1. Legislative timelines are drawing closer and the required insurance models and products need to be available domestically in the very near term. The OEM/ASDE category is now recognised as a challenge. This is due to lack of clarity about the implications of accepting the ASDE role as defined in the Automated Vehicles Act, alongside the lack of true driver-out vehicle platforms which could meet the potential legislative requirements. This narrows the range of trials available in the UK and impacts commercialisation ambitions. Coupled with a limited early market demand for CAM solutions, the climate of economic stagnation and low public understanding and acceptance have made it challenging for operators to define a clear CAM business case, and as a result has led to CAM Operators being defined as a challenge

Table 1: Current UK CAM supply chain strengths

Strength	Neutral	Challenge
Software (in particular data, AI, safety and security)	Tools (Simulation, test and analysis)	Hardware manufacturing (including deployment infrastructure)
RTO (Research and Technology Organisation)	Test services	Finance
Engineering services	Communications and data infrastructure	**OEM/ASDE (established & new)***
Hardware (design and development)	**Insurance and/or legal***	**Operators***

*Changed since previous report

Source: Author generated

2. Emerging themes /

This year's analysis revealed new common trends by combining insights from a diverse range of interviews and survey responses.

In response to the aggregated views summarised in Table 2, a set of recommendations has been developed to address them. Building on the perspectives shared in our last report, the following key themes emerged as the dominant sentiment within the UK's CAM industry for 2024 and 2025.

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Table 2: Key themes and recommendations for maturing the UK CAM supply chain

Emerging Theme	Recommendation
1. Priority use-cases are emerging	
The past year has seen a clearer shift towards priority deployment use-cases supported by actions and sentiments shared by both industry and government. On- and off-road logistics offer an immediate opportunity and a compelling business case. Despite being a major potential market for CAM, passenger services currently have significant challenges to overcome for mass adoption.	Prioritise investment and regulatory support for on- and off-road logistics and passenger services, as these use cases offer a stronger business case and early-stage deployment opportunities. Develop pilot programs to incentivise and strengthen partnerships with logistics companies and service operators to demonstrate the feasibility of priority use cases.
2. Challenges with private investment	
Despite private capital interest in some CAM areas, attracting investment in supply chain areas outside of software services and products is still difficult. Further CAM deployments would evidence a sustainable supply chain and a more predictable return on investment. A demonstrable market demand is also necessary to generate substantial financial backing. The 1.05 billion USD Series C investment in Wayve in May 2024 stands out as a major financial event this year. It exemplifies the possibilities in CAM and the success of Wayve's approach to building versatile core capabilities.	Two areas for development exist to address this theme: the first is to continue to support deployments and showcase their market viability both domestically and internationally as we come close to being able to remove the safety driver. It is critical that these deployments demonstrate a strong business case to create more certainty for the investment community. The second is ensuring that organisations forming critical areas of the supply chain are supported over this coming period to ensure their long-term sector leadership and investment potential.

Emerging Theme	Recommendation
3. Regulation pathway	
The Automated Vehicles Act in May 2024 was a significant milestone in the move towards the target of full regulation by the end of 2027. The act signalled the UK's ambition to enable autonomy and to become a viable destination for deployment and opportunities in the supporting supply chain. A view expressed from both domestic and international players. Timely delivery of the secondary legislation is being considered as increasingly more important by industry to ensure the continuous competitiveness of the UK sector.	Moving towards passenger service pilots in Spring 2026, and onwards to 2027 there must be close collaboration between regulators and industry to ensure that new regulations address sector challenges, and that industry is well prepared to work within them. This will ensure the regulator is well informed to deliver clear-cut regulation and that the industry is well prepared to use it optimally. Building on the good work done to date, this collaboration will also enable emerging challenges to be addressed effectively and quickly.
4. Demand side stimulation	
There is a growing need for support to stimulate the demand side for deployments and vehicles. It is identified as having the potential to elevate the persistent challenges in sourcing investment support and justifying the business case for CAM services. It would also lower barriers for new entrants looking at CAM as a solution to transport challenges as well as help lower the unit costs for the rest of the market.	Developing a procurement strategy that enables subsidies or funding mechanisms to stimulate the growth in demand for automated vehicles, particularly in the case of passenger services. One approach in this case could be to subsidise the difference between standard and automated versions of vehicles, that are due to be replaced to lowering initial adoption barriers.

