Transport: Self-Driving, Sustainable and Smart

Robert Courts MP / Will Norman / Lee Cronin
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When new roads lead nowhere

Readers who already enjoy classic policy documents – and after all, who doesn’t – will doubtless already be familiar with the Standing Advisory Committee on Trunk Road Assessment’s 1994 blockbuster, *Trunk Roads and the Generation of Traffic*. To produce this report, the Committee consulted 172 different organisations and individuals, seven government departments and agencies, seven local authorities and commissioned eight separate studies to answer one question: do new and improved roads create more traffic? The answer, it found, was yes – “induced traffic can and does occur, probably quite extensively” on Britain’s roads. The phenomenon of “induced traffic” on roads was first explained 50 years ago by the German mathematician, Dietrich Braess, who recognised that driving can be described as a game in which every player will make self-interested decisions until a kind of moving stalemate, or equilibrium, is reached. Because building a new road creates a new, more attractive option for many drivers, it can actually increase the density of traffic flow and lower the overall speed at which equilibrium is reached. The reverse is also possible; in examples around the world, closing roads has been shown to reduce journey times. Despite having known this for half a century and proven it definitively 14 years ago, the government remains so wedded to the fallacy of roadbuilding that it committed, in the recent Budget, to spend £28.8bn on new and improved roads from 2020-25. The 2018 Budget contains 21 occurrences of the word “road”, five mentions of “railway”, one “airport” and no mentions of bicycles, cycling or walking. With fuel duty frozen for the ninth year running, the UK remains economically committed to a mode of transport that, last year, violently killed 1,793 people. With cars so entrenched in our transport, it is therefore vital that they are made safer, both in traffic and for the environment, and smarter, in how they use a network that is, though paved with good intentions, planned in a way that slows them down.
The Transport for New Homes Association, which is part of the Campaign for Better Transport, has published a report which finds that young couples living in out-of-town new-build homes are “trapped” in car ownership and use. A lack of public transport, and an absence of shops and other amenities close to new housing have led to overreliance on private cars, fostering a sense of isolation and a lack of safe pedestrian and cycle routes into town, according to the report.

This is particularly the case for people living in developments built on large greenfield sites on the edges of towns. The Association visited 20 new housing developments for the report, which was backed by the RAC Foundation – a motoring group. The lack of mobility options, the report claims, leads to increased car journeys and longer commutes, a lack of lifestyle activity and vibrancy, a lack of opportunities for those who don’t drive, and “barren” public realms “dominated by parked cars and road access with little greenery”.

Director of the RAC Steve Gooding said “it’s not much fun when … you have to ferry your kids everywhere, and then you drive straight into a traffic jam.”

For a £7.99 monthly subscription, residents of Milton Keynes can now receive scheduled parcel delivery courtesy of Starship’s fleet of robot couriers. Parcels are sent to a user’s “address” at a depot, then carried from the depot to the user’s location by a six-wheeled, self-driving robot. The robots can carry up to 10kg and travel up to 3km from the depot, at a maximum speed of 6kmph – equivalent to a fast walking pace. Guided by nine cameras, eight ultrasonic sensors (similar to parking sensors), radar and GPS, the 55cm-high robots can operate in rain and snow. The company says robot delivery creates more convenience and safety for the huge and growing market for online orders. Other companies including Nuro and TeleRetail have conducted trials of similar services, and Starship robots have delivered food in Estonia and Germany, but this is the first time that commercial package delivery has been offered by robots. Starship has also partnered with Co-op in Milton Keynes to deliver groceries.

EU unveils “green deal” for transport

At a historic meeting in Graz, Austria, EU environment and transport ministers have agreed a “green deal” for transport. The deal makes a number of pledges, which will start a “new era” of “clean, safe and affordable mobility for Europe”. It promises to accelerate the market introduction of low and zero-emission...
Budget airline easyJet has launched a new feature in partnership with social media giant Instagram, allowing users to view suggested holiday destinations, based on the images which appear on their news feeds.

easyJet’s “Look&Book” feature is available to download as an iOS app, and is an add-on to Instagram. It is an attempt, according to the airline, to tap into the millennial generation’s enthusiasm for travelling.

Look&Book scans Instagram users’ feeds for “contextual clues” and then provides holiday adverts relating to the relevant post. It tells Instagram users to take screenshots of favoured locations, so that it can make a recommendation off the back of it.

Daniel Young, head of digital at easyJet, told The Drum: “It’s fantastic how technology is enabling us to enhance and streamline the customer search and booking experience.”

Crossrail chief steps down

Rohan Banerjee

The chief executive of Crossrail, Simon Wright, will leave his position on 19 November after the government had to agree to a bailout payment in order to complete the delayed £15.4bn infrastructure project.

Wright will be succeeded by Mark Wild, the managing director of London Underground, who will remain in the post until the opening of Crossrail’s central section – the Elizabeth Line, which runs from Reading and Heathrow in the west through tunnels across to Shenfield and Abbey Wood in the east.

The TfL commissioner, Mike Brown, said Wild had extensive experience of delivering major projects, which will be important in completing Crossrail safely and efficiently. Wild has served as a non-executive director of the Crossrail board since taking over the underground in June 2016.

TfL has blamed the delay to the Elizabeth Line, which was originally due to open in December, on the need for more testing of communications between trains and signalling systems. TfL has since said that full-time testing of the Elizabeth Line would start “soon”.

In October, a £350m loan was given to Transport for London to cover a revenue shortfall as a result of the Elizabeth Line’s delay. Questions have been raised as to whether the Mayor of London, Sadiq Khan, knew if the Crossrail project was going to be stalled for this long.

Adidas designs Oyster trainers

Augusta Riddy

Transport for London and Adidas Originals have produced three new trainer designs to celebrate the 15th anniversary of the Oyster card.

They take inspiration from key visual aspects of the Oyster card, the Tube and the first underground connection, from Paddington to Farringdon Street. The shoes cost £80 and include a limited-edition Oyster card topped up with £80 and a leather card holder featuring the Adidas and TfL logos.

Director of commercial development at TfL Graeme Craig said of the collaboration: “The Tube, its roundel and the Oyster card are all iconic symbols of London and this partnership shows how two world-renowned brands can work together to produce something truly original.”

The trainers follow a strong tradition of design collaboration on London’s transport network, which Adidas West Europe senior vice president Gavin Thomson called “the world’s most famous transport system”.

“True to Adidas Originals’ principles,” he said, “the collaboration takes its inspiration from the past, present and future to celebrate the heritage and unity of London’s creators.”
We are on the cusp of a profound change in how we move people, goods and services around our towns, cities and countryside. This is driven by extraordinary innovation in engineering, technology and business models,” reads the government’s industrial strategy, published last year with the mandate of building a Britain that is “fit for the future”. Connected Autonomous Vehicles (CAVs) – vehicles capable of navigating their environment without human input – are name-checked 12 times in the white paper, which claims that the UK has an opportunity to “assert global leadership” in the field.

Self-driving cars will soon become a reality on Britain’s roads. In 2015, the government launched the Centre for Connected and Autonomous Vehicles (CCAV), a joint policy team between the Department for Business, Energy & Industrial Strategy and Department for Transport. CCAV is providing over £250m in funding, matched by industry, with the belief that CAVs “could change the way we travel”. A £5m test trial, conducted as part of the government’s 5G strategy, found numerous benefits associated with self-driving technology, including improved productivity. The government has also established the “MERIDIAN” initiative, a “co-ordination hub” that seeks to convene UK industry around a set of “long-term strategic priorities” aimed at keeping the UK on the cutting edge of autonomous vehicle development. Chris Grayling told the Association of British Insurers last year that the UK is “well positioned not just to follow changes in motoring technology over the next couple of decades, but to lead them”.

