# wejo | Ctrl*Shift*

**THE GROWTH OF THE CONNECTED VEHICLE DATA MARKET – THE IMPLICATIONS OF PERSONAL DATA AND EMERGING US LEGISLATION**

## 07
# Key enablers of market development

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Participants in the research programme for this series of reports identified Communications and Data Marketplaces as the two main enablers of connected car market development. In this report we will explore the role they play in driving the market forward.

Continued improvements in cellular communications technology have led to higher transmission speeds, wider and more reliable coverage and cost efficiencies. Together these will play a vital role in enabling rapidly expanding data volumes and a greater variety and frequency of data. Developments in Vehicle to Vehicle infrastructure will also present new opportunities for innovation, particularly in terms of car safety, transport efficiency and the development of Smart Cities.

Data Marketplaces play an important part in driving connected car data innovation, adding market value by producing data from different sources which can be standardised across the connected car data ecosystem. By enabling data liquidity, providing real-time analytics and creating one central point of information, these marketplaces can help data consumers gain important insights and drive innovation for the connected car market.

| Key Findings | Enablers which can strategically advance the connected car market were identified in two main dimensions. |
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| | • Communications: continued improvements in cellular communications technology offer higher transmission speeds, wider and more reliable coverage, and greater costs efficiencies. This will be vital in enabling rapidly expanding data volumes, driven by the growth in connected car numbers, and greater variety and frequency of data. |
| |     o Developments in Vehicle-to-Vehicle and Vehicle-to-Infrastructure will offer new innovation opportunities, for example in car safety, transport efficiency and the development of smart cities. |
| | • Data Marketplaces: innovation and wider market value can be stimulated by the amalgamation and synthesis of data from multiple different sources, enabled by interoperability or standardisation across the connected car data ecosystem. Data marketplaces have an important part to play in this by: |
| |     o Facilitating the 'data liquidity' required to ensure an efficient overall market for connected car data. |
| |     o Creating a central point of access through which data consumers can satisfy their data needs, and enabling them to innovate with new data combinations. |
| |     o Offering value-added solutions using the data in the marketplace e.g. providing real-time analytics to generate new insights. |

The research identified a number of key enablers that will facilitate the strategic development of the market development. These fall into two main categories:

- Improving connectivity and data transmission

- Data marketplaces and related 'open innovation' enabling solutions

## 1.1. Improving Connectivity

Improving connectivity will be a key factor in development of the market. Connected cars are adopting newer communications capabilities (e.g. moving from 2/3G and earlier network technologies to 4/5G) and network operators are extending the geographical coverage of higher speed technologies such as 5G.

Newer technologies offer faster speeds and reduced data transmission costs, which allows for the volume of data transmitted and received by the vehicle to increase, services to be updated frequently and for complex processing to be done in the cloud.

At present, the US connected car market is strongly dependent on older 2G/3G networks – but it is moving rapidly toward 4G. Key recent steps in the evolution of connectivity in the US connected car market include:

- The installed base of vehicles with embedded 3G/4G LTE capability reached c. 41 million by the end of 2018 - an increase of 22% from just over 33 million in 2017.

- Significantly, in 2018 the 4G LTE installed base surpassed that of 3G.

- 4G is forecast to exceed 80% of total in-vehicle communications technology by 2024.

- 5G enabled vehicles are currently being tested and will start to be rolled into production from 2022 onwards.

In the short-to-medium term, market innovation will be focused on services based on the dominant 4G in-vehicle technology. 5G enabled features will start to become available in this timescale, but will likely be pitched at premium brands/models in OEM product ranges.

Another important aspect of the evolution of connectivity relates to technology that enables Vehicle-to-Vehicle (V2V), Vehicle-to-Infrastructure (V2I), and Vehicle-to-Anything (V2X) communications.

Use cases based on V2V or V2I communications include:

- Safety: A V2V enabled vehicle broadcasts its location, heading and speed 10 times per second. All surrounding vehicles receive the message – this potentially allows the detection and assessment of dangerous situations (e.g. road obstacles, potential collisions) before they are noticed– either by cameras in the vehicle or by the driver.
- Traffic Flow: traffic lights could be used to assist drivers in maintaining speeds to optimise traffic flow and vehicle to vehicle technologies could allow for 'platooning' – where vehicles travel closer together at a common speed to increase road capacity.
- Emergency Services: V2I communication can be used to enable traffic light pre-emption by emergency vehicles - ensuring that the lights are green when an ambulance approaches (and eliminating the risks associated with having to run a red light).

