

THE VEHICLE DATA BIG BANG

How to turn theory into reality

May 2022

MANAGEMENT SUMMARY

Early predictions jumped the gun, but the value of vehicle data is real

In the last five years, monetization of vehicle data has captured the attention and imagination of researchers and analysts around the world. Massive new markets have been predicted, with some analysts asserting that profits from vehicle data and services would outpace profits from the vehicles themselves. Our last [Point of View](#) covered this topic in detail and provided guidance on what manufacturers need to do to fulfil the promise of monetizing vehicle data.

Now, we will explore the evolution of the market over the past few years, what new technological challenges have arisen, how the organizational and legal aspects are unfolding, and which focus areas will be of interest in the short and medium term. We also provide our thoughts on how new challenges can best be tackled to stay relevant, how to start capitalizing on small to mid-sized opportunities now and how to be ready when it's time to go all in.

There have been some premature predictions over the past few years,

but we believe the underlying confidence in the immense potential of vehicle data is well founded. It would be a costly mistake to overlook the recent signs of growth and miss out on a significant opportunity. What we're seeing is the beginning of a new market bursting into being.

€19m predicted for Europe in 2022

Recently, this market has started rapidly moving in the right direction. We're seeing:

- New data-based business models being built and launched
- New data points becoming available in the market
- Car data platforms going public with massive valuations
- Manufacturers stepping up their car data game by transitioning from solely raw data providers to suppliers of insights-as-a-service and new data-driven products.

With a predicted potential revenue of EUR 19m in 2022 in the European Union, we are still far away from the EUR 800m market we predict

for 2030, for personalized and anonymized data sales alone without additional reseller revenue potential. These numbers do not include the significant benefits from internal data utilization and revenues from data-driven services. We expect the exponential growth seen in the last years to continue accelerating, resulting in revenue of 3 – 4 EUR per vehicle/month for car data products in 2030, compared to less than 35 cents per vehicle/month in 2022.

The tremendous gap between the status quo and projected revenues can be explained by unexploited potentials on both the supply and demand side. On the supply side, we identified major challenges that need to be tackled to achieve the potential exponential growth. On the demand side, we are currently in an early adopter phase in some industries while others haven't even reached market readiness.

In the future, we predict that a large proportion of the revenue potential will be generated from fleet services, insurance use cases, and more importantly, from software-defined products that will be derived from structured usage of vehicle data by the manufacturer.



With increasing data traffic, OEMs need to optimize IT, organization and legal operations

After looking at each of these areas in detail, we'll provide some key takeaways to help manufacturers define and execute their data strategies.

The technical front lays the foundation for the positive market trends to accelerate. New challenges need to be tackled now or the race may be lost to faster acting OEMs, data platforms or third parties in the value chain. With increasing traffic and vehicles that will be producing terabytes of data per hour, the first challenge is to create a dedicated data architecture and ontology approach, which is crucial to keeping the data structured and accessible.

The organizational front relates to the structural changes that must take place to accommodate the sale of data. This in turn leads to a whole new set of skills. Selling data can no longer be thought of as a side hustle that can be handled on top of other tasks. A structured sales approach in parallel to vehicle sales is needed. It will be necessary to find out which market has which requirements and how those can be fulfilled to provide the most value to each buyer. At the same time, it is necessary to harmonize vehicle data sales activities with the overarching data organization together with the broader range of data classes from your CRM, ERP, product data, as well as dealer and traditional sales data.

The legal front comes in the form of new laws and legislation. Most of them may not be specifically formulated with vehicle data in mind, but will nonetheless impact the business at its core. Over the last year, the legislation landscape in the US and Europe has become active, aiming to keep regulations up to date with the evolving tech and market trends. By the same token, data privacy laws have become market-specific, strengthening customers' data privacy and regulating what manufacturers can do with their vehicle data. OEMs are now facing the decision to either get involved early in the process to shape the upcoming regulations or to lean back and wait for the initiative to hit the market, counting on their ability to react quickly.

THE VEHICLE DATA ECOSYSTEM IN FIGURES:

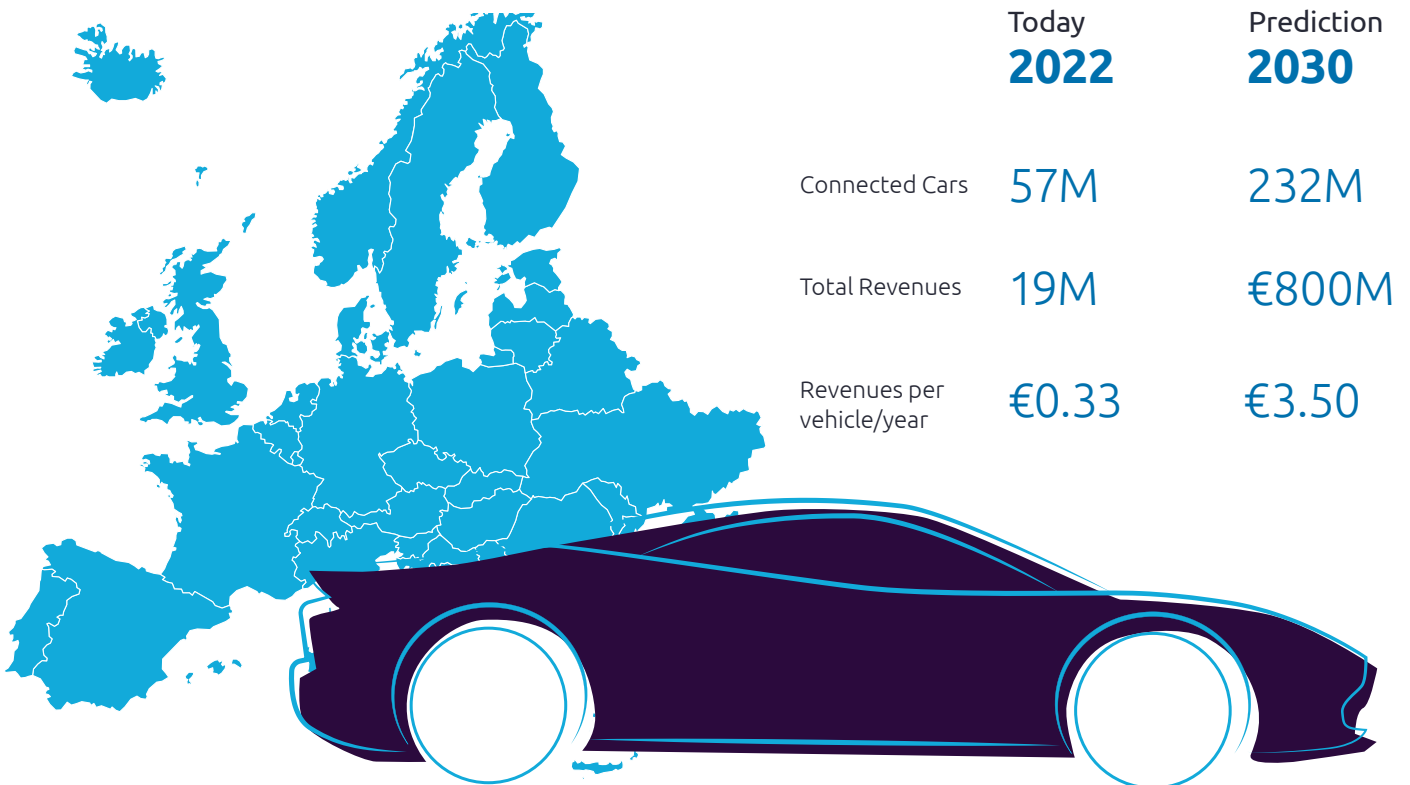


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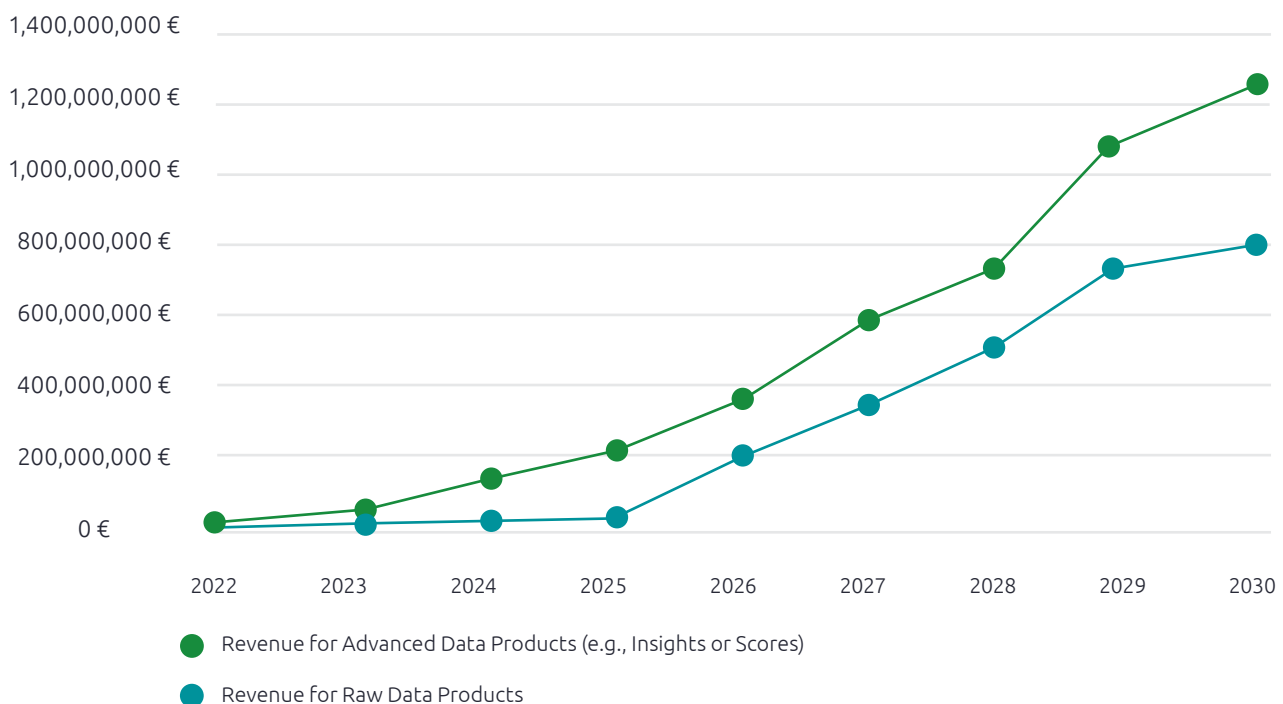
MARKET OVERVIEW

Where are we now and what will the future look like?

Vehicle Data revenue will increase by more than 700% in the next three years

Putting the hype aside, we get a clearer view of the current state of vehicle data monetization. We estimate that in 2022, car data market revenue will rise to approximately EUR 19m in the European market.

REVENUE POTENTIAL FOR VEHICLE DATA PRODUCTS IN EUROPE



We are still cautious in our market assessment, but we see market development as clearly positive. Years of investment as well as economies of scale are starting to show results. In a best-case scenario, we estimate that the revenue potential for automotive data in Europe will reach EUR 800m for the sale of personalized and anonymized raw data by 2030. That does not include estimations for internal value (e.g., sales optimization, R&D, and data-driven software development) and cost reductions.

It is important to mention that at a certain point in time, business scalability can only be achieved by vertical growth to new segments and client groups with new personalized data use cases. Selling anonymized, swarm data will be capped due to the geographical coverage.

As the graph here shows, OEMs can achieve much higher revenue by climbing up the value chain. Internalizing specific data products by offering one's own services can result in revenue growth of up to 60%.



Take the example of the limited business scalability of anonymized products.

Car data can be used to aid in weather forecasting, but only a certain number of cars are needed for any given region – beyond that the data they send back provides rapidly diminishing returns. A third party will not be willing to pay for excessive data once their goal is met.

The revenue for sales and service data comes with a staggering 65% gross contribution margin now, a percentage that is expected to grow over the years due to low operation costs and high scalability. The excitement over vehicle data was a bit too early, but it wasn't misplaced.

Fleet data and the structured internal data usage will generate most value

The EU market clearly indicates the potential for generating up to EUR 4 per vehicle/year. There is a particularly high potential for fleet data. This is due to the greater demand for data by fleet operators, and the ability to rely on already established use cases.