Source: Author generated

There is a need to develop a coordinated strategy for the development of the UK CAM supply chain which takes account of both the capability and the opportunity to ensure support is correctly targeted and aligned with growth priorities for the sector. The development of the strategy should be led by an organisation such as Zenzic with support from both industry and government stakeholders.

Future sub-sector specific strategies are to ensure collaborative R&D programs focus on areas where the UK has a competitive advantage, such as software and hardware. Encourage partnerships between hardware and software developers to ensure successful integration.

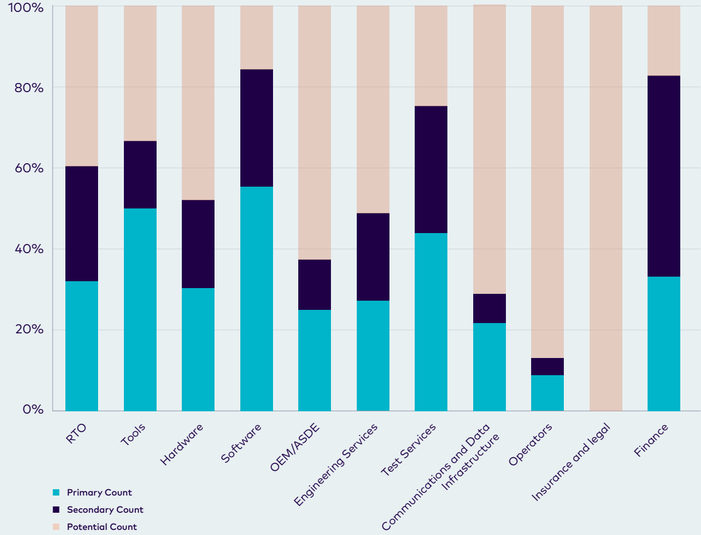
3. Key findings /

Market readiness

The current market readiness of products and services across all categories is established by comparing available products to total organisational presence visible in Figure 2, showing the potential from future products still in development. In most categories, the primary count of available products is closer to being market-ready than the secondary count, as expected. Categories such as Hardware, Engineering Services, and Test Services have a roughly 60/40 primary-to-secondary distribution, indicating the presence of multiple, equally developed secondary capabilities.

Overall, Figure 2 suggests the CAM sector is still in its early stages, with most elements at low maturity. Software and Test Services show the strongest establishment and focus, while most other categories have a longer path to market readiness. Given the indicated readiness levels across all categories there remains a substantial opportunity in the CAM sector.

Figure 2 - Distribution of market-ready products across top-level categories



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Notably, there are significant gaps in the availability of products within crucial enabling categories like Insurance, Hardware, and Communications & Data Infrastructure. Addressing these domestic shortages promptly is vital for effectively leveraging future legislation. The limited availability of fully functional commercial CAM services is clear from the low levels for Operators; however, their demand needs to be encouraged while simultaneously improving their availability.

Capability areas and positioning

Figure 3 provides a snapshot of the UK's CAM supply chain capability. This is achieved by mapping the global competitiveness of the capability categories (both primary and secondary) against the percentage of companies in those categories with their headquarters in the UK. In summary, the data analysis revealed three insight themes:

Sovereignty and Control: Building a robust and sovereign CAM ecosystem is crucial for the UK's long-term economic and strategic interests. In figure 3 this would be represented as critical capabilities being positioned in the top right corner. To achieve it from current standing this would require a concerted and targeted effort to strengthen domestic capabilities across the entire supply chain.

Vulnerability in Critical Areas: The lower competitiveness and anchoring of hardware and communications and data infrastructure pose significant supply chain vulnerabilities. These areas are fundamental to the CAM ecosystem, and reliance on foreign entities could hinder UK innovation and deployment.

Targeted Strategies: The spread of capabilities across the graph highlights the need for targeted growth strategies tailored to the specific needs of each sub-sector. A one-size-fits-all approach will not be effective.

