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Unlocking the full life-cycle value from connected-car data

Car data can help mobility players along the entire value chain—but they need to act now.

by Michele Bertoncello, Christopher Martens, Timo Möller, and Tobias Schneiderbauer

February 2021

Connected cars provide a unique customer experience while simultaneously delivering cost and revenue benefits to mobility companies, including OEMs, suppliers, dealers, insurers, fleets, tech players, and beyond. To date, however, most players have overlooked opportunities to monetize data from these vehicles—a significant oversight, considering how companies in other industries are aggressively generating value from data. In fact, seven of the ten most valuable companies in the world already generate billions in profits from data-based services. These businesses include both new attackers and tech companies. Players in traditional industries are increasingly following the same path and transitioning from hardware to software-as-a-service (SaaS) and subscription businesses.

The automotive landscape may now be more amenable to using data from connected cars. To help mobility companies that want to pursue opportunities in this area, we assessed the potential market value of data-based services, investigated promising use cases, and identified levers that they can apply to improve their chances of success.

The potential for monetizing connected-car data

Consumers see tremendous value in connectivity, with McKinsey's 2020 consumer survey on autonomous driving, connectivity, electrification, and shared mobility (ACES) demonstrating that 37 percent of respondents would switch car brands to achieve improvements in this area. In some countries, the percentage of consumers willing to switch brands for improved connectivity was even higher (56 percent in China, for instance). Similarly, 39 percent of consumers were interested in unlocking additional digital features after purchasing a vehicle—a figure that rises to 47 percent for customers of premium OEMs. Given connectivity's increasing importance, OEMs that fail to meet the bar risk losing customers.

A few stakeholders have already acknowledged the importance of data and begun to take action. Some insurers have tailored insurance rates to driving styles, for instance, and certain cities use sensory data to identify potholes. A few media agencies have also increased their advertising reach through new touch points inside and outside of vehicles. For these players and others, car data provides valuable insights—often obtained from driver interactions with vehicle systems—that are unavailable from other sources.

Slow progress with connectivity and data monetization

Many OEMs have struggled with connectivity or related software developments, resulting in poor customer reviews and delayed start of production. Only a few get the software-defined car right, and even fewer fully monetize vehicle data. Those companies that do successfully differentiate themselves focus on three important activities:

— providing end-to-end access to 1 to 2 terabytes of raw data per car each day to enable continuous product and service improvements

— focusing on monetization throughout the vehicle life cycle through recurring revenues from monthly subscriptions, such as those for premium connectivity services, and paid over-the-air (OTA) upgrades, which may eventually include those related to full-self-driving capabilities

— bringing services from the idea stage to vehicle integration in up to six weeks using dedicated end-to-end teams—a strategy that has helped some players, especially new OEMs specializing in electric vehicles (EVs), achieve record-high valuations, even though their sales are a fraction of the sales of their much larger peers

Most companies are much less successful than the leaders in profiting from connected cars and monetizing information. Few customers now buy OEM-connected services or sign up for insurance-player-connected offers, such as usage-based insurance. What's more, OEMs and data marketplaces typically find few B2B customers today who are willing to purchase data, limiting

their revenues. Monetization from car data has thus grown more slowly than we anticipated in our 2016 report on this topic, which was published at a time when the industry seemed to hold great promise.

Three factors explain why most companies have been unsuccessful in monetizing data so far:

— *Failing to generate customer interest and differentiate their services.* Customers already receive many connectivity services—seemingly free but often paid for with their data—on their smartphones. OEMs may thus encounter difficulty when attempting to convince customers that car-connectivity services will deliver additional value, especially since they often involve complex onboarding and installation processes. These challenges, combined with poor execution of services and communication issues, now severely limit uptake in the consumer sector. Within the B2B sphere, many customers are also unaware of the potential benefits of car data. Very few actually use it, and some only leverage the limited information available through dongle solutions.

— *Not resetting the organization.* Companies must reshape their organizations and processes to build capabilities that enable effective data monetization throughout the entire vehicle life cycle. To date, however, few players have created dedicated, cross-functional data-monetization units for this purpose. Instead, many functions still work in silos, with few connections between R&D and marketing and sales. OEMs have also struggled with talent acquisition and development, as well as with the creation of agile work processes and tools. In another complication, many companies maintain internal target systems and business cases that still focus on the point of sale, rather than on the entire vehicle life cycle. Their processes oftentimes result in too many variants and limited upgradability of features, hampering any monetization attempts.

— *Not establishing ecosystems for scaling.* For automated charging payments, remote-vehicle monitoring and services, targeted advertising, and other areas, automakers should work with existing infrastructure, service, and data providers to achieve scale quickly and deliver sought-after benefits. Instead, too often they work in isolation to develop—or simply reinvent—hard-to-scale island solutions between an OEM and one other player (for instance, a single gas-station brand). Lacking dependable partners, they have little time to focus on core competencies and differentiators. This pattern is true even for standard elements, which partners could easily provide. OEMs are also less likely to form partnerships in the B2B sphere than their peers in other sectors, making it difficult to serve the huge number of potential customers and obtain full value. This situation is changing, however.

