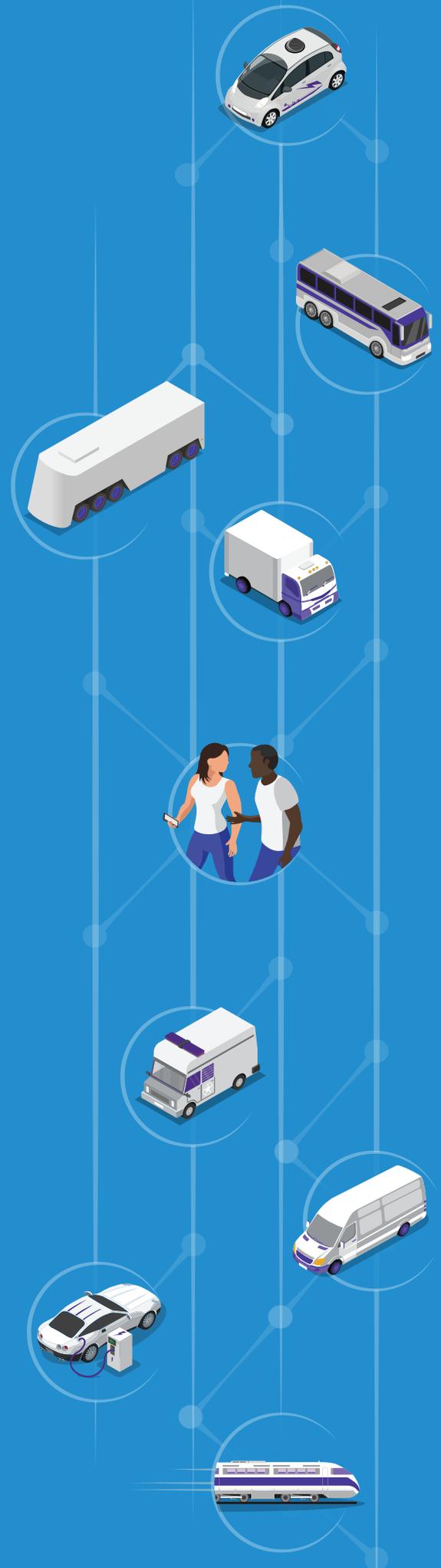




The rise of electric, shared and autonomous fleets

Reimagine the future of how people and goods will move



February 2019

kpmg.com/uk/mobility2030



A mobility revolution on an accelerating curve

A global mobility revolution has already begun and is rapidly accelerating, opening up enormous opportunities and challenges for every player across the mobility ecosystem.

This revolution is being fueled by the convergence of emerging technologies, specifically electric vehicles (EV) and alternative fuels (AF), connected & autonomous vehicles (CAV) and Mobility-as-a-Service (MaaS), together with changing consumer and societal demands.

Present day transport system inefficiencies (UK commuters, for example, spend on average 27 days a year traveling to and from work¹), traffic fatalities (1.35m annual road traffic accidents globally²), and pollution (91% of the globe breathes air above WHO safe pollution limits³) are all huge global societal issues that the emerging revolution in mobility could significantly relieve.

A greener, cheaper, on-demand and more interconnected and autonomous mobility landscape will bring multiple benefits. We estimate that the economic benefit of AVs could reach up to £51 billion per year and create an additional 320,000 jobs in the UK by 2030.⁴ Meanwhile, in the UK replacing a fossil-fuel powered car with an electric model could halve greenhouse gas emissions over the course of its lifetime.⁵

We expect constant change over the coming decade, with the penetration rates of EVs, AVs and MaaS increasing rapidly to 2040.

There is plenty that organisations can do now to get started on the journey and position themselves to take advantage of the opportunities: doing the thinking to decode the coming disruption and work out what it means for the business; identifying what new propositions will be needed to fight for customer share; 'un-stranding' the existing asset base to see how assets could be used in the future mobility landscape; analysing the opportunities for data monetisation; and then planning for roll-out to achieve scale.

With so much changing so quickly, and with the rise of fleets presenting growth opportunities across sectors, the time for action is now.

¹ <https://www.tuc.org.uk/news/average-worker-now-spends-27-working-days-year-commuting-finds-tuc> (2017)

² *Global status report on road safety 2018*, World Health Organisation

³ <https://www.bbc.co.uk/news/health-43964341>

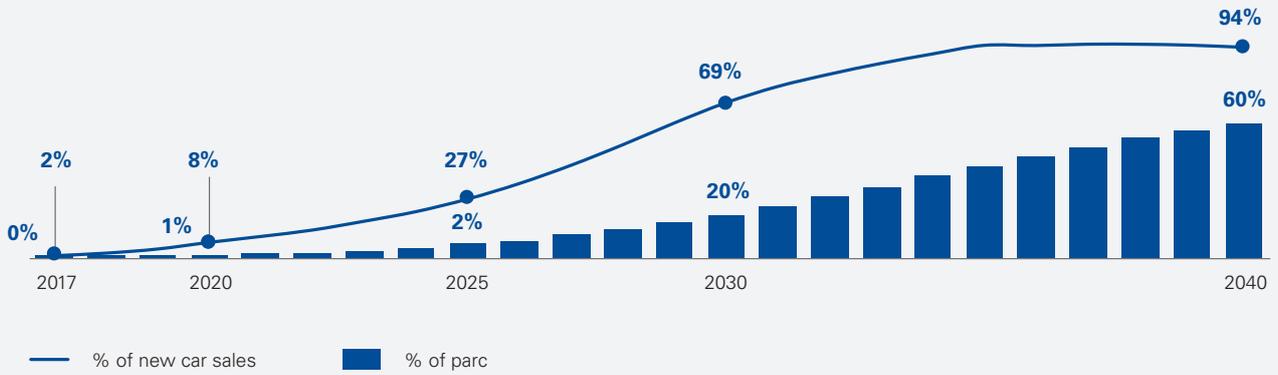
⁴ *Connected and autonomous vehicles – the UK economic opportunity*, KPMG UK

