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Software Defined Vehicle: Growth and value creation opportunities for the UK

Joachim Taiber, Advanced Research Fellow, Centre for Sectoral Economic Performance

Robert Shorten, Professor and Head of the Dyson School of Design Engineering

Marc Masen, Professor, Department of Mechanical Engineering and Vehicle Futures Hub

Nigel Steward, Professor of Practice, Director of the Centre for Sectoral Economic Performance

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Executive Summary

The automotive sector is an economically important sector for the UK, generating over £85.4 billion annual turnover and supporting about 830 000 jobs [1]. 77% of the cars made in the UK are exported [2]. However, this sector is susceptible to competition and technology disruption, particularly from Chinese OEMs (Original Equipment Manufacturer) who are aggressively entering the European market, and from US fleet operators that are targeting the fully automated transportation fleets sector. While the technologies underpinning these disruptive forces, such as electrification, autonomy and connected cars, have been mostly developed outside of the UK, contemporary technology developments arising from Software Defined Vehicle (SDV) offer economic opportunities that the UK is particularly well placed to exploit. Our objective in this brief report is to examine the readiness of the UK to embrace this opportunity, and to map a potential sectoral strategy to catalyse this opportunity. Specifically, this report considers the impact of SDV on automotive sector value creation, the key building blocks of an SDV economy, and how UK stakeholders can be utilised to exploit the SDV transformation.

Chapter 1: What is a Software Defined Vehicle (SDV)

A Software Defined Vehicle is a new architectural approach to develop automotive vehicles. SDV views vehicle design as not only a mechanical concept, but rather as a data- and software-driven system that may be continuously updated to meet the functional needs of users, and of other stakeholders, over the entire lifecycle of the vehicle.



Figure 1 – SDV ecosystem inspired by telecommunications industry

In contrast to legacy hardware-centric vehicle architectures, which have limited ability to upgrade via software, an SDV is by-design built to adopt its functional capabilities through software updates enabled by a suitable system architecture. This approach allows potential access to core functional components of the vehicle, such as powertrain, energy storage, computational systems, and vehicle sensors. The architectural transformation of a vehicle from a rigid system with limited functional features towards a highly agile system with an expandable feature set, and self-driving capabilities provides opportunities for new forms of value generation. This is achieved by by accessing the vehicle subsystems and developing services to monetise the use of these systems across numerous use cases (both from single vehicles, and collaboratively across multiple SDVs).

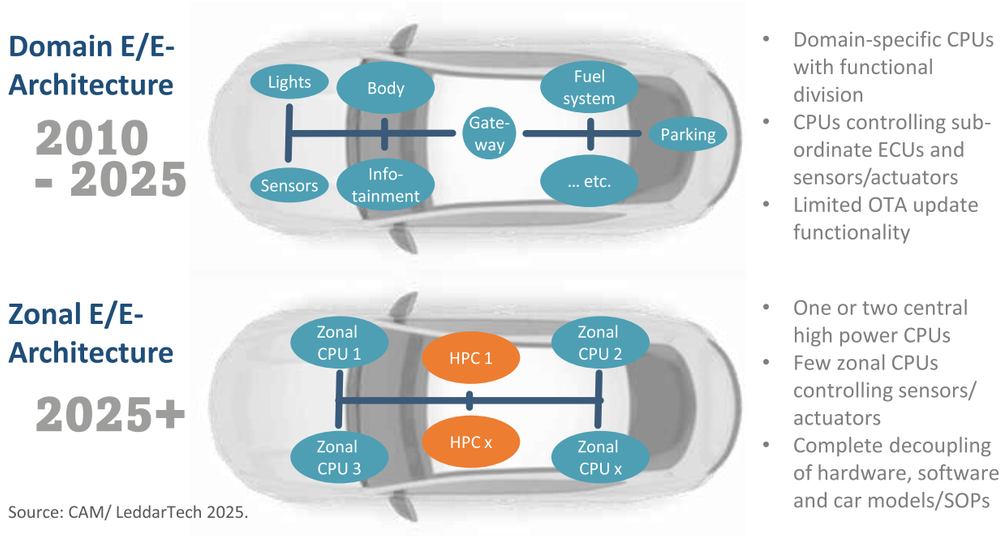


Figure 2 – transition from domain-centric to zonal vehicle system architecture to enable SDV (Accenture report [3])

The ability to reconfigure a vehicle using software updates opens many opportunities for value creation for various stakeholders, and we shall discuss these opportunities in the next chapter. To give a very brief flavour of these, in addition to enabling over-the-air (OTA) vehicle upgrades, an SDV architecture offers the possibility of using various vehicle components to develop new non-automotive as well as traditional automotive use cases. Components that can be used to create services include the vehicle battery, the computing power of on-board systems, vehicle sensors such as lidar and cameras, and vehicle memory systems. Examples include the following.

(a) **In-cabin services:** These include software defined features unlocked at the behest of vehicle owners. For example, these could be anything from bespoke infotainment features and bespoke packages to assist driving, to vehicle services such as advanced navigation or bespoke autonomous functionality.

(b) **Vehicle software upgrades:** These include over-the-air updates to avoid or prevent vehicle recalls, or to enable maintenance prediction.

(c) **Vehicle hardware upgrades:** Significant automotive hardware upgrades are often not feasible as they affect the vehicle physics and consequently the driving stability of the vehicle. However, SDV architectures facilitating deployment of automotive control systems offer the possibility to compensate for such changes, and potentially make possible upgradable vehicle architectures that are, for example, circular by design (and consequently extend the vehicle lifetime).

(d) **Dual use:** The vehicle fleet, in combination with advanced vehicle sensors, are an embodiment of a large-scale, and highly resilient, sensor network. This network could be used not only for civil sensing applications (finding lost objects, detecting parking spaces, road monitoring), but also to protect sensitive national infrastructure.

(e) **Sovereign SDV applications:** The combination of lithium-ion batteries, heavy electric vehicles, autonomy, and third-party AI systems, potentially pose sovereign threats. SDV offers the opportunity to build national guardrails to mitigate these risks.