Car-data monetization at the tipping point

While OEMs and other players have faced immense challenges to monetizing car data, the industry is now at an inflection point, where they must focus on five imperatives to accelerate progress (Exhibit 1).

Ensuring short-term profitability and making solid long-term investments

Players along the value chain must undertake a complex dual transformation. First, they must make their core businesses profitable in the short term, despite severe headwinds, including those related to COVID-19's economic impact and the consequent volume loss of over 20 million units globally. Internal combustion engine (ICE) vehicle bans, increasingly stringent emissions regulations, and potential defaults of ballooning auto loans are also negatively affecting financial performance, as is systemic overcapacity.

Second, automakers also need to master electrical and electronic (E/E) architecture and software, as well as EV and autonomous vehicle (AV) technology, all of which require significant investments to

Exhibit 1

Focusing on five imperatives can help accelerate car-data monetization.

Source: McKinsey Center for Future Mobility

achieve long-term value. The switch from ICE to EV will have a particularly significant negative effect on margins for the foreseeable future—not just at the point of sale, but also in aftersales, given the lower maintenance requirements for these vehicles. OEMs must undertake operational improvements to free up the funding for these new endeavors, but these changes will not be sufficient to cover the full costs.

In this environment, connected services represent a near-term revenue and profit opportunity. They require relatively low initial investments and have faster development timelines compared with many technologies, including advanced driver-assistance systems (ADAS) that can require double-digit billion investments. Connected services are especially attractive because they provide high margins and recurring revenue streams. Strong offerings also increase retention, since about one-third of customers are willing to switch car brands to achieve better connectivity.

Improving the customer experience

OEMs are well positioned to monetize their direct customer access and data, since very few companies have such regular and extensive interactions with their end customers. Despite the potential, many OEMs have only scratched the surface when monetizing data, and their efforts often fail because they provide a poor customer experience and encounter execution issues, resulting in low retention. For instance, many have complex sign-up and log-in processes across different devices or else have challenging interfaces. These features put OEMs at a disadvantage compared with companies that offer the comparative ease of one-click smartphone solutions. Consequently, few end customers extend their connected-service packages beyond the initial trial period. OEMs will face even greater challenges, as customer interactions with smartphones and other consumer technologies will continue to raise the bar. In other words, automakers must compete not only with their peers but also with the best high-tech players.

The approach that new EV OEMs are taking to address this problem differs from that of traditional companies. They leverage customer feedback and constantly improve their products based on the information. EV OEMs also have very short reaction times and are willing to ship beta versions, which they later improve with OTA updates. For instance, one OEM developed and released a feature to adjust in-vehicle warnings within six weeks in response to a customer request. In parallel, consumer-technology players are also leveraging their internal expertise to develop operating systems (OS) that provide access to a full ecosystem of internal and external applications, such as maps. Again, their approach is more similar to that for smartphones than cars.

Some OEMs and suppliers are slowly waking up to this new world and are developing better infotainment solutions and apps. Others follow a different path and integrate the full infotainment solutions that tech players have developed, with some already announcing these ventures. OEMs and suppliers still have a long way to go to become fully customer centric, however.

Using data to respond to regulatory pressures and new security requirements

Data regulation is becoming increasingly strict, as shown by Europe's General Data Protection Regulation (GDPR) and the California Consumer Privacy Act (CCPA). Rather than limiting the speed and development of car-data monetization, the new guidelines provide a clear framework for OEMs and data customers. Compared with the United States, the European Union has more thorough guidance on the use of private data, including who may handle it, which gives players greater legal security when working with personal information. This results in a situation where European companies are much more likely to sell personalized data than those in the United States.

Beyond regulations, organizations are issuing new concepts that create a secure legal environment for data monetization. One example is the Neutral Extended Vehicle for Advanced Data Access (NEVADA) Share and Secure concept, issued by the German Association of the Automotive Industry several years ago.[1] The European Union is also developing rules for accessing vehicle data and may standardize them across countries. Similarly, in the United States, Massachusetts voted in favor of expanding "right to repair" laws about vehicle data and fault codes to give independent service stations greater access to this information. While OEMs largely control a vehicle's data today, these recent changes may give owners a greater say in how a car's data is used and monetized. Similar regulatory changes in the banking sector increased competition and enabled new offers for customers.

Beyond data security and access, cybersecurity is increasingly important for connected vehicles. Greater protections could thus actively advance vehicle connectivity, and many organizations are attempting to set guidelines in this area. For example, the World Forum for Harmonization of Vehicle Regulations (WP.29), 1958, under the UN Economic Commission for Europe, requires OEMs to ensure cybersecurity throughout the development process and fix any software issues via OTA updates.