⁵ <https://www.independent.co.uk/environment/electric-cars-vehicles-greenhouse-gas-emissions-climate-change-co2-a8528006.html>

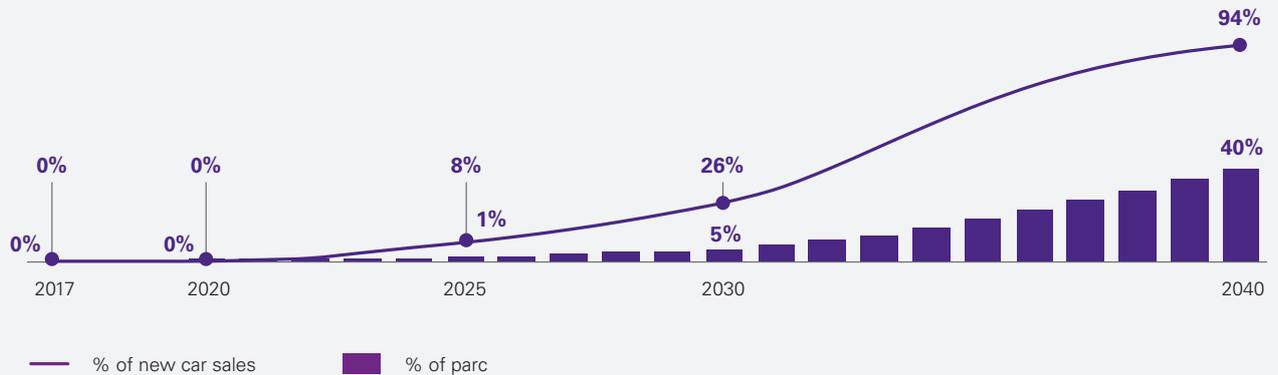
UK passenger vehicles – 2017-2040 adoption rates



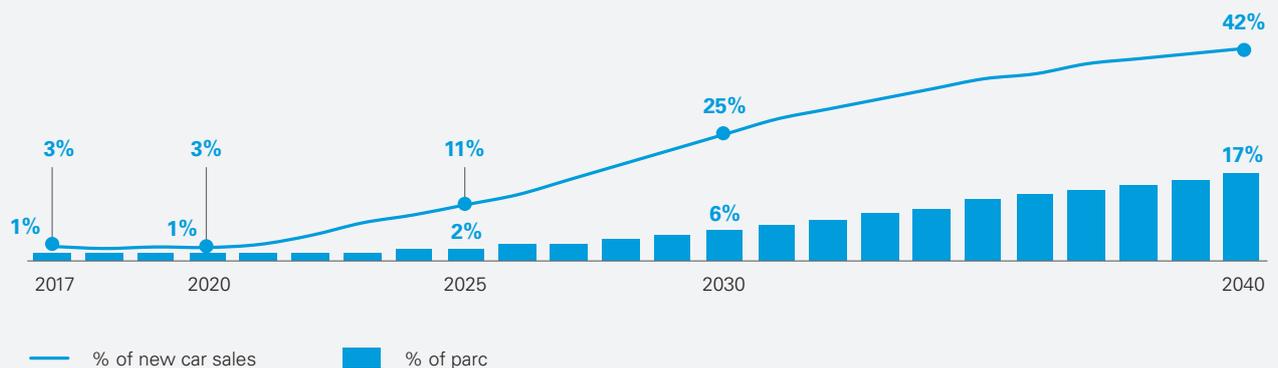
EV adoption (battery electric vehicle and plug-in hybrid electric vehicle)



AV adoption (level 4 and level 5 adoption)



MaaS adoption



Significant economic and digital shifts amidst the rise of fleets

Alongside the societal benefits will come significant economic shifts. These won't just be confined to making or selling new kinds of vehicle. AVs are expected to eventually generate some 2 petabytes of data per year⁶, bringing vast opportunities for those who can access and leverage the data effectively to sell relevant products and services to users.

For an example of the new value models being created, we need look no further than Uber, which after only 10 years of operations have reported a Q2 2018 revenue of \$2.8 billion, up 63% on the previous year.⁷