One of the British companies leading the CAV revolution is Cambridge-based FiveAI, founded in 2015. Launched by a group of tech industry veterans, the firm is planning a “fully automated shared mobility service” – a taxi fleet, effectively, of self-driving cars – as an alternative to driving to work. The firm, which is already testing its CAVs in Bedfordshire, made headlines in August when it...
FiveAI plans to launch a driverless taxi fleet in London

FiveAI plans to launch a driverless taxi fleet in London, collecting data from roads in Croydon and Bromley. The company’s co-founder, Ben Peters, says his team has always wanted to do something “technically difficult and technically interesting”. After reading “about 2,000” research papers on AI between them in a year, they drew up a list of six problems with commuter cars that their technology will aim to solve.

FiveAI’s research has found that cars, taxis and private hire vehicles account for almost half of the street space used in London, but only 13 per cent of distance travelled. A third of commuters in the capital have no “better option” than their own vehicle, and up to 5,900 Londoners die a year from air pollution. TfL recorded 3,881 people as having been killed or seriously injured in London traffic collisions in 2017, and 17 days in a London drivers’ year are spent in traffic: According to the ONS, UK households spend more on transport (mostly buying and fuelling cars) than they do on food, clothing, recreation, health or education.

“This model of car ownership we’ve had for the last 100 years is being exposed as a net negative thing for society,” says Peters, who contends that adoption of CAVs will increase seat use, reduce congestion, and free up the “economic burden” of owning a car. Peters says the roads of the future will be driven by “heterogeneous” transport – bus-like vehicles for rush hours, sleepers for long-distance travel and smaller occupancy units for night-shift workers. FiveAI plans to start with shared, zero-emission shuttle services that travel a “relatively fixed route” in areas on the outer rims of London where public transport is limited. It’s for this reason that its cars are currently learning the roads of Croydon and Bromley, where it hopes to begin offering services in 2020. As more routes are learned and services added, Peters says, “eventually those routes cross over, and become more and more dense, until you can go from anywhere to anywhere else.”

FiveAI doesn’t manufacture self-driving cars, but builds systems to be integrated into existing models. The current models use 14 cameras, three lasers, six radars and GPS, all of which combine to gather data on pedestrian movement, road conditions and a huge multitude of other factors. With this data, it constructs an image of the surroundings, “deep learning” – a type of machine learning based on repeated processing of different scenarios – to build an understanding of the environment and the responses needed to navigate it.

This requires serious computational power: the on-board computers are able to process 300 trillion calculations a second. The hardware is spread across the vehicle’s roof-box, boot and bumper. Large-scale data collection is needed to allow the car to deal with an effectively limitless number of scenarios. Cyclists, for example, are one category of road user, a courier might cycle in a different way to a commuter, who in turn will use the road differently to a tourist on a hired bike. The job of FiveAI’s CAVs is to learn how to use the roads in co-operation with all possible types of cyclist, and anything else it might meet on the road.

Alongside real-world testing, the firm has built simulations in which countless variables are created to test and train the AI. Weather conditions, road surfaces and even shadows can be added.

But while FiveAI’s technology is impressive, Peters explains that “a whole series of different techniques, sciences and disciplines have to come together” to solve the engineering problem of autonomous vehicles.

And while around 40 out of the top 50 experts in fields associated with CAVs are European, Peters says other countries are beginning to pull ahead. “If we don’t solve [autonomous vehicles] in Europe,” he warns, “our transport in cities and systems will be delivered by US or Chinese companies, which I don’t think is necessarily a good thing.”

For Peters, this problem is frustrated by two factors, the first of which is regulation. In March, the government announced a three-year review of driving laws, which will examine the legal issues
of widespread CAV use, such as responsibility and associated risk. Peters says this “regulatory clarity” is needed fast, or companies will be more hesitant to commit to the technology. “From a regulatory perception, China and the US could be ahead of us if we don’t get to grips with setting up certification, licensing and other regulatory instruments to make these services real,” he warns.

The second factor is a lack of investment. In 2018, the two largest funding rounds for automotive technology have been the $2bn and $600m raised by Faraday Futures and Lyft respectively: both firms, based in the US, are testing CAVs. Other companies, such as Waymo, have the backing of technology giants such as Alphabet (Google’s $748bn* parent company). The cash offered by the UK government pales in comparison, and private investment is harder to come by. Peters suggests that European firms follow the leads of firms such as Google and Amazon, which target their technology directly at consumer demand, winning large markets quickly. There is a tendency, he says, for European companies to lack focus; because they work across many fields, they “spread their science thinly”. Success, for FiveAI, involves a “laser sharp” focus on application.

That said, FiveAI is far from the only UK company in the game. The government’s £120m in CAVs supports over 70 projects and 200 partners. Britain’s considerable base of automotive manufacturers, universities, and insurance companies give the country a head start.

On the roads between London and Oxford, FiveAI rival Oxbotica is testing its own technology after a £14m investment – the same amount raised by FiveAI last year – in September. Oxbotica is part of the Driven consortium, which is looking not only at how CAVs navigate, but also how they communicate with each other. The government has predicted that the CAV market in the UK will be worth £28bn by 2035, and automakers that sell and manufacture in the UK are looking for ways to get in early.

Peters is, as you’d expect, bullish about the transformative potential of CAVs. Implementation is for him a question of when, not if, and it will be felt most by those in the (non-driving) seat: “This is honestly the most transformative change that is coming over the next decade. It’s going to completely change the way that transport systems in our cities operate.”
The University of York’s Professor John McDermid introduces the Assuring Autonomy International Programme, which is assuring the safety of smart city initiatives.

Why technology must still put people first

We are on the cusp of a technological breakthrough that will influence lives across the United Kingdom and around the world. Smart cities, with intelligent traffic lights, electric vehicles and connected autonomous systems, provide the means for improved mobility, better infrastructure, and increased productivity. But they are not without risk. We have already seen some highly sophisticated autonomous vehicles (AV) involved in unsophisticated, sometimes fatal, accidents, and experiencing difficulties as they encounter everyday scenarios. The technology for safely operating AVs has a long way to go. So too do the regulations and standards that give us the confidence to introduce them to market.

As humans we understand the behaviour of other humans – drivers and pedestrians – and can anticipate what they might do next. An autonomous system uses sensors and algorithms to detect and identify hazards on the road, and decides on the action to take. It also adapts its behaviour during operation through machine learning. For example, an AV may characterise a detected shape as a child and brake to avoid collision. If that child is wearing a Halloween costume then the AV may no longer correctly categorise it, and may not take the appropriate preventative action. That decision, or incomplete learning about the road environment, could be fatal.

The challenge is in assessing (and regulating) the capabilities of AV and other systems, so we can assure that what they have learnt is correct and safe.

Technology firms are rapidly evolving the capabilities of the robotics and autonomous systems (RAS) that will be used in our future cities. To fully realise their benefits we need to develop methods for assurance and regulation without stifling this innovation. This is the approach being pioneered by the Assuring Autonomy International Programme, a partnership between Lloyd’s Register Foundation and the University of York. “As a leader in pioneering research and training in the safety of complex systems, the University of York was the natural partner to address the assurance and regulation gaps we identified in our Foresight Review of Robotics and Autonomous Systems,” said Professor Richard Clegg, Foundation chief executive at Lloyd’s Register Foundation. “The Programme brings regulators, industry, policymakers, and researchers together to solve the issues we face in assuring the safety of the RAS.”

Successful use of the technologies in our smart cities will be incremental. At every stage the programme can and will: make recommendations on what is safe, advise on policymaking, review existing legislation, provide education and training, develop safety and assurance cases for technologies such as artificial intelligence, develop guidelines and safety standards, and forge international partnerships.

Further collaboration, funding and support are needed to ensure the UK leads the way with safe smart cities and to ensure our communities and industries benefit as fully as possible. The programme is the unique and impartial partner that is already bringing this together. Work with us to help us to do more.