Together, the new regulations and increased cybersecurity could prompt OEMs to reexamine their approaches to vehicle data and make this information more widely available within their ecosystems. In turn, they may be able to capitalize on data monetization opportunities arising from increased information sharing.

Taking advantage of new opportunities

Forecasts indicate that connectivity levels will increase significantly, with 60 to 70 percent of new vehicles sold in North America and Europe reaching Connected Car Customer Experience (C^3X) Level 3 or above by 2030. (See sidebar, "The Connected Car Customer Experience framework.") This shift will dramatically expand the addressable market for connectivity solutions. New features that will increase C^3X and enable a wider range of services include the following:

— more powerful E/E architectures that enable features such as OTA updates

— improved sensors, including cameras and light detection and ranging (LiDAR), that collect additional data points

— significantly increased computing power and interconnectivity

Importantly, new EV OEMs are at the forefront of many developments, effectively setting new standards for the industry while defining new ways of working. For example, the most advanced players are several years ahead of other OEMs in popularizing OTA updates and creating an advanced E/E architecture. They also keep upgradability and maintainability top of mind from

[1] The German name for the German Association of the Automotive Industry is Verband der Automobilindustrie.

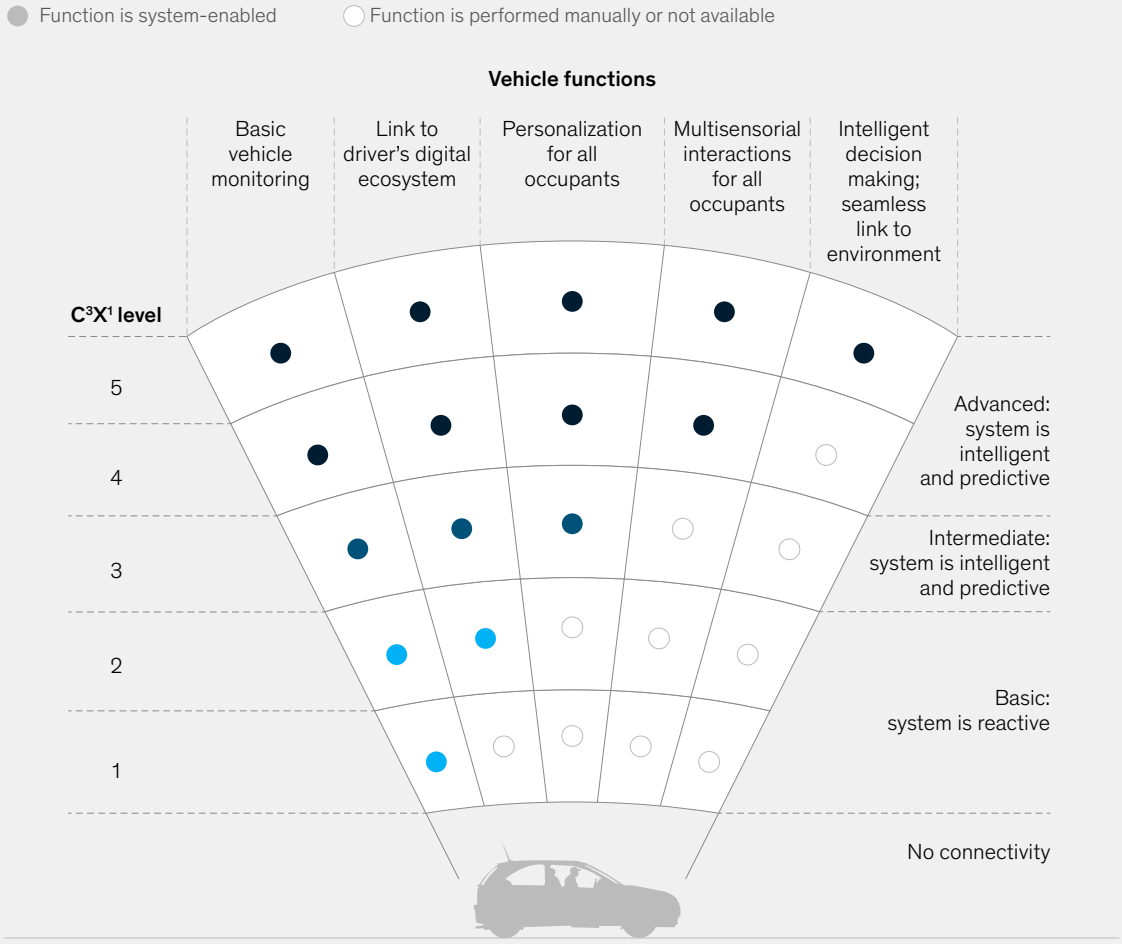
The Connected Car Customer Experience framework

The McKinsey Connected Car Customer Experience (C^3X) framework describes five levels of user experience in connected cars, ranging from basic to advanced connectivity (exhibit):