We also foresee additional potential for internal use cases such as data-driven software optimization, which some manufacturers are referring to as the Big Loop. Here, the goal is to enable vehicle functions to be continuously optimized with artificial intelligence.

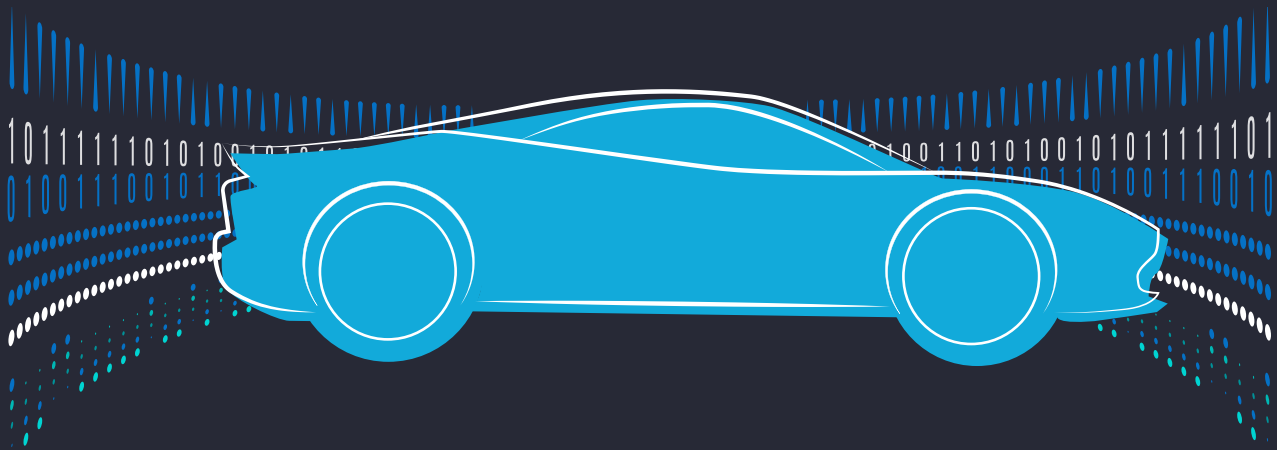
The positive market development is mainly driven by a strong increase in available data signals, resulting in optimized data product portfolios and a changed value proposition of the manufacturers.

Data signals – OEMs will have to handle vast amounts of vehicle data

The status quo is marked by a constant increase in the amount of available data signals, mainly driven by the business demand of third parties who are willing to pay for those signals. Additionally, improved data collection technologies and an increased number of sensors to prepare for ADAS in vehicles are driving the increase in available data signals. Since 2020 we have observed a massive increase in available e-mobility data signals, such as charging rate, battery cycles, battery and charging status for business models around battery improvement, second life and recycling. In addition to the quantity of data, the quality is also constantly increasing, making data more readily accessible for data consumers. However, huge differences can be observed among manufacturers. As

a result, customers are still willing to pay a premium for great quality and enriched data sets from data platforms rather than OEMs.

In the future the growth in available data signals will accelerate exponentially as it depends primarily on the level of autonomous driving as well as the technology (lidar, radar, etc.) that enables autonomous driving. For example, Tesla drivers report about 4GB of data transmitted to the OEM after a typical day's use for the beta version of Level 5 autonomous driving. However, this figure could increase to up to 3.6 TB of data per hour with the inclusion of additional autonomous driving technologies and greater reliance on such vehicles. As data transmission will continue to grow, it will become more difficult to manage the high data load, even with a reliable 5G network.

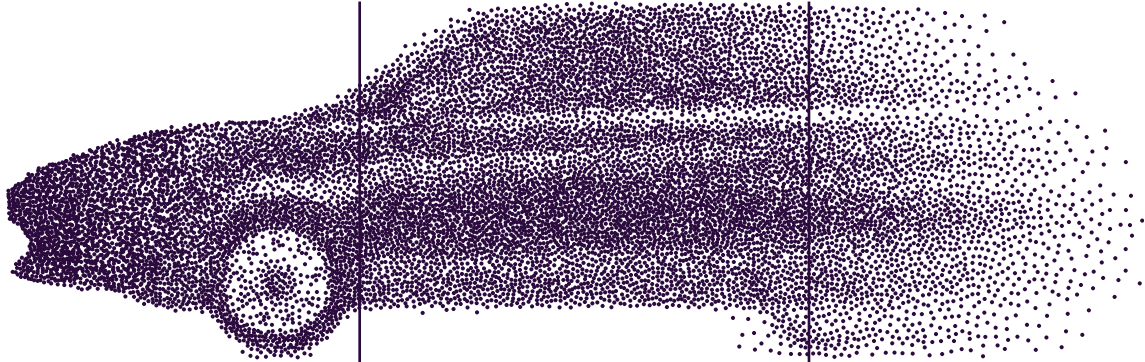


42 DATA SIGNALS: THE MINIMUM VIABLE DATA SET

Together, two major automotive associations, CLEPA and ACEA, have defined a “minimum viable data set” of 42 data items which OEMs should cover to provide the most attractive use cases in the market. Those data signals reach from basic information such as odometer value, diagnostic trouble codes up to more specific information such as battery

light status and diesel additive range. The graphic below names those data signals. It is elementary for the individual OEMs in the automotive industry to comply with those guidelines to leverage the full potential of the vehicle data business.

Uncoordinated data collection initiatives will complicate the provision of services by the data consumers, lowering product attractiveness, margins and revenues for the OEMs.