For more information, please visit: www.york.ac.uk/assuring-autonomy
Birmingham and the wider West Midlands region will be the site of the first Future Mobility Zone, but what does it mean, and could it set an example for the rest of the UK? Augusta Riddy finds out

The home of cars is transforming travel once more

The motorcycle, the bicycle and the car were developed and manufactured in the West Midlands. It seems fitting, then, that the area – which includes the cities of Birmingham, Coventry, and Wolverhampton – would become the UK’s first Future Mobility Zone, as announced by the West Midlands Combined Authority Mayor Andy Street at the 2018 Conservative Party conference – an announcement that is accompanied by £20m of Department for Transport funding. But what do transport officials have in mind when they talk about “future mobility”, and what effect would such a “zone” have on the day-to-day movements of those residing in the most populous region outside of London?

Mike Waters, director of policy, strategy and innovation at Transport for West Midlands, explains how the region is already racing ahead in faster 5G mobile connections, autonomous vehicle development and smart ticketing. Having carried out extensive research and trials in these smart city areas, the Future Mobility Zone is about “taking the best of that R&D and deploying that at some scale”. His team intends to create “genuinely seamless travel across modes”. In practice, this means creating a single, “best price” payment system across all legs of a journey, so that there is “one common underlying pricing structure and means of paying for services across everything from bike hire through to buses, trains, taxis and parking”. “Nobody,” Waters declares, “has really quite managed to put all of these components of the transport system together.” It’s also about connecting the transport system to the rest of the city’s infrastructure, by integrating the payment solutions with other public services, “be that leisure facilities, education, libraries”. One central source of journey information, similar to that offered by Transport for London and using travel data that Google and other apps don’t currently have, will be made available to users that will tell them exactly how long a journey will take, and the best route across all modes, “giving people information they can be utterly confident in when they need to leave”.

A payment system called Swift is already in use throughout all public transport in the West Midlands network; it has 200,000 regular users across the whole region, and is the second largest of its kind after the Oyster payment system in London. A priority for the West Midlands Transport Authority is to develop Swift further, to “build up the success of the information systems improvements we’ve put in place and the payment systems that underlie that”. Creating a Future Mobility Zone is a rolling project with no fixed end date, and as it progresses it will eventually turn its eye to more radical changes such
as facilitating shared car journeys and developing autonomous vehicle services. The £20m injection from government gives the project an initial boost, but in the long term the authority will be seeking private investment.

In 2015, the West Midlands Combined Authority didn’t exist, and Waters believes that having the young organisation lead on infrastructure projects such as this brings together “all the leaders across the West Midlands with the mayor to provide a single voice [which] did not happen anywhere near as powerfully two years ago”. How can it be ensured that the whole area progresses, not just the cities? The very fact that it’s a region-wide body means “these benefits spread across all citizens,” he claims.

Creating a seamless public transport system is not an attempt to kick people out of their cars, Waters says, but to provide genuine travel choice “so that there aren’t second-class choices”.

Currently, he explains, “there are many circumstances where people feel that the car is the only viable journey for them”. “I think in common with many large urban areas outside of London … you don’t benefit from that density of public transport that central London has” and “a car-free life is much more challenging”. His team is looking to tackle what he calls “inappropriate” car use. “The big problem is single-occupancy, short-distance car trips in peak periods using polluting vehicles.” Still, is it not a little risky for a Tory mayor with a slim majority to ask people to minimise their car use, in an area known for its love of cars? “There is no sense that there is a car-bashing agenda,” Waters responds. “It’s about making sure the whole transport system works in an integrated way.”

The initiative seeks to capitalise on a recent influx of investment in the region. “There are multiple billions going into the structure of our transport system,” explains Waters. “HS2 is delivering two stations in the area, through to ten new railway stations, rail line enhancements, capacity line enhancements, bus rapid transit, metro lines are going to treble,” and so on. This follows a prolonged funding drought: “It’s on the back of a sustained period of underinvestment, so yes, we are catching up quite aggressively … all of our city centres – Birmingham, Coventry, Wolverhampton – are all almost unrecognisable from ten or 15 years ago.”

Looking to a smarter future, Waters would like this “new way of travelling” to be available across the country. “We don’t want a siloed West Midlands solution; this is not a parochial race … we already work closely with London, Manchester, and other major urban areas to make sure we are all working together to get a national-level solution.” Andy Street has said that “the Future Mobility Area will make sure the residents of the West Midlands can travel around the region as quickly, easily and cheaply as possible.” If he’s right, and people find that they are happy to leave their car at home, then the rest of the UK could follow suit. As Waters says, “ultimately, it’s an exportable, exploitable product.”

“This is not a car-bashing agenda”
Electric vehicles are on the rise, but “range anxiety” continues to deter many car buyers and manufacturers. Rohan Banerjee meets the experts working on the latest battery technologies

Electric cars need a new light bulb moment

Electric vehicles (EVs) are increasingly common, but still only account for a small proportion of total car sales in the United Kingdom. Although sales of EVs in the UK have reached a record high, representing one in every 12 new cars purchased in 2018, the Society of Motor Manufacturers and Traders points out that hybrid, plug-in hybrid and pure electric cars make up just eight per cent of the overall market.

Richard Fields, an electrochemical engineer at the University of Manchester, says “a big upfront cost” and “a distinct lack of infrastructure” are the main reasons for the slow uptake of EVs. “Even if people have the purchasing power to get an EV, without convenient charging points, they may be put off.”

There are also concerns about EV batteries’ capacity, range, and the time it takes to charge them. As Lee Cronin, regius professor of chemistry at the University of Glasgow, explains, “most normal EVs have a solid battery, and when it runs out of charge you have to recharge it by plugging it in. If you use a rapid charger at a service station, it could be between 30 and 40 minutes. Some people charge their EVs overnight at home, which is hardly convenient.”

Broadly speaking, batteries are packages of chemicals that contain two electrodes (an anode and a cathode) made from different chemicals. These are immersed in a third material, called an electrolyte. When the two electrodes are linked, chemical reactions within the battery release electrons from one substance to another, creating a charge. Lithium-ion batteries, widely known from their use in laptops, cameras, smartphones and other electronic devices, are the most common type of battery used in EVs. They are produced in huge volume and, thanks to economies of scale, have become cheap to produce. EVs use electricity stored in battery packs to power the electric motors that turn their wheels. When depleted, the batteries are recharged using electricity from the grid. However, lithium-ion batteries can lose capacity for every full charge they receive, known as a cycle. The more cycles a battery completes, the more it will degrade and lose capacity. In a car, this results in a decrease in range.

Range is an EV battery’s energy capacity divided by its energy consumption. A car with a 24 kiloWatt-hour battery pack – the size used most commonly in EVs – might diminish to 20 kiloWatt-hours, over time. A fully charged range of 84 miles, then, would
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become 67 miles maximum range, if the pack diminishes to 80 per cent of its original capacity.

Capacity loss is expected, and at the normal rate of loss it would take several years to reach 80 per cent. A 2018 study featured on academic journal website PrePrints found that the Nissan Leaf – the UK’s most popular EV – dropped to 80 per cent capacity after five years. For comparison, according to market researcher Polk Automotive, the average petrol car, if maintained well, will last 11 years at peak performance.

Flow batteries, developed by NASA in the 1970s, are rechargeable batteries where rechargeability is provided by two chemical components dissolved in liquids contained within the battery unit. A liquid, rather than solid, electrolyte of metallic salts is pumped through a core that consists of a positive and negative electrode, separated by a membrane. The main difference between conventional batteries and flow batteries is that energy is stored not in the electrode material, but in the electrolyte liquid.

Cronin says this gives flow battery technology some major advantages and could make them, with improvements, as practical as petrol. He says: “The flow battery we developed is made of a liquid. So if you run out of charge, you could, in principle, pump out the depleted liquid and – as you would with a normal car – refill it with liquid, in just a few minutes.”

