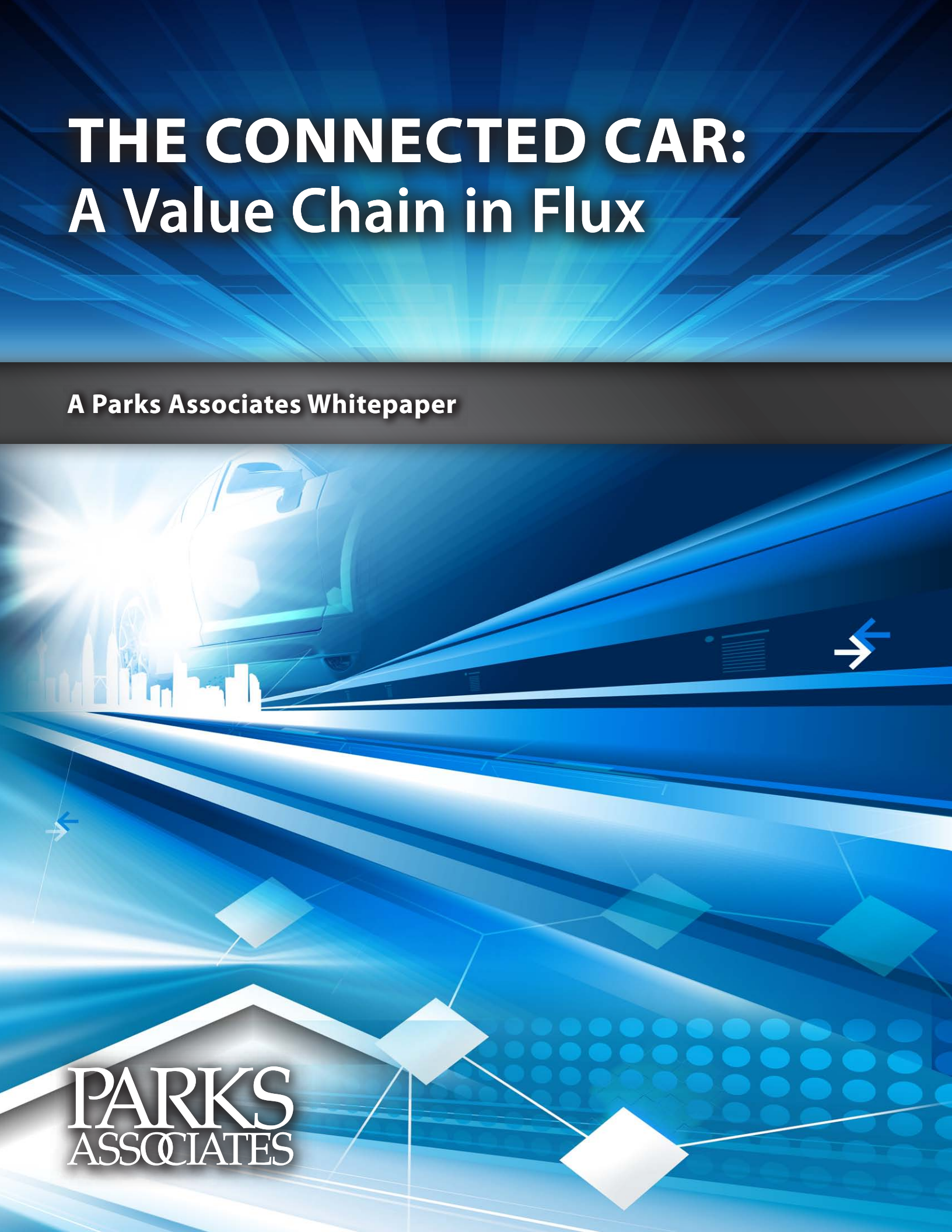


THE CONNECTED CAR: A Value Chain in Flux

A Parks Associates Whitepaper



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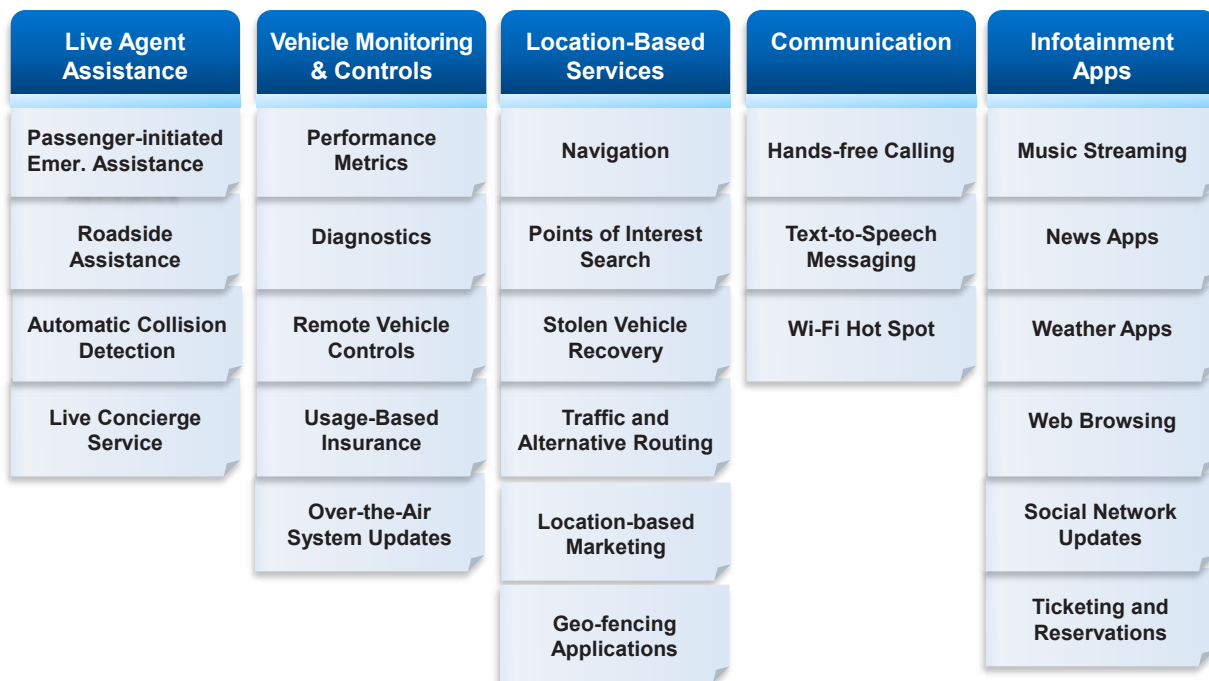
THE CONNECTED CAR: A Value Chain in Flux

CONNECTED CAR SERVICES AND TECHNOLOGY HAVE ADVANCED SIGNIFICANTLY IN THE PAST TWO YEARS.

Auto OEMs like GM and Audi, mobile network operators (MNOs) like AT&T and Sprint, and big tech players like Apple and Google have all made major announcements about their in-vehicle connectivity solutions. This trend continued with a major auto industry presence at the 2015 International CES.

As the market matures, established connected car players are exploring ways to expand their presence and revenues, and new players hope to gain a foothold while the market is still young.

Connected Car Services



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The Connected Car Value Proposition

AT ITS CORE, IN-VEHICLE CONNECTIVITY HOLDS THE GREATEST VALUE FOR CONSUMERS AND AUTO MANUFACTURERS.

