



Great expectations

Insights exploring new automotive business models and consumer preferences

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About the Future of Mobility practice

Deloitte's Future of Mobility practice draws on deep cross-sector expertise to help companies navigate and lead technological advancements in transportation, including autonomous vehicles and new transportation systems. Informed by Deloitte's analysis, the Future of Mobility team provides transformative insights across sectors, driving sustained value for Deloitte's clients moving forward. For more info visit www.deloitte.com/insights.

**Future of
Mobility**



Why are disruptors dangerous?

They aren't protecting a business model

By Scott Corwin

Originally published in Automotive News on November 5, 2017.

*Dear Automotive Industry Leader,
We are at the dawn of a new era when more seamless and integrated mobility promises to move us from point A to point B faster, cheaper, safer, cleaner, and more conveniently than today.*

The sources of value creation in this ecosystem expand beyond the vehicle to the operating system, in-transit experience, and mobility management. In the past 18 months, many automakers have made a number of significant investments in mobility. The central question: Are these steps enough?

You now confront a new set of competitors that look at this transition in radically different ways that challenge long-held industry beliefs. The disruptors view mobility as a “system of systems” and see new

opportunities to reduce or eliminate the negatives associated with today's passenger automobile: accidents, congestion, air pollution, and limited access for the physically or economically challenged.

Many disruptors do not believe in linearity or incrementalism. They seek tipping points that shift trajectories. Unlike you, they feel no pressure to protect a business model in which economic returns are generated from assets, and they seem less beholden to delivering quarterly results. Instead, they see the world as a set of engineering challenges that can be overcome and are emboldened by a long track record of successfully disrupting other industries.

Their goal is to build economic value through technology advances, rapid social acceptance and adoption, and by monetizing data and services.

This transformation will result in winners and losers. Who those winners might be, and what the

future might look like, will be shaped by which vision—yours or the disruptors’—comes to pass.

The typical down-cycle approaches of delaying product programs, consolidating operations, cutting costs, and pursuing revenue management will not position you for success on the other side of this transformation.

While many global auto consumers remain uncertain about self-driving cars, any reprieve offered by popular attitudes, government policy, or low fuel prices is likely to be little more than a speed bump on the way to a more electric, autonomous, and shared future vehicle fleet.

Mobility models

Compounding this competitive threat is the challenge of operating in a more complex market in which we will simultaneously see four mobility models:

1. Personally owned and operated vehicles
2. Shared driver-operated vehicles (like today’s taxis and ride-hailing)
3. Personally owned autonomous vehicles
4. Shared autonomous vehicles

The vehicles that will be developed and the ways they will be used in these four models will likely be quite different from each other, and the dispersion of the fleet will add massive complexity for automakers and suppliers serving these markets.

Dealers and auto finance could see profound changes, too, with greater emphasis on offering fewer highly customized vehicles, a shift toward fleet management, and changes in the number and size of loans and leases as personal vehicle ownership declines. In addition, shorter duty cycles could reduce the aftermarket suppliers depend upon.

For you, these changes mean confronting what it means to be an automotive company in the future. To date, most automotive companies have sought to create option value. While defending the core business, they have placed several bets that could be accelerated or wound down once there is greater clarity about the future. Inevitably, a lot of capital could be wasted.

Many CEOs are expected to optimize the existing business and experiment in new ones, while executing on both. Practically, that often means generating short-term yields while also taking risks in radical innovation and business model transformation. No mean feat. This balancing act has rarely been executed successfully in an enduring way.

Copernican paradigm shift

Ultimately, strategy is about making really hard choices to allocate scarce capital. How will you allocate resources—to defend the existing business or to chart a new path? It starts with building a collective vision among your leadership team and board around how you think the future mobility ecosystem will operate a decade from now. That likely requires a Copernican paradigm shift from a world in which carmakers are at the center of passenger mobility to one in which they are orbital players in a much larger and more complex system.

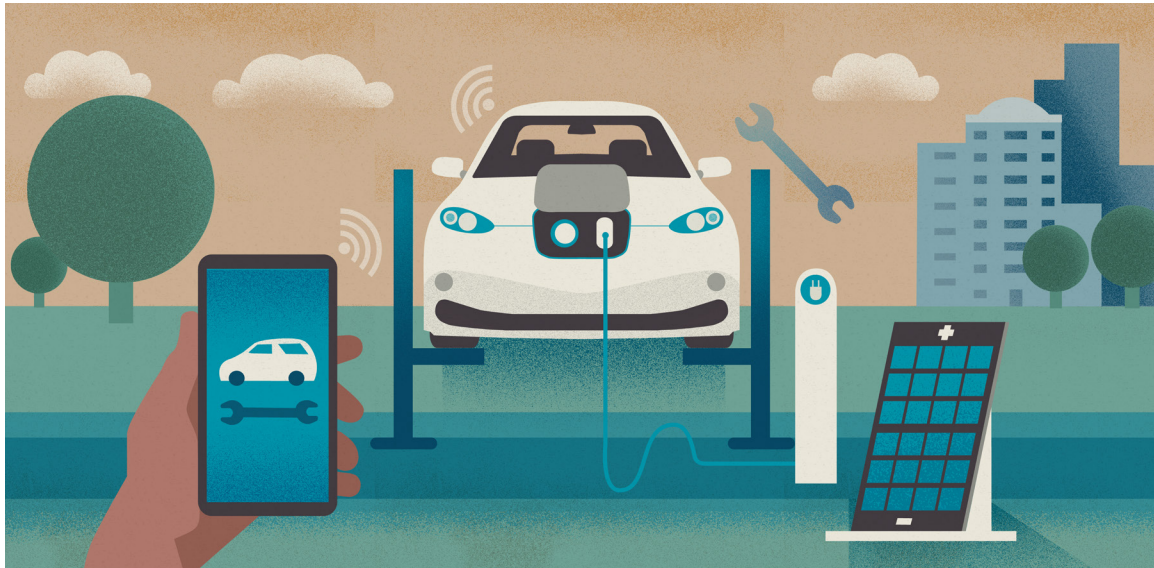
We see multiple business models coalescing to form a new ecosystem, centered on technology innovators, fleet operators, services businesses, and platform providers.