Cronin’s technology uses a metal oxide that can be charged with electricity when added to water. “The part of a battery containing the charge is known as the electrolyte and when this is made of a solid, it is resting between two electrodes. When you use the battery, a reaction takes place inside the electrolyte, and charge passes from one electrode to the other until the electrolyte runs out. Then you charge the battery up, by forcing charge in the opposite direction. In a flow battery, the electrolyte is made of a liquid, so it can be stored in a tank, and pumped past the electrodes.”

While flow batteries have technical advantages over conventional rechargeables, such as potentially separable liquid tanks, current uses of flow batteries are comparatively less powerful and require far more sophisticated electronics. Cronin continues: “We had to work out a way of improving the energy density, so we could store more in the liquid. We were playing around different salt solutions and found a way of getting more salt into the water and keeping it stable.” Should this technology take off, the ambition, Cronin says, “is to have EVs perform on a level with petrol cars.” Drivers would remove the “spent” liquid, he says, “using a withdrawal nozzle at a refuelling station.” They would then use a second nozzle to refill the flow battery with fresh liquid from another pump.

While Cronin’s approach seeks to...
ELECTRIC VEHICLES

The UK needs new EV-related infrastructure

make more of the liquid electrolyte, another type of battery, a solid-state battery, goes the other way. Solid-state batteries ditch that liquid electrolyte entirely in favour of a solid conductive material. In Southampton, a company called Ilika was awarded £4.2m of funding from Innovate UK’s Faraday Battery Challenge to develop them. The challenge that exists is in finding a solid material that is conductive enough use in large batteries. Some of the materials being explored for use as solid electrolytes in solid-state batteries include ceramics and glass.

The major benefits of solid-state batteries, according to Ilika’s product commercialisation manager Denis Pasero, derive from their use of non-flammable solid electrolyte as opposed to the organic solvent used in current lithium-ion batteries, which is both flammable and has a relatively short useful life. “All parts of solid-state batteries are solid ceramic films, which are safer [because they are not flammable]; and also because they are dense, thin films, they may provide more energy for given volume available in the car; and they can also be charged faster.”

He adds: “The PowerDriveLine project [for which we received funding] will establish a pre-pilot line for solid-state battery cell technology and develop processes for a solid-state materials supply chain. The technology also has useful application for stationary energy storage, that is large size batteries that can store the energy harvested by solar panels on roofs of buildings, allowing consumers to more efficiently use energy provided by the grid. An important part of the PowerDriveLine project is ensuring availability of the full supply chain, particularly in the UK, for this new innovative technology.”

Richard Fields, who works for the University of Manchester’s Graphene Engineering Innovation Centre, says that advanced materials have a significant part to play in improving EV batteries. What role can graphene – a super-thin and super-strong material derived from graphite – have in making them better?

Fields says that shaping the carbon atoms of graphene into hexagonal lattice sheets to “coat” the battery’s anode, will improve conductivity. Keith Pullen, professor of energy systems at City, University of London, says that splitting EV battery packs could help to improve their performance. “Even if there were a battery with 400 miles’ range at reasonable cost, size and weight, the charging issue remains as a major barrier,” he explains. Splitting the battery from one large unit into a number of smaller ones, according to Pullen, offers advantages such as reducing voltage and energy losses. “This can facilitate a method of swapping out discharged with pre-charged batteries.”

Pullen says that splitting the battery, and using effective cooling and packaging could offer a bridge between lithium-ion batteries and the new types which take longer to develop. “Despite a lot of hype, lithium-ion cell development is now on a plateau and bringing new chemistries to production is not easy and takes a lot of time. The success of lithium-ion in terms of cost reduction is, strangely, a barrier to bringing in new technologies which must compete on cost as well as offer better performance.”

Cronin, who himself drives an Audi TT Sport, agrees that the immediate challenge in developing battery technology is in attracting the investment to do it. “We’ve got to convince people that it’s economically viable. In terms of rolling it out, then obviously the infrastructure is a challenge as well.” To solve that, Cronin suggests “retrofitting” or converting the existing infrastructure – petrol stations – to accommodate new battery charges.

“The government has a responsibility,” Cronin says, “to make EV investment attractive. There are things that can be done: tax credits, a duty on fuel... a green levy could encourage more manufacturers to shift over to EV technologies more quickly. EVs are part of a wider aim to reduce climate change and the UK should lead the conversation.”
When it comes to NHS patient transport, the effect of commissioners having to make cuts in this area are less apparent but no less distressing for those who used to rely on it. Very few people actively look forward to a hospital appointment. More often than not, it’s an anxious time. As with any trip, you have to factor in the logistics. Should I take someone with me? How long will it take? One thing you shouldn’t have to factor in, especially when you’re an elderly or disabled person, is a four-hour round trip because the bus to your local hospital has been cut or because you’re no longer deemed eligible for NHS patient transport.

Most of us will rely on public transport and the NHS at some point in our lives; they are both crucial to the United Kingdom’s health and wellbeing. But we know that transport issues have forced many older people to cancel, refuse or miss critical appointments, with up to 16 per cent of the people surveyed by Age UK reporting this.

A quarter of older people’s bus journeys are to get to medical appointments, yet we found that 1.4m older people struggle to get there. The devastating cuts to bus services across the country have played a large part in this. In fact, you have probably seen the effects in your town, village or community year-on-year since austerity began. When it comes to NHS patient transport, the effect of commissioners having to make cuts in this sector are less obvious but no less harmful for those who previously relied on it. This has a profound impact on older people who live with a chronic health condition.

Despite this being a huge issue for millions of people across the UK, there are no obligations on local authorities to ensure bus routes serve local hospitals and there has not been a review of eligibility criteria for NHS-provided patient transport since 2007. If vulnerable people in our society are being failed on their way to hospital, whether it’s through bus routes being cut or moved to save struggling council budgets, or the quality of NHS patient transport varying widely across the country, many more people will end up being treated at the point of crisis rather than the point of care.

Simple changes could make a huge difference, such as ensuring local authorities have an obligation to serve local hospitals with bus routes or standardising the transport information included in hospital appointment letters to enable people to make an informed decision about how they get there. Or making sure bus stops at hospitals are placed carefully to ensure older and disabled people could access the entrance easily from the stop. For those too unwell to travel on public transport, it’s vital that the NHS provides a consistent and fair way of assessing who should qualify for this service. Improving how people get to vital hospital appointments makes sense. Complicated and expensive journeys to and from hospital benefit no one from patient to doctor to taxpayer.

Further collaboration, funding and support are needed to ensure the UK leads the way with smart communities and to ensure our industries benefit as fully as possible.

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Age UK

People must be able to reach the care they need

Transport provision is directly linked to society’s health and wellbeing, explains Robert Henderson, public affairs manager at Age UK

IN ASSOCIATION WITH

Age UK
With this challenge in mind, we at Johnson Matthey asked ourselves what it would take to develop a cathode material that would support a lithium-ion battery not for consumer electronics, but which would enable electric vehicle usage on a grand scale.

We looked at a number of strategic factors that are crucial to the success of electric vehicles – total cost of ownership, driving range, safety, acceleration, recharging – and developed our new cathode material, eLNO, with these consumer priorities in mind.

One critical aspect that holds back the wider EV industry is how far you can drive between charges, as it is currently limited by the batteries in use. So we developed eLNO with a view to enabling long-range driving – up to 300-400 miles – to help get EV batteries to the same point as internal combustion engines.

With this challenge in mind, we at Johnson Matthey asked ourselves what it would take to develop a cathode material that would support a lithium-ion battery not for consumer electronics, but which would enable electric vehicle usage on a grand scale.

Leveraging our 200 years of technology excellence, Johnson Matthey has developed a new type of cathode material called eLNO™ – for use in electric vehicle lithium-ion batteries. This material has been developed to support widespread electric vehicle (EV) adoption, by improving the driving experience thereby encouraging the purchase and use of electric vehicles.