- Basic connectivity is focused on drivers and reacts to their inputs. It includes two levels. Level 1 involves general hardware connectivity. It only allows drivers to track basic vehicle usage and monitor the technical status of their vehicles. At level 2, the vehicle can use a driver's personal profile to access digital services via external digital ecosystems and platforms.
- With intermediate connectivity, the focus shifts to all occupants. It includes only level 3. At this level, all occupants enjoy personalized controls, infotainment, and advertising.
- Advanced connectivity extends to predictive systems and includes levels 4 and 5. At level 4, occupants engage in live multimodal dialogues with the vehicle in real time and receive proactive recommendations on services and functions. At level 5, the vehicle is a virtual chauffeur and uses cognitive artificial intelligence to meet the explicit and unstated needs of occupants.

Exhibit

The McKinsey Connected Car Customer Experience framework describes five levels of user experience in connected cars.



[1]Connected Car Customer Experience.
Source: McKinsey Car Data Monetization 2018

the beginning. Several new EV players operate in parts of the value chain that other players typically outsource, such as overall software development for infotainment, which gives them more control and additional revenue options.

Some tech companies are positioning themselves to become the industry's new default option for infotainment, especially among volume OEMs in the European Union and NAFTA. Their products are already being integrated into vehicles in these locations. In China, local tech players are creating similar ecosystems around their OS, some of which have also already been integrated into vehicles.

In light of these developments, OEMs must define their make-versus-buy strategies and identify the truly differentiating key control points, as well as determine where they can compete. Because customers are familiar with tech players and their nonvehicle offerings, these companies could develop strong traction on critical automotive control points if OEMs do not move quickly. Those that hesitate might become little more than vehicle assemblers.

Beyond new tech players that are directly involved in a vehicle's tech stack, other players, including telcos, retail outlets, and media agencies, are entering the extended ecosystem as data users and suppliers (Exhibit 2). Few of them now use car data, but many would benefit from such information. Collaboration among multiple players within the ecosystem will be necessary to capture full value.

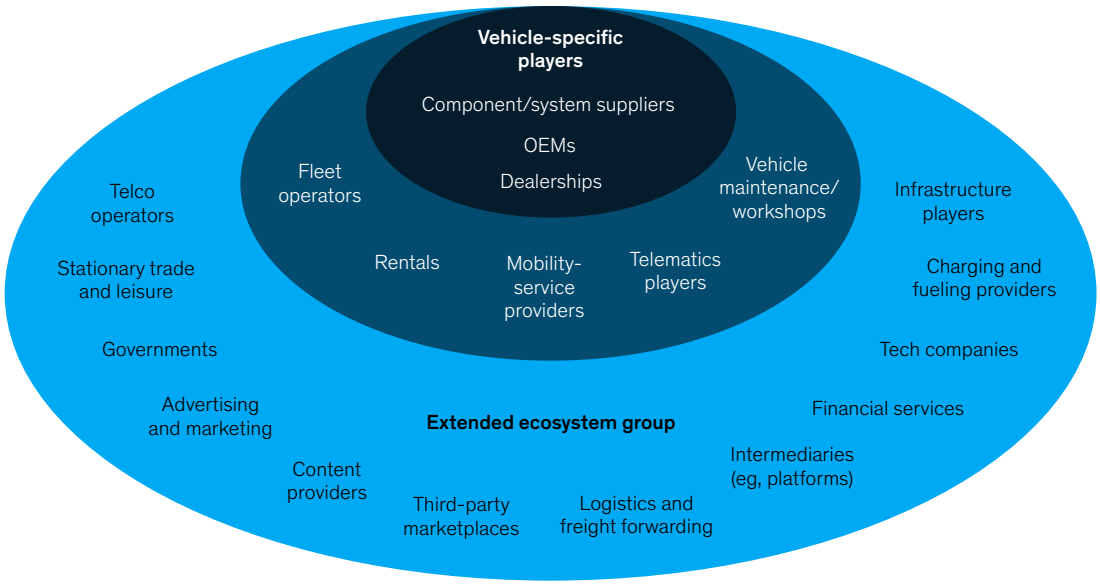
Increasing the importance of life-cycle monetization and new business models

The automotive industry has already begun moving toward life-cycle monetization, rather than focusing on revenues at point of sale and in the aftermarket. Several developments may increase this trend. First, sales will increasingly shift online, with 20 to 25 percent of vehicles expected to be sold through this channel by 2025. Similarly, subscription models

Exhibit 2

With new companies entering the mobility value chain, collaboration between vehicle-specific players and the extended ecosystem is critical.

Vehicle ecosystem, nonexhaustive



Source: McKinsey Center for Future Mobility

will become increasingly popular, with respondents to McKinsey's European Auto Financing Survey 2020 expecting the subscription market to form 20 percent of the total retail-financing revenues by 2025. These developments underline the importance of taking a life-cycle perspective and will increase the opportunity for monetizing connected services.