Basic data set: Supported by > 10 brands

- Odometer value
- Fuel tank level in liters or percent
- GPS position & time
- Remaining electric range/distance
- High voltage battery charging status

Advanced data set: Supported by - 10 brands

- Speed of vehicle at current value
- Buckles status
- Power steering warning lamp
- Coolant temperature high warning
- Tire pressure warning indicator
- Windshield wiper fluid level
- Acceleration of vehicle
- Brake pad low warning
- Airbag warning lamp
- Brake fluid level low warning
- Oil pressure warning lamp
- Window status
- Door status
- Trunk status
- Convertible roof status

Specific data set: Supported by < 5 brands

- Diagnostic trouble codes
- Distance to next service
- Time to next service
- Door lock status
- Quiescent current/value
- Full lock status
- Time until next required oil change
- Sunroof status
- Service indicator
- Low oil indicator
- Malfunction indicator all systems
- Remaining brake fluid life
- Distance until brakes service
- Due date for brake fluid change
- Tilting status of sunroof
- Vehicle high voltage battery
- Total remaining range
- Diesel additive range
- Diesel additive status (low indicator)
- Distance until engine oil service
- Oil temperature high warning
- Battery light status

Data products – insurance use cases and internal use cases are the low hanging fruits in the short-term

The status quo is marked by a growing adoption of vehicle data products and an increasing number of successful business models within the market. What started in the insurance sector with innovative usage-based insurance products including pay-as-you-drive (PAYD) and pay-how-you-drive (PHYD) has now expanded to mileage verification and first notice of loss (FNOL), claim and incident reporting – all based on vehicle sensors now generating valuable data in formats that are usable and actionable.

As mentioned above, fleet operators are also tapping into the space of embedded car data solutions. This is because their ten-year-old “dongle” solutions are expensive, inflexible, and vulnerable. Manufacturers are profiting from this due to streamlined consent processes. This model is used instead of individual driver consents for B2C use cases, which means a single fleet manager can simultaneously grant the whole fleet access. Furthermore, fleet use cases are already market-proven and help fleet managers to efficiently manage their assets, track driver behavior, and improve driver safety.

The public sector is also demanding more aggregated, anonymized data to get greater insights on urban traffic to derive measures for infrastructure optimization and improve road safety by Car-2-X communication. In 2021, Mercedes Benz launched a ready-to-use dashboard for local authorities to visualize potholes and bumpy roads to help them optimize their use of public funds. Audi recently announced their go-live of multiple safety-related use cases in the public mobility data space to warn other traffic participants about hazards, breakdown vehicles, and extreme weather such as heavy rain, fog, or crosswinds.

In the future we predict that the number of released and market-proven data products will continue to grow till 2025. This strong growth is mainly driven by two trends:

1. A further growth in the area of fleet
2. A stronger focus on internal use cases

Especially the second growth area will contribute significantly to the increase in data products, as internal monetization is yet an underrepresented but very important value stream for the OEMs. However, our estimate for future revenue potential

reveals that internal utilization will account for 45% of the overall data monetization market in 2025. Enhancement of marketing, sales and aftersales processes as well as R&D optimization will be the main drivers. In general, we see internal monetization as an essential short term revenue source that helps to ramp up the external vehicle data monetization business.

The Mobility Data Space is the first data space in Germany that fully implements the International Data Spaces (IDS) standard for sovereign data sharing in the mobility sector. Multiple cross-industry participants can share data to contribute to safe, environmentally sustainable, and user-friendly mobility options.

“Cross-industry initiatives like the Mobility Data Space are very important. The connection of data signals from various sources will allow the generation of totally new and more beneficial use cases.”

Felix Schwabe
Head of Digital Business Development
at AUDI AG



Data channels – data marketplaces are still the dominant sales channel for OEMs but car data players will move up the value chain

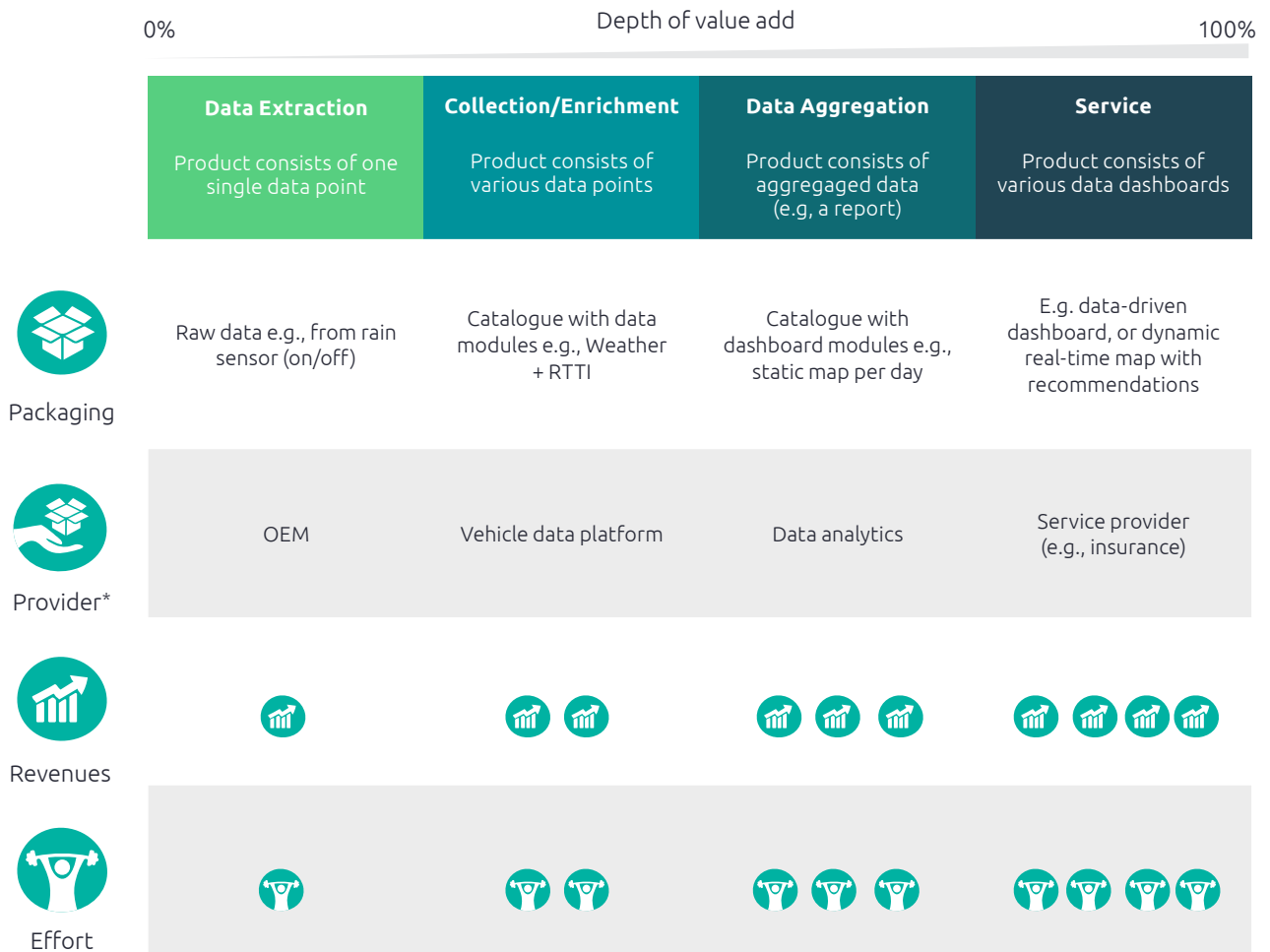
The status quo is characterized by the sale of vehicle data, with the majority of manufacturers focused on reseller contracts with the leading car data platforms. Besides the upsides of externalizing sales, cleaning, enriching and normalizing data across multiple OEMs, manufacturers are now heavily relying on the client network of the data resellers.