The majority of lithium-ion batteries that have been researched and produced over the past 30 years were developed for consumer electronics purposes. These products have very different requirements to EVs, and so do their batteries. For example, a mobile phone needs to be charged once a day, which is sufficient, and the battery needs to last for about two to three years. Needless to say, a car battery is required to perform in a very different way.

Batteries are going through a period of transformation, and this change is bringing a future in which electric vehicles are the norm closer every day. Johnson Matthey is, at its core, a science and technology company; we spend approximately £200m every year on research, and for us, helping to develop battery capability to meet the needs of an electric-vehicle future was a natural extension of our expertise.

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eLNO also has excellent power...
characteristics which means that a battery containing eLNO will actually enable faster acceleration for an EV than a standard car, and the recharging times can be quicker.

Of course, safety is a significant parameter for consumers and for the industry in general, and by making energy storage safer, we have managed to improve the overall safety of electric vehicles using batteries containing eLNO. Finally, total cost of ownership is an essential consideration when buying a car. For EV adoption to really take off, consumers – unsurprisingly – want to pay the same price as they do for a regular vehicle, or close to it, and they want to have the same refuelling costs, whether their vehicle uses petrol, diesel, or electricity. This is a key differentiator with eLNO: we have worked hard to remove cost as a barrier to EV adoption, and the material we have developed keeps costs down for the consumer.

There are many batteries on the market that are good at one of the aspects I have mentioned, but successful EV batteries need to be good at all of them – only then will they rival the vehicles we drive today. We have used our science and chemistry to create a holistic approach to accelerating the adoption of EVs, but looking to the future there are a number of challenges that Johnson Matthey, and the wider industry, is facing before mass rollout can take place. In order to commercialise our new cathode material and get it “out there”, we need the support of a nationwide, focused strategy on electric vehicles and electrification, which needs to be driven by the government.

Johnson Matthey is playing an important role by developing a battery material that enables longer-range driving, and reduces total cost of ownership, but in order to really see a big acceleration in broad EV adoption, we need charging points and more widely rolled out EV infrastructure, and we need these vehicles to compete on price with those powered by internal combustion engines. In turn, a strategy of this type would lay the basis for developing a steady and secure development supply chain. The government is already very supportive of research, but an ambitious strategy and financial backing are needed to turn that research into practice. The US Department of Energy recently commissioned a number of studies on the cost of taking brand-new technology from the laboratory into commercialisation, and found that for every $1m spent on basic research, another $10m is required to scale up that technology, and $100m is required to actually move that technology into large-scale manufacturing. The industry is very grateful for the firm backing of government in pursuing this EV agenda, but the amount of investment required to take this technology forward is not something the private sector alone can provide.

Johnson Matthey, meanwhile, is pressing ahead with the scaling up of this transformative product at our pilot facility in the North East of England. Earlier this year we announced investment in a demonstration skills facility in Clitheroe in Lancashire and initial investment in a commercial-scale facility to be located in mainland Europe, close to where we expect our major customers to be. This facility will come online in 2021/22 and we expect to have our material powering EV platforms thereafter.

And we are continuing to innovate, as we have done for 200 years, with products such as eLNO that help to improve lithium-ion batteries to meet a critical need for industry, society and consumers, and to help make the world a cleaner and a healthier place. eLNO is a trademark of Johnson Matthey.

For more information, please visit: www.matthey.com
Transport in a no-deal Brexit

The Department for Transport has released a series of technical notices on what happens to vehicles and passengers if the UK leaves the European Union without an agreement. Here’s a quick guide to how a no-deal scenario will affect each sector.
Driving in the EU
The DfT warns that in the event of a no-deal Brexit, a UK driving license “may no longer be valid by itself when driving in the EU”. The department adds that if a person moves to another EU country to live, they may not be able to exchange their license, and therefore have to sit their test again.

CO2 emissions from new vehicles
The EU currently imposes CO2 emissions targets for manufacturers and fleet operators, enforced by fines. These “excess emissions premiums” could exceed €1bn in 2020. In a no-deal scenario, the DfT says it would “ensure continuity to minimise the additional requirements placed on industry”, but would incorporate UK regulations that were “at least as ambitious as current arrangements”.

Flying to and from the EU
A no-deal Brexit could mean that airlines wishing to operate flights between the UK and the EU would have to seek individual permissions to operate from the respective states. In this scenario, the DfT would envisage the UK granting permission to EU airlines to continue to operate, and expects the EU to “reciprocate” with a similar arrangement. According to the DfT, it would “not be in the interest of any EU country or the UK to restrict the choice of destinations that could be served, though, if such permissions are not granted, there could be disruption to some flights.”

Bus and coach services
Without a deal that includes EU recognition of UK-issued operator licenses, the DfT has warned that “continued passenger movement... cannot be guaranteed” and that “UK operators may be unable to access the EU”, particularly if they wish to run services that pick up and drop off passengers in the EU. However, the government is already “taking steps” to join the Interbus Agreement, which would allow coach holidays and tours to continue, and the DfT states that “EU tourists and students would not be stopped from visiting the UK if there is any delay to joining the Interbus Agreement”.

Shipping and seafarers
Shipping companies “should prepare for a scenario... in which submission of security pre-arrival information would be required before their vessels were permitted to enter the port(s) of an EU country”, warns the DfT, although it states that the UK will “continue issuing exemptions for scheduled services from an EU country to a port in the UK... regardless of the outcome of negotiations”. Seafarers from the UK may need to apply for new certifications to work on ships registered under EU flags.

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Rail safety standards
Even in the event of a no-deal Brexit, the DfT assures that the UK would “still be able to pursue bilateral agreements with EU countries to maintain cross-border services.” Passengers using cross-border services, the DfT says, are “responsible for ensuring that their insurance and ticket terms and conditions are sufficient to cover possible disruption.”
Children often have the clearest vision of the future. Attending an event for London schools about the future of transport, I was struck how simple many of their ideas were and how our youngest citizens intuitively grasp the essentials of a liveable city. They weren’t talking flying cars, jet packs or hoverboards. In their vision of the future, they could ride bikes and walk with their friends in a clean and interesting environment. And of course, all buses were fitted with games consoles.

A smart city isn’t simply about technology. Tech and data are the means, not the end, and the fundamentals are simple: enable people to be active every day; ensure our air sustains us; use our space and resources well; and make the city somewhere people choose to live their lives.

When I took the job as Sadiq Khan’s walking and cycling commissioner, I was clear that it was about enabling more people to get around on foot and by bicycle, making it easier, safer and more attractive. There are many reasons for this, but a crucial one is to clean up London’s filthy air.

Every Londoner breathes air with levels of toxic PM2.5 particles above World Health Organization guidelines. It’s a key challenge of our times—shortening lives, harming people’s lungs and worsening chronic illnesses. It’s absolutely vital that the national government adopts this air quality standard, as we have in London.

There are numerous causes, but the prime culprit is road transport, contributing more than half of NOx and particulate matter. No other factor comes close. Some believe this will simply be solved by mass uptake of low emission and electric vehicles. There’s no doubt they have a role to play – and in less than six months, our 24-hour Ultra Low Emission Zone will begin, leading the way in getting the more polluting vehicles off London’s streets.

But rapid change won’t happen without incentives – and sadly, the government

Will Norman, London’s deputy mayor for transport and the city’s first walking and cycling commissioner, says more must be done to tackle pollution and road congestion.
space wisely

cities use their

Truly smart
cities use their

space wisely

appear reluctant to provide them. Electric vehicles are a part of the answer but they are by no means the whole answer. They don’t emit NOx, but they generate particulates from brakes, tyres and road dust. Nor does swapping polluting vehicles for cleaner vehicles solve congestion, or make the allocation of road space and resources any fairer. It doesn’t fix road danger, with recent collision statistics showing more serious injuries than people in cars. Vulnerable road users are sadly killed and injured, with the recent collision statistics showing more serious injuries than people in cars. 