To capture new opportunities, OEMs and suppliers are looking at OTA feature updates and connected-service unlocks to generate new revenue streams throughout a vehicle's life cycle. Some players, for example, already sell software features, such as acceleration updates for their existing vehicle fleets. Some also offer their connectivity packages and ADAS systems by subscription and plan to roll out similar offerings for ADAS features. Other players have developed new services. For instance, a Chinese EV OEM offers mobile-charging services to customers, and a US start-up provides a similar service for refueling. Another EV OEM plans to offer an office-mode feature to optimize conference calls and document sharing, as well as a connectivity package with television and media services. Beyond generating revenues, these services provide players with recurring interactions with their customers that may increase brand loyalty.

At present, consumer willingness to purchase connectivity services may be limited, however. Globally, respondents to McKinsey's 2020 ACES consumer survey were willing to pay about $13 per month for advanced map features and personalized navigation, or for fuel- and cost-efficiency features. This willingness to pay for connectivity features is increasing, especially for differentiating features.

Beyond selling features to consumers, OEMs, suppliers, and others can monetize mobility data in many ways. Their profits could come via data marketplaces or by forming partnerships with companies, such as insurance or mobility players.

Value creation in nine use-case clusters

With companies responding to these five imperatives and advancing car-data monetization, we expect to see many new use cases that provide value throughout the vehicle life cycle. These can be grouped into nine clusters that generate revenue and reduce costs in B2B and B2C settings. The clusters fill gaps and address pain points from R&D and product development through vehicle use and after-sales services. Today, for instance, customers do not have competitive in-car entertainment options that rival those of smartphones. Infrastructure operators also lack data about the condition and usage of their assets, and fleet operators are missing data that could help them better manage vehicle maintenance and repair. Leveraging car data and connectivity would enable use cases that address these issues (Exhibit 3).

These nine clusters, which contain 38 use cases, could deliver $250 billion to $400 billion in annual incremental value for players across the ecosystem in 2030.

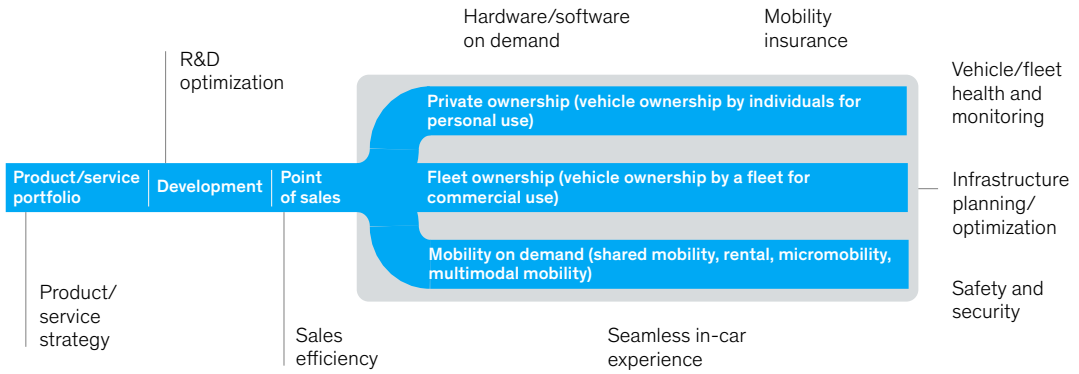
These nine clusters, which contain 38 use cases, could deliver $250 billion to $400 billion in annual incremental value for players across the ecosystem in 2030 (Exhibit 4). These figures include additional revenue generated from services and data sales, as well as cost savings enabled by car data. It is somewhat lower than the $450 billion to $750 billion in annual value that we estimated players would obtain through car-data monetization in our 2016 report on this topic.

We reduced the expected 2030 value because uptake of car-data monetization has been slower than anticipated, making it impossible to reach the upper range cited in our original forecast. Several factors explain the slowdown:

— Players along the value chain, especially OEMs, are taking longer to build the required capabilities and hire the right talent; many are still struggling to attract developers.

Exhibit 3

Use cases fall into nine clusters that deliver value across B2B and B2C applications.

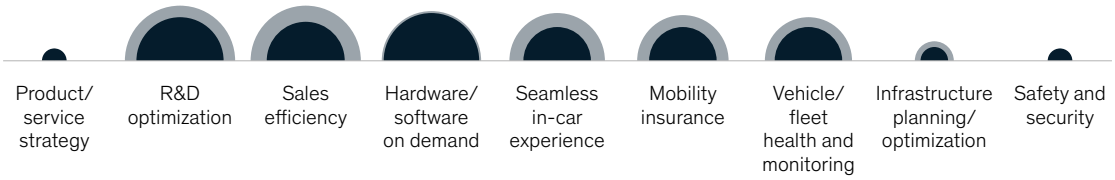


Source: McKinsey Center for Future Mobility

Exhibit 4

Nine use-case clusters have the potential to deliver $250 billion to $400 billion in value by 2030.