(f) **Homologation services:** Cross-border real-time homologation features are features that could be enabled using an SDV platform.

(g) **Smart City applications:** Vehicles with accessible and upgradable sensors can be used to augment traditional sensing, for example to detect and localise gas leaks, to augment home alarm and surveillance systems, and to provide warning of flooding.

These are just some examples of how modern vehicles could be monetised by innovators via an SDV platform. It is also clear, when viewed through the prism of these applications, that the automobile is undergoing a similar transformation to that of the personal computer and the mobile device; namely **from a dedicated device to a service delivery platform**, exploiting the convergence of many resources in a single device. When viewed in this manner, the enormous potential for value creation is apparent.

Historical Context: SDV represents a significant step in the evolution of automotive vehicles. Traditionally, value creation for automotive end-users is based on the promise of reliable, flexible, affordable, safe, and time-efficient personalised point-to-point transportation. However, delivering on this promise is becoming increasingly difficult in the context of increasing levels of urbanisation across the world. Increasing traffic congestion compromises the efficiency of personal transportation leading to many commuters switching to public transportation options. Affordability of personal transportation is also a major issue. For example, the average price of a new car in the UK has almost doubled over the last 10 years, from £18k to more than £34k [5]. It is in this context that SDV brings opportunities to the automotive sector. SDV-enabled cars could potentially enjoy a lower total cost of ownership, primarily due to predictive maintenance and a reduction of physical recalls through over-the-air (OTA) updates, and due to building services around vehicular architectures and resources. This has the potential to new avenues for monetisation of vehicles offering owners access to significant recurrent revenue streams.

From a UK perspective, the increasing dependency on non-domestic suppliers of core technology and the lack of value creation in the digital supply chain represents a contemporary threat to the traditional automotive industry, especially when other jurisdictions are actively progressing the SDV vehicle model. Traditionally, the UK (and Europe) has been dominated by legacy OEMs which have consistently advocated a decentralised ECU (Electronic Control Unit) system architecture whereby software is outsourced to specialised automotive suppliers. Those suppliers depend on the volume of ECUs delivered for growth, and on bespoke vehicle functions delivered to OEMs. With this model, functional validation across a range of specialised OEM-centric ECUs is a very challenging task and a key reason for the lengthy product development times. Newer OEMs, such as Tesla, have prioritised centralised system architectures with a small number of ECUs, and agile software stacks and system functionality.

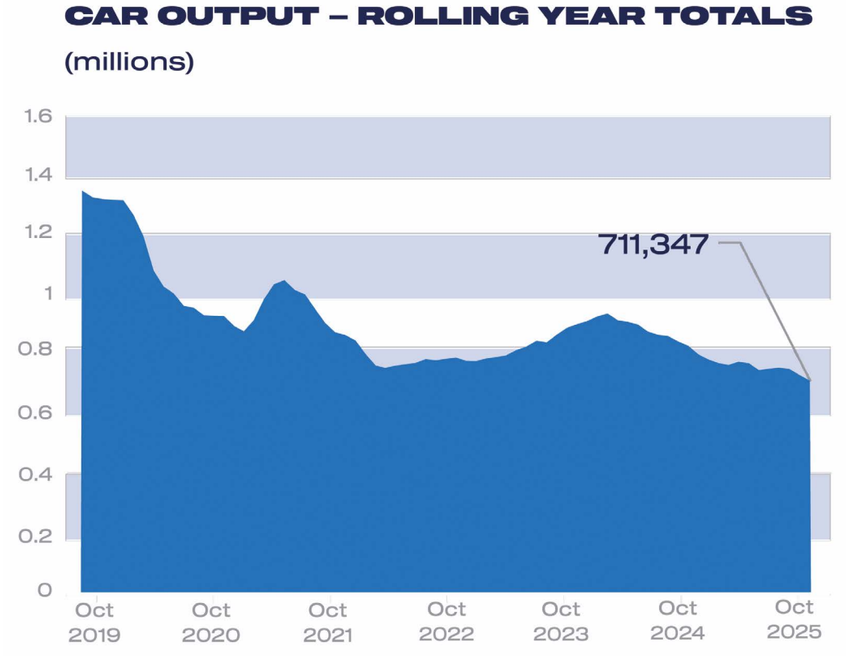


Figure 3 – Declining domestic automotive production in the UK [6]

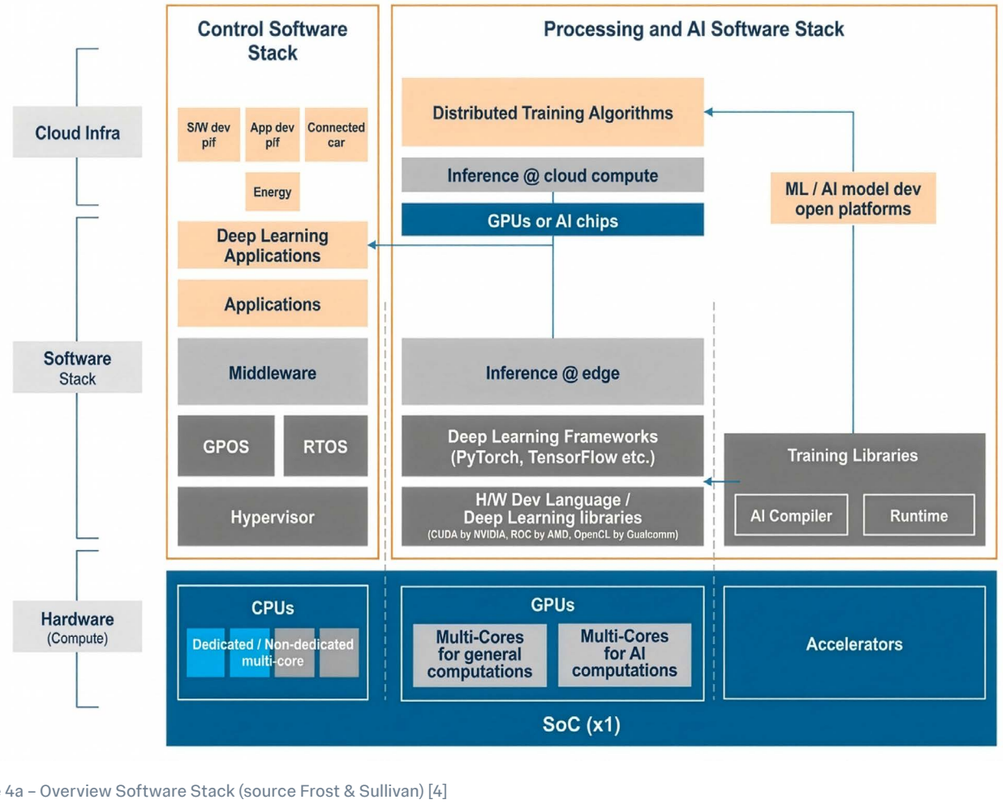


Figure 4a – Overview Software Stack (source Frost & Sullivan) [4]