Vehicle manufacturing will likely continue to be important, but value will increasingly be generated by software and consumer data. The in-vehicle transit experience could become central, with “experience enablers” making the 3.2 trillion miles traveled every year more relaxing, productive, and entertaining. The digital infrastructure could be every bit as critical as roads and bridges, as companies offer seamless connectivity and network security.

Finally, mobility management will be a central component to the ecosystem. Mobility advisers are aiming for a seamless journey, with easy access, a tailored in-transit experience, a smooth payment process, and customer satisfaction. That means developing mobility data collection, predictive analytics, user control, and relationship management.

Technology companies are not predestined to dominate this ecosystem.

Numerous opportunities will emerge to create value and competitive advantage, but these could and likely will also result in an automotive enterprise that is radically different from today’s.



The Revenue Multiplier Effect

How enabling technology drives company value

By Omar Hoda, Joseph Vitale, Jr., and Craig A. Giffi

The historical norms of investment are being challenged today in Wall Street. Over the last few decades, the drivers and determinants of corporate value have evolved—tangible assets no longer exclusively dictate a firm's value.

Investors and stockholders are beginning to look at underlying economic or business models, in addition to historical performance, forecasts, and analyst reports to make investment decisions. Without assessing which approach is optimal, one thing is clear: Newer business models that use enabling technologies are more important than ever. But why?

Technology-enabled industry convergence is disrupting the automotive industry at a pace not

seen in the past 20–30 years, and continues to reshape the roles that will exist in tomorrow's world. In *Patterns of Disruption*, we outline a scenario in which five roles will exist within the future automotive industry¹:

1. Hardware providers: Will provide the physical devices (automobiles, connected hardware, smartphones) needed in the future automotive industry.
2. Fleet operators: Consumers are moving from automotive ownership models to usage-based models where they want a car on demand, when they need it and where they need it. We are likely to see the continued growth of mobility fleet operators that will leverage network effects to provide more tailored services.
3. Operating system providers: These companies will provide horizontally functioning operating systems for car providers that can span across connected vehicles, connected consumers, and

connected infrastructure to facilitate interaction across these domains.

4. Data aggregators: These companies will capture, interpret, and provide information and analytics that will drive value to consumers and producers of the industry.
5. Mobility advisors: Businesses that know their individual customers and can be trusted to proactively suggest where they should go to increase customer return on mobility.

As automotive companies evaluate their business models, it is important to understand how investors are valuing companies and acknowledge that investor confidence is influenced by industry convergence. Well-known companies like Airbnb and Uber are now recognized for their ability to meet users' demands in the hospitality and transportation industries, without using physical assets. Unlike traditional hotels, Airbnb does not own the properties it offers and the same can be said about the cars used to "Uber" riders around. Are these, then, technology firms? The answer is: It's not clear—at least not entirely. Looking forward, traditional industry classifications will continue to evolve and lines separating industries will likely blur. Some believe that, eventually, today's industry classifications will become outdated. In addressing these changes, some analysts claim that all companies will become tech

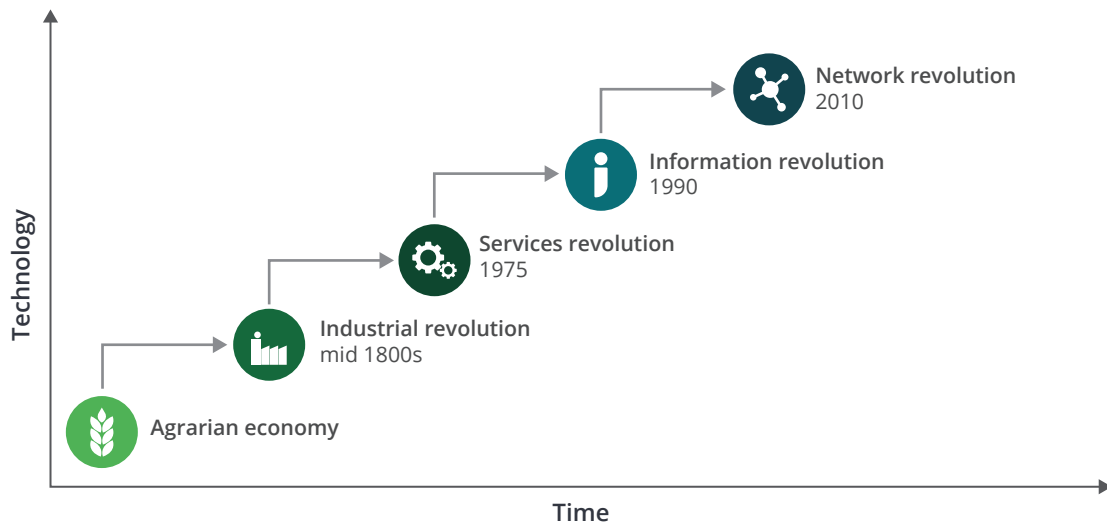
companies, while others assert that technology as a sector itself will become "the" enabler and the industry may cease to separately exist.