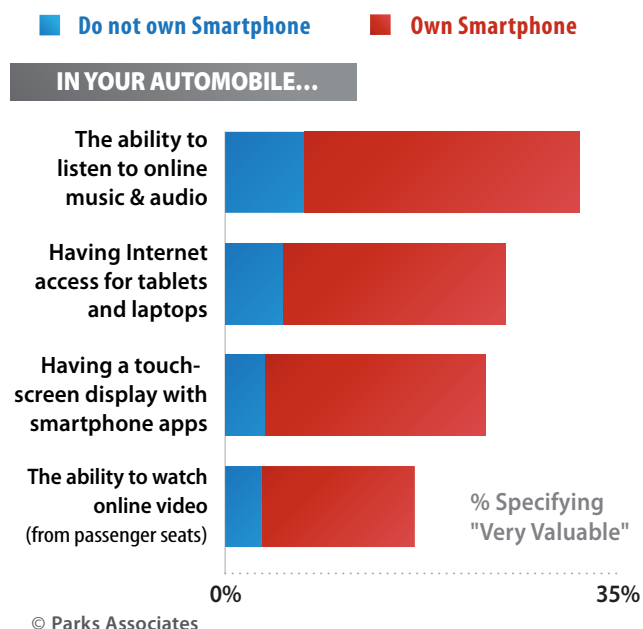
For consumers, a connected vehicle enables a growing number of features and services that make the driving experience safer, more convenient, more compelling, more fun, and less costly. These use cases include, but are not limited to, emergency and roadside assistance, live concierge services, navigation and traffic/re-routing services, stolen vehicle recovery, hands-free calling, Wi-Fi hot spots, infotainment apps, vehicle performance alerts, and remote vehicle controls.

Connectivity has the potential to increase a vehicle's value to auto OEMs through multiple benefits:

1. Expands customer relationships.
2. Generates new revenue through direct-to-consumer services.
3. Generates new business for dealerships.
4. Controls costs by proactively addressing performance issues and managing software updates over-the-air.
5. Creates a competitive advantage and differentiates models.
6. Collects, analyzes, and monetizes vehicle and driver data.

Value of Connected Automobile Features

U.S. Vehicle Owners in Broadband Households



Consumers, particularly smartphone owners, show strong interest in connected car features.

Not surprisingly, most auto manufacturers have established some level of connected vehicle services to their vehicles.

52% of new cars sold in the U.S. by year-end 2014 will have some connectivity capability.

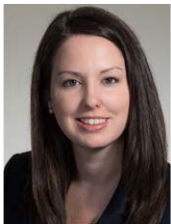
— Parks Associates

As the industry grows, the number of mobile network operators, software developers, and service providers joining the market also rises.

The influx of all these new players is changing the connected car market. All players, including the auto makers, mobile operators, and software and service providers, face their own unique challenges and opportunities but must also find a way to partner and share this growing space for connected solutions.

OEMs Take Divergent Approaches To The Connected Car

"An approach that relies solely on the driver's smartphone data connection is unsustainable. A hybrid connectivity approach enables more high-value services for drivers and provides the flexibility to respond to shifting consumer preferences."



- Jennifer Kent,
Parks Associates

As the dominant player in the auto space, OEMs set the pace for connected car adoption. GM has embedded a telematics solution in nearly every light vehicle coming off its line going back to 2009. Other OEMs have taken a wait-and-see approach or experimented with connectivity solutions only for their luxury vehicle models.

The four major issues affecting OEM strategies:

- OEMs must decide whether a connected vehicle program should leverage embedded connectivity, smartphone-based connectivity, or a hybrid of both. Embedded connectivity saddles the OEM with much higher costs but has greater capabilities than a smartphone-based approach.
- OEMs must choose a way to support their connectivity services. Some OEMs use live-agent-supported assistance services, typically supported by user subscriptions. Others emphasize connected car use cases that do not require live agents on stand-by.
- OEMs must decide on a billing strategy. They can preserve their primacy in the driver relationship by selling connectivity to the consumer directly, or they can stick closer to their core competency—and divest a piece of the consumer experience—by partnering with connectivity service providers.
- An OEM must decide on offering their service through a trial period or a free-premium model. Trials typically come with a three- or six-month period where the car owner can test them out and hopefully switch to a paying subscription at the end of the trial. A freemium model offers tiers of service, with a basic level available for free and a premium tier of services that requires a subscription.
- As they evaluate and roll out services, OEMs are increasingly relying on partnerships with mobile operators, which have experience in managing wireless solutions and understand consumer expectations of connected devices and apps.

Mobile Network Operators Expand Their Presence In The Car

MOBILE NETWORK OPERATORS (MNOs) HAVE A GROWING INTEREST IN THE CONNECTED VEHICLE SPACE CONSISTENT WITH THEIR INCREASED INVOLVEMENT IN THE MACHINE-TO-MACHINE (M2M) MARKET.