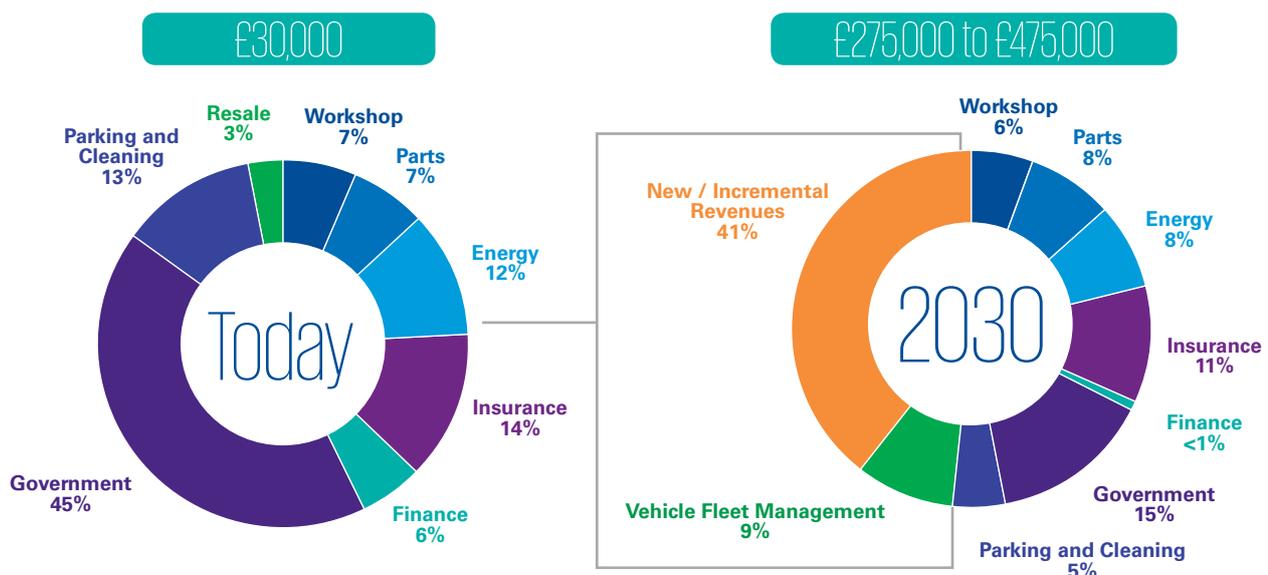
The progressive development of EVs and AVs, coupled with the shift in consumer preference away from vehicle ownership to vehicle access⁸, will see the rise of fleets that individuals and businesses access on a subscription or pay as you go basis. "Fleets for personal or commercial use will steadily converge," says Christoph Domke, Director of Mobility 2030 at KPMG UK.⁹ Fully automated vehicles mean that moving people and moving goods will become more aligned. Whether operated and owned by ride-hailing companies, OEMs or MaaS providers, the changes will be far-reaching. This vision depends on the effective rollout of 5G and national security-level cyber infrastructure.

For the UK economy alone, we believe there is a £75-150bn opportunity. This will include a £24bn+ boost to UK industry through telecoms demand, new digital revenue streams, service industry revenue, greater efficiency of city infrastructure and freed up asset value.⁹

There are significant prizes to play for, including huge downstream digital revenue streams that we estimate could increase ten-fold over a ten year lifetime of a future vehicle through content, media and retail that consumers will purchase on journeys when they are freed up from actually driving.¹⁰

But of course, there will be losers as well as winners. Some incumbents risk being displaced by new players, or left out of exciting collaborations and alliances. The critical need now is for businesses – whatever role they currently fulfill – to determine where they will play in the future ecosystem. They will need to assess and, most likely, reset their financial, business and operating models. This will almost certainly involve the need to create new partnerships and alliances, as no single organisation is likely to have the capacity or internal resources to develop new models on their own.

Downstream revenues associated with an EV, AV, MaaS vehicle over 10 years



Source: KPMG Mobility 2030 analysis based on company executive responses to questions on future revenue streams in our Global Automotive Executive Survey (2017) and an analysis of cash flows associated with purchasing and running a personal vehicle now vs a fleet operating an EV-AV-MaaS vehicle in 2030 (over a ten year period).

⁶ <https://business.financialpost.com/technology/the-real-prize-and-threat-of-the-driverless-car-revolution-is-data-the-car-knows-a-lot-about-you>

⁷ <http://www.businessofapps.com/data/uber-statistics/>

⁸ Global Automotive Executive Survey 2019, KPMG

⁹ KPMG Mobility 2030 analysis

¹⁰ Ibid





The movement of people

How will people transport themselves in ten years' time, and beyond? Science fiction visions of hyperloops may be some way off, but nevertheless we will see enormous changes in a short space of time, thanks to rapidly emerging technologies and changing consumer expectations.

The shift from ownership to access

According to Charlie Simpson, Partner and Head of Mobility 2030 at KPMG UK, "We're now at a point where vehicle ownership – and indeed, the very concept of driving – is becoming significantly less attractive to Generation Z." There has already been a 21% reduction amongst the proportion of 17-20 year olds learning to drive in the UK between 2007 and 2016.¹²

Tomorrow's consumer is more likely to want to access a mobility service or mode when they need it than to own their own permanent vehicle – just as we have already seen the shift from ownership to access in other parts of our lives such as music and entertainment. Transport usage will become like having a Netflix subscription.

MaaS aggregation

We therefore expect continuing growth in ride-hailing services, carpooling, dynamic shuttle services and shared ownership models, as well as interconnected services. MaaS aggregators will offer integrated multimodal solutions that consumers can access on demand, enabling users to access and purchase transport services through a single point of contact (e.g. a mobile app), rather than a collection of interfaces.