The cluster of key capabilities (RTO, Hardware, Engineering Services, and Test Services), anchored around 60%, is critical for the UK CAM sector, representing a significant domestic presence. This mid-range anchoring strategically benefits the UK by enabling easier collaboration, faster development, and streamlined logistics for mobilising crucial CAM service deployment support. This level also indicates existing UK expertise and infrastructure, providing a strong base for future growth.

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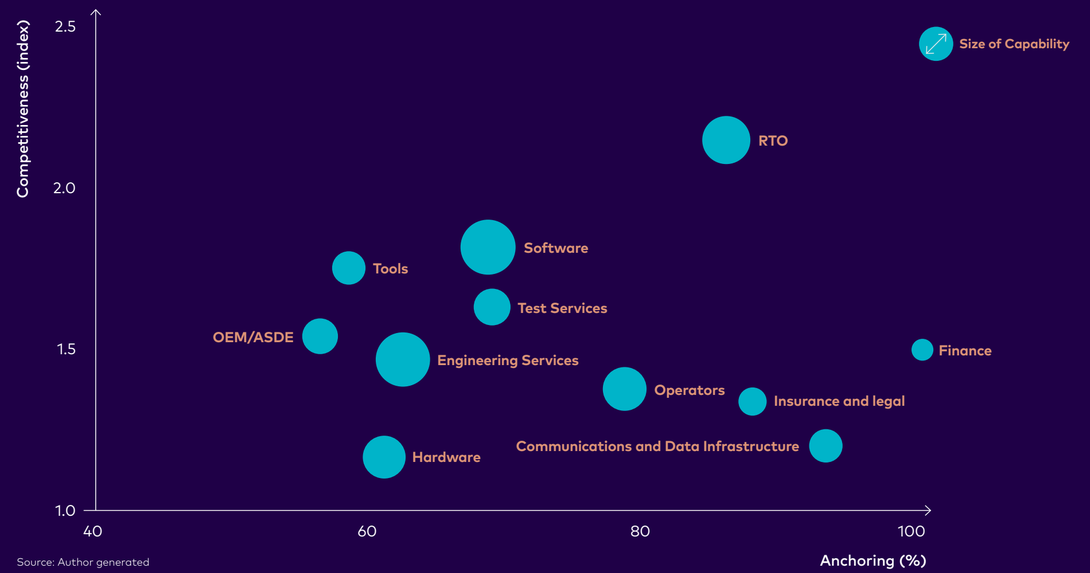
Figure 3 - Category positioning based on capability anchoring vs. global competitiveness index



Source: Author generated

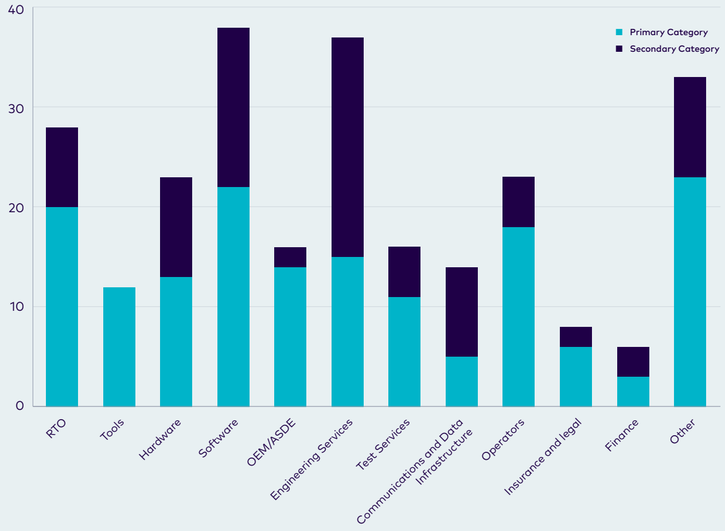
Supply chain capability distribution

Figure 4 shows the self-identification of main and/or secondary area of CAM business from respondents to the work. The increasing complexity of the CAM sector, driven by advanced technological development, is evident in the interconnectedness of industries involved in Automated Vehicle (AV) services. This intersection is particularly reflected in RTO, Software, and Engineering services. Consequently, as illustrated in Figure 4, these capability categories have the highest number of UK organisations.