Several industry trends have triggered MNOs' re-evaluation of the M2M space.

Mobile carriers are experiencing declining voice and messaging revenues. While smartphone and tablet adoption have led to strong growth in data revenues, these revenues are not keeping pace with the explosion of growth in data consumption, and consumers are increasingly turning to OTT players for value-added mobile services.

Against this backdrop, several factors are driving carriers' deeper expansion into M2M, including the automotive market:

- M2M is a way to diversify carriers' revenue streams.
- By expanding their role in the M2M value chain beyond network access and into services, MNOs hope to avoid becoming a "dumb pipe."
- Compared with network access fees, services resist commoditization, meaning a deeper expansion into M2M can help preserve carriers' margins as this industry scales.

M2M services differ from traditional MNO consumer services because the mobile operator typically does not own the relationship with the end user when an M2M solution is deployed. Instead, consumer-facing OEMs, such as in the automotive industry, have direct access to the consumer. Wireless carriers' connected vehicle services are targeted primarily at auto and aftermarket OEMs, as well as third-party service providers, in a B2B2C business model.

However, MNOs have opportunities to expand their direct relationship with the consumer in this environment by leveraging the smartphone's innate connectivity when used in the car environment. For instance, carriers can sell data plans for in-vehicle services—especially infotainment and Wi-Fi hotspot services—directly to consumers. This may be in the form of a separate data plan for the vehicle itself or carriers can allow their existing subscribers to add their vehicles to their current data subscription.

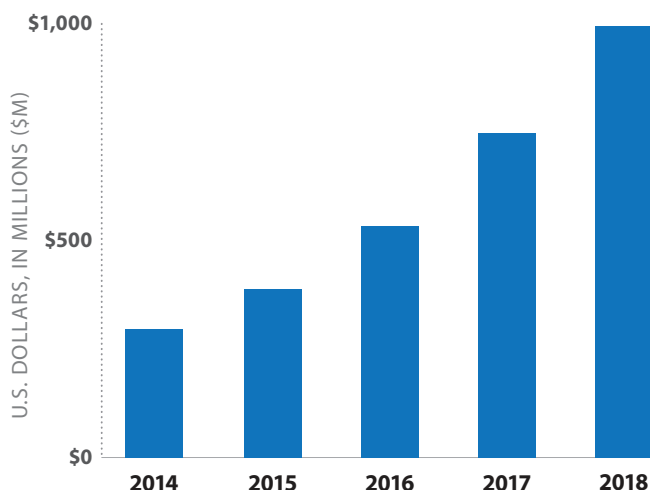
AT&T, FOR INSTANCE, ALLOWS DRIVERS TO ADD A VEHICLE TO THEIR MOBILE SHARED DATA PLAN FOR \$10 PER MONTH.

Additionally, carriers can leverage their retail stores as a channel for aftermarket connected automotive device sales.

Verizon Wireless, for instance, sells Delphi Connect devices, which drivers can plug into their vehicle's OBD-II port to view vehicle performance metrics, locate their vehicle from their phone, and control certain vehicle systems remotely. The 4G/LTE Delphi Connect device also works as an in-vehicle Wi-Fi hotspot. In addition to the device price, consumers pay a \$5/month connection fee.

With over 200 million vehicles on market without a connectivity solution built-in, the aftermarket potential for connected vehicle services is enormous.

MNO Connected Car Revenues



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—IN 2015—

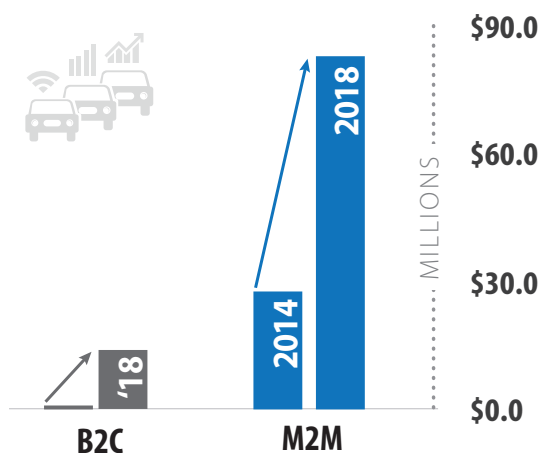
U.S. mobile network operators will generate over
\$380 MILLION
 in revenues from connected car network access fees alone, the vast majority coming from M2M offerings.