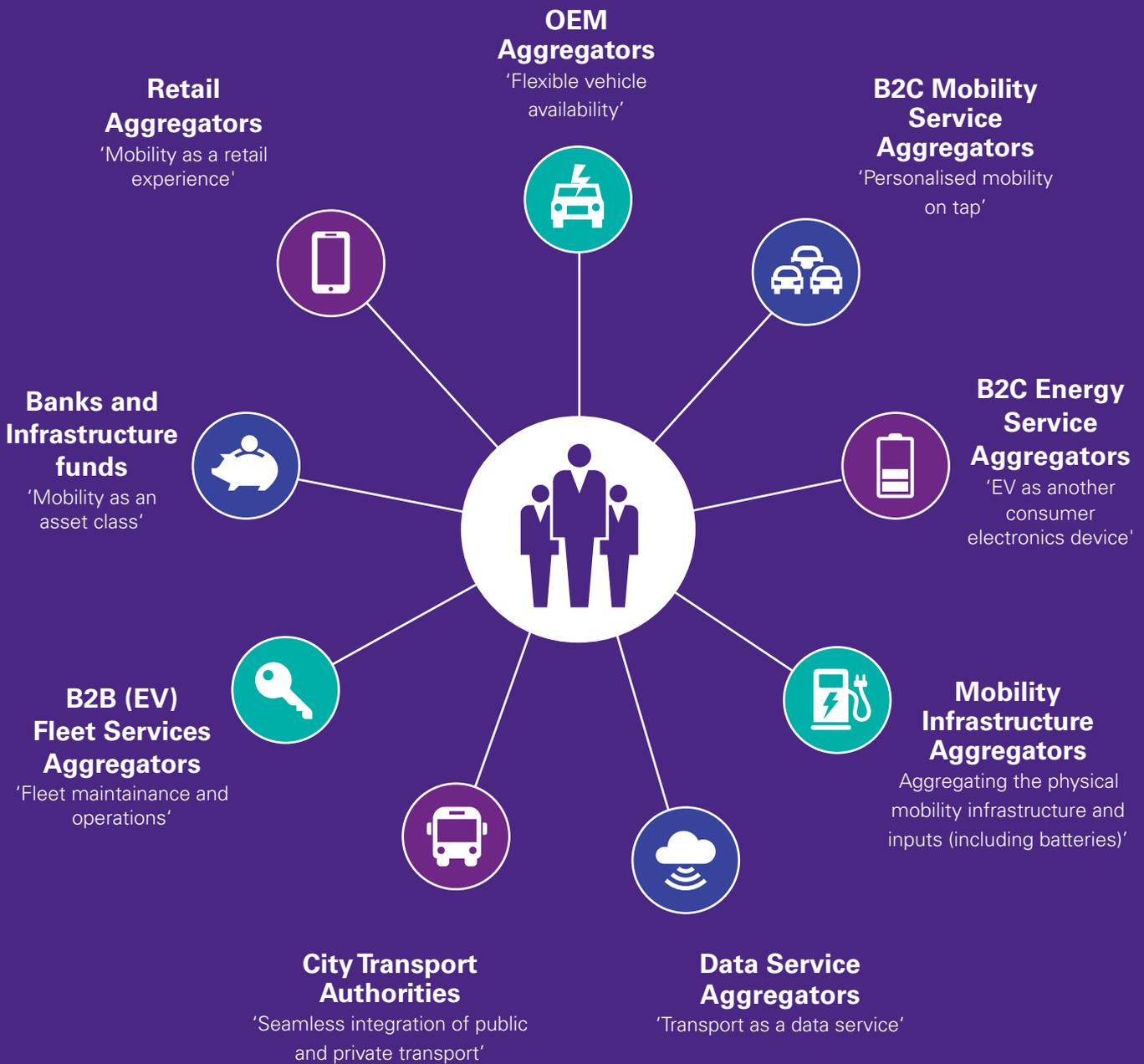
"We're now at a point where vehicle ownership – and indeed, the very concept of driving – is becoming significantly less attractive to Generation Z."

Charlie Simpson, Partner and Head of Mobility 2030 at KPMG UK

¹² <https://www.journalism.co.uk/press-releases/average-age-to-start-driving-now-26-as-younger-adults-put-off-learning-and-car-buying-/s66/a657725/>

One of the key questions that follows from this is – who will that aggregator be? A transport service provider, an OEM, a payment service provider? How many of them will the market support? The position of aggregator will be the highest value of all and the struggle to take that place could be one of the key battlegrounds of the coming years. The biggest prize will belong to those who can ‘aggregate the aggregators’ and take the primary interface position with the customer.

Competing ecosystems fighting for a dominant ‘aggregator’ role for customer primacy



Shifting into position

Moreover, this is not just about the future: there are opportunities right now to be secured. We have seen the phenomenal growth of the ride hailing providers, such as Uber, Lyft, and Didi. The valuation of Uber alone is expected to reach \$120bn in 2019.¹³

These operators are all pursuing strategies of becoming mobility aggregators and are expanding into multiple adjacent markets - including bikes, scooters, car sharing and last mile delivery.

Coupled with this, we have seen the emergence of companies like Whim that offer a single interface to access multimodal services. Indeed, Whim recorded 2.5m journeys in its first year while operating solely out of Helsinki, Finland. Since then, Whim has expanded to Birmingham, UK and Antwerp, Belgium, and is planning its expansion to 12 further cities.¹⁴

But as new players move themselves into position, major questions are forming. Who will own the cars and fleets of the future? Will OEMs maintain their brand prominence, or will they begin to make vehicles on behalf of a MaaS provider? Other players could move into fleet ownership too. Car rental firms, energy companies (particularly for EVs), the tech giants: there are multiple possibilities.

At the same time, there are huge questions to be resolved around the new infrastructure that will be needed to support EVs, AVs and other new forms of mobility. "Much of our built environment, from parking and retail to leisure, transport hubs and whole city centres, will need to re-imagined around people, rather than cars," says Graham Armitage, Partner and co-head of Mobility 2030 at KPMG UK.

Transport authorities, city planners and transport operators need to take future needs into account now when making current decisions. This is made more challenging by the increasing pace of change and the requirement for new operational capabilities and skills. And who will foot the bill for the changes? Funding mechanisms, public and private, are needed.

"Much of our built environment, from parking and retail to leisure, transport hubs and whole city centres, will need to re-imagined around people, rather than cars."

Graham Armitage, Partner and co-head of Mobility 2030 at KPMG UK

Comparison of five largest automotive OEMs and five largest mobility service players by market capitalisation or valuation estimate

Five largest traditional automotive OEMs

Toyota Motor Corp	\$203bn
Volkswagen AG	\$88bn
Daimler AG	\$60BN
BMW AG	\$60bn
Honda Motor Co.	\$55bn

Total top five \$474bn

Five largest new mobility services players

Uber	\$72bn
Didi Chuxing	\$56bn
Lyft	\$12bn
Grab	\$6bn
Go-Jek	\$5bn

Total top five \$151bn

Source: Bloomberg, Reuters, Financial Times, crunchbase.com

¹³ <https://www.forbes.com/sites/greatspeculations/2018/12/03/how-uber-could-justify-a-120-billion-valuation/>

¹⁴ <https://mobilemarketingmagazine.com/whim-transportation-app-debuts-with-25-million-trips-taken->

Opportunities for fleet operators

Fleet operators are already able to reap significant benefits from these technological innovations. Modern vehicles are rapidly becoming more connected, equipped with smart sensors and other technologies that enable continual monitoring and predictive maintenance. Increasingly, this will be delivered 'over the air' remotely as software updates.