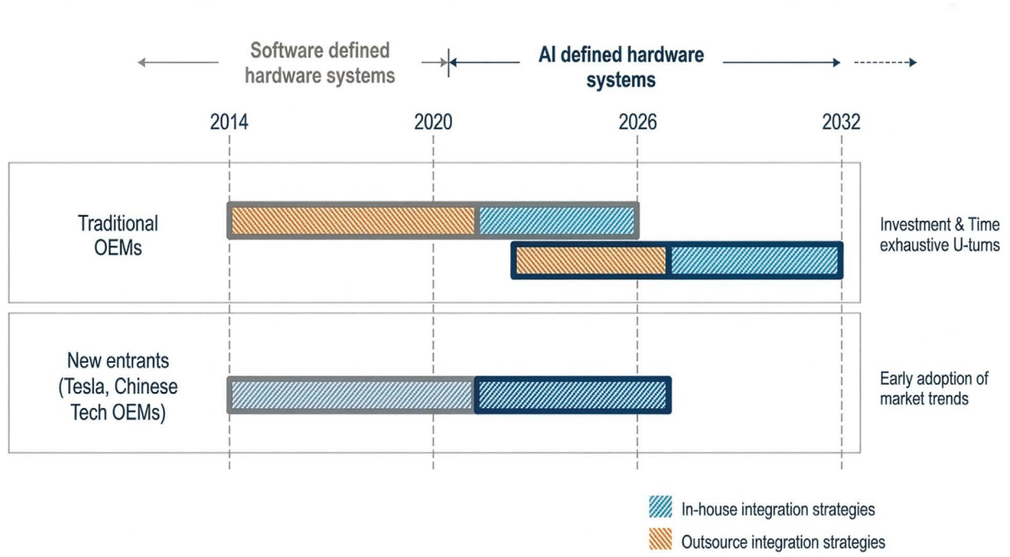


Figure 4b – From SDV to AI Defined Vehicle (AIDV) (source Frost & Sullivan) [4]

There is also fundamental difference how legacy OEMs and “new” OEMs from the US and China address SDV. European legacy OEMs incorporated the “upsell” of additional vehicle functions deep into their business models, which led to highly complex system architectures to configure the vehicles individually according to customer demand. In contrast, Asian legacy OEMs favored an “all inclusive” functional model with reduced system complexity, but still utilizing decentralized system architectures. New Chinese OEMs employed a combination of system models from other sectors such as telecommunications, quickly adapting and developing the SDV-centric vehicle architectures of US-based new generation automotive OEMs like Rivian and Tesla. Very quick iterations via OTA cycles, the use of open-source standards, and the focus on high-demand and innovative end user features have been embraced by the newcomers and have put extreme pressure on the legacy automotive companies.

Furthermore, European and US-based legacy automotive OEMs preferred to offer highly automated driving features and fully electric powertrains as premium options at a higher price point. Chinese OEM newcomers on the other hand, offered L2+ features, for example BYD’s God’s eye [7], as standard equipment and were able to leverage the large Chinese supply chain pool to undercut pricing of their international counterparts.

SDV Opportunity for the UK: The opportunity for the UK in SDV stems from its strong position in AI (in which the country ranks third in the world, after the US and China [8]) and from its strong position in many of the sectors necessary for a thriving SDV economy. The UK also has an excellent research ecosystem, substantial financial backing from global tech companies, and a globally relevant position in finance, insurance, gaming, traditional automotive, as well as in semiconductor design. The shift in focus of international investment from horizontally aligned physical AI to vertically aligned physical AI is highly relevant for the assembly of an SDV or AI Defined Vehicle ecosystem with the potential of key pillars being developed and validated in the UK.

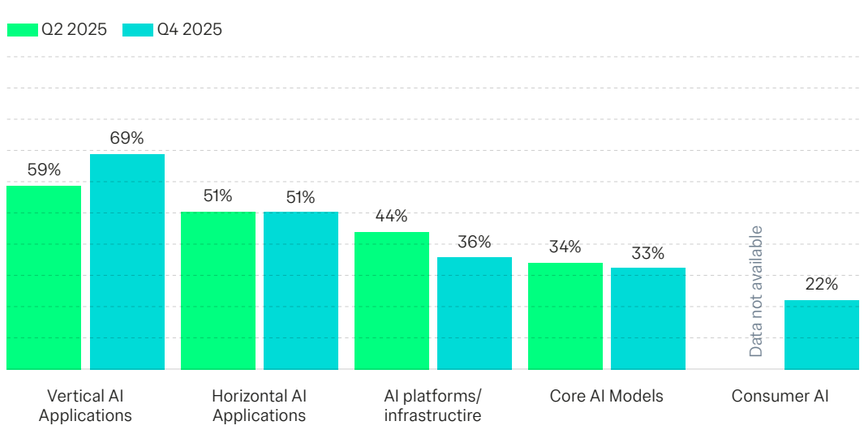


Figure 5 – Vertical integrated physical AI applications
Source: Survey from Iconiq Capital among AI development community [9]

Chapter 2: The SDV opportunity canvas

A canvas of potential use-cases for SDVs could be constructed by considering the following four baseline pillars and classifications: in-vehicle application layer, component architecture, the vehicle state, and markets and consumers.