GROWTH OF Connected Car Revenue Sources — MNOs

MOBILE NETWORK OPERATORS

2014 vs. 2018

U.S. Dollars, In MILLIONS [\$M]



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Software & Service Providers Stake Their Claim

CONNECTED CAR SOFTWARE STRATEGIES REFLECT THE LARGER CONNECTIVITY DEBATE WITHIN THE INDUSTRY:

Should connected vehicle applications and services be offered through embedded telematics units and head units, or brought into the car through drivers' mobile devices?

Offering services through embedded connectivity requires heavier investment from OEMs, which work with each software provider individually to develop applications for their vehicle models. The smartphone-based approach, in which the vehicle dashboard mirrors the apps on the consumers' smartphone, features a shorter development cycle and far fewer operating systems for developers to contend with. The mobile app development ecosystem is appropriate particularly for infotainment applications, which have frequent updates and are subject to rapidly shifting consumer preferences.

Yet, due to the dominance of proprietary software ecosystems in the automotive space, most app developers are locked out of the connected car market. Whether built as an embedded app or a smartphone-based app, connected car apps need approval from OEMs, which will need assurances of the app's safety when used within their vehicles. Furthermore, app development work lacks reusability because each app deployed is custom-created for that vehicle make and, in some cases, vehicle model.

Entry of Google and Apple

Despite the challenging development environment, the connected vehicle industry has become the most recent battleground for leading tech companies.

MIRRORING

Google and Apple have joined the connected car space with products that bring their mobile operating systems to the car through a "mirroring" or "projected" approach.

Mirroring allows drivers to interact with approved smartphone apps in a safer way.

The user controls certain smartphone functions and apps through voice control or via the car's display and buttons.

SERVICE EXAMPLES:

- Apple CarPlay
- Android Automotive
- MirrorLink

THE ENTRANCE OF APPLE AND GOOGLE INTO THE CONNECTED CAR SPACE IS NOT SURPRISING.

Both want to be the consumer touch point for connected applications and services, from the mobile space to the connected home space and now the automotive space. The more device ecosystems they penetrate, the stickier their services become, and the more revenues they can generate.

- Apple can sell more hardware and digital content by expanding to the car.
- Google gains access to a whole new layer of consumer data and a new platform for delivering ads.

The consequences of the expanding presence of the tech companies in the auto space on auto manufacturers are mixed. Many auto manufacturers have already signed up for one or both of these smartphone-based initiatives, but doing so threatens the role of OEMs in the car app ecosystem. It is much more cost efficient for developers to build apps for two mobile operating systems than to build an app for each OEM's proprietary infotainment system. Additionally, consumers have made clear their preference for third-party apps and OS app stores over apps and app stores provided by mobile OEMs and mobile carriers. The same preferences are likely to apply in the vehicle space. Plus, OEMs are not likely to be able to play one OS off the other but instead must support both initiatives—otherwise, they risk losing vehicle sales because the driver's smartphone is not compatible with the car's on-board operating system.

Still, auto OEMs can continue to play an important role in the infotainment ecosystem. Due to safety concerns, auto OEMs have a much better argument for retaining a closed-garden approach for the majority of its services, compared with other companies that have been disintermediated by Apple and Google (e.g., mobile carriers). OEMs can allow select applications that improve the vehicle experience for drivers, but do not compete with their own services, to be distributed through the Apple and Android app stores and mirrored to the infotainment unit, while remaining the sole provider of revenue-generating services or those services that would pose a safety hazard if provided by a third party.



Will The Aftermarket Disrupt The Primary Market?