It’s clear that we need fewer vehicles, not just different ones. For too long we worked around congestion by speeding up cars, building roads and widening bottlenecks. It doesn’t work and it can’t continue. While our world is increasingly technology-driven, one solution to these problems is remarkably low-tech. Active travel – walking or cycling for all or part of your journey – is the answer. Sadiq Khan has made this the centrepiece of his transport strategy. His ambitious 2041 target is for 80 per cent of journeys to be active or on public transport. We’re at 65 per cent (of 26.7m daily trips), with a long way to go. It needs strategic planning, tactical interventions, political support and sustained funding to get there.

Cycling in particular shows huge potential. It’s space efficient, non-polluting and allows every day activity. But while it’s the fastest growing transport mode, many are deterred, or excluded, by traffic and safety fears. This exclusion tells a familiar story: women, children, older people and ethnic minorities cycle less, according to a study by TfL, earlier this year.

That’s why we’re investing a record £169m annually, mostly into safe infrastructure. Cycling is now mainstream transport, topping 730,000 daily journeys, around a fifth of London Underground. Growth is turbo-charged where we build quality facilities, up to 200 per cent on parts of our cycle network. Building good infrastructure is critical and is at the heart of our programme. But

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Truly smart cities use their space wisely

where to build it? That’s where we need to get smart. Data has changed the game and our pioneering Strategic Cycling Analysis is a ground-breaking tool that helps us plan for the city of the future. The Cycling Network Model for London (Cynemon) gathers data from multiple sources including the census, on-street counters, hire journeys, GLA employment stats and big data cycling apps. This analysis has identified the 25 priority routes to unlock the eight million daily trips (averaging two miles each) that could be made by bicycle.

Technology can not only help us build our network, but can improve how we navigate it. A plethora of developers is competing to help with route planning and navigation. The problem is that current technology tends to use car-based algorithms that don’t really fit cycling. That’s why we’re creating the world’s first cycling infrastructure database, an open dataset that will help unleash the next generation of way-finding, tailored and designed for cycle journeys.

Added to this, technology is maturing to grow cycling even more. E-cargo bikes could revolutionise “last-mile” deliveries. Companies such as DHL and Sainsbury’s are showcasing how they can beat traffic and park at their destination.

Technology can also change perceptions of cycling. I frequently battle the false claim that cycling infrastructure isn’t used. Sensors now track numbers cycling and on flagship routes we’ve installed counters that display the numbers using them. The Embankment counter regularly tops 10,000 a day, showing people cycling is now a normal activity and they can be part of it.

So, data is giving the best ever insight into where we should concentrate our efforts, and technology will help open up cycling to mass participation. But I am with those young people: the really smart thing is recognising what a different and better place our cities will be when more of us can make the switch from four wheels to two.
Driving in my car

Important lessons were learnt from Shell’s “Powering Progress Together” forum on visions of transport for 2040

As aims go, it’s a bold one. Speaking at Shell’s “Powering Progress Together” forum on visions of transport for 2040, panelists expressed numerous views on how the market should change, how emissions can be reduced and the role of electronic vehicles, whether autonomous or driven by people. The long-term visions are understandably diverse.

In the shorter term, reassuringly, there is a lot of common ground. The advent of electric vehicles looks like a solid prospect – although as Edmund King, president of the AA, pointed out, there are immediate practical difficulties as the AA’s own research suggests only 48 per cent of drivers (at least in London) could charge their cars overnight on a driveway. “But let’s keep our eye on what the solution should be, and the solution should be getting people around in a way that is more conducive to them and beneficial to the environment.”

Reduced to those basics the way forward, then, appears obvious. The question is how exactly to achieve it. The National Grid, represented by strategy manager Belinda Littleton, certainly wants to do what it can to help get charging points onto petrol companies’ forecourts nationwide. Shell has made an excellent start with ten Shell Recharge sites in the UK taking around 30 minutes per vehicle on fast charge, and more are planned. Over the coming months, Shell will be bringing Shell Recharge to approximately 30 additional sites across the country, and in 2019, will be introducing 150kW super chargers –
Infrastructure work will have to happen

which deliver an 80 per cent charge in just ten minutes – to some of them.

Initially it’s looking pretty positive, commented Littleton. By the end of 2018 there should be around 850 charging stations in her own borough alone, serving around 400 cars, so everyone will have more than one charger; unfortunately, with growth in EVs forecast at ten per cent compound, that luxury is not going to last for long. There will be a clear need for change, whether this is a change to charging at the destination (numerous supermarkets already have charging stations and this will need to increase) or further changes.

Infrastructure work will have to happen: lamppost charging is a possibility being trialled for EVs but the current car culture won’t be sustainable in an electric future. “Long-distance driving rather than the every day eight miles is going to be difficult – that long-distance drive to Cornwall, we’ve been thinking about how the whole country needs to have certainty around how they can charge.”

This may mean breaking journeys up, it will certainly mean faster charging technology than currently exists – and also concepts like car sharing need to come to the fore (although as is often pointed out, the difference between answers to the question “should car sharing be more popular to reduce congestion and pollution?” and “OK then, would you share your personal space with one of your colleagues every day?” is generally pretty pronounced). Given that part of the vision for autonomous vehicles is to have them unowned and shared, like a large and tailored bus service, the preference for personal space is going to make change less than straightforward.

On the plus side, things could change very much in the favour of the driver. A vehicle that generates its own electricity through the turning of the wheels could end up producing a surplus and selling it back to the grid, something that simply doesn’t happen now. Whatever happens it will mean changes to infrastructure; already there are signs of major car parks accommodating charging points and if EVs take off in significant numbers these will only increase and spread to shopping centres and other places in which people are likely to be parked for a while. Companies like NewMotion are already starting to put such charging stations in where needed.

The panellists were speaking very positively about the prospects of cars and ownership of them changing beneficially; there would, however, be practicalities to overcome. Michael Hurwitz, director of transport innovation at Transport for London, said the objectives are very clear, but added that they had to be inclusive. Summoning a shared driverless car by a smartphone app sounds terrific,
“but we’ve got to cater for the 15 per cent of people who can’t use a smartphone as well,” he said. “Every day about a million people have to move around the country and they have the challenge of mobility. We have to think about everybody.”

His office is open to innovations that take all of that into account, he said, and it will test ideas that match the criteria. Back in the immediate world, the plan is to ban petrol and especially diesel by 2040, possibly beforehand. Hurwitz agreed there needs to be a target or nothing would happen; another suggestion to help these targets along was making public transport free of charge – he had yet to see a business plan that made this viable.

The existing generation may appear reluctant to accommodate changes like these and sharing their cars as they like the way they live now. The AA’s King said the attitude is a little like NIMBY-ism. “It’s all ‘not in my front seat’ – people feel that if they want to have their car radio on loud, they should be able to have it. There are things we could do in terms of design to change elements of it but ultimately people don’t want to share their journey.”

Another thing that has to improve is the public’s perception of safety in the autonomous vehicle arena. Fatalities have happened but they happen in cars people drive as well, in far greater numbers, and it’s accepted as a dismal but inevitable fact of life. “It’s often quoted that human error is a factor in 95 per cent of crashes, maybe among other factors,” said King. “With a partly autonomous vehicle we can reduce a lot of errors, so autonomous emergency braking and other controls – some
smaller cars have this emergency crash resistance, so if you’re about to crash into another car it will stop. You don’t always have to get rid of the driver to use technology to increase safety.” It would be wrong to underestimate the complexities, though. He pointed to one particularly congested roundabout in Vietnam, where a command to an autonomous vehicle to keep 2m space around themselves would simply make sure nobody ever crossed it. There’s a generation of suspicion of automation to overcome.