Relative value pool in 2030, by use-case cluster



Source: McKinsey Center for Future Mobility

On a per-vehicle level, connectivity could deliver up to $310 in revenue and $180 in cost savings per year, on average, in 2030.

— The development of new, more capable E/E architectures has taken longer than expected.

— Players along the value chain have been slow to form the ecosystems required for data monetization.

— The industry's tightening economic situation, coming after its 2019 high in profits, has reduced investments in connectivity; the COVID-19 crisis will also have a negative impact on investments, although less pronounced, and will reduce the vehicle parc by reducing the 2020 sales volume.

The industry has made progress in addressing all of these issues, however, and connectivity is poised to deliver significant value. On a per-vehicle level, this equates to up to $310 in revenue and $180 in cost savings per year, on average, in 2030. These figures vary significantly by vehicle, however, because of multiple factors. For instance, vehicle connectivity is a key differentiator. While basic connectivity allows vehicles to transmit data and show content on in-vehicle screens, advanced connectivity enables OTA upgrades. (The advanced levels require a wide range of in-vehicle sensors to generate data that enables additional use cases and features.) While many car-data use cases have been deployed in basic vehicles, the value potential of vehicles with advanced connectivity is two times greater.

In 2030, we expect annual revenue potential per vehicle to range from $130 to $210 for basic connectivity (C^3X levels 1 to 2) to $400 to $610 for advanced connectivity (C^3X levels 4 to 5). Annual cost savings would be in the range of $100 to $170 and $120 to $210 per vehicle, respectively.

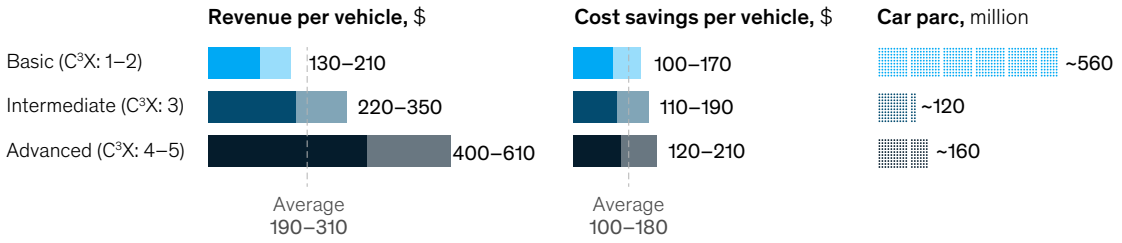
With car data from basic cars conveying many benefits, even players with lower-connectivity-level vehicles can start to monetize data and enter the market. In fact, basic vehicles will continue to account for the largest share of the overall value pool because of their high share of the vehicle parc. By 2030, about 95 percent of new vehicles sold globally will be connected, up from around 50 percent today. Around 45 percent of these vehicles will have intermediate and advanced connectivity (Exhibit 5).

Every player can take advantage of use cases, but certain organizations may sometimes receive more benefits than others. For example, dealerships can capture data-driven sales efficiency improvements, insurers will benefit from usage-based insurance offers, and infrastructure players gain the most from use cases that leverage car-sensor data to monitor road conditions. In general, however, multiple players are required to generate full benefits. OEMs are present in nearly all use cases and will receive a certain share of value, given that today's gatekeeper function could change because of future regulations. Telecom players are also critical to most use cases, since they provide the data connection, and data aggregators and marketplaces will also commonly be involved.

Exhibit 5

Use-case potential differs by vehicle-connectivity level.

Use-case potential in 2030, by Connected Car Customer Experience (C^3X) level[1]



[1]C^3X levels based on the McKinsey Connected Car Customer Experience framework.
Source: McKinsey Center for Future Mobility

Within the nine clusters, some use cases address larger underlying baselines than others, and their potential impact differs accordingly. Three use cases will deliver the greatest impact: OTA updates, R&D hardware optimization, and sales and service efficiency. Together, they represent 40 to 45 percent of the total value pool.

OTA updates, upgrades, and unlocks

These features will create monetization opportunities for OEMs and suppliers by allowing players to sell features throughout a vehicle's life cycle. OTA can bring new software-based features to vehicles, even those already in the fleet, after the start of production (SOP). They also allow OEMs to introduce new features to the head unit, activate hardware, and fix potential issues. These capabilities not only generate revenue from end users but also reduce residual value losses by allowing dealers to add missing features. OTA can also save costs—for instance, by preventing or accelerating recalls that could cost OEMs hundreds of dollars per vehicle. OTA features could also reduce the number of variants OEMs need to create, since all vehicles would be equipped with the same components.