*"Connected cars, especially in the context of high bandwidth connectivity enabled by 5G, might be considered as 'supercomputers on wheels' that just happen to carry people or cargo. Improved transport is only one element of the value that connected cars can bring – what can you do with a network of mobile supercomputers?"*

Tony Verb, Co-Founder GreaterBayX

## 1.2. Data marketplaces

Many participants in the research were of the view that it is unlikely that 'stove-piped' services with strong central control (e.g. by the OEMs) will be the most successful way to develop the connected car data marketplace – instead suggesting that open innovation will ultimately bring greatest value.

*"If everything is controlled from the centre, this is a bad market. It's the old mainframe market, it's not the personal computing or the smartphone market. The internet succeeded because it started at the edge – because there was nothing but the edge… and the edge is personal"*

Innovation can be stimulated by the amalgamation and synthesis of data from multiple different sources, enabled by interoperability or standardisation across the connected car data ecosystem.  Data marketplaces have an important part to play in establishing this approach.

Data marketplaces connect providers and consumers of data via a platform that ensures quality, consistency and security. Typically, data suppliers authorize the marketplace to license their information on their behalf, following defined terms and conditions. The marketplace itself makes money in various ways, typically by taking a share of the new value created from the data it offers.

The marketplace provider, or third parties can also offer value-added solutions using the data in the marketplace e.g. providing real-time analytics to generate new insights.

In the context of developing the market for connected car data, data marketplaces can:

- Create a central point of access through which data consumers can satisfy their data needs.

- Create commercial scale – marketplaces increase in value to both the OEM and end user if a deeper, more liquid pool of information is available. Some OEMs do not have enough connected vehicles to establish a market but by allowing data to be aggregated across OEMs they are able to participate to their own benefit and those of the data buyer and driver too.

- Support interoperability and standardisation – defining formats and abstractions that support cross-dataset, cross-organisation and cross-industry use cases.

- Open up new commercialisation opportunities – different types of data consumers will find new and innovative ways of using and combining data that were not obvious or relevant to the originating data providers.

- Enable crowdsourcing – by combining information and analytical models to deliver new value, more data suppliers will be drawn to the platform (a virtuous circle)

- Test and optimise different sharing models – OEMs are exploring a range of ways of sharing data. The Neutral Server approach is one being explored by a number or European OEMs which has characteristics discussed in more detail in the case study below and which, in particular, may address concerns around mandatory data sharing.  Other OEMs are adopting models that better support streaming data in near-real time which is particularly valuable for use cases around traffic, mapping, usage-based insurance and smart city performance.

Importantly, data marketplaces facilitate the 'data liquidity' required to ensure an efficient overall market for connected car data. This opportunity space has already been identified and there are several independent platform provider companies now offering this type of service for connected car data.

Data marketplaces can focus on a particular industry or opportunity space e.g. LexisNexis bring together multiple data providers and consumers to create one-to-many and/or many-to-many marketplaces to deliver a wider range of products from traffic and congestion through to advertising and retail.  These more broad-based offerings, provided by firms like wejo, can be underpinned by a range of technologies including the neutral server solution service which is discussed further below.

## Extended Vehicle Model and Neutral Servers

The extended vehicle model (developed by the European Automobile Manufacturers Association) is a way of sharing connected car data in a safe and secure way – and is an example of a standardised approach to a connected car data marketplace that is currently being used by some European OEMs.
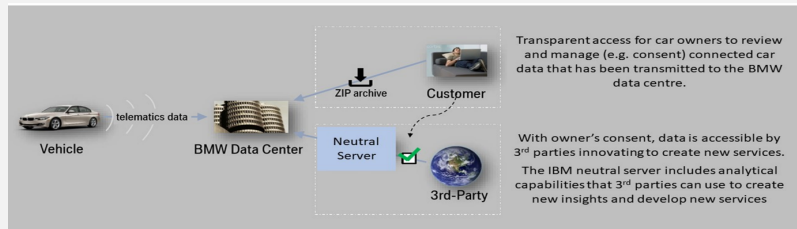
Essentially, the 'extended vehicle' is a remote secure server where connected car data can be accessed without allowing third parties direct access to a customer's physical vehicle – addressing the significant security and safety implications that such direct access creates.