There are currently around 15 major car data marketplaces, and the number is growing. These include Otonomo, Wejo, SmartCar, Caruso,

High-Mobility, Lexis-Nexis, OCTO and other specialized vendors. In 2021 it could be observed that the trust in the business model of those data platforms had massively increased. Otonomo went public with a massive valuation of over USD 1Bn despite revenues below USD 400,000 in 2021. Wejo entered the stock market with a similarly high valuation – investors are confident that the business will be sustainable in the next few years.

In the future car manufacturers will move up the car data value chain. OEMs will increasingly provide insights rather than raw data. This development can be explained by two benefits: higher margins and lower data privacy risks. A prime example of this development can be found in the pay-how-you-drive (PHYD) use case. The shift from selling raw data to providing a data-driven service has strong upsides, but also requires significant investment by OEMs and the development of internal know-how. The following graph shows the various steps in the value chain:

THE SHIFT FROM EXTRACTING DATA TO PROVIDING A SERVICE INCREASES EFFORT, VALUE AND REVENUE



To shift from data extraction to services it is necessary to analyze competition and customer needs, and develop internal solutions.

*Climbing the value chain will give OEMs the opportunity to take over the roles of vehicle data platform, data analytics and service provider.

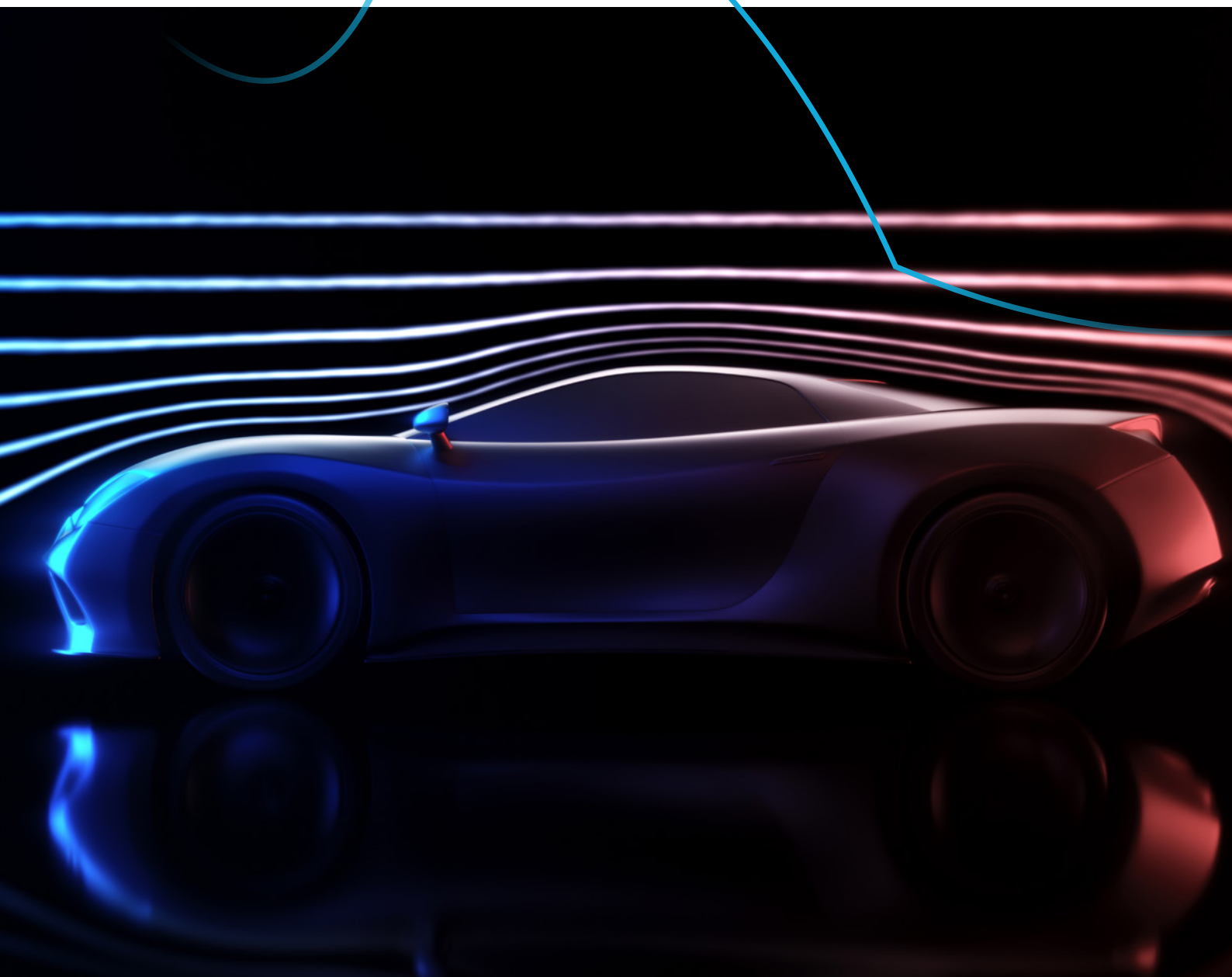
Mercedes-Benz's pay-how-you-drive (PHYD) is a prime example of the shift towards more service-oriented data provision. By partnering with an external data analytics provider, the company can sell a complete driver score to insurance companies, rather than simple raw data. This same development can also be observed at Tesla. Since 2021, the company has been providing its own insurance PHYD. This service can be booked both in the car and via the company's web portal.