The reality is that it doesn't matter how we choose to define industry classifications created by technology. What matters is how innovation and the integration of technology enable the physical aspects of each company. This is what makes companies like Apple and Google unique and valuable to investors—they focus on consistently expanding their intellectual property and core capabilities to drive value to their products, services, and ecosystems. It's also where incumbent companies within the automotive industry need to go in order to continue to drive value for their shareholders.

Industry convergence and technology enablement has led investors to allocate their capital more toward companies that leverage intangible (versus tangible) assets to serve customers . . . and thereby maximize returns. It's also led to an influx of capital, even toward companies that haven't yet turned a profit. This is accelerating the growth in value of such tech-enabled companies, thereby creating a virtuous cycle. We have found that corporate value is higher in companies that rely less on tangible assets, but leverage technology "as the business" rather than "in (supporting) the business."

As a way to explain the fundamental differentiating factors of firms and how they drive value,

Figure 1. New technologies birth economic revolutions...shifting value



Source: Deloitte analysis.

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Deloitte developed a new way of viewing companies. We looked at what companies with a high stockholder value-to-revenue ratio (which we've labeled as the "Revenue Multiplier")² have in common and how they differentiate themselves from those that have lower valuations. To understand how, exactly, it is helpful to look back at the four key economic revolutions in US history and define the business model for each stage (figure 1):

1. The Industrial Revolution sparked a change from hand production to machines and capital-intensive processes. In this "Asset builders" phase, physical assets were the key determinants of performance and value.
2. In the 1970s, US firms shifted focus to a lower-capital/lower-risk model where they leveraged human capital (in the form of services), yielding higher returns. This is depicted in the "Service provider" model.
3. With the development of the modern Internet in the 1990s, the Information Revolution was characterized by enhanced communications and broader access to information. "Technology creators" used capital to develop and sell (license) intellectual property (IP).
4. During the latest decade, companies have found ways to drive value based on interactions with users, suppliers, and other (community) points of contact. "Network orchestrators" are adept at using their digital presence to create,

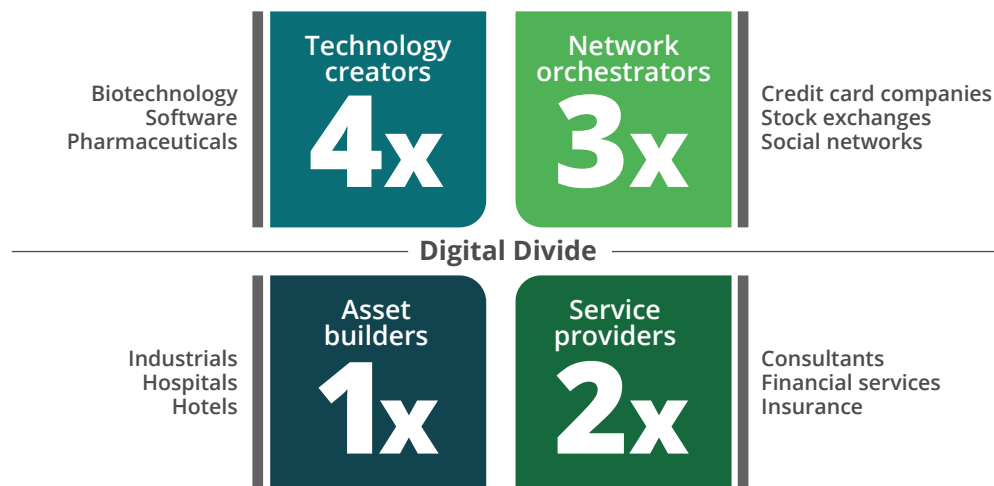
market, and sell goods/services . . . or to just connect people.

Our research has shown that as these four new economic models came into existence, each revenue model had a multiplier worth twice the value of the model it succeeded. We call this phenomenon the Revenue Multiplier ("RMx") Effect (figure 2). The key thing to consider with these business models and the value that is assigned to companies in each group is the scalability of their offerings—marginal costs are significantly lower for technology and information-based companies.

This helps explain why the S&P 500 has seen a significant drop in the number of top-valued firms whose business model relies primarily on physical assets and human services. These have been replaced with companies with business models that rely more on intangible and network assets (figure 3). But, where does this leave auto companies?

The majority fall into the asset builder quadrant, or hardware provider *business model* in our future world. Original equipment manufacturers (OEMs) are especially labeled as such and many, with their traditionally heavy focus on manufacturing and sales as the main business model, have multiples below 1x, indicating that investors are not rewarding their approach. Despite the significant "new" technology that traditional automotive companies are developing and bringing to market, and the vast

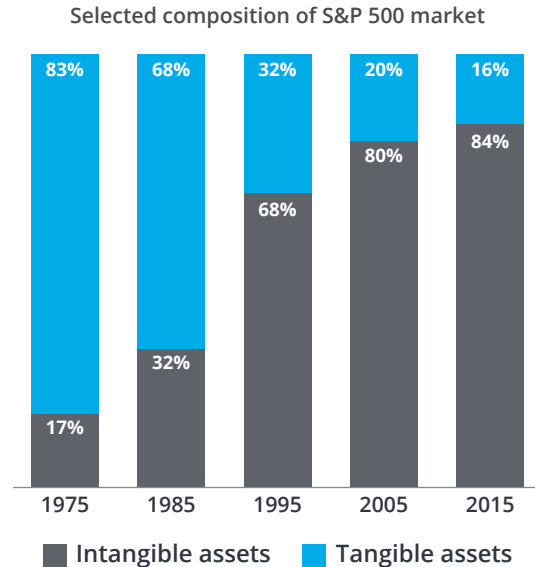
Figure 2. The Revenue Multiplier Effect



Source: Deloitte analysis.