Pillar A: In-vehicle application layer

Roughly speaking, SDV functionality in a vehicle could be classified as follows.

Layer	Description	Example use-case
Applications	Applications that deliver services to driver, passengers, or external stakeholders such as cities, fleet operators, insurance companies etc.	Real-time video streaming to passengers.
Vehicle dynamics	Applications that adjust ride characteristics of vehicle to achieve certain objectives.	Dynamic torque control to limit tire emissions.
Safety critical/sovereign	Applications to deliver safety critical updates or to manage sovereign interests.	Updates to address safety critical issues.

The **Application Layer** of the SDV platform is centered around applications that do not affect the driving dynamics of the vehicle. For example, software defined features unlocked at the behest of vehicle owners. These could include anything from bespoke infotainment features, bespoke packages to assist driving, to vehicle services such as advanced navigation or autonomous functionality. Other examples of services at the applications layer could include: (a) continuous health monitoring of driver; (b) services offered to passengers; (c) advanced driver assistance information systems; (d) insurance and assurance services; and (e) vehicle health monitoring. An emerging interest is the use of AI agents which can automate the interaction with multiple system entities. For example, AI agents could play a major role in arbitrage applications arising from vehicle to electricity grid (V2G) services.

The term **Vehicle Dynamics Layer** refers to the capability to adjust the vehicle dynamics to develop certain services. These may include services allowing vehicle modifications to manage non-tailpipe emissions, or to upgrade the vehicle in response to technology advances (for example to enable low frequency battery swapping).

The **Safety Critical/Sovereign Layer** of the SDV platform refers to services to deliver safety critical updates and services that could be deployed to protect sovereign interests. For example, autonomous electric vehicles pose risks due to the combination of lithium-ion batteries, autonomy, vehicle weight and AI. This risk may need to be mitigated in certain situations. Another example in this class is the use of the sensor pack to monitor sensitive infrastructure (airports from drone incursions) or to provide advance warning of DoS (denial-of-service) attacks in cities.

Pillar B: Component architecture

SDV enabled services are highly dependent on available sensors and compute capabilities in the vehicle. An opportunity arising in this context concerns the ability of the SDV to incorporate bespoke sensors, and in standardized sensor deployment (for gathering training data).

System	Description	Example use-case
Battery	All components that relate to energy storage and consumption in the vehicle.	V2X, V2G, V2V services.
Sensors	All sensing components – cameras, GPS, lidar, radar, lights.	Dynamic torque control to limit tyre emissions.
Compute and connectivity.	All compute related components – computation, connectivity, memory.	Monetise unused compute/connectivity/ storage to compete with cloud services or provide resilience.
Bespoke	The ability to incorporate new sensors to enable new use-cases.	RFID, new pollution sensors. AV training data generation.

Pillar C: Vehicle state

SDV enabled services may also be classified according to vehicle state.

State	Description	Example use-case
Moving	Services based on moving vehicles.	Health monitoring of driver over time.
Stationary	Services based on parked (unoccupied) vehicles.	Gas detection and localization services.
Connected to grid	Services based on vehicles that are connected to grid (charging or not charging).	Vehicle to vehicle or vehicle to grid services.
Single vehicle	Services that can be offered from a single vehicle.	Parking space detection.
Multiple vehicles	Services that can be offered from a vehicle fleet.	Monitoring of areas for security applications.

Pillar D: Markets and consumers

SDV enabled services may also be classified according to target market.

End user	Description	Example use-case
Driver	Services for driver.	Congestion notification.
Passengers	Services for passengers.	In-car services.
Outside car	Services to cities/OEMs/brokers.	Pollution measurement.
Non-defence	Civilian applications.	Assurance and insurance.
Defence	Defence related applications.	Drone detection. Geo-tagged surveillance.
Non-human agents	Services to support other agents.	Navigation for Autonomous vehicles. Services for drones. Services for AI agents. Services for bikes. Energy grid. Home energy storage.

Finally, we note that standardization of hardware on the vehicle system and the backend side will enable streamlined operations through AI-based workflows in areas such as data for Autonomous Vehicle training, charging, cleaning, maintenance, functional software updates, payment processes, and safety & security compliance verification. Differentiation for the end user could be accomplished via individualized software applications, such as personalized ride settings, battery and security settings (which could be hardware or software related or both). In general, the private cost of car ownership can be reduced through leveraging the advantages of commercial fleet operation, whereas the social cost of car ownership could be reduced through a reduction of crashes and better utilization of energy and physical space.

Chapter 3: UK sectoral alignment with SDV

The UK is particularly well suited to support the creation of an SDV ecosystem and to nurture its development. Several factors contribute to this assertion. First, many of the sectoral components necessary for a thriving SDV economy are particularly strong in the UK. Second, the opportunity afforded by SDV is likely to be a catalyst for major innovation opportunities, not just in automotive, but in related areas. With one of the strongest research environments in the world, the UK is very well positioned to support the development of such an innovation ecosystem. Third, the UK lies at the intersection of three important regulatory environments: the US, the EU and China. This is both a challenge, and an opportunity. The opportunity is for the UK to act as a gateway to these environments, and to develop agile SDV platform elements that can be deployed across multiple regulatory boundaries. Fourth, the UK, in both AI and AV (autonomous vehicles) is considered a global leader. Autonomous systems, and the use of AI, will become increasingly important in developing SDV platforms and use-cases, so the UK is well placed to lead these developments. Finally, the UK government has identified SDV as a significant opportunity for economic growth and national structural supports are already in place to accelerate innovation in the SDV space.