The hope is likely to be the next generation; younger people, numerous surveys suggest, are less inclined towards car ownership; they don’t take it for granted that they have to learn to drive and the appeal of travelling a long distance without a defined reason appears limited to them. Their world view appears likely to accommodate a greener future with AVs and EVs aplenty, but there is more to motoring than cars owned by consumers.

The commercial sector, whether in terms of delivery vans or heavy goods has to be part of any long-term plan. One thing that has changed dramatically in the pattern of driving in recent years is the proliferation of couriers and delivery vans on the roads. The e-commerce boom has become the courier’s jamboree which is great for their business but not so grand for the environment when all of the vehicles are puffing out noxious fumes. Grahame Bennett, head of fleet engineering at the Royal Mail, spoke about companies needing to work together; it is the height of absurdity that delivery trucks and vans can move around duplicating each other’s routes with spare capacity and not consolidate; one audience member pointed out that the reality of the situation was that even the same company had delivered multiple items to his home in separate deliveries, by courier, on the same day. Catherine Weetman, representing the Chartered Institute of Logistics and Transport, stated that road freight alone accounts for 23 per cent of global carbon emissions.

Meanwhile, there are logistical problems. By all means the government is dissuading people from buying diesel models as they are notorious polluters, ironically the reverse of what people believed them to be when they bought them a few years ago (and as one dealer at the conference pointed out, clean diesel models have been around for a long time now but adverse publicity has made them virtually unsellable). Baroness Brown, deputy chair of the UK’s Committee on Climate Change, noted that change has been slow to come just at the same time as a lot of vehicle manufacturers have a lot of petrol cars to shift before they move onto hybrids and electric vehicles, even before the market considers abandoning car ownership altogether and sharing autonomous services. A cynical view perhaps, but one that fits the facts.

For all that, it’s worth bearing in mind that technology has a knack of surprising people. Twenty years ago isn’t that long but if, in 1998, someone had said phones should evolve beyond voice communications devices and act as personal music centres and high-definition top-quality cameras as well, it’s doubtful they would have had many listeners. Forecasts about the motor industry and particularly the emergence of alternative fuels and autonomous, shared models may yet go the same way; overtaken by something we simply haven’t thought of yet, or indeed something we have. Solar vehicles, hydrogen-powered vehicles and other alternatives may yet deliver an unexpectedly viable alternative. The trick, as Shell sees it, is to be ready for multiple versions of the future.
One of the immutable rules of modern politics is that any government worth its salt will promote at least one (but often many more) high-profile infrastructure project. These are almost invariably multi-billion pound projects which aim to upgrade connectivity to or within our major cities, creating much publicity in the process: think HS2 and Crossrail. But sometimes the real stars are the quietest.

And so it is with the community transport sector. But the lack of “big ticket billing” should not be seen as a measure of the importance of community transport. Communities up and down the country rely on these services, particularly in rural areas such as my West Oxfordshire constituency. Community transport offers our most vulnerable residents a lifeline: a connection to the shops, a visit to friends or an appointment with their GP. As the government rightly shines a spotlight on the issue of loneliness, we should shine a spotlight upon the vital role community transport plays in combating isolation.

As I see in my all-party parliamentary group, despite the lack of celebratory headlines, new and innovative community transport operations are emerging all over the country, offering a high-quality, caring service to some of the most vulnerable people in our society. This is evidenced by the fact that community transport operators do not wish for the government to hold their hand. They are after all, by their very nature, innovative and community-led solutions.

This is perhaps why I feel such an affinity with the sector. Community transport perfectly encapsulates the British spirit: communities coming together and, through harnessing their collective hard work and good will, providing a bespoke solution which improves the welfare and wellbeing of every resident.

We are, at present, undergoing a transport revolution in this country. With each passing day more and more
In an age when convenience is king, transport is now being built around peoples’ lives rather than the reverse. Journeys are increasingly being planned, booked and paid for on an app in the palm of one’s hand. The battle being fought by new transport companies is to create the most personalised journey possible, with passengers in control of every element.

Community transport providers are understandably watching this transformation with a feeling of unease, fearing that this growing reliance on technology will ultimately foster more isolation if the demographic they seek to serve – for whom the world of smartphone apps may not be natural – is left behind.

The community transport sector is innovative by its nature and by no means resistant to change, but it does want to know where it fits in with a modern transport network and how (or indeed if) it ought to respond to the changes happening around it. Whilst the growth of high-tech transport presents a challenge to community transport, I am confident that the opportunities outweigh the challenges and that the sector will – as it always does – thrive in the years ahead.

There is certainly room for community transport to do more than just fill the gaps created by commercial transport companies, and act to add greater convenience to their services. Rather than being necessarily viewed as a threat, door-to-door and dial-a-ride services should be seen as an example to learn from. The model of companies such as ArrivaClick, in which passengers need only register their desired pick-up and drop-off locations, offers a glimpse at what a community transport service might look like in the future.

Not all community transport operators will be able to operate such systems, but the aim to increase flexibility ought to be shared by all, because it is precisely that flexibility – to go where passengers want, when they want, that lies at the heart of community transport’s success. There is also potential in placing the technological impetus on the transport provider, rather than the passenger to increase customer convenience. Passengers could register their pick-up and drop-off location over the phone, for example, and leave the techy elements to the provider.

Key to sharing the benefits of modernisation to all forms of transport is ensuring that community transport services are fully integrated within the network. The growth of multi-modal journey planner initiatives such as Mobility as a Service, which give passengers greater knowledge and control over their journeys, illustrates that we need to ensure that community transport forms part of an integrated transport network. This would open community transport services up to a new set of passengers who might have never considered it, making the entire sector sustainable and broadening horizons.

As the government looks at the use of technology in transport policy, it is vital that community transport is fully incorporated into future strategies. New systems need to support the role community transport plays in supporting the most vulnerable passengers, for example those with a visual impairment, dementia or arthritis, who require bespoke care and attention. If the needs of the most disadvantaged (and, in turn, community transport) are central to new transport systems, then we will ensure that no-one is forgotten and we can create a transport system that caters for everyone’s needs.

The growth of high-tech, modern transport systems is to be welcomed. For most of us, the use of technology allows us to access more convenient and flexible transport. But we must not forget those for whom this technological transformation presents a challenge. For them, modernisation must continue to compliment the vital community transport lifelines on which they rely.

If we harness the new technologies of the future, we can create a joined-up transport system that ensures no-one is left behind.
TRANSPORT

The latest contracts, jobs and training

THESE CONTRACTS ARE NOW OPEN FOR TENDERS

1. Transport Scotland
   Scottish Trunk Road Network Management Contract – South East and South West
   Bid deadline: 16th November
   Tender value: £720m and £690m
   Transport Scotland is inviting bids for multiple construction and engineering contracts over the next eight years in the south east and south west of the country. The work includes pipelines, power lines, highways and air fields.
   Contact: stephen.breslin@transport.gov.uk

2. Highways England
   Asset Delivery Maintenance and Response (East Region)
   Bid deadline: 14th November
   Tender value: £490m
   Highways England is looking for a suitable contractor to provide all routine and cyclic maintenance and repair services on motorway networks in the east of England. Additional duties will include the provision of traffic management.
   Contact: eastassetdelivery@highwaysengland.co.uk

3. Herefordshire Council
   Passenger Transport Dynamic Purchasing System
   Bid deadline: 5th June 2026
   Tender value: £56m
   Herefordshire Council invites suppliers to apply to take over the provision of public transport services for the county over an eight-year period.
   Contact: procurement@herefordshire.co.uk

4. Transport for London
   London Roadlab
   Bid deadline: 26th November
   Tender value: £2.2m
   TfL is seeking a new data science partner to deliver solutions to problems relating to road works and congestion in the city.
   Contact: erinweir@tfl.gov.uk

5. Driver & Vehicle Standards Agency
   Driver simulation software for creating CGI to use in the driving theory testing
   Bid deadline: 30th November
   Tender value: TBC
   DVSA wants to secure a six-month partnership to help provide its own computer-generated scenarios to be used in driving theory and hazard perception tests in the UK.
   Contact: ava.martin@dvsa.gov.uk

Total value: £1.96bn

THE LARGEST PUBLIC SECTOR CONTRACTS OPEN FOR BIDS SOON

“Pre-Information Notices” give advance warning of contracts that will soon be open for tenders.