Such maintenance significantly lowers the costs of running a fleet, as problems are caught at an early stage and are cheaper to fix. It also enhances service levels to customers by preventing or greatly reducing unexpected or unplanned downtime. "Moreover, autonomous driver assistance systems (ADAS) are already hugely reducing the number of vehicle collisions, through automatic emergency braking and other innovations, by as much as 38%, adds David Dew-Veal, a fleet operations expert at KPMG UK.¹⁵ This can significantly reduce insurance premiums, driving costs down further.

Meanwhile, the servicing costs for an EV are anywhere between 40% and 60% lower than for a traditional ICE vehicle due to the lower number of moving components and lower fuelling costs.¹⁶

These factors, combined with significant falls in battery costs, mean that the total cost of ownership (TCO) of an EV will fall below that of an internal combustion engine (ICE) car by around 2021, while AV technology will lower MaaS prices and increase access and usage.¹⁷ We therefore expect to see an accelerating uptake of EV and AV models by fleet operators, particularly logistics/commercial fleets in the first instance due to their focus on TCO, and this in turn will drive consumer acceptance and adoption for their own personal use.

With so many potential paths opening up, businesses must gain clarity now over what their place in the ecosystem will be. This will involve doing the thinking to make sense of the coming disruption then moving into a design phase of developing business models, before coming to the 'doing' phase of scaling propositions up and developing enabling operating models to make them a viable reality.

"Moreover, autonomous driver assistance systems (ADAS) are already hugely reducing the number of vehicle collisions, through automatic emergency braking and other innovations, by as much as 38%."

David Dew-Veal, Fleet operations expert at KPMG UK

¹⁵ <https://www.thatcham.org/what-we-do/car-safety/aeb/>

¹⁶ KPMG Mobility 2030 analysis

¹⁷ *Ibid*





The movement of goods

Just as the movement of people will see far-reaching change, so will the movement of goods both between commercial operators and from businesses to consumers.

Indeed, the transformation of commercial goods networks could be even faster than that of the movement of people, given that the over-riding driver in commercial networks is Total Cost of Ownership (TCO), which new business concepts and technologies could reduce significantly.

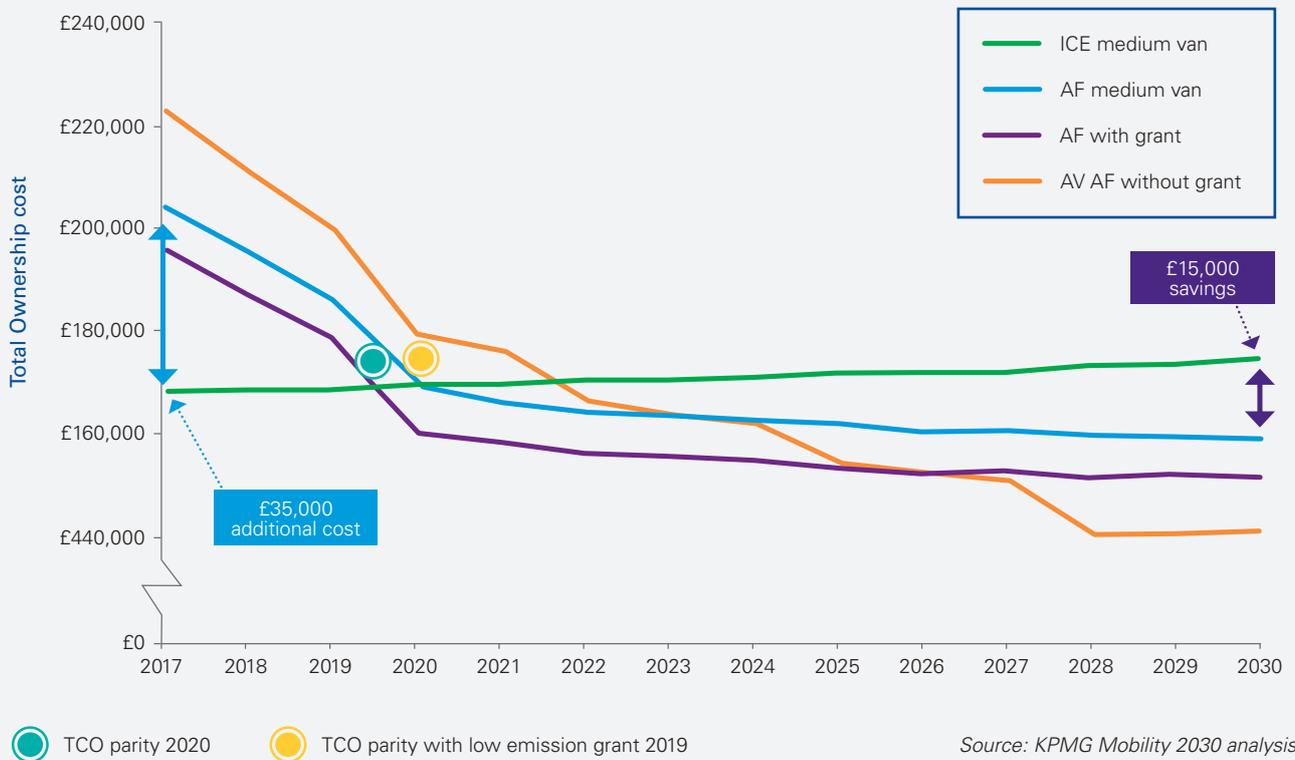
TCO parity looming large

As discussed above, the cost of EVs is set to drop significantly, thanks to, for example, lower battery costs. We therefore estimate that for light commercial vehicles (LCVs), TCO parity between EV and ICE vans will occur as early as 2020 in the UK (a year earlier than for cars), with an ICE-EV difference of £15k per vehicle by 2030.¹⁸ A regulatory-driven move away from diesel is also anticipated to help drive the uptake of alternative powertrains, which we anticipate will account for 66% of LCV sales in the UK by 2030.¹⁹