Sectoral strengths: The UK has recognised global strength in areas such as finance, insurance, ICT, software, gaming, automotive, and semiconductor technology, all of which are important enablers for SDV. In finance for example, across several indices, the UK ranks as one of the world's leading international financial centres, and as one of the largest net exporters of financial services globally. In Venture Capital & FinTech, the UK is the 3rd largest venture capital market globally (behind the US and China) and London remains a top 2 global hub for FinTech ecosystems [21]. Thus, the UK is well positioned to support the financing of SDV not only in the UK but also elsewhere. Furthermore, the UK's software development industry remains substantial and growing and has risen to be one of the most profitable in the world, with its value estimated at £49.5 billion in 2026 [17]. The sector now counts more than 29,000 active businesses and has grown at a 3.6% CAGR between 2021 and 2026. The industry is also currently undergoing a disruptive period of transition to AI driven coding. For example, as of late 2025, there were approximately 5,862 AI-related companies in the UK (up 58 % from 2023) and AI-related sector revenue has reached £23.9 billion [18]. The UK is also a leading force in video gaming with the largest market share in Europe and a significant pool of developers [19]. The gaming sector includes more than 2000 domestic companies which generate about £6 billion gross value added (GVA) - this compares to £85 billion for the entire automotive sector. The UK is also a leader in motorsports, an area that has been traditionally viewed as a driver of innovation in the global mobility sector [20].

Research, Universities and Translation: The UK research ecosystem is one of the strongest in the world with top universities such as Imperial, Cambridge, UCL and Oxford consistently listed among the top 10 in the QS World University Rankings. According to the European Innovation Scoreboard the UK is also part of the top performance group of innovation leaders (scoring above 125% of the EU average). The UK also has a vibrant venture capital ecosystem.

AI Readiness: The UK government has consistently worked over a long period of time to develop and utilise its strength in AI research to develop a domestic AI industry of global relevance. The UK ranks third after the USA and China in allocating private funding to the AI sector and this has led to the formation of close to 6000 domestic AI companies with revenue north of £20 billion and GVA of more than £10 billion [10] (amounting to about 50% of the GVA of UK automotive manufacturing). The regulatory framework in AI of the UK attempts to balance innovation and trust and it invests both in local infrastructure and in developing highly skilled AI talent. The UK is also home to multiple AI frontier labs with key personnel working on the AI foundational models. Thus, it has the industrial substance to support the development of physical AI which makes it an ideal market to drive the transition of the automotive sector towards SDV.

Autonomy: The UK invested early in what is termed AV readiness, both through the development of a forward-looking AV regulatory framework (introduction of the Automated Vehicles Act in 2024) and in the participation and active content contribution in international standardization organizations for automated driving. This has contributed to its leading position in Europe in the testing and deployment of robotaxis which becomes an increasing strategic factor in the ride share fleet market development.

Regulatory opportunities: From an economic and trading perspective, the largest trading partners of the UK are the US, the EU and the largest single country trading partner is China. From a regulatory perspective the UK is balancing good trading relationships with all major partners mentioned, which makes it an attractive location, particularly for global service developments, and for innovation (as the UK lies at the intersection of these different regulatory environments).

SDV structural supports: The UK government has developed several programmes that directly support SDV innovation. One example is the UK Drive 35 program. This is a £4 billion funding initiative (running until 2035) managed by the Department of Business and Trade, the Advanced Propulsion Centre UK (APC) and Innovate UK, and addresses many aspects of the SDV innovation cycle. Other examples of supports for SDV include the ASTECH (Accelerated Software-Defined Vehicle Technology) project and the CAM initiative (Connected and Automated Mobility). The latter is a government supported programme to nurture and foster automated driving system trials.

Chapter 4: SDV as an innovation and export catalyst

Stimulus for innovation: The UK has several core strengths in areas which are highly relevant to build an AI-enabled SDV ecosystem. It still has a strong industrial base to design and build automotive vehicles including a supporting supply chain, and a great potential to use AI to automate these workflows to support SDV integration. The UK is a leader in semiconductor/power electronics chip design and related research activities generating more than £10 billion in annual revenues [11] and it has a software developer community of nearly 500 000 people [12]. It has the lead position in AI in Europe (generating more than £20 billion in annual revenue), as indicated earlier. The UK has also an app developer community of about 13,000 people [13] supporting hundreds of thousands app related jobs [14]. It plays a leading role in the global automotive simulation domain service both as an innovation and testing hub [15].

In addition, the combination of large urban areas and rural areas in the UK provide a challenging "proving ground" for SDV. Taken together, these strategic strengths provide key ingredients for SDV to catalyse growth in chip design for edge applications, battery chemistry research, and AI foundational model development.

Export potential: Currently the economic performance of the automotive sector in the UK is primarily measured on domestic car production. However, in future it may be more important to measure performance through the number of subscriptions to SDV-platform based services as is the case in the mobile phone industry.

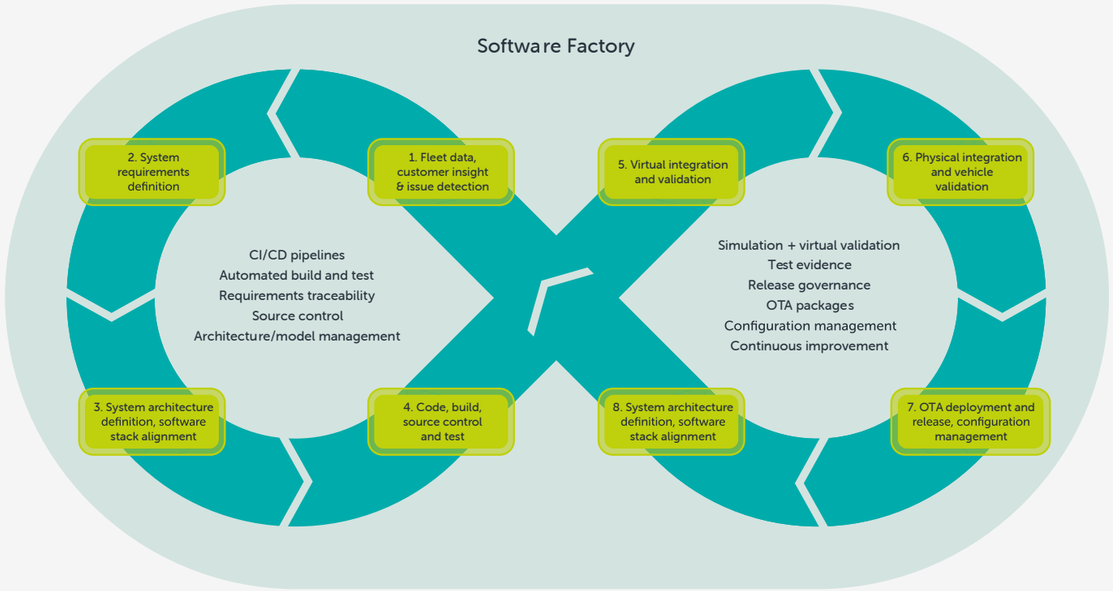


Figure 6 – Software Factory - Source: APC SDV Value Chain Report 2026 [16]

Chapter 5: Gross Value-Added (GVA) analysis for SDV in the UK Automotive Sector

SDVs can generate additional GVA to the UK economy in the following ways.