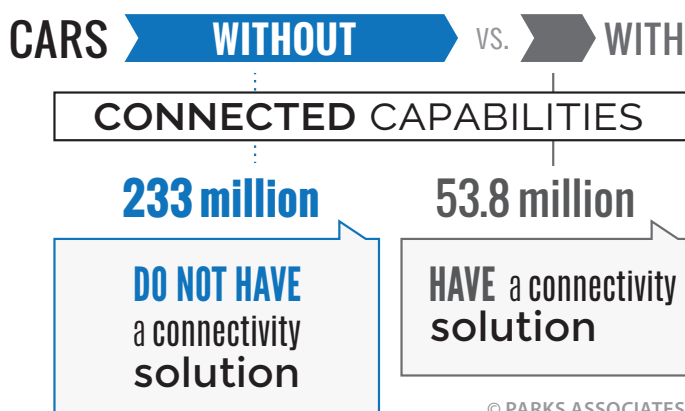
THE EVOLVING CONNECTED CAR VALUE CHAIN IS EXPANDING EVEN WIDER, WITH SERVICES FROM AFTERMARKET PLAYERS, LIKE ZUBIE AND MOJIO.

Both of these companies offer consumers devices with embedded cellular radios that plug into the OBD-II ports in their cars. With these devices, and their associated mobile apps, consumers can access vehicle performance data, data about their driving habits, and even location data.

These aftermarket start-ups are poised to disrupt the connected car ecosystem for several reasons:

ENORMOUS ADDRESSABLE MARKET—There are many more cars without connectivity than with connectivity on the road, and this situation will remain for years to come. These devices free consumers from having to wait until they need a new car to take advantage of new connected car services.

By the end of 2015, only 25% of U.S. light vehicles in operation will have a connectivity solution—**this enormous addressable market is a big opportunity for aftermarket players.**



CONSUMER CONTROL OF DATA—Vehicles produce an enormous amount of data, including both vehicle performance data and driver behavioral data. Auto OEMs typically control access to data collected via embedded telematics modules, but data collected via connected aftermarket devices are shared with the consumer. This approach undercuts one of auto OEMs' potential avenues for monetization of car connectivity: selling access to vehicle performance data (e.g., to dealers or third-party mechanics) and driver behavioral data (e.g., to insurers). With direct access to their vehicle and driving data, consumers will have more power over selecting mechanics and auto insurers.

FOUNDATION FOR AN APPS REVOLUTION—Mojio in particular is positioning itself not only as a direct-to-consumer company but even more fundamentally as an open-source connected vehicle platform that exposes vehicle data to app developers through APIs. Through Mojio, app developers from any number of industries can offer consumers new app experiences based on their own personal vehicle and driving data. As evidenced by the success of the smartphone app ecosystem, the availability of an open app development ecosystem will almost certainly result in valuable new innovations for drivers and the businesses that serve them. However, to attract top developers, Mojio must build a large user base of its connected car device, which remains to be seen.

AS THE MARKET MATURES, THE CONNECTED CAR VALUE CHAIN WILL CONTINUE TO EVOLVE.

Not only will the industry see new players emerge, but the relative power positions of existing players are far from settled. It is too early to project winners and losers, but companies that intend to play in the connected vehicle market for the long term must offer services that provide real value to consumers.



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Founded in 1986, Parks Associates creates research capital for companies ranging from Fortune 500 to small start-ups through market reports, primary studies, consumer research, custom research, workshops, executive conferences, and annual service subscriptions.

The company's expertise includes the Internet of Things (IoT), digital media and platforms, entertainment and gaming, home networks, Internet and television services, digital health, mobile applications and services, support services, consumer apps, advanced advertising, consumer electronics, energy management, and home control systems and security.

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As Director, Research Quality & Product Development, Jennifer manages Parks Associates' process for producing high-quality, relevant, and meaningful research. She acts as an internal advocate for Parks Associates clients and leads the company's efforts at conceptualizing and implementing digestible, relevant research presented in an optimal manner. Jennifer is always looking at the most effective ways to provide research to Parks Associates clients.

Since joining Parks Associates in 2009, Jennifer has worked on the mobile and health research team, specializing in the connected health, mobile payment, and connected car markets, as well as the consumer research team, analyzing consumer data related to the connected home and consumer electronics markets.

Jennifer earned her Ph.D. in religion, politics, and society and an M.A. in church-state studies from Baylor University. She earned her B.A. in politics from the Catholic University of America in Washington, D.C.

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