To enable OTA, OEMs and suppliers must define E/E architectures and create modular-vehicle software that can be upgraded. They can best meet future customer requirements, prepare for competitor moves, and adjust to technology developments if they deploy systems with sufficient spare capacity and performance for future features. In addition to considering technical specifications, OEMs must rethink business cases, supplier relationships, software, and intellectual property (IP) management.

By 2030, about 95 percent of new vehicles sold globally will be connected, up from around 50 percent today.

They should also define feature road maps that extend well beyond SOP.

While OEMs have been driving OTA updates and upgrades, suppliers will increasingly enter this space. Postpurchase feature activation will enable new cooperation and revenue-sharing models that allow suppliers to access new revenue streams, especially for innovative new products.

McKinsey's 2020 ACES consumer survey shows that 39 percent of customers would appreciate having the ability to unlock additional connectivity features after vehicle purchase, rather than having to make the decision at the time of purchase. In the premium segment, this number rises to 47 percent. Results vary by country, however. For instance, 63 percent of Chinese respondents wanted to unlock features after purchase, compared with under 30 percent in France, Japan, and Switzerland.

R&D hardware optimization

If R&D hardware is optimized, OEMs and their suppliers can adjust vehicle specifications and features based on real-time data received from the vehicle fleet. This approach relies on more current information than traditional methods, which involve deriving functional requirements for new platforms and vehicles based solely on historic data. Among other benefits, OEMs can use real-time data to deprioritize features in future vehicles if current customers barely use them, or to change component specifications. As variant management becomes increasingly difficult and complex, this could save OEMs billions of dollars.

Car data is becoming especially relevant as OEMs move from an SOP to a life-cycle focus. By leveraging real-time data from their vehicle parc, OEMs can identify issues and rectify them for all new vehicles and accelerate recalls for the existing fleet.

To deploy this use case successfully, engineering, strategy, marketing and sales, and procurement teams must jointly analyze data and decide on future specifications and variants. OEMs must also collaborate closely with external partners, since the suppliers that deliver software and hardware must be closely integrated into the optimization process. Their involvement will allow them to manage their products' deployment over the vehicle life cycle.

Predictive maintenance

This feature requires data about component and consumables usage, as well as status data, to avoid costly vehicle failures. For OEMs and dealers, predictive maintenance increases revenues by driving higher repair traffic within an OEM's own channel. Fleet operators, including mobility service providers, can increase uptime by avoiding unscheduled repairs or breakdowns, and insurance players could save significant sums if predictive maintenance prevents accidents related to component wear and damages.

With the right capabilities, vehicles could also proactively schedule repairs, saving their drivers time by coordinating repair slots that best suit their calendars. Similarly, vehicles could also help optimize inventory management for dealer service departments and workshops by notifying them about upcoming repairs. Finally, vehicles could actively reduce maintenance costs by adjusting their settings based on data, thereby lowering wear and tear. For instance, vehicles could lower power output during acceleration from slow speeds to prevent excess tire wear.

Capturing car-data monetization's value

To capture the potential value behind these use cases, players across the mobility ecosystem need to develop four key capabilities.

Double down on a customer-centric approach

Monetization should concentrate on what customers want and their willingness to pay. To plug gaps regarding end users' perceived value, companies

should hold customer clinics to map out specific aspects of services and identify missing elements to address pain points. This approach will help them develop new use cases while also allowing them to optimize existing features and services.

As in consumer technology, where features are constantly updated, OEMs and suppliers must continue developing their offers beyond SOP to stay relevant. This capability will necessitate ongoing user testing after initial delivery to identify improvement opportunities, as well as continuous software updates, releases, and features, to ensure high customer engagement. If done correctly, the upgrades will allow players to create differentiating "signature moments," similar to those iPhone users now enjoy after OS upgrades and new app releases.

After developing and deploying features, players must ensure that customers actively use them. To do so, they must create customer-satisfaction teams that collect usage and interaction data along the customer and vehicle life cycle. The teams can then use this to inform decisions and provide input for the next release. For example, real-time tracking of feature usage could be used to determine which ones are most popular. Companies could then advertise these features to other customers who are not yet using them. Usage of features and functions would increase, thereby raising their perceived value, and customers would be more satisfied with their vehicles.

Recognizing the importance of a customer-centric approach, leading SaaS players have 75 percent more full-time employees engaged in churn prevention, per revenue dollar, and they help ensure that customers fully use their services, increasing the odds that they will resubscribe. As OEMs, suppliers, and other players move into subscription services, they must also increase their customer focus to improve retention. For instance, they could follow the example of some tech players by having customer-service representatives without sales targets explain new features.

Get technical enablers right

In the future, players must leverage data from R&D through actual usage to inform product decisions, reduce component wear, and develop new services. This capability will necessitate specific requirements for a vehicle's E/E architecture, software, and OS. For example, players must ensure upgradability and maintainability through hardware-abstraction layers and create hardware with sufficient performance reserves. Similarly, back-end systems and the related infrastructure must be designed to support regular OTA updates and other critical functions. Details will matter, with features related to system design determining whether players will be able to efficiently update individual features or be required to reinstall whole sections to enable car upgrades.