1. SDV vehicle architectures can reduce cost of vehicle manufacture and hence increase automotive OEM manufacturing margins if prices remain constant. However, pricing is under severe attack from lower price imports from China.

2. SDV has the potential to create new software products offering new services to automotive users that can generate new sources of revenues and profits.

3. SDV could create new jobs as well as replacing obsolete skills with the new ones needed for SDVs, potentially at a higher salary level.

4. A model has been built to determine the GVA of the UK automotive sector and possible future impacts on GVA from the above additional sources of GVA over the next 10 years. GVA in the model is calculated based upon the Income Method where

   GVA = EBITDA + Wages & Salaries

   Note that EBITDA stands for Earnings Before Interest, Taxes, Depreciation, and Amortization.

GVA of the UK Automotive sector today without additional SDV revenues and profits

For the UK Automotive sector today, GVA is created through.

- EBITDA from automotive manufacture
- EBITDA from automotive sales, maintenance and other services
- Wages & Salaries generated from automotive manufacture
- Wages & Salaries generated from automotive sales, maintenance and other services

EBITDA from automotive manufacture in the UK has been calculated as follows.

EBITDA (manufacture) = #cars manufactured x average car price x EBITDA margin (%)

In 2025 the UK manufactured 717,000 cars [1] at an assumed average price of £34,650 per car. In the model we have assumed EBITDA margins of 4% acknowledging the increased price pressures that the sector is experiencing from Chinese competition and have studied a range of 1 to 14% for the sensitivity analysis based upon historical ranges [22].

In 2025, the UK sold 2,020,000 cars at an average price of £34,650 each. Average Dealer and services EBITDA margins are reported at 2.76% [23] and we have used a range of 1 to 4% to explore sensitivities.

According to SMMT [1] 188,000 people are employed in automotive manufacture in the UK and 642,000 in dealerships, maintenance and other services. In the model wages and salaries of £47,000 have been used for automotive manufacture [24], and £44,000 for dealerships, maintenance and services [25].

The input of the above data into the GVA model delivers a GVA of the UK Automotive sector today of £37.3 bn which is close to UK govt reported figure of £38 bn. Figure 7 below shows the relative contribution of EBITDA, Wages and salaries as well as automotive manufacture and dealerships, maintenance and other services to GVA. It can be readily seen from Figure 7 that automotive's contribution to the GVA of the UK Economy is dominated by the jobs that cars create in terms of sales and services.

The Growth of GVA of the UK Automotive sector today without additional SDV revenues and profits over the next 10 years

The GVA model can be used to determine how GVA of the UK automotive sector can grow over time. Over the next 10 years the compound annual growth rate (CAGR) for UK car sales is expected to be 5% [26], and the SDV car CAGR is expected to be 27% [27], with forecasts suggesting that by 2032-33 all new cars sold in the UK will be expected to be SDVs [27]. Car prices and wages and salaries will grow with inflation over the period and an inflation rate of 2.9% over the 10-year period and contribute to GVA growth. EBITDA margins for automotive manufacture and dealer, maintenance and other services have been assumed to remain constant at 4% and 2.76% respectively. Using these inputs the model shows that the GVA of the UK automotive sector will grow from £38 bn to $52 bn again with Wages & Salaries from Dealerships, maintenance and other services dominating GVA contribution to the economy, and this is shown in Figure 8.

Breakdown of today's UK Automotive Sector
£38 Bn GVA

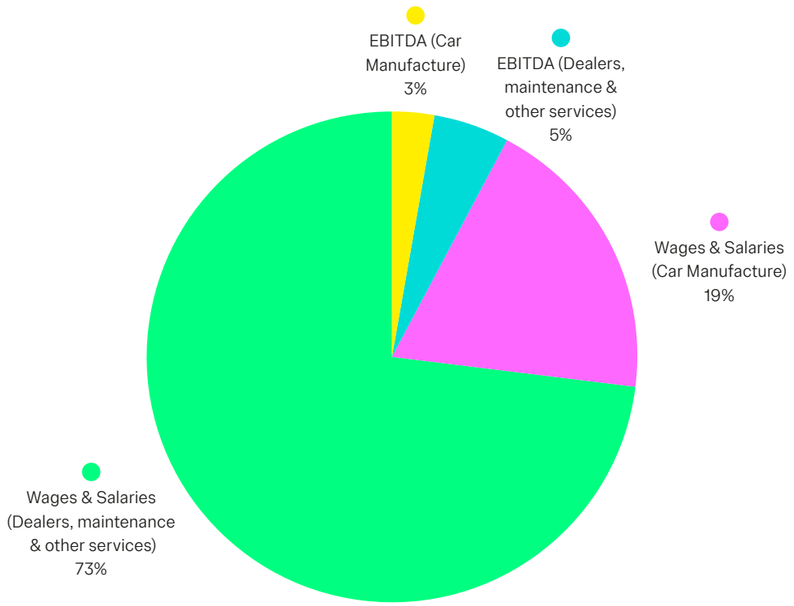


Figure 7 – A breakdown of the UK Automotive's £38 bn contribution to the UK economy in 2025 (Model Output)