The approach allows for the establishment of 'Neutral Servers' – data centres that are not operated or funded directly by the OEMS. These can be set up to make vehicle data readily available to interested third-party service providers without the need for them to sign a contract with the vehicle manufacturer providing the data.

This approach also ensures customer choice – vehicle owners are free to obtain services from the vehicle OEM, the OEM's network of authorised repairers or any other service provider of the owner's choice.  In this way, the neutral server starts to address the concerns from independent repairers about being 'locked out' by OEMs in the provision of connected car data enabled services such as predictive vehicle maintenance.  A neutral server also promotes open innovation by offering access to the data of multiple OEMs via one server, rather than needing to access the many servers of individual manufacturers.

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### CONNECTED CAR DATA MARKETPLACES UTILISING NEUTRAL SERVERS

BMW launched its connected car system in May 2017 as an add-in for their ConnectedDrive store for connected data enabled services. BMW makes vehicle data available through its own platform 'CarData' and also makes it available to neutral server providers. There are a series of neutral server providers operating marketplaces for vehicle data including wejo, Otonomo and High Mobility.  BMW's approach allows drivers to manage and control connected car data collected from their BMW and Mini vehicles, and approve the sharing of this data with third-party service providers who use it to innovate new services for BMW and Mini drivers.



At present, the data that BMW provides includes 79 data points:
- 63 condition data points (fuel and fluid levels, GPS location, mileage, battery voltage, etc.)
- 14 usage data points (trip distance, charging status, average fuel consumption, etc.)
- 2 event-based data points (emergency and breakdown situations)

The Neutral Server is currently suited to uses that only require access to vehicle data at specific points in time e.g. at the point a repair shop wants to verify the status of a sub-system or if a fleet operator wants to check vehicle mileage once or twice per day.

Other OEMs also provide data to Neutral Server marketplace operators. For example, Daimler allows wejo, and other providers, access to data that supports use cases ranging from insurance, EV charging, fuel monitoring and smart mobility services.

One advantage for data buyers utilising a neutral server is that the neutral server allows access to data from multiple OEMs rather than the buyer having to establish their own 1:1 relationships with each manufacturer. This promotes competition and innovation in the sector.

# CONCLUSION

Connectivity is an important part of consumer life, across all industries, and this is an area that will be a key factor in developing the connected car data market. Currently the majority of cars are still working with 2G and 3G technologies, and there is a clear need to move towards 4G and 5G. The extension of geographic coverage of 5G will facilitate this new development, allowing for a greater volume of data to be transmitted at much faster speeds and lower costs. Technology that enables Vehicle to Vehicle (V2V) Vehicle to infrastructure (V2I) and Vehicle to Anything (V2X) are also important stages of the connectivity evolution that can help make roads and cars safer, reduce traffic congestion and support emergency services vehicles.

Data Marketplaces are significant in developing the connected car data market; creating a central point of information, allowing for fast innovation and facilitating data liquidity. These marketplaces can also bring together multiple providers and consumers in one place, driving business decisions based on real life experiences.

While the connected car data market has its challenges, there is a clear thirst among manufacturers and consumers to drive these technologies forward. Connected cars represent a new era for the automotive industry that offers many benefits. By working collaboratively to tackle challenges, drive investment and put customers first, there is much to be gained, for OEMs and for society as a whole.

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This study has examined the growth of the connected vehicle data market and the implications for the use of PII including examining the key benefits and emerging issues as they relate to stakeholders in the market.

The work has highlighted a number of ways in which market participants can work to ameliorate the issues facing the sector to ensure the considerable untapped value of connected vehicle data is fully realised.

The analysis summarises the opinions of influential thought leaders together with the industry expertise of Ctrl Shift and wejo.

We are grateful for all contributions and encourage continued debate on this rapidly evolving landscape.