Players must also develop a strong make-versus-buy strategy. No single company will have all the essential data capabilities and systems in-house, nor is there a one-size-fits-all solution. Instead, companies will need to identify key control points and decide whether they should buy and integrate systems (such as voice assistants), deploy white-label solutions, or develop elements themselves. The selected strategy will likely depend on a company's capital-expenditure availability, capabilities, and time-to-market constraints.

Choose an operating model for a digital business

Companies will need a cross-functional team consisting of R&D (user interface and experience, E/E, and back end) and marketing and sales staff, supported by legal and finance teams. Such teams, which can jointly develop and deploy use cases over the whole vehicle life cycle are still rare in automotive or struggle to integrate with the remaining legacy organization. They are firmly established in other industries, including telecommunications, insurance, mobility services, and SaaS.

Cross-functional teams help players develop use cases quickly, since they provide important

input about product characteristics—for example, marketing can provide insights about what features are attractive to customers, legal can advise if offerings meet current regulations, and R&D can help determine if products are technically feasible.

In addition to core staff, cross-functional teams should include customer-success managers who help increase retention and reduce churn by ensuring high-feature uptake and usage. This applies to both B2B and B2C use cases. The value of such managers has already been demonstrated within the cloud-service, data-marketplace, and consumer-technology sectors. In those industries, leading players spend nearly twice as much on customer-success functions compared with the average company, helping them perform three times better with respect to customer churn and retention.

Beyond establishing cross-functional teams, companies must consider new strategies for recruitment and work processes. Critically, players must hire the right talent and ensure flat hierarchies. Ideally, product or feature teams will move rapidly from generating ideas about minimum viable products and testing to front- and back-end implementation. Leveraging tools and work processes from software development, these teams will have end-to-end responsibility for development and deployment, and can significantly accelerate timelines. Our research suggests that these agile teams boost productivity by 27 percent, reduce launch delays by 30 percent, and eliminate 70 percent of defects. Compared with teams that follow traditional processes, agile teams have up to 200 times more frequent software deployments. In some cases, they launch multiple deployments of new and updated software in a single day.

Fully leverage a digital go to market

Players must develop digital go-to-market (GTM) skills to sell their services. While some players, such as insurance companies, already use digital channels successfully, other players need to catch up. For instance, OEMs could reach customers inside and outside of their vehicles through digital channels like mobile apps, websites, and social media or through dealers. Better coordination will be essential, however, since most OEMs now manage each channel independently, rather than in a coordinated fashion, and practices also vary country by country. This leads to a highly fragmented GTM approach and complicates any attempts to leverage data in a meaningful way. Automotive players might achieve some gains by emulating consumer and technology companies, which have a well-coordinated multichannel approach.

OEMs' current GTM approach may have developed because they previously focused on selling hardware as a one-off. Subsequently, most customer outreach involved advertising their cars and sometimes attempting to increase loyalty in aftersales services. Continuous customer interaction was less relevant and OEMs, especially premium players, were very cautious about advertising other features and services to their customer base. Going forward, however, OEMs must move beyond emailing newsletters and venture into context-driven performance marketing that leverages their own channels, as well as those of relevant partners. Other players will become part of an OEM's ecosystem early on, or build their own channels for direct end-customer access, depending on their specific position in the value chain and their synergies with OEMs' connectivity programs.

Act now to successfully participate in car-data monetization

Automotive connectivity is changing faster than ever, significantly increasing the potential for data monetization for players across the ecosystem. Data suppliers, such as OEMs and vehicle fleets, are well positioned to benefit, as are insurance players, companies in the automotive aftermarket, cities, infrastructure providers, and other data customers. Importantly, all stakeholders must act fast. Given the industry's current underperformance on data monetization, new players with innovative approaches could

rapidly gain an advantage over slower-moving incumbents. Those that fail to act now will miss the opportunity to differentiate themselves in one of the industry's key customer-facing spaces. While OEMs, suppliers, and other players along the value chain increasingly realize this imperative, they have not yet consistently created new offers and services that customers find compelling. They often fall short because customer expectations keep increasing and technology advances are occurring rapidly. If they continue to underperform, their brand appeal and profit pools could suffer, decreasing their market share. Conversely, those that harness the opportunity before them may unlock new profit pools for the industry and enable new, profitable growth.

Michele Bertoncello is a partner in McKinsey's Milan office; **Christopher Martens** is a consultant in the Cologne office, where **Timo Möller** is a partner; and **Tobias Schneiderbauer** is an associate partner in the Munich office. The authors are members of the McKinsey Center for Future Mobility.

The authors wish to thank Saral Chauhan, Andreas Gläfke, Alexander Ringler, and Charlotte Wiemuth for their contributions to this article.

Designed by McKinsey Global Publishing