

Connectivity joins the dots and changes the game

Our cars are now data-gathering machines that
can change the face of motoring as we know it,
reports **Beate Kubitz**

The car of the past was basically a tin box with wheels. Manufacturers knew little about what happened to their vehicles once they rolled off the production line and were driven away – and drivers had only a basic idea of performance metrics such as miles per gallon or the cost of servicing.

All this has changed. Today's car is a data collection – and transmission – machine on wheels. It comes with cellular connection, receives over-the-air software updates and transmits information about driving conditions, hazards and performance to manufacturer databases for analysis, machine learning and to share road safety information between vehicles.

It has the potential to connect instantly to infrastructure sensors, manage its own parking, road toll and fuelling accounts (particularly if it's electric), keep an eye on the traffic and report on its driver's behav-

our to insurers or fleet managers.

It opens up different models of ownership for both individuals and fleets as well as being an important element of fleet electrification. It could see manufacturers operating on-demand leasing fleets or combining mobility and energy services as a subscription.

While the future is uncertain, connectivity already shapes the relationship between all the people and organisations interacting with a vehicle in its lifecycle: from those that finance it, insure it, fuel it, the places it is parked, the road infrastructure it travels on, taxation, servicing and maintenance and, of course, drivers and passengers.

AFTERMARKET CONNECTIVITY

While only a minority of cars roll off the production line with this level of connectivity there have long been aftermarket solutions which open up a vast array of possibilities for new services, managing and optimising fleet use.



ABOUT THE AUTHOR

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Connected car technology can offer significant savings, improve safety and help meet legal and reporting obligations. Aftermarket vehicle connectivity devices usually plug into the on-board diagnostics port and connect to various types of services.

Different devices have different levels of functionality – they may monitor and transmit the location of the vehicle or relay information from the car's on-board systems. Monitoring vehicle faults or fuel levels, they can track speeds, idling or sudden braking and record driver behaviour or just enable remote ►

CASE STUDY: TESLA MODEL 3

The Tesla Model 3 comes with an integrated 4G connection. This means owners can connect to their car from anywhere in the world. The owner's app will open the car on approach – they can also open the vehicle remotely (as well as flash the headlights and sound the horn) provided it's parked. If an owner or fleet manager wants to allow someone else to drive it, it's quite possible. The app enables any authorised account holders to see the car's position and speed, internal temperature and battery charge levels. They can also set maximum speeds or limit it to speed limits.

The vehicle is covered in cameras and sensors, both to aid driving (it has a lane-holding capability and collision warning systems) and to record conditions. Owners can opt to share anonymised footage with Tesla to help inform vehicle development including safety features and autonomous driving.

In-car navigation maintains a database of roads and road rules and connects to live traffic

information. It also provides live information about the Tesla supercharger network, connecting with live battery information to automatically provide route plans which include any required charging.

The superchargers connect to – and automatically identify – the car on connection. Charging is seamless and charged to the account holder on completion. The 'ecosystem' includes solar roof panels and a battery; the ultimate goal is to create a system which connects homes and vehicles to the grid enabling solar generation, vehicle charging and power storage, all playing a role in the decarbonisation of both transport and energy.

The final element of connectivity is over-the-air software updates. This means the car's software code can be upgraded throughout its lifetime. Most modern cars have about a million lines of code – everything from engine management systems to any non-mechanical elements of driving. Inevitably, there are occasional glitches and cars



are sometimes recalled by manufacturers to update software that is working incorrectly – for instance GM recalled vehicles because the airbag software was not functioning correctly, and the high-profile 'Dieselgate' was a result of software programmed to mislead testing sensors. Where reprogramming is required, over-the-air software updates can achieve it without returning the vehicle to the dealer. Tesla over-the-air software updates have increased the range and performance of all Model 3s in circulation by 5% by reprogramming elements such as the regenerative braking more than a year after the model was launched.

► booking, opening and locking of the vehicle.

Driver monitoring lets companies meet health and safety policy requirements for ISO 45001 (occupational health and safety monitoring systems) and much more efficient working practices.

Automated drive time recording can simplify compliance with working time regulations, using car clubs to manage pool vehicles or electric delivery vehicles to ensure they're sufficiently charged for each trip.

Telematics provides extra comfort for vehicle financing – some providers require them as a condition of the lease to protect their asset. And, as vehicles transition to electric drivetrains, data and connectivity becomes vital to managing the fleet.

>1%
%
of cars licensed
in the UK are
electric or ULEV

SWEAT THE ASSET

Delivery vehicles are not the only beneficiaries of connected vehicles. Cars are notoriously under-utilised – usually being driven for less than 5% of the time. Large organisations can invest significant sums in their fleets only to see them sit idle for the vast majority of their lives.