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Figure 3. Investors reallocated capital toward technology-based models



Source: Deloitte analysis.

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sums of capital being invested, especially for autonomous vehicles, they receive little credit for being technology creators and their valuations still hold tight to the asset builder quadrant. Investors are clearly signaling that new business models must accompany and leverage the investments being made in this new technology.

With this understanding of the auto industry in mind, the question is: Can automotive OEMs shift and create complementary business models that position them to move beyond the asset builder quadrant? The answer (optimistically) is yes, but it will require a new perspective on how they use technology as an enabler to create new business models.

It is also important to consider that there is not a 1:1 mapping between the economic models presented by RMx to the models presented in *Patterns of Disruption*. A company trying to compete in the fleet operator space could potentially build a business model which places it within the service, technology, or network quadrants depending on the nature and scope of services being offered. And as a result, it can be viewed quite differently by investors and the investment community given how they participate.

For example, Uber, while a type of fleet operator, is sort of a virtual fleet operator creating a marketplace of drivers and riders, managing both supply and demand, yet owning few assets in the process. We would view Uber in the network orchestrator quadrant as its role is largely to orchestrate or match the supply of vehicles and the demand for rides in a specific geography.

The startup technology company, RideCell, also participates in the fleet space, but does so by providing a technology platform to fleet operators, who can choose to build their own technology platform or use a company like RideCell³ to get it done. RideCell would fall in the technology creator quadrant because it essentially sells a technology that enables a network orchestration business model.

However, there are other companies like traditional livery and goods delivery services who participate in the fleet operator space as service providers, providing services like an Uber, but who either lease/own or operate their fleets.

Given this, let's pause here and look at the investments that several OEMs are making in order to make shifts in their models or diversify away from their core asset builder model:

- MOIA, an independent company created by Volkswagen, dedicates itself to providing mobility solutions to users in urban areas through ride-sharing and ride-pooling. This service seems to be targeting the service provider role, to address the challenge of congested cities through ride-sharing of electrified shuttles in dense urban settings.⁴
- GM created Maven, a new car rental platform that allows users to book its cars through mobile devices, providing an opportunity to engage with users in a way GM hadn't before and accessing its vehicles as a service. Maven is helping GM attain new information on its customers that helps them generate new insights that help drive future value.⁵
- Ford has articulated a vision to build a "holistic, organic, interconnected system powered by a transportation operating system" that will work across many transportation and infrastructure elements to address the challenges of moving

people and goods in cities more efficiently: a vision toward a network orchestration model.⁶

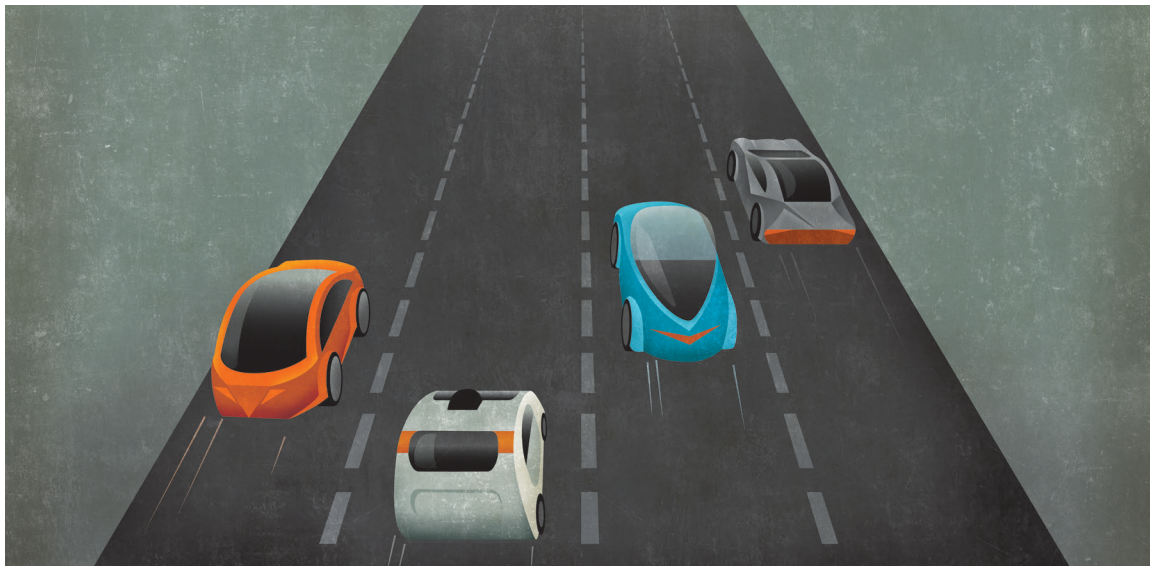
As the automotive industry continues to mature, OEMs will need to continue to develop new capabilities and leverage technology in order to maintain competitiveness and increase shareholder value. Clearly, they understand that, and are driving to a variety of spaces and deploying different models to do so. Perhaps the most salient question at this point is whether the business model transformations necessary can keep pace with the speed of the

technology development they are shepherding and the significant capital allocations being made.