“ We need to go beyond the sale of raw data signals. In the future we aim to offer vehicle-data based services to directly provide an added value to our customers.”

Felix Schwabe – Head of Digital Business Development at AUDI AG

We see most OEMs in an early stage of pure data extraction and also partially engaged in data enrichment. In general, climbing high on the value chain will increase margins on data products and services but also will demand a broader skillset within the organization and higher resource engagement overall.

We make two suggestions: firstly, we can recommend moving away from stage one due to upcoming legal initiatives, which will impact the raw data selling business. Secondly, we propose to evaluate on a use case level, in which OEMs aim for the precise level of data refinement necessary for a given use.



NEW CHALLENGES REQUIRE NEW SOLUTIONS

Data consumers are already lining up and preparing to shift their products to an embedded car data solution. Once issues such as pricing, frequency, and quality of data are addressed, they're willing to pay. And more good news: vehicle data is expanding to further fields of application, such as providing insight into the optimization of cars' operating systems. Manufacturers today find themselves in the position of a rancher who has struck oil – they're suddenly in possession of something immensely valuable but have little to no experience in tapping into this unfamiliar terrain.

The challenges of monetizing vehicle data fall into three categories: technical, organizational, and legal. Let's turn to those next.

The technical front

OEMs data management systems were simply not built to handle the volume of data traffic from connected – and soon to be autonomous – cars. Consequently, there are two pressing tasks. Firstly, valuable data needs to be disaggregated. Secondly, it is important to ensure data privacy and compliance with legal requirements. Besides the legal reasons, such actions maintain customer trust. Once these two tasks are complete, product and process optimization can be achieved by improving the accessibility of internal data.

Tesla and data: a case study

In the field of data collection, Tesla provides a benchmark worth studying. Based around a specific event (e.g., an accident), a Tesla car collects relevant information on a micro-second level and stores videos and images from seven cameras around the vehicle on their own servers. This data and video material has been shared

in individual cases and following requests from officials.

On the one hand, this helps Tesla optimize their products and know exactly how their customers are using their product – a laudable goal for any manufacturer today. However, it has also earned Tesla

the annual “Big Brother” award for data they collect and for their lack of transparency, data protection, and data privacy conditions. The vehicle essentially does not fully function if the driver does not accept the full terms and conditions to extract and store data for product optimization reasons.

TESLA DATA SIGNALS THAT ARE MOST RELEVANT DURING AN ACCIDENT

Vehicle Speed

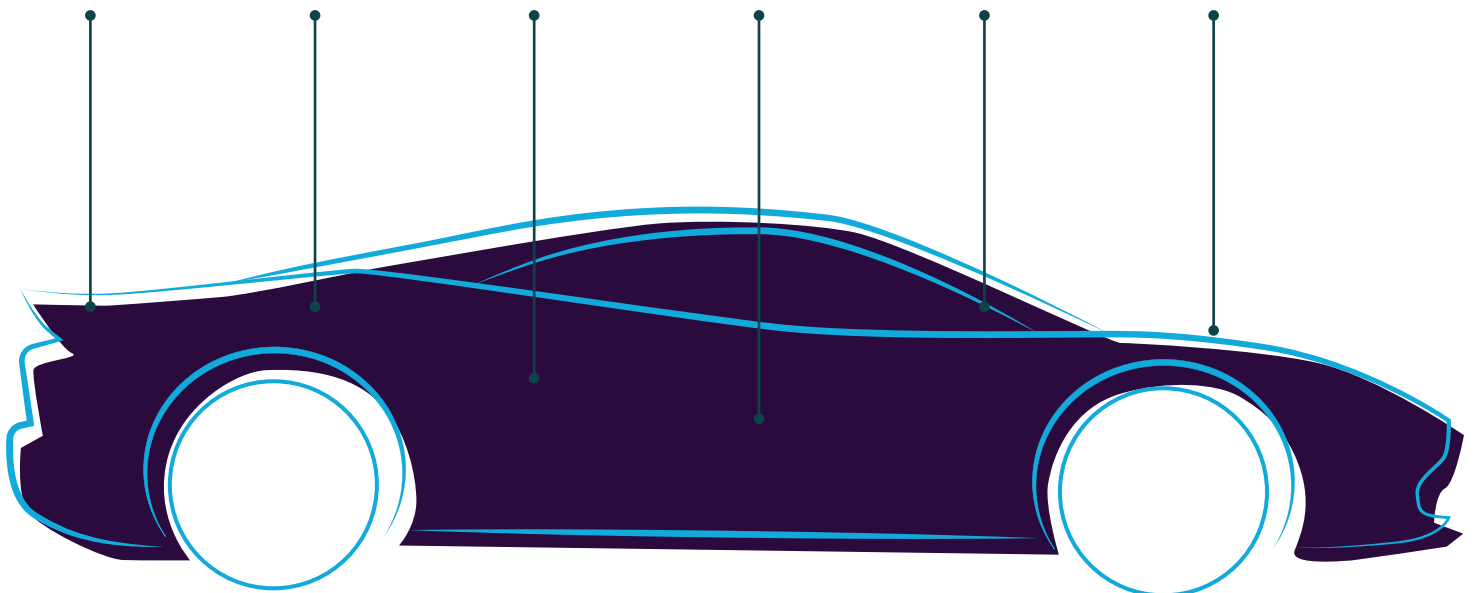
Accelerator Pedal Position

Brake Application

Lateral Acceleration

Longitudinal Acceleration

Crash Detection



Rising data traffic demands a structured data architecture approach

For now, vehicle data privacy is primarily a question for planners – crucial for designing a data management strategy, but not a pressing problem. Most European OEMs still lack the consistent car data architecture necessary to structure data in the right format in the right medium. At present, data architects are concerned primarily with questions such as: when a car should extract data, how to store them in the data lake, how to design GDPR compliant deletion rules and how to store historical data.