All of this points us firmly down a one-way road: the increasing electrification of commercial fleets. Alongside this we will also see varying degrees of adoption of other alternative powertrains such as compressed or liquid natural gas, hydrogen fuel cells and hybrid vehicles.

However, in heavy goods vehicles (HGVs) the uptake of electrification will be more limited due to the size, weight and charging requirements of the batteries, together with the infrastructure developments needed – unless there are rapid breakthroughs in commercially viable battery technology and charging networks. There will also be marked variation by region. We expect that diesel HGVs will still be dominant in many countries such as the US and India in 2025/30, whereas natural gas HGVs will see higher demand levels e.g. in China and areas in Europe.²⁰

Light commercial vehicle total cost of ownership in the UK



¹⁸ Mobility 2030 analysis

¹⁹ Ibid.

²⁰ Ibid.

AV fleets: 'Boxes on wheels'?

Electrification aside, it is the development of autonomous technologies that could bring the most significant cost savings.

A driver represents up to 40% of the cost of operating a commercial vehicle, depending on industry, region and fleet operator specification: taking the driver out instantly transforms the economic equation.²¹ What is more, the driver – being a mere human – is the least reliable part of a commercial vehicle operation, and can only legally work for a specified number of hours per day. Technology, on the other hand, could work with perfect reliability for as long as it is required to do so. Fleets will increasingly be maintained while on the move through software updates and monitored via telematics.

That is why we have already seen the trialling of autonomous commercial fleets – including 'platooning' in countries with long open roads, such as the US – and why it will continue to be one of the holy grails of the distribution industry.

The ultimate prize – although this may be some way off – will be to remove the truck at the front of a vehicle altogether so that the trailer can be extended (as well as motorised) to carry a greater load at lower unit cost. This is particularly relevant in European markets where there are binding truck/trailer length limitations. The whole vehicle could be controlled by autonomous technology integrated into the vehicle – a kind of automated 'box on wheels' – running at optimal efficiency and cost effectiveness.

For LCVs in particular, we expect the adoption of AVs to outpace that of passenger cars, given the TCO benefits, safety improvements and the pressing need across the commercial vehicle sector to find a solution to driver shortages. Furthermore, there are fewer aesthetic concerns for a commercial AV than for a passenger car.²²

We are also seeing significant investment into automated technology for last-mile deliveries through personal delivery device robots and drones. Delivery vehicles will increasingly be equipped with teams of drones and ground transportation robots that can be launched to make multiple deliveries across an area. We expect such investment to skyrocket over the next few years.²³

The increased consumer demand for autonomous delivery will also lead to sharply increasing numbers of delivery vehicle miles travelled. For the US market, we predict the number of shopping trips to be reduced by 50% by 2040. The number of bots needed to serve future deliveries will be around a minimum of 1m in the United States, equivalent to the number of buses on the road.²⁴

Digital freight brokerage

Another major trend that will sweep the industry is digital freight brokerage. The distribution sector is notoriously inefficient – as many as 30% of HGV runs, for example, are estimated to be empty in the UK.²⁵ Digital freight brokerage has been dubbed "Uber for trucks" and there are already over a global 1,000 apps developed around the world through which loads can be matched to vehicles, such as Transfix, Convoy, TG Matrix and Uber Freight.²⁶ The apps developed can connect players instantly, providing quotes, background checks and location information, making the brokerage process more transparent and significantly faster. With 15% commissions typical for brokers, this will become a hugely valuable market.

Winning the customer

Another significant shift is likely to be the disintermediation of traditional players in the commercial distribution ecosystem by tech giants such as Amazon. Amazon is investing across the logistics supply chain, increasing its control of technology and the customer. This enables it to compete (and win) against major carriers and local last-mile delivery companies. Customers are increasingly willing to pay a subscription for efficient, guaranteed delivery and use Amazon as their first port of call. Other online retail giants are likely to follow the same path, creating challenges for traditional delivery partners.

A complex new ecosystem

Just as in the personal market where we foresee lower levels of vehicle ownership, we expect more organisations to lease their fleets in future rather than own them, as well as use flexible 'as-a-service' models, which are already being introduced by the likes of MAN and Voltia. We are also likely to see a rise in 'virtual fleets' where companies 'ride-hail' vehicles on demand for their distribution needs. These factors will generate strong commercial opportunities for fleet management companies operating shared, autonomous and electric fleets.

A complex commercial mobility ecosystem will continue to evolve at pace, with players rushing to fill parts of the new value chain. As with the personal market, the strategic imperatives are clear: to think through the disruption that is coming, design solutions that can monetised, and scale them into the market. This will take time, but needs to start now.

²¹ KPMG Mobility 2030 analysis

²² Ibid.

²³ *Autonomy delivers*, KPMG US

²⁴ Ibid.