There's no doubt that the evolution of the auto industry is taking place and disruption is coming. It's not a question of whether change will happen, but rather when and how it will happen, which companies will succeed, and how quickly incumbent players will adopt new models. As an auto company, it's time to take an objective look at the current state and outlook, and ask yourself: What road (business model) do we want to take?

ENDNOTES

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2. William Ribuado, "Special letter: Technology is changing how we view industry, value companies, and develop strategy," *SNS Subscriber Edition* 21, no. 16 (May 2, 2016).
3. Jack Stewart, "The top 10 startups racing to remake the auto industry," *Wired*, October 5, 2017.
4. Darrell Etherington, "Volkswagen launches MOIA, a new standalone mobility company," *TechCrunch*, December 5, 2016.
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6. Kevin Roose, "Can Ford turn itself into a tech company?," *New York Times Magazine*, November 9, 2017.



A reality check on advanced vehicle technologies

Evaluating the big bets being made on autonomous and electric vehicles

By Craig A. Giffi, Joseph Vitale, Jr., Thomas Schiller, and Ryan Robinson

You would be hard-pressed to open an automotive industry publication these days and not be inundated by articles detailing new possibilities of bringing autonomous and electrified vehicles to market.

Indeed, manufacturers, suppliers, and tech companies are investing enormous amounts of money to make these technologies a reality. There are several reasons behind this R&D push: Autonomous vehicles have the potential to dramatically improve road safety by reducing driver error; and electric vehicles (EVs) can reduce the negative environmental impact

caused by burning fossil fuels for transportation. Although these are undeniably positive goals, achieving them may be more difficult than we think. In fact, the current pace of investment in advanced vehicle technologies can be described as a game of high-stakes poker where the players are all in, and the outcome is largely undetermined, though unlikely to favor everyone at the table.

Capital allocations for these technologies are skyrocketing

In an industry where it has become increasingly difficult to differentiate between vehicles or brands, leading-edge technologies such as autonomous driving and electrification represent a huge oppor-

tunity to fundamentally change a hypercompetitive playing field that has been maturing over the last 100 years. Most analysts will agree that electrified, autonomous vehicles will be part of our lives at some point in the future, but there are many different opinions regarding how long it will take for that to happen on a large scale. Optimists believe we are sitting on the edge of a revolution that is ready to play out in the next several years. On the other hand, a more conservative view tempers this enthusiasm by taking into account several headwinds that, when combined, especially threaten traditional automakers.

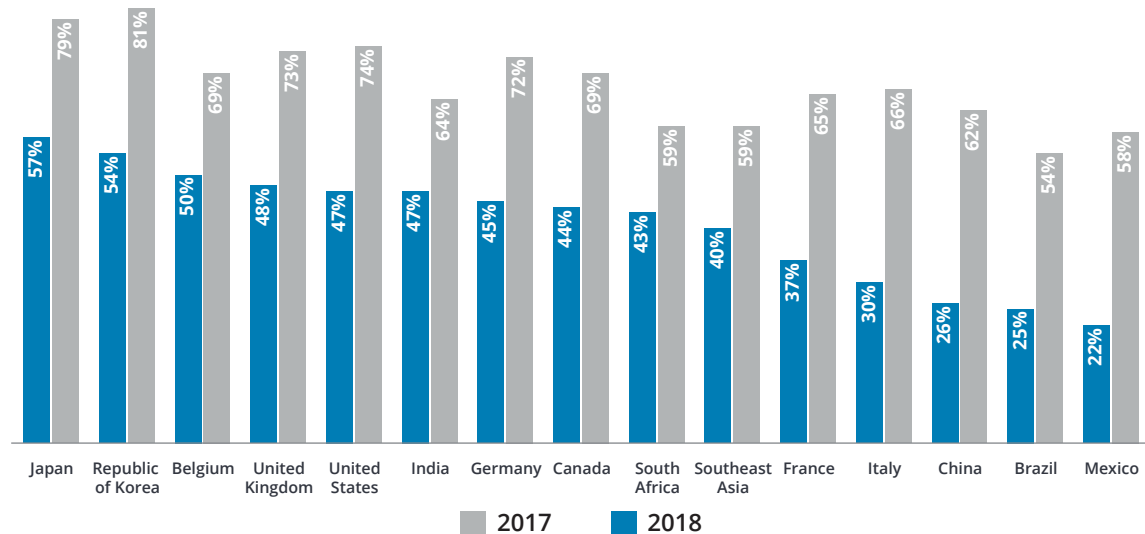
It's difficult to accurately determine the amount of money being shoveled into these new technologies, but a recent study by the Brookings Institute estimates investment in the autonomous technology ecosystem to be at least \$80 billion over the past three years.¹ Similar levels of investment have recently been announced by several automakers looking to push their global powertrain strategies toward an electric future. For example, Volkswagen has stated its total investment in electric vehicles will be in the range of \$86 billion by 2022.²

On the surface, these investments seem well founded. Recent findings from the *2018 Deloitte global automotive consumer study* suggest that consumers may be warming to the concept of fully

self-driving vehicles: 47 percent of US consumers in this year's study feel that autonomous cars will not be safe, which is down significantly from last year's 74 percent. The same can be said for every country covered in the study (figure 1), for example, South Korea (54 percent this year felt self-driving vehicles will not be safe vs. 81 percent last year); Germany (45 percent this year vs. 72 percent last year); and France (37 percent vs. 65 percent).³ However, even though the survey results suggest a positive directional trend for autonomous vehicles, it still leaves almost half of consumers in most markets doubting the safety of this technology. While we fully expect consumers' acceptance of autonomous vehicle technology to grow more favorable with real-world positive experiences, how this new technology can effectively be monetized should be a concern for company boards and senior executives searching for signs that these investment decisions will yield significant returns down the road.