As more and more data is collected in the coming years, 5G technology (which will be soon embedded into new models) will enable the transfer of massive amounts of data. However, with a lack of data architecture it will become increasingly difficult to structure the data in a way that makes it easily consumable for third parties and for internal departments in search of product insights. For a more detailed look at the direction data architecture is taking, see the sidebar.

How to provide context to vehicle data? A brief primer on ontologies

OEMs with more advanced ontologies will have an advantage when it comes to any use of their data. Previously the niche domain of data scientists, awareness of ontology is likely to reach many people in the vehicle-data sphere.

A brief primer:

The best way to understand “ontologies” is by comparing them with human languages. An ontology is nothing more than a language that has been modelled so that machines can exchange data with each other. The advantage is that data is interoperable and can be linked without transformation effort. If real data is linked with the ontology, you get an enterprise knowledge graph that represents the knowledge of the company and can contribute to the data becoming FAIR*.

A current example is the Catena-X initiative which has the goal of keeping the data interoperable or, “in the same language” so that all companies understand each other.

*Guiding Principles for scientific data management to improve the Findability, Accessibility, Interoperability, and Reuse of digital assets

“95% of the collected data will be useless if they have no context.”

Dr. Pascal Feillard - Group Senior Director – Capgemini Engineering

In-vehicle analytics algorithms can decide which data is worth collecting

Even with the cellular cost of data transmission falling consistently and the growing role of 5G in extracting those terabytes of data out of the vehicles, it needs to be evaluated which data is worth collecting in which situation. As learned from the tech industry, in-vehicle analytics engines can help extract diamonds from the rough, assessing the valuable insights which need to be identified to avoid massive data storage when only a small percentage of the data is useful.

To give an example, OEMs will want the ability to sort drivers (or more accurately, driving patterns) into categories, and then to derive useful insights from each driver. When a driver is just commuting the whole week from point A to point B, he's probably not generating interesting insights for a third party. In-car data analytics engines can learn to detect such patterns, categorize them, and decide whether data collection is worthwhile. Data collection for that driver might resume on weekends; and it would certainly kick in in the case of an unusual event, as Tesla vehicles do when a collision occurs.

Driver identification is not fully sufficient to comply with EU laws

If a man is driving his wife's car, whose data is being recorded from a legal perspective – the driver or the owner?

Driver recognition is currently not 100% GDPR compliant. One stumbling block is simply determining who is driving, and whether they have given their consent. If a man is driving his wife's car, whose data is being recorded? If the wife has given her consent, how do we know if the husband has given his? At present, we cannot be sure that every driver has individually consented to having his or her data shared. This likewise applies to PHYD insurance tariffs, studies, and more.

Some OEMs have attempted to solve this problem by personalizing driver profiles such that the driver needs to type in a password before even starting the vehicle. But this may not be the most customer-friendly way and can also be circumvented as the "easy access" mode avoids this step. In the EU at least, this is still not a sufficient driver identification solution.

Some potential solutions are already in the market. Tesla, for example, just filed a new patent for an AI automotive system that uses biometrics to track the passenger's position within the vehicle and personalizes the settings accordingly. In 2022, KIA introduced a finger biometric authentication system to select different personalized profiles within the new K9 model. This is not only driven by car data and its protected usage, but also for new and promising use cases such as in-car payment.



The organizational front

OEMs often underestimate the structures, skills, and interdisciplinarity they need to fully leverage car data. Too often, only the short-term revenues of vehicle data are considered while the full potential of a longer-term, more holistic approach to vehicle data is missed.

Successful (data) sales organizations have professionalized their internal structures

Many companies are tempted to solve their data sales needs by adding a small functional team to their existing organization, overlooking legal requirements, and neglecting the need for interdisciplinary team setups. OEMs need to shift their models to encompass the bigger picture, and interdisciplinarity is key. When it comes to data sales, OEMs continue to have different stages of maturity – some recognize the need to ramp

up and professionalize, while others still regard it as a niche market which can be met with a small team or by existing employees on top of their usual workloads. Based on the future relevance of car data in terms of legal requirements, revenue potential, and a possible differentiator in the purchase decision, we believe that the lion's share of the data market will fall to the OEMs with integrated, scalable organizational structures in place.

WE HAVE DEVELOPED A DATA ORGANIZATION FRAMEWORK, WHICH CAN SERVE AS A GUIDELINE TO SET UP YOUR DATA ORGANIZATION:

STEP

1

Set up a dedicated data sales entity



STEP

2

Equip with sufficient resources



STEP

3

Orchestrate the data initiatives in your company



1. Set up a dedicated data sales entity

We highly recommend separating data sales operations from the rest of the organization, including the creation of a separate legal entity, for the following reasons:

- To ensure compliance with upcoming laws. The Data Governance Act requires that the data seller be independent from the data processor.
- For interdisciplinarity. A healthy data business requires full-time focus on a multitude of disciplines.

Technical resources, sales resources, and especially legal resources are needed. Moreover, as the company moves up the value chain they will require further resources, especially in the area of data science and analytics.

2. Equip with sufficient resources

Go-to-market approaches for vehicle data products are heavily influenced by market access characteristics as well as local legal and political regulations. To target the right markets most effectively, OEMs need to iteratively assess all market conditions. Each data product has its own characteristics – some require less sales effort, while some require intensified efforts shouldered by dedicated sales agents, experts, and project managers. As already mentioned above, a move up the value chain will require additional resources, as the B2B approach shifts to a B2C model. Overall, significant investments are needed as the market grows from an early adoption phase and then – as we predict – through a period of exponential growth.

3. Orchestrate the data initiatives in your company

There will be many fragmented initiatives that involve vehicle data in your organization. It is essential to identify and track the various activities, consolidate, and orchestrate them. Therefore, we recommend building up a joint requirement intake process, where one centralized data management team fields requests from any department which is interested in accessing vehicle data. For external sales, a separate sales entity with top management support can facilitate the process.

The legal front

As data markets develop, legislation is close behind. OEMs that fail to comply with existing and upcoming regulations may face fines in the hundreds of millions and in some cases even billions. Not to mention additional scrutiny and reputational damage. Non-compliance is not an option, but there is still a window of opportunity for OEMs to influence the regulatory process.