²⁵ <https://www.citymetric.com/transport/heavy-goods-vehicles-are-not-paying-their-way-roads-it-s-time-distance-based-charging-3806>

²⁶ KPMG Mobility 2030 analysis

Sector disruption

All of this will raise significant questions and challenges for several traditional sectors, including:

OEMs



With global vehicle sales in developed markets likely to fall amidst declining personal ownership rates, there are clear challenges for traditional OEMs. They face significant and growing competition from tech giants such as Amazon and Google who are developing their own AVs, as well as a host of agile start-ups. OEMs are starting to move with the times and doing the right things – entering into partnerships and investing in start-ups, developing EVs and AVs – but can they move quickly enough? Can they successfully engineer a comprehensive redesign of their business models at the same time as keeping their existing businesses going?

Many will have a future as ‘metalsmiths’ – manufacturing ever more sophisticated vehicles, but ceding the customer interface to mobility providers. But some may be able to take the position of ‘gridmaster’ – manufacturing vehicles but also, crucially, providing platforms for a variety of mobility services.²⁷ We also expect consolidation and a reduction in the number of OEMs, as development costs increase with tech content and unit sales begin to decrease.

Transport Authorities



There are already signs that the growth in ride-hailing and micro-mobility services is having a negative impact on urban public transport usage. Transport Authorities are likely to face declining revenues as this trend gathers pace. Alongside changing work patterns and internet shopping, ride hailing has been cited as a contributing factor to the recent decline in the number of passengers using the London Underground.²⁸ Authorities are also likely to face declining demand for lucrative car parks and roadside parking charges. The upside of this may be that prime real estate can be freed up for sale or conversion to different purposes.

Furthermore, fuel revenues will inevitably decline as EV uptake accelerates. The UK government will also have to assess how it can fill the fiscal hole that will be left when the current annual £28bn²⁹ of fuel duties largely dries up – no small task. Transport authorities have a number of areas to focus on: enabling collaboration between public and private transport; creating new value capture models and realising the benefits of cleaner, safer and more efficient transport.

Dealerships



With overall sales declining, together with sales moving ever more substantially online via platforms and apps, the future for physical showrooms looks challenging. Dealers are already experimenting with pop-up and shopping centre formats to increase customer engagement – but this won't be enough on its own. A combined “bricks and clicks” model and direct-to-consumer offerings will also be needed.

Dealers are also likely to experience large revenue declines due to the falling requirement for service and maintenance of EVs. For example, Hyundai are selling their EV Kona via an online-only channel. In any event, those skills will become more software-based with the emergence of CAVs. For dealers, new models will be required; strong relationships with fleet players are likely to be crucial.

Mobility-as-a-Service providers



There will be enormous opportunities for the new breed of MaaS providers offering mobility solutions and packages; data providers harnessing the huge volumes of data generated and selling it to service providers to enable targeted and relevant advertising or information services to users; banks and payment service providers offering integrated account solutions; insurers providing cover wrapped into transport services together with cybersecurity insurance; and investment institutions funding investments in the new infrastructure that will be needed.

This will clearly be a highly coveted position, given the rapidly increasing valuations and investments received by early market leaders. Those able to develop compelling customer value propositions supported by coherent business and operating models will see huge opportunities both for organic growth and attractive exits.

²⁷ *The time is now: Are you a metalsmith or 'gridmaster'?* KPMG UK

²⁸ <https://www.theguardian.com/uk-news/2018/feb/12/fall-in-journeys-leaves-tfl-facing-near-1bn-deficit-next-year>

²⁹ <https://obr.uk/forecasts-in-depth/tax-by-tax-spend-by-spend/fuel-duties/>

Energy



The significant decline in demand for vehicle (fuelling) hydrocarbons, as a result of the shift to EVs and alternative fuels, will impact oil and gas revenues. These players also face challenges as to how to re-purpose forecourts. EVs can be charged at home, destinations and workplaces, which risks a significant amount of capital tied-up in stranded assets. In response, we have already seen several oil and gas majors make acquisitions in the charge point operator space as they seek to become wider energy providers.

The power and utilities sector also faces local grid capacity challenges, especially as EV adoption scales. Smart charging, vehicle-to-grid switches and time-of-use tariffs are likely to be critical to manage supply and demand for electricity.

As technologies evolve, the energy sector will have a big role to play in supporting the development of alternative powertrains and clean fuels, and cost-effective, long-range, high-performance batteries.

Infrastructure



Significant investment is needed to develop smart infrastructure for vehicle-to-grid connectivity, and for mass electric vehicle charging. Road upgrades will be needed, which will introduce different maintenance requirements and enable data to play a key role in optimising road management and safer usage. This in turn will require new standards and regulations. There are major implications for transport authorities, city planners and infrastructure operators.

Public and private funding mechanisms will be needed, with questions to be resolved over who foots the bill. At the same time, there is an opportunity to improve the built environment, by reclaiming large amounts of urban real estate currently used for parking and to redesign cities around people rather than traffic.

As noted in our ‘Islands of Autonomy’ report, AV is likely to be most quickly and widely adopted in cities.³⁰ This is due, for example, to the need for network density and the ability to geo-fence areas. Infrastructural considerations and challenges are therefore likely to be faced by major city authorities first.

Financial Services



The mobility ecosystem will present huge opportunities for banks and payment providers in developing integrated mobility payment platforms. There could be the opportunity alongside that to take the position of a trusted aggregator for consumers, bringing them access to mobility solutions. But there are challenges likely too – new approaches to asset securitisation and financing will be needed with significant questions over whose balance sheets will be able to support these asset investments.

For insurers, there is the fundamental business model challenge of moving from B2C to B2B vehicle insurance as the model shifts from personal to being product liability-based in an AV world, with all the additional data requirements and the cyber security insurance needs too.