Evidence suggests that it will be difficult for manufacturers to see substantial returns on investments in autonomous technology using current business models, as a significant number of consumers in countries such as Germany (50 percent), the United States (38 percent), and Japan (31 percent) are unwilling to pay any additional money for vehicles equipped with this feature.⁴ And for those

Figure 1. Percentage of consumers who think fully self-driving vehicles will not be safe (2017 vs. 2018)



Source: 2017 and 2018 Deloitte global automotive consumer studies.

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willing to pay extra, the amount they find acceptable is a pittance compared to the costs associated with developing and equipping vehicles with this technology.⁵

The results for electric vehicles are similar, where 42 percent of German consumers and just over one-third of consumers in both Japan and the United States indicate they are unwilling to incur any additional costs for access to alternative powertrain technology.⁶ This all strongly implies that something more fundamental—the very core of today’s business-to-consumer business models—will need to change in order to capture a reasonable return on investment in these technologies. Shifting market fundamentals, as outlined below, only further reinforce this point.

Market fundamentals are shifting, raising the stakes

There are a number of factors at play in global automotive markets, further complicating the demand for and investment in autonomous and electric vehicle technologies:

FLUCTUATING DEMAND

Several markets around the world have been posting record levels of vehicle demand in the last few years as the recovery from the global recession has played out—but this demand differs from region to region. While year-over-year performance in the United States has been quite robust, with the market still hovering near record levels, growth has now tapered off, leading many industry watchers to wonder how much is left in the tank. European demand found a tentative foothold in the last couple of years, but economic concerns around Brexit are casting a long shadow over growth expectations for the region. Even China is looking at muted demand expectations going forward, after riding a huge wave of middle-class expansion for several years.

In fact, global demand for light vehicles is starting to stall. Recent forecasts expect annual growth to be limited to between 1.5 and 2.5 percent going forward into the middle of the next decade.⁷ At the forefront of these concerns is the United States, where most analysts are predicting a cyclical downturn. A

significant uptick in the level of incentives, averaging \$3,472 per vehicle in October 2017, suggests that the market is already being artificially propped up.⁸ While the industry has put the economic meltdown of 2009–2010 behind it, the still massive fixed costs of mass-market incumbents could potentially make them as sensitive to volume fluctuations—especially downturns—as they were a decade ago.

Given these tightening global market conditions, many automakers may need to prioritize operational investments, making it more difficult to justify large capital allocations in a time of uncertainty. This scenario could also destabilize many of the strategic partnerships that are developing between traditional manufacturers and the suppliers shouldering a significant amount of the overall investment in these technologies.

THE TRANSPORTATION-ON-DEMAND WILDCARD

Global vehicle demand may also go through significant change as transportation-on-demand service models gain greater traction. For example, even in a traditionally car-loving country like the United States, 23 percent of consumers from our study said they used ride-hailing or ridesharing services at least once a week, and a further 22 percent said they use these services once in a while.⁹ Most interestingly, 52 percent of this combined user group said they are actively questioning whether they need to own a vehicle going forward.¹⁰ In India, the situation is even more pronounced, where 85 percent of consumers indicated they have used a shared mobility service, and 61 percent of those users questioned the need to own a vehicle.¹¹ Such statistics point toward a growing trend of mass urbanization happening in many countries and a potential future where personal vehicle ownership is drastically reduced in favor of shared mobility fleets—a significantly different global market reality to which traditional manufacturers, suppliers, and other stakeholders may find it difficult to adjust.

Having said that, strategies regarding the next stage of growth for ridesharing fleets being developed by both traditional automotive manufacturers and industry disruptors are becoming increasingly intertwined with the adoption of autonomous technology.¹² But in select markets around the

world, ridesharing services have encountered regulatory headwinds. While we expect these regulatory setbacks to be mere speed bumps challenging the growth of this new form of transportation, the uncertainty of the regulatory environment should be a concern if the large capital investments in autonomous technology are predicated on scaling it through the shared mobility model. In this regard, disruptors have a distinct advantage, as their typical capital- and asset-light business models are not burdened by the significant existing asset base and broader set of capital requirements of traditional automakers.