Breakdown of 2035 UK Automotive Sector
£52 Bn GVA

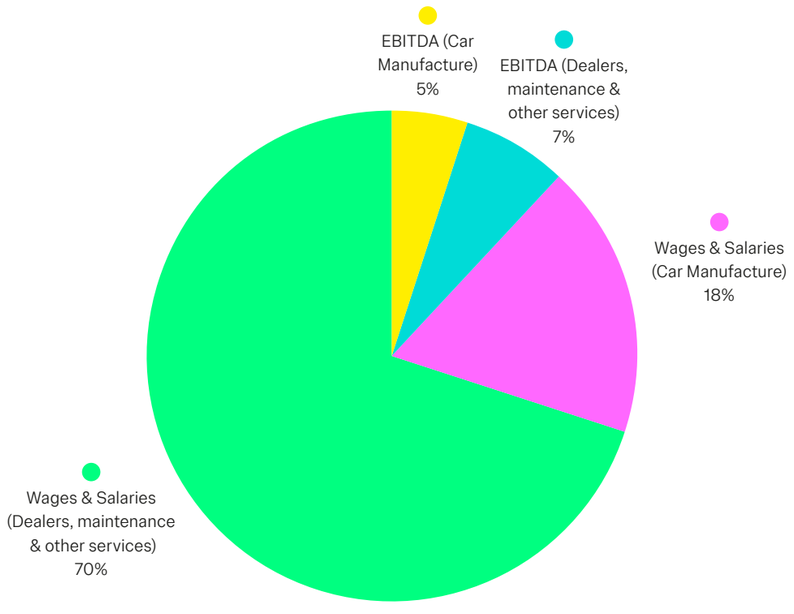


Figure 8 - A breakdown of the UK Automotive's £52 bn contribution to the UK economy in 2035 (Model Output)

Growth of GVA of the UK Automotive sector today with additional SDV revenues and profits over the next 10 years

Additional EBITDA
SDVs can allow the generation of additional revenues and profits from the sales of applications and services provided from the "application layer" as described earlier in this report. One could have an App for each possible use-case, that could be downloaded from the Cloud onto the applications layer of the SDV's computer, much like an App can be downloaded onto a mobile phone to provide services. Such Apps can be embedded in the applications layer and their function isolated from the vehicle's core functions so that vehicle safety is not compromised.

To estimate what the future revenue and profit streams might be for Apps on an SDV we have drawn parallels with the iPhone App Store and applied key metrics from this platform and applied them to a future SDV App Store to determine what potential additional GVA can be created.

The key metrics tested in the model are summarized in Table 1 below.

Using the data inputs of Table 1 the additional GVA from SDV related App sales has been determined for two cases.

1. SDV App revenues generated in all UK produced cars sold in the UK and Worldwide

2. SDV App revenues generated in all UK produced cars and a defined market share of all cars sold worldwide

Note that option 2 requires either a car platform that has a large market share worldwide, or that an SDV Apps Platform is created by a UK firm that can be hosted on the computers of many of the World's car manufacturers. To this end, market shares in the range of 1-25% with a central case of 8% have been explored. Such global market shares are in this range, for example of Volkswagen Group and Toyota hold 9.8% and 11.5% market shares respectively at present [33]. 22% is the market share of the iPhone [34], and Volkswagen Group [35] market share in Europe.

During the modelling it was found that the App or Games sales : Hardware sales ratio was not a useful ratio as they were suggesting annual app sales in the range of £5800 – 21,000/year. This is likely related to the much shorter lifetime of phones and gaming consoles which have much shorter product cycle times of 1-2 years compared to 5-8 years for cars. Instead, the question was asked for Option 1 what the annual app cost would be to double the EBITDA of UK automotive manufacturers by 2035 through SDV app sales, and the answer was £830/year in annual revenues, and this figure was used as the upper range of the GVA modelled estimates. The lower range estimate was the annual revenue per App figure of £34,000.

Additional Wages & Salaries
The creation of SDV Apps will also create new high value-added jobs that contribute to the GVA of the sector. In the UK, there are 291,000 Apple App store developers [29] and ecosystem jobs, and on average each App employs 2-4 people, with larger Apps requiring greater than 5 in a team [36]. Salaries are in the range of £45-60,000 per year [37], with senior level developers earning £60-110,000 [38] which are higher than the average automotive worker today. In the model we have used 5 developers per app and £55,000 per year salary figures for the GVA model.

Ratios	iPhone App Store
App Sales: Hardware sales	0.56
#Apps available: #phones	0.1
Annual revenue per app, £/year	34,000
App Sales: # phones, £/unit/year	57
EBITDA Margin on App sales	33-35%
CAGR of #Apps since launch to today	35.7%*

Table 1 – Key Revenue, profit ratios, and growth rates tested in the GVA model [28-32]
*the iPhone had 500 apps at launch and now has 2.4 million available in the App store and that these Apps have been created by a worldwide network of developers outside of Apple.

SDV GVA impacts
In the case where SDV App revenues generated in all UK produced cars sold in the UK and Worldwide, the additional GVA that SDV would create in 2035 over the base case of £52 bn without SDV would be £2.4 bn for the lower range and £4.5 bn for the central case of SDV revenues.

In the case where SDV App revenues are generated in all UK produced cars and at an 8% market share of all cars sold worldwide, then the additional annual GVA SDV would create above the base case of £52 bn would be £6.1 bn for the lower end of the range and £26.3 bn for the central case of SDV revenues. It is interesting to note that a 25% market share for SDV apps could generate an extra £96.2 bn in annual GVA over the £52 bn base case. A waterfall chart showing the incremental growth of automotive sector GVA with SDV app growth is shown in Figure 9 along with the Net Present Value (NPV) of GVA of this growth also shown that uses the UK HM Treasury Green Book 's discount rate of 3.5%. SDV App developments can transform the automotive sector and add significant value to the UK economy if a World market can be captured by a UK firm or firms.

A sensitivity analysis to the various factors that can impact annual GVA in 2035 has been conducted and based around the central case of annual SDV revenues per car. The variables and ranges studied in the sensitivity analysis are given in Table 2.