Telecommunications



The sheer bandwidth needed to support the operation of CAVs will be the essence of the challenge for telcos - potentially including vehicle to vehicle, vehicle to infrastructure communications and cyber security. This will require the rollout of 5G across the UK. We will also see an intensifying battle, involving telcos and media content providers alike, to provide content into AV pods. A vast market will be opening up – and seizing early advantage could be key to future success.

In addition to this, with data the ‘new oil’ and telcos having vast experience dealing with software solutions and reams of data, they will have a critical role to play in contributing to the development of software-intensive CAVs themselves, as well as connected up various consumer devices.

³⁰ *Islands of autonomy, KPMG US*

People and goods - a shared future?

It is clear that there are many similar drivers behind the future development of the movement of people and of goods: costs, safety, efficiency and the rapid emergence and development of new technologies. There are also similar challenges to be faced by the sector players providing services into each market, such as competition from new entrants, increasing sector convergence, and the need to develop new skills, partnerships and capabilities.

The question inevitably arises: to what extent will we come to see shared services or modes that combine the movement of people and goods together?

As we are architecting the future, new modes that are connected, flexible and efficient will provide an opportunity to better structure the overall transport system and make better use of spare capacity.

“For example, could AV pods be configured in a modular fashion such that they could carry people in one trip and then goods in another?” Suggests Edwin Kemp, Associate Director of Mobility 2030 at KPMG UK. “Or even both concurrently? The economics of AVs means they will need to be highly utilised.”

We are already seeing early indicators of this convergence of moving people and moving goods in some of the sharing economy and P2P models, such as Nimber and Stuart. Here an Uber type service matches goods to be delivered with people already travelling or commuting in that direction, making use of ‘spare capacity’ in the overall system. The emergence of CAVs and dedicated mobility fleets will, in our view, continue to drive these shared service models at greater scale and sophistication.

“Could AV pods be configured in a modular fashion such that they could carry people in one trip and then goods in another?”

Edwin Kemp, Associate Director of Mobility 2030 at KPMG UK





Regulating the pace of change

In such a dynamic and fast-moving technological environment, the challenge for national and local regulatory authorities is, on one level, simply to keep up. Existing laws and regulations are likely to become increasingly obsolete as the technology progresses.

But authorities will have to find a way of staying ahead and pre-empting change, so that they aren't caught out. We have already seen cases where authorities have been surprised by the pace of developments, such as in a number of cities where thousands of dockless bikes have been 'dumped' following their surge in popularity and the launch of multiple new rival services.²⁴

At the same time, the mobility future will play out on a city by city basis rather than country by country. Each city will develop in its own way, and it is critical that city transport authorities are able to facilitate development with sensible legislature and governance. Transport authorities will play a convening role, bringing together private partners and stimulating investment. Existing legislation may not be fit for purpose. For example in the UK, e-scooters - which have boomed in the US and elsewhere - are illegal on our roads as the relevant legislation has its roots in a 19th century Highways Act. Sustainable contemporary solutions need to be found rather than piecemeal workarounds.

On a national level, new legislation and regulation is critical to enabling the safe and effective deployment of AVs. The Law Commissions of England, Scotland and Wales are currently reviewing the UK's legal framework for AVs, due to be completed in March 2021. The primary objective is to propose a legal framework which will remain effective in light of AVs and address questions around safety assurance and liability. The Review is going to tackle some of the fundamental questions regarding CAVs operating on public roads and is expected to be the cornerstone of their adoption in the UK.

Regulatory authorities have a key role to play in facilitating innovation and encouraging collaboration between public and private sectors to design solutions, while enabling progress and ensuring transparency, safety and fairness in the market. Customer privacy and rights will need to be carefully guarded and competition that brings better value to both consumers and the public purse will need to be fostered.

²⁴ <https://www.standard.co.uk/news/transport/smart-bike-firms-reveal-crackdown-on-vandalism-and-dumped-bicycles-in-london-a3847976.html>

Fleets are the key growth driver (and you've got to collaborate to compete)

With so much developing so quickly, it is not a question of whether mobility is transformed - but how quickly, at what scale and to what degree the benefits are realised.

We see the rise of fleets as the biggest single growth driver. It will therefore be critical for many different players in the mobility ecosystem to secure relationships with the right fleet players early on. It then follows that, as fleet operators grow and expand, so the revenue streams of other players will grow too through the provision of supporting products and services – vehicles themselves, digital platforms, charging infrastructure, telecommunications bandwidth, etc.

Organisations across the mobility ecosystem need to get involved and start placing bets now: the time for standing back and observing has passed. Those that remain passive risk simply being left behind. With the pace of change expected, once a business loses ground it could prove near-impossible to catch up.

One of the keys to success in the new world is undoubtedly collaboration. Alliances and partnerships will be essential, as no one player will be able to do everything on their own due in large part to the new and distinctive capabilities required to deliver these solutions. KPMG's 2019 Global Automotive Executive Survey found that 65% of automotive executives believe in cooperation with competitors – or 'co-ompetition'. Amongst Chinese executives, this was as high as 84%.

Every business needs to be looking across its value chain and asking: what are the new propositions and models we need to back? Do we need to partner with a third party to achieve them?

Some investments may not pay off; others may prove the springboard for future success. The only way to know is to get active and get projects 'live' on the dashboard.

The reality is that in the future landscape of subscription-based and shared fleet services, the value of even premium brand assets from the old world may be seriously eroded or indeed irrelevant. Even the biggest and most established players cannot rest on their reputations.

One of the ultimate prizes, as we have seen, will be to become an aggregator who 'owns' the customer relationship. Will there be an aggregator who aggregates Uber, for example? Who can position themselves as the customer's trusted gateway to the fast-track of the future?

It is the businesses that develop ambitious but realistic strategies now for the future, and who are prepared to back that up with investment and partnerships with others, that will have the highest probability of emerging as winners as tomorrow's mobility landscape rapidly forms around us.



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