AFFORDABILITY

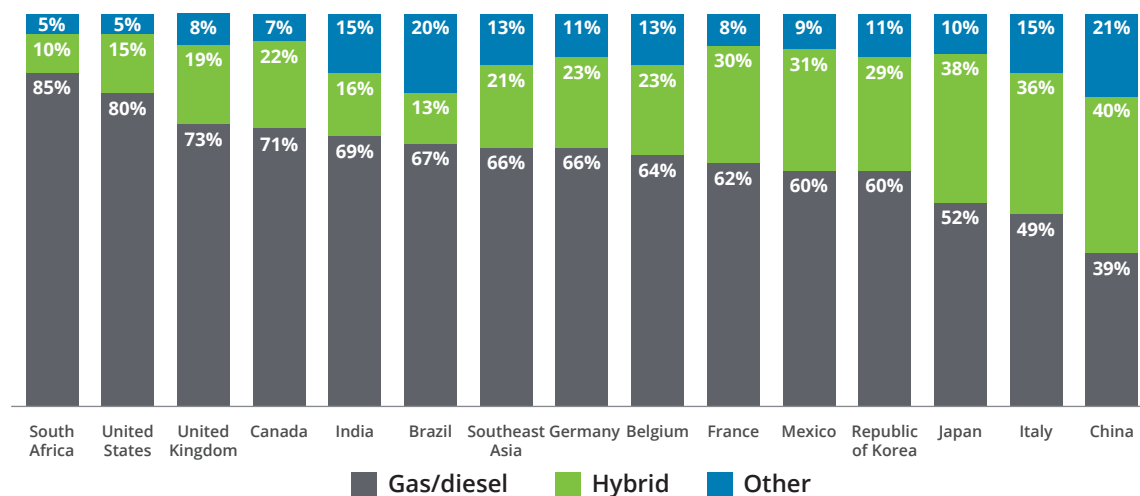
There is also a growing affordability issue in key markets such as the United States, where the average transaction price for a new vehicle continues to hover in record territory, hitting \$35,428 in October 2017, representing a 1.5 percent increase on a year-over-year basis.¹³ In response, more consumers are looking to exploit financial tools such as leasing and long-term loans as a way to keep monthly vehicle payments within reach. According to Edmunds, leasing remains near-record levels, accounting for almost one-third of new vehicle transactions (31.1 percent) through the first half of this year.¹⁴ As for loan terms, the average term for the US market hit a record high of 69.3 months in June 2017.¹⁵

As a result, consumers may be increasingly hesitant to commit to vehicles equipped with au-

tonomous or electric powertrain features, as these vehicles typically command a significant price premium compared with more traditional vehicles. Ironically, it is this affordability issue that may prompt consumers to rethink vehicle ownership altogether, opting for the much lower, usage-based cost model that shared transportation represents. At the very least, it may prompt consumers to look at acquiring a used vehicle. With record numbers of off-lease vehicles becoming available over the next few years, prices of used vehicles should moderate, encouraging a substantial number of consumers to effectively prolong the use of “conventional” vehicles.

While recent survey results (figure 2) suggest that the percentage of people who would prefer an alternative powertrain in their next vehicle has increased over the past 12 months in key global markets such as China, India, Japan, and Germany, consumers in both the United States and Japan cite price premiums as the biggest reason they will not consider buying a full battery-powered electric vehicle (BEV). In fact, 80 percent of US consumers would still prefer either a gas or a diesel powertrain in their next vehicle (which is actually up from 76 percent in last year’s study)—likely due to the low fuel cost environment in the United States, where gas prices continue to hover in the range of \$2.50 per gallon.¹⁶

Figure 2. Consumer preference for type of engine in next vehicle (2018)



Source: 2018 Deloitte global automotive consumer study.

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To date, US consumers have been enticed into buying electrified vehicles through the use of heavy government incentives, which can range up to \$7,500, depending on the model.¹⁷ However, even with these federal tax credits in place, the US electric vehicle market has struggled to gain a foothold, accounting for only a small portion of annual vehicle sales.

REGULATORY-DRIVEN ELECTRIFICATION

Policy makers in a variety of global jurisdictions are aggressively promoting the next generation of urban environment that includes a clean, connected, efficient, and safe transportation system. In fact, countries, such as Norway, Britain, France, and the Netherlands have already announced that they plan to ban the sale of vehicles that run on conventional gas and diesel engines over the next two to three decades. China is also studying a timeline to move away from traditional gas- and diesel-engine vehicles, in large part due to government desire to both stem harmful emissions that are choking major cities as well as significantly reduce the country's reliance on imported oil.¹⁸ India also aims to have an all-electric vehicle fleet by 2030, prompting automakers such as Hyundai and Suzuki to announce aggressive plans to introduce a range of electric vehicles in the Indian market.¹⁹ The combination of all these government announcements make the drive to electrification seem inevitable in most markets, but autonomous cars have yet to be given a clear regulatory mandate that companies can use to justify their massive capital investments.

However, for the time being, consumers remain wary of EVs as the technology races to keep up with unrelenting expectations. The main reason Chinese and German consumers are keeping their distance from BEVs is anxiety over how far they can drive on a single battery charge. Similarly, consumers in both India and South Korea are the most concerned about a lack of vehicle-charging infrastructure in their respective countries.

In several countries around the world, the investment required to update already-flagging infrastructure to facilitate advanced technologies such as electric charging stations and smart sensors is staggering. It calls for creative, long-term thinking in the face of dramatic changes to traditional funding models. This includes the most basic implication re-

garding EVs: no gas tax revenue to fund large-scale government projects. For this reason, many jurisdictions, including India, are looking to public-private partnerships for the funding required to modernize mobility systems.²⁰ In Europe, automakers BMW, Daimler, Volkswagen, and Ford have set up a joint venture called Ionity with a goal to install a network of 400 high-power electric vehicle charging stations, each costing approximately \$233,000, across the continent by 2020.²¹