1. Crown Commercial Service
   CCS intends to put in place an agreement for the provision of smart energy products and services, such as electricity grids and electric vehicle charging points, for cities.
   PIN value: £500m

2. Crown Commercial Service
   CCS intends to establish a contract for the delivery of vehicle hire services for government departments and public sector bodies, including local NHS trusts, the police and regional charities.
   PIN value: £50m

3. Cabinet Office
   The Cabinet Office will be on the lookout for a new long-term transport partner to support government bodies with private hire or coach requirements.
   PIN value: £16m

Total value: £866m

TRANSPORT JOBS NOW OPEN FOR APPLICATIONS

Legal Officer, Office of Rail and Road
Salary: £41,011–£49,091
Location: London
Closing date: 12th November
The ORR is looking for a legal professional to advise on the regulation of railways’ health and safety. The successful candidate will also help to author and update the terms and conditions under which passenger and freight train operators use rail transport, as well as help to manage the department’s budget.

Engineer (multiple roles), Transport for London
Salary: £25,000–£79,999
Location: London
Closing date: 26th November
TfL is looking to recruit engineers at various stages of their careers to work on a range of infrastructure projects on the network. The successful candidates will be responsible for delivering designs, drawings, logistics reports and enhancements on existing buildings, roads and rail.
TRAINING OPPORTUNITIES

MSc Transport, University College London and Imperial College London
This one-year full-time postgraduate course is delivered by two of the University of London’s civil engineering departments. It covers transport’s impact on social and economic policy, health and safety provisions, and the construction of large-scale infrastructure.

Cycle Skills Short Course, Transport for London
Transport for London is running several short cycling proficiency courses for a range of ability levels. The courses, including basic cycling and advanced urban route navigation, are free to all London residents, and are held in each of the city’s boroughs.

FUNDING OPPORTUNITIES

Innovate UK has several transport-related funding programmes available.

1. Zero-emission vehicles: funding to drive development and adoption
   Businesses working on ultra-low or zero-emission projects can apply for a share of £22m to develop their ideas and help the UK become a world leader.
   Deadline for applications: 6th December

2. Future electric vehicles: Faraday Battery Challenge
   The latest Industrial Strategy Challenge Fund opportunity is offering up to £25m to UK businesses working on the development of batteries for EVs.
   Deadline for applications: 12th December

3. Game-changing ideas for civil aerospace funding
   Organisations can get a grant to work on collaborative innovation projects that will benefit the UK aerospace industry.
   Deadline for applications: 5th December

How data can create a truly mobile society

Smart technology and analytics will shape people’s future transport experience, writes Andrew Pester, chief executive at the British Parking Association.

Parking is a dynamic sector and it’s changing more rapidly than at any time in our association’s 50-year history. In two years we are predicted to have over one million electric vehicles on our roads and the technology we use to manage car parks is evolving at a fast pace. As motorists become more familiar with the many different ways of searching, booking and paying for parking, it’s essential we understand their changing preferences and use the full range of technology that’s available.

Smarter parking technology is already delivering benefits to our towns and cities worldwide, for businesses, road users and local municipalities. As a not-for-profit association we work closely with our members, key stakeholders and government to inform and encourage this innovation, so we can become a truly mobile society.

It’s clear we live in a digital world and the way we use data is transforming our day-to-day lives. Key components of our future transport network will be underpinned by parking data which will allow connected and autonomous vehicles and consumers to search, book and pay for parking quickly and easily, reducing congestion and harmful emissions and getting people where they need to go.

As the leading voice for our sector, we have collaborated with international partners to support this development, BPA members have helped to establish an Alliance for Parking Data Standards (APDS) to develop, promote, manage, and maintain a uniform global standard that will allow organisations to share parking data across digital platforms worldwide. Building on the success of the APDS, we are now turning our attention to Traffic Regulation Orders. TROs control things such as on-street parking and one-way streets. The development of a digital standard for TROs is essential as connected and automated vehicles which need to understand and interpret parking and traffic rules and regulations digitally and simply won’t be able to function on our roads without them.

Right now, with 35m vehicles on Britain’s roads, it is essential that parking is available, well managed, and that it works for everyone. The growth of car ownership and the number of cars on our roads is placing increasing demands on parking, much of which is on private land due to the expansion of parking at retail and leisure parks, and supermarkets. In order to ease congestion and get cars quickly and efficiently into parking spaces, local authority parking and private parking provision needs to work in conjunction as seamlessly as possible.

We have always placed the consumer at the heart of our thinking and continue to provide strong leadership for our parking community. Nowhere is this better demonstrated than by our work with government, MPs and other key stakeholders to encourage and enable the Private Parking (Code of Practice) Bill to deliver fairer and more consistent parking standards for motorists. We are delighted that MPs from across the House support this Bill and we will continue to push for a positive outcome for all.

For more information, please visit: www.britishparking.co.uk
One of the things that’s most irritating about politics in 2018—and goodness me, aren’t there a lot of choices—is the utopianism that’s crept into the transport debate. There is an apparently endless supply of people who wouldn’t be seen dead on public transport, or using any other service labelled with the word “public”, if they can possibly help it, yet who have come to the conclusion that they are the people the staid and dusty world of transport policy has been waiting for.

And the message they are keen to send is that the old ways of doing things is over: shiny new technologies are going to disrupt the transport sector, just as they disrupted the music industry or retail. Why bother investing in mass transit, when autonomous vehicles (CAVs) and ride-hailing apps are about to take over the world? Why waste money on high-speed rail, when Elon Musk’s exciting new Hyperloop will be along any minute? Silicon Valley types ask these questions, even as they earnestly suggest some kind of fixed-route, ride-sharing service based on vehicles larger than the private car, blissfully unaware that they’ve just reinvented the bus. Again.

It’s true that new technologies will have huge, and occasionally unexpected, effects on our transport systems. CAVs, for example, could reduce the need for parking spaces, freeing up huge amounts of land for other uses, and may eventually make roads safer, too. As sci-fi as it sounds, the Hyperloop—pods in vacuum tubes, travelling at up to 760 miles per hour—is, technically, feasible; if it happens, it could radically reduce demand for carbon-spewing short-haul flights. But these two technologies have something else in common: low capacity. The pods on most of the—still largely theoretical—Hyperloop designs can carry only a few dozen people each. And however clever AVs are, they don’t change the rules of geometry. A world in which every journey involves a private car, travelling at a limited speed, means continuing to give over a load of space in our cities to roads. If cars end up taking longer routes to avoid traffic, we might even need more.

There are transport technologies that don’t face these problems—that can carry a lot of people, at decent speeds, while producing relatively little pollution and taking up relatively little space. But they aren’t as exciting, sexy and new as things such as CAVs or Hyperloop. They’re boring ones: trains, trams and buses.

New technologies will improve those, too. Smarter and more integrated payment systems will make them easier to use. Big data will help planners spot gaps in the network, that could be usefully or profitably filled. Apps will help users to plan more efficient journeys, and spread them out so they don’t all travel at once.

But the point remains: if you want to move large numbers of people around limited space in the most efficient way possible, you should invest in fixed and predictable high-capacity routes. The solution is the same as it ever was: decently run mass transit networks. There is a reason Silicon Valley keeps re-inventing the bus.

Jonn Elledge is the editor of CityMetric

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