There are some points of note to be observed in categories such as Engineering Services. In the instance of Engineering Services, a significant proportion is allocated to the secondary capability. This could be due to an attempt from organisations in categories such as Software, Test services and OEM/ASDE to start providing comprehensive service packages of higher value in the current service economy. Overall, the increasing growth in the category between iterations of this analysis signifies the increasing appetite and importance of engineering development products and services in a CAM environment.

The "Other" category is examined separately as it clearly illustrates the scope of the CAM sector's complexity – it incorporates elements supporting the sector environments such as consultancy, engagement and authority services amongst others.

Figure 4 - CAM capabilities within the detailed data (primary and secondary) by category



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Geographical and regional distribution

Figure 5 illustrates the geographic spread of organisations in the CAM supply chain. With more participants this year (162), the map is more populated than before, showing improved representation in Scotland and Wales, alongside slight increases in the Northwest and Northeast. This growth mainly reflects better awareness and engagement from existing organisations in these regions, rather than a significant number of new CAM suppliers, though a few exist. The primary concentration of activity remains in the West Midlands, London, and the Southeast, reflecting established industry centres.

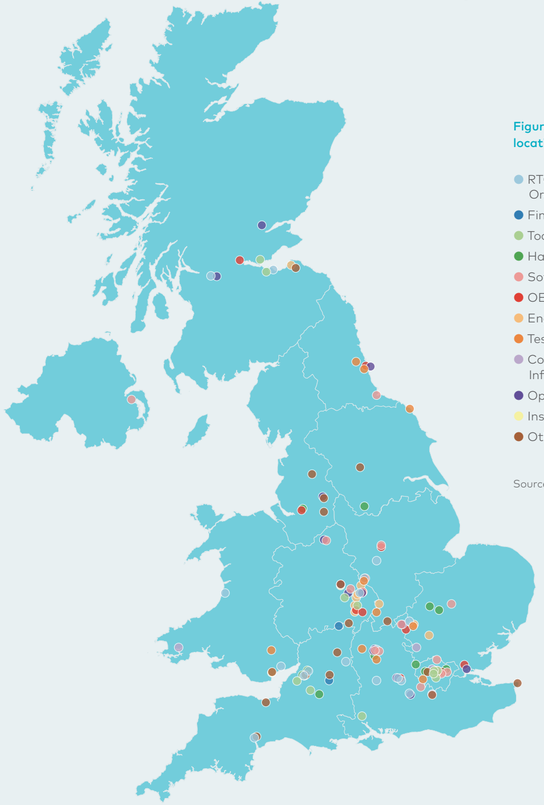

Figure 5 - Map of main UK locations by primary category

- RTO (Research and Technology Organisation)
- Finance
- Tools
- Hardware
- Software
- OEM/ASDE
- Engineering Services
- Test Services
- Communications and Data Infrastructure
- Operators
- Insurance or Legal
- Other

Source: Author generated

4. Annex /

Top level category	Sub-categories
Hardware	Cameras / RADAR / LIDAR / Onboard Mapping Hardware / Odometry sensors / Ultrasonic sensors / Sensor supporting hardware / Embedded controls hardware / Passive control systems and computing components / ECU hardware / Other electronic & architecture / V2X equipment / Cyber secure modem / Safety related HMI hardware / Localisation hardware / Drive-by-wire / GNSS and IMU / Powertrain/propulsion hardware / Actuators
Software	Mapping & path planning / Control systems / Connectivity and cybersecurity / HMI software / Data processing
Engineering Services	Vehicle development / Simulation / Security / Infrastructure / Safety cases/auditing / Other services
Finance	Private funding e.g. VC / Public funding body
Research and Technology Organisation	Academic Insitution / Research organisation / Public Sector Research Establishments' (PSREs) / Public Research Organisations (PROs) / Other RTO i.e Catapults
Test services	Controlled environment / Semi-controlled environment / Public environment / Other - please specify
Tools	Simulation / Testing / Other - please specify
Operators	Passenger Transit / Freight & Logistics / Last mile delivery / Highway Authority / Personal mobility
Insurance and Legal	Insurance / Legal / Regulatory/Consumer testing
Communications and data infrastructure	Data/web services / Communication infrastructure / Mapping/geospatial
OEM/ASDE	Passenger Transit / Long-haul freight (>10km) / Short-range deliveries (<10km) e.g last mile / Personal mobility

Source: Author generated

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