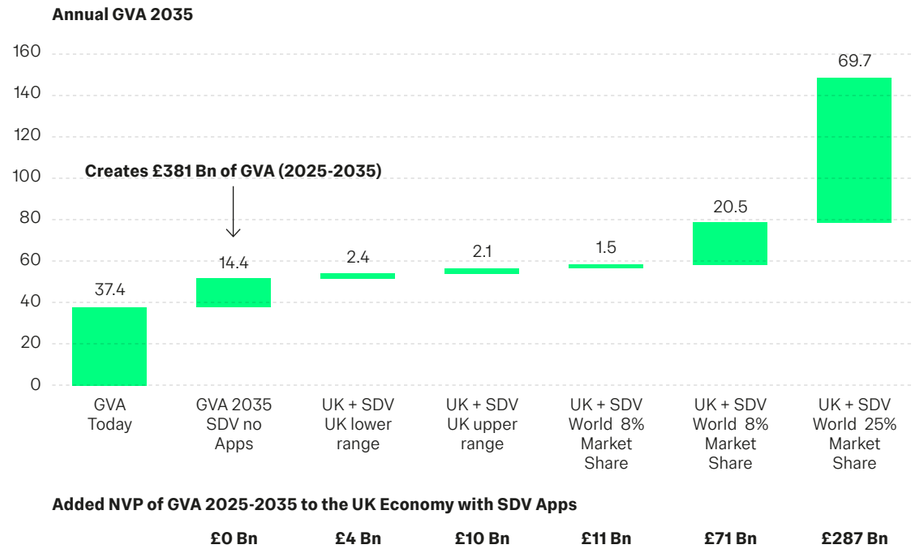


Figure 9 – Impacts of potential SDV App revenues and job creation scenarios on the GVA of the UK Automotive sector.

Variable	Lower range	Central case	Upper range
App market share, %	1	8	25
CPI Inflation, %	1	2.9	8
Annual App revenue/car, £	100	830	1500
CAGR for SDV cars, %	15	27	35
EBITDA margin (Apps), %	15	34	50
EBITDA margin (car manufacture), %	1	4	14
CAGR all cars sold, %	1	5	9
EBITDA margin (Dealers, maintenance & other)	1	2.7	4

Table 2 – Variables and ranges studies in the sensitivity analysis.

The tornado diagram in Figure 10 shows the results of the sensitivity analysis, and it can be clearly seen that App market share, inflation rate and app pricing are the biggest factors influencing Automotive sector GVA with SDV apps. Inflation rate is important due to the very large contribution of employment that the automotive sector creates. Therefore, GVA increases in line with wage and salary inflation over time.

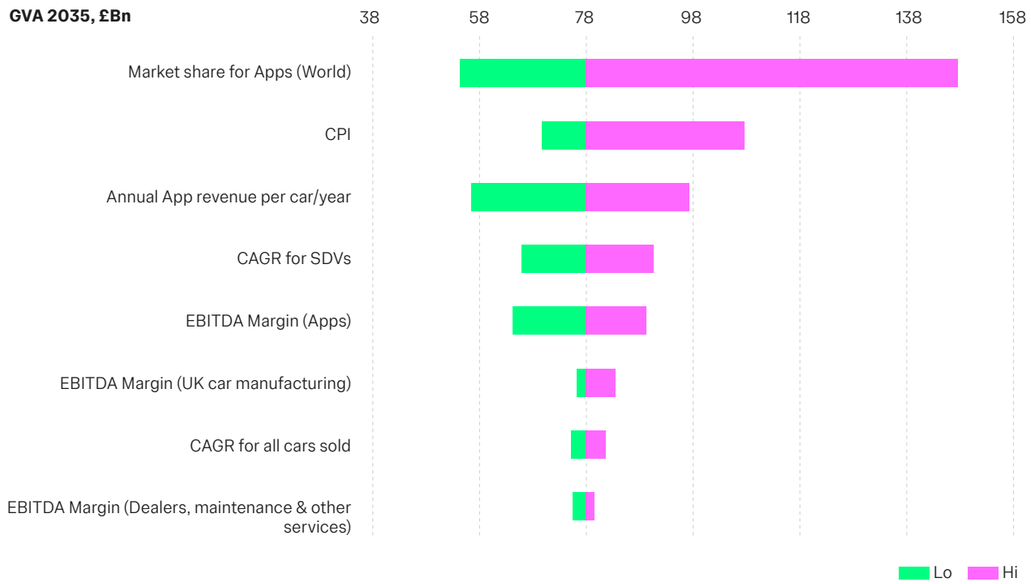


Figure 10 – Sensitivity of automotive GVA with SDV app creation and revenues.

Chapter 6: SDV Implementation Plan

CSEP will now develop and realise a sector implementation plan with three objectives: (a) to catalyse interest in SDV; (b) to bring key stakeholders together; and (c) to develop a number of exemplar use-cases. This implementation plan will consist of the following key-steps.

1) **OEM onboarding**: The first step is to onboard a major OEM to provide a test-vehicle and/or to test vehicles and allow third-party safe and limited access to key SDV components such as certain sensors, the vehicle battery, and available on-board compute.

2) **SDV platform provider onboarding:** The second step is to develop an SDV app-store. This will be done in partnership with a telco/tech company, potentially involving UK based start-ups. Key questions to be addressed include API development in development with an OEM, and the development of a storefront to make available developed applications.

3) **SDV use-case development:** Several use-cases will be developed as exemplars of SDV value-added. These will be made available via the app-store and all development code and software will be made available open-source.

4) **Organise competition:** The fourth step involves the creation of a national competition to stimulate interest from universities, entrepreneurs, start-ups, and the app development communities. CSEP and Imperial will support the management of the competition, support the competition prizes, and provide support to the winning entries via Imperial's entrepreneurial eco-system. A national publicity campaign will be developed in parallel to promote SDV and the competition.

5) **International SDV conference:** An international conference will be organised in 2027 to promote UK SDV readiness. Potential candidates are IEEE IAVVC 2027 (April, London, hosted by Imperial), or a conference organised by leveraging the AI4SDV consortium.

6) **Develop a more refined implementation plan:** This will be based on public response to the exemplar use cases, the response to the competition, industry interest, as well as public and private investor feedback.

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