Lawmakers are quickly catching up to recent developments in the data space

Over the last couple of years, lawmakers have introduced proposals and new regulations that will continue to impact our relationship to data and its overall monetization potential. These regulations (detailed overview on page 18), from first drafts to fully fledged laws, affect a wide range of areas – from data privacy and standards to competition law. The overarching goals of this legislation are to strengthen data privacy and individual rights, as well as to enable access to data for a large community of stakeholders.

For OEMs, these regulations may threaten their dominance over vehicle data, as restrictive data access policies, monopoly pricing and data gathering without consent may be in direct violation to these new regulations.

In general, however, these regulations will likely be positive for all actors involved. It will foster the creation of a much larger vehicle data ecosystems, create joint standards and help to build public acceptance.

As a swathe of new regulations work their way through the legislative pipeline, regional actors such as China, the EU, and the US on a federal and state level, want to be at the forefront of this development, to be part of the conversation, and to steer clear of monopolistic structures.









New laws and guidelines will impact vehicle data revenues from manufacturers

These regulations will translate into far-reaching requirements for business models, IT systems, financial and legal procedures, as well as the overall enablement of data use cases and their time to market.

Many manufacturers now face the challenge of complying with these laws without compromising on the monetization potential of vehicle data. This question can only be answered on a case-by-case basis, depending on each instance of vehicle data strategy, partnerships, and organizational setup.

Here you can find a quick description of the most relevant laws and initiatives that are likely to impact the data business soon.

Regulation	Current Status	Consent Process	Vehicle Software	Organization	Data Marketing	Affected Region	Comments
Data Governance Act	Advanced (draft)	●	●	●	●		Aims to create and facilitate the exchange of data between entities and countries in accordance with GDPR. Distinguishes between data holder, data subject and data intermediary – the latter of which is subject to strict neutrality. If OEMs want to offer intermediary/marketplace services, structural separation is recommended.
Digital Markets Act	Advanced (draft)	●	●	●	●		If OEMs fall under the definition of a gatekeeper, third-party data access and interoperability needs to be granted. No favoritism of own services.
GDPR	In force	●	●	●	●		Sets the rule for the collection and processing of personal data. It governs all data-related use cases in Europe.
TTDSG	In force since 12/2021	●	●	●	●		Explicit consent may be required for the collection and storage of data by the vehicle as well as data transfer to the OEM. New requirements towards driver identification may become needed.
Right-to-Repair (R2R)	In force (MA, USA)	●	●	●	●		Extends existing right-to-repair legislation in Massachusetts to also cover telematics data. The previous MA R2R-legislation (without telematics) was the blueprint for a nationwide R2R implementation.
Provisions on the Security Management for Automotive Data	In force (China)	●	●	●	●		Severely limits data processing outside the vehicle without individual consent and strictly limits cross-border data transmission.

● Limited impact ● Medium Impact ● Severe Impact

KEY TAKEAWAYS

More revenues can be generated now by selling fleet data and insights to third parties

Now that innovators and early adopters (e.g., insurance companies) have started to pump the first revenues into the pockets of data providers, we expect that other early adopters will massively accelerate the revenue growth over the next three years. OEMs need to align their offerings with market demand - relevant data signals in a suitable format for high frequency and high quality. New data products need to be bundled and the data collector technologies need to fulfil those requirements.

Internal data utilization will generate the most value

More and more manufacturers are recognizing the value of their data and evaluating how to utilize it to optimize their operating software (car.OS), improve their navigation services and provide safety related features. Besides product optimizations, sales processes can also be improved as drivers' needs come into clearer focus. Including data directly in the corporate IT landscape (such as CRM/ERP) offers a huge benefit and will help to increase conversion rates.

Increasing data traffic will demand a more structured data architecture approach

It is expected that data generation by connected and partial autonomous vehicles will exceed 3.6 TB/hour for fully autonomous vehicles by 2025. On the data transmission side, decreasing cellular costs together with 5G will be able to handle the amount of data sent from the car to the OEMs backends. However, it is essential to define a structured data architecture approach and to give data context, so it is easily usable for third parties and internal stakeholders. Furthermore, this will help to "win back" business which is currently being carried out by car data platforms.

Stepping up the value chain needs to be carefully analyzed on a use case level

In 2021 we saw multiple OEMs that evolved from traditional "raw data" selling into providing more sophisticated data-based products such as ready-to-use driver scores, dashboards for infrastructure analytics and further insights-as-a-service offerings. On one hand, more advanced products offer higher revenue and margins, but they also require more inhouse capacities and skills to develop products. The exact demand of the market must be analyzed before taking this step.

Observe the legislation debates – they will impact the vehicle data business

Many new laws and guidelines are currently defined on the EU level to strengthen customers' rights and data privacy. Whether directly related to vehicle data or not, most of them will have an impact on the data sales of manufacturers. Legal departments need to get up to speed. Watch what's currently in the pipeline and start to assess the impact so that you can act before it's too late.

Professionalize your data sales operations and embed in overarching data organization

Successful manufacturers know exactly which use cases are requested by which market and have dedicated resources, business plans, sales targets, and multiple sales channels. All of this is required. It is not enough to regard vehicle data sales as a "nice-to-have" add on located somewhere abstract, lost between digital business, connected vehicles, and IT departments. Many OEMs have already started to launch separate entities for their data and software sales – this trend is expected to accelerate due to new upcoming legal requirements currently being discussed in the EU.

TAKE THE LEAD ON VEHICLE DATA

The shift from a physical manufacturing mindset to the world of digital is profound. We believe that the industry leaders who act first – setting up scalable structures and familiarizing themselves with digital best practices – will gain an unassailable lead in the coming years.

To share your experiences and questions, contact us below.

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Monetizing Vehicle Data is part of Capgemini's [Smart Mobility Connect](https://www.capgemini.com/service/invent/smart-mobility-connect/), a series of custom automotive offers addressing the need for customer centricity. Smart Mobility Connect empowers clients to digitalize their core business and customer-facing channels (connected customer), monetize new growth potential (connected services and products), expand the profit pool with new partnerships (connected ecosystem), and transform to a customer centric business, leveraging the overarching AI-enabled customer engine platform. <https://www.capgemini.com/service/invent/smart-mobility-connect/>

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