Connectivity enables cars to be used more efficiently and shared between people in organisations and beyond, although staff who pay benefit-in-kind taxation might be resistant to sharing 'their' car. Telematics systems enable cars to be shared seamlessly, integrating easy-to-use online booking systems and radio-frequency identification (RFID) cards to open and lock vehicles, rather than key sharing. They also collect clear

usage data so fleet managers can see how vehicles are being used and retire any under-used vehicles from the fleet.

Using car club telematics and management systems regularly save businesses money, reduce parking requirements and cut risk by providing managed services. Systems such as Tomorrow's Journey enable pool cars to be opened up to short-term hire during downtime – simultaneously increasing utilisation rates and creating income streams that offset fleet costs.

CONNECT AND CONSOLIDATE

The Manchester Metropolitan University case study (page 32) reflects a much wider issue. The UK car fleet is currently in excess of



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38 million licensed vehicles of which (at the end of 2019) less than 1% were electric or other ultra-low emission vehicles (ULEVs). A massive and rapid turnover of vehicles to change the fleet to ULEV is urgent to combat a crisis in air quality and the climate emergency.

It's generally recognised this enormous shift entails some level of downsizing of the fleet, particularly as purchase costs of electric vehicles (EVs) are currently higher than their petrol and diesel counterparts. While there is a need to consolidate the fleet and shed vehicle numbers, it is expected smaller fleets will need to increase their utilisation rates.

Car clubs and pool vehicles are one way this increased utilisation requirement can be achieved. The manufacturers are

increasingly recognising this in their business models. Connectivity is key to enabling seamless sharing as it enables a smooth customer experience (e.g. cars opened remotely or by mobile phone) as well as better management of the asset.

CONNECTED AND CAR CLUB-READY FROM THE PRODUCTION LINE

The Renault Zoe is one of the most long-standing and proven models of electric cars, which already has a strong track record in the fleets of several European car sharing programmes. In its latest iteration, the Zoe will have car-sharing software from French telematics provider Vulog fitted as standard in all new vehicles.

The Vulog software integrates multiple functions involved in car-sharing - ➔



CASE STUDY: FARMDROP

Farmdrop is an ethical grocer supplying sustainably-produced food via an online platform. To deliver orders, it uses an electric fleet of 25 'Vanimals', equipped with Geotab GO devices, primarily to monitor driver behaviour, location and vehicle charge level.

This is important because the vans are fully electric. Electric vehicle deployment is relatively new and comes with its own challenges. Running out of power is a big deal – instant refuelling is pretty much impossible – so you have to be confident the vehicle can complete its delivery round.

The platform connects with the van's battery management so its performance can be understood over time – what range is realistic and what routes can be covered.

At first, drivers were not keen on having their behaviour monitored and there was some pushback. But they were given their data as a game in which they could beat their own scores (and their peers' scores) each month.

Behaviours measured included speeding, seat belt use, harsh braking, acceleration and cornering. This gamification of scores engaged drivers – resulting in an overall 33% improvement in the first four months.

Interestingly, as well as improving driving behaviour in terms of safety for drivers and other road users, the other benefit was a 27% reduction in power use in the vehicles. By driving more smoothly, drivers reduced the amount of electricity used per mile – cutting costs and, effectively, extending the range of the vehicles.



► such as finding an available car online or through an app, and unlocking it with a mobile device, plus monitoring charging and invoicing to streamline the management of the car fleet.

Shipping vehicles 'car club-ready' is intended to increase uptake in the shared mobility market and could help smaller car-sharing schemes adopt and share EVs. It has the potential to give Renault access to a new audience: people who may not want to buy a car but also those who may not otherwise try an EV.

CONNECTED VEHICLES AND RISK

As we move to sharing vehicles, insurance becomes more complex, especially as the UK model bases premiums on insuring the driver (rather than on the continent where the vehicle is insured for any driver). But connected technology enables greater insight into who is driving a car at any given moment (and how they are driving) and to identify the associated level of risk.

This has already been used to insure people in 'high risk' categories. Insurers base their evaluation of individual risk on general actuarial principles across

populations grouped by demographic data. This means some groups – young drivers in particular – have extremely high premiums to reflect the perceived risk.

Real life driving data from connected cars can be used by people to demonstrate that they're less risky than average. Thus we have a new market for 'black box' insurance, where a plug-in unit is used to collect and transmit driving data. Insurance can be provided on a conditional basis (for instance by driving within curfew times) or premiums can be adjusted to reflect driving behaviour (such as compliance with speed limits or smooth braking and acceleration).

Young drivers with otherwise very high premiums are the key market for these products, receiving feedback on driving behaviour in an app. Falling below a target score, however, can result in the policy being cancelled.

INSIGHT REDUCES RISK

As telematics is deployed in more vehicles, it should be easier to manage risk. The market for short-term cover is growing with companies such as Cuvva providing short-term policies, enabling people to borrow cars and be insured on a temporary basis. Others such as Drivy and HiyaCar enable peer-to-peer car hire, insuring the vehicles while they are 'on hire' without it affecting the owners' insurance policy. Connecting vehicles increases uptake and provides better insight.

TRAFFIC, ROUTING AND LIFTSHARING

Connectivity provides the opportunity for vehicles to interact with infrastructure – for instance, traffic signals, smart motorways and variable speed limits. Currently this has limited applications such as managing interactions between buses and traffic management systems to prioritise buses through traffic signals.

But businesses are planning for increased connectivity. ALD Automotive provides business mobility – through funding solutions and support services (from accident management to fuel spend reduction) and, increasingly, smart mobility solutions. This involves connected vehicles which provide fleet managers with insights into every aspect of their fleet, from fuel consumption to mileage and driver behaviour. But it's becoming more commonplace for fleet managers to stress that driving may not be the optimum use of staff time.

A new ALD application, ALD Move, is being tested. The app syncs with a user's online calendar to produce an optimal travel itinerary for their data. Based on real-time data and predictive analysis, it takes on board weather, congestion and other traffic information. The result is that it can advise on optimal and alternative routes, including multi-modal mobility options, when appropriate. ALD Move can be paired with a mobility card, providing access to a complementary range

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CASE STUDY: MANCHESTER METROPOLITAN UNIVERSITY AND ENTERPRISE CAR CLUB

Manchester Metropolitan University uses a telematics-based car club system to book pool cars. The telematics, booking and back office system are provided by Enterprise Car Club. Staff can book the vehicle they need online and open it with an Enterprise RFID card, contactless bank card or by using the Enterprise Car Club app.

This has changed working practices considerably. Before the pool car scheme was implemented, 550 staff used their own cars in the course of work in a year.

This grey fleet usage had considerable implications as the university had to ensure all staff vehicles were fit for purpose as part of their duty of care. Providing centrally-managed pool vehicles reduces the overall risks, as well as the associated workload and the administration of expenses.

The efficiency of the pool vehicle system enables the university – a large organisation with more than 4,000 staff



– to operate with a very streamlined fleet of 25 vehicles to service its needs, keeping costs to a minimum.

In addition, the pool vehicles reduce parking requirements as staff who need to drive during the day do not need to bring their own cars to work.

These factors have combined to enable the introduction of a high proportion of electric vehicles. Reducing the overall number of vehicles has, unsurprisingly, reduced the fleet's capital requirements and the low running costs of the 10 electric vehicles bought has provided long-term cost savings.

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Pool vehicles needed for more than 4,000 staff at Manchester Metropolitan University

CASE STUDY: INSURING THROUGH HIYACAR

With connected shared cars comes more utilisation and more data that, used properly, can be very powerful. More than 50% of Hiyacar bookings are made with QuickStart cars which incorporate Hiyacar's keyless technology. These vehicles are closely managed throughout their booking and use cycle with liveness detection and facial recognition on pick-up of the car and during bookings, encrypted digital keys that are only valid on one device, GPS tracking, mileage and fuel usage. The technology uses LE Bluetooth at short range to stop jamming. The vehicles can be remotely locked and unlocked – including arming the immobiliser – and digital keys can even be revoked if necessary.

While this appears to manage risk, it's not all plain sailing. Hiyacar was recently forced to switch insurer because it was hard for the insurer to understand how to apply the data.

Hiyacar COO Rob Lamour says: "We studied to see how we can prevent claims and bad behaviour and use this data to effectively underwrite over the top of our insurance policy. The impact was clear. By managing risk using traditional and non-traditional methods, we were able to reduce our claims ratio to as low as 15%.

"But our insurer, using its traditional rating factors, priced our premium so uncompetitively that it was, effectively, subsidised by the business. This is not a sustainable model. We decided to reject renewal terms and stop trading to find another provider whose thinking was more aligned with ours. We refused to be held ransom by market pricing and wanted to keep true to our values of creating a sustainable business.

"Insurers generally look backwards to calculate risk whereas new companies that are doing



something different need to look forwards. If we want to change mobility there is a need for 'fit for purpose' policies, not repurposed ones."

This shows connectivity has not yet permeated the whole industry. "We are not yet at a point where the insurance industry can fully understand asset-based risk even in this connected market," says James Cartwright, managing director of gap insurer Direct Gap. "As we see more vehicle sharing and the new flexibility that connected vehicles can provide, adapting existing models will be tricky".

of public transport mobility alternatives. The app can incentivise mobility choices through an incentive programme, which can reinforce corporate mobility policies.

As connectivity increases (the next generation of 5G connections promises to enable more and faster connections between vehicles, infrastructure and platforms) the potential to develop functions cannot be underestimated. As vehicles are able to connect to manufacturer platforms and fleet management systems, and can ingest data about driving, roads and safety as well as optimising their own routes, charging and usage, the role of the car in the mobility

ecosystem will change. While connectivity already enables efficiencies and optimisation, it's clear this is only the beginning of vehicles' connectivity reshaping the automotive and mobility landscape. **ST**

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REVIEWS**