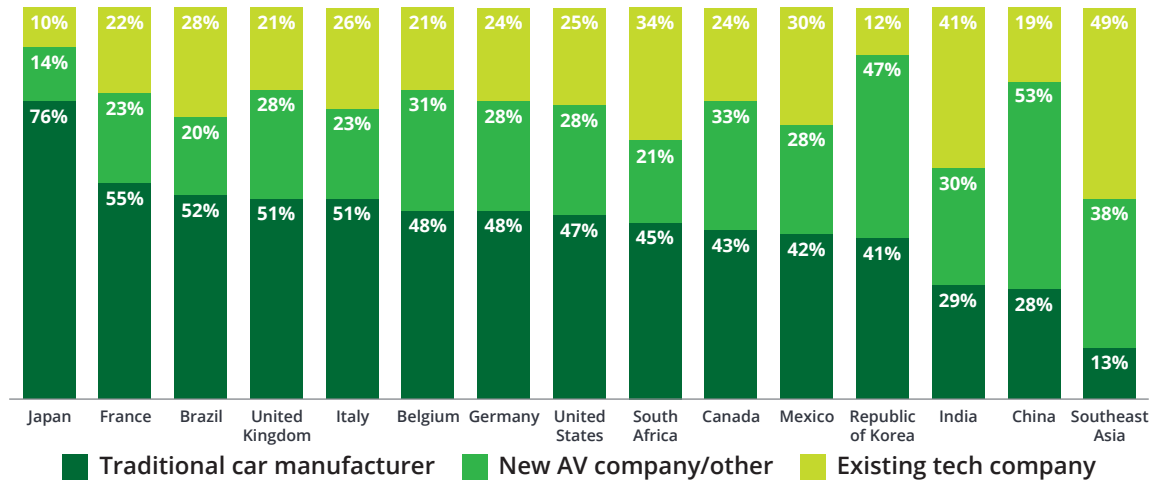
What's it going to take for consumers to get on board?

Safety, brand trust, and cost are all major factors determining consumer acceptance of these two technologies, especially self-driving vehicles. For example, 54 percent of US consumers in last year's study said they would be more likely to ride in an autonomous vehicle if it was offered by a brand they trust; the number has increased to 63 percent this year.²²

Interestingly, consumers in China are the most positive about self-driving vehicles, with the percentage of people who think autonomous cars will not be safe plunging from 62 percent last year to only 26 percent in this year's study. One of the reasons for this difference could be that Chinese consumers recognize their country ranks among the highest in the world for annual road fatalities.²³ Younger consumers in several global markets also seem more likely to embrace autonomous technology, with 70 percent of the Generation Y/Z population cohort in the United States saying they would be more likely to use a self-driving or autonomous vehicle if it were produced by a trusted brand. This compares with 62 percent of Generation X and 56 percent of Boomer/Pre-Boomer consumers.

That said, even though brand trust is becoming more important, the type of company consumers would most trust to bring fully self-driving technology to market has not changed over last year (figure 3). Consumers in Japan, Germany, and the United States still favor traditional vehicle manufacturers; this is in contrast to consumers in South Korea, India, and China, who would most favor new autonomous vehicle manufacturers or existing technology companies.²⁴ One of the reasons for

Figure 3. Types of companies consumers trust most to bring fully autonomous vehicle technology to market (2018)



Source: 2018 Deloitte global automotive consumer study.

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this difference could be tied to the relative strength of automotive brands in more mature markets.

Another way to make consumers feel more comfortable about new technologies such as autonomous vehicles is to prove that the technology can be used safely and reliably in real-world conditions. Whether it's a serious accident linked to the use of autonomous drive features, or a relatively minor fender-bender involving a fully self-driving shuttle in Las Vegas,²⁵ the result is similar: consumers who seriously question the readiness of the technology. For example, 71 percent of US consumers said they would be more likely to ride in an autonomous vehicle if it had an established safety record (up from 68 percent last year). It is a similar story in South Korea (83 percent vs. 70 percent), and Germany (63 percent vs. 47 percent).²⁶ In response, several companies, including some of the largest tech companies in the world, have been testing autonomous technology for many years with relatively few issues, but it only takes one negative incident to destroy much of the goodwill, faith, and interest built up around these long-term R&D experiments.

In addition, the price premium for a battery-powered vehicle should come down as battery production increases. In fact, battery prices have dropped by nearly 50 percent since 2013, from \$599 per kilowatt hour to \$273 per kilowatt hour in 2016. Prices will likely fall even further, potentially hitting \$100 per kilowatt hour by 2026,²⁷ making BEVs more price-competitive with traditional vehicles

and, ultimately, a more attractive option to consumers. However, these projections are based on using lithium-ion batteries, which run the risk of igniting if punctured during an accident. New developments in battery technology such as the use of solid-state materials promise to improve the overall safety of batteries used in BEVs, but they are also likely to cost more, at least in the near term.

Finally, with an increasing number of connected vehicles in operation, consumers also express fear that their vehicle could be compromised by a hacker with malicious intent. In a recent poll conducted by the American International Group, nearly 75 percent of respondents listed vehicle hacking as an issue of concern.²⁸ As a result, our survey shows that 54 percent of US consumers would feel better about riding in self-driving cars if governments would implement standards and regulations to help ensure manufacturers are taking cybersecurity issues as seriously as possible.

Where is all this going?

Considering the headwinds of slowing demand and cooling global conditions that threaten to derail several key automotive markets around the world, it is unlikely that OEMs, suppliers, and technology companies will be able to sustain the frantic pace of capital allocations currently flowing into autonomous drive and electric powertrain development.

Even companies that are actively looking for ways to maintain a level of focused investment through market rationalization, brand divestitures, or operational cost cutting are likely to find it difficult. In fact, some companies may quickly find themselves struggling with more immediate operational issues that take precedence over long-term technology investment strategies.

At the end of the day, it can be argued that the investment process required to bring fully autonomous and electrified vehicle technology into the mainstream is not yet mature enough. Driverless cars are still very much in an experimental stage, and new developments such as solid-state batteries designed to improve the performance and safety of BEVs remain just out of reach. The further out the investment window goes, the harder it will be for most players to justify and maintain their spending on development. For this reason alone, it is likely that companies will have to make some hard choices in terms of which technology investment bets they are able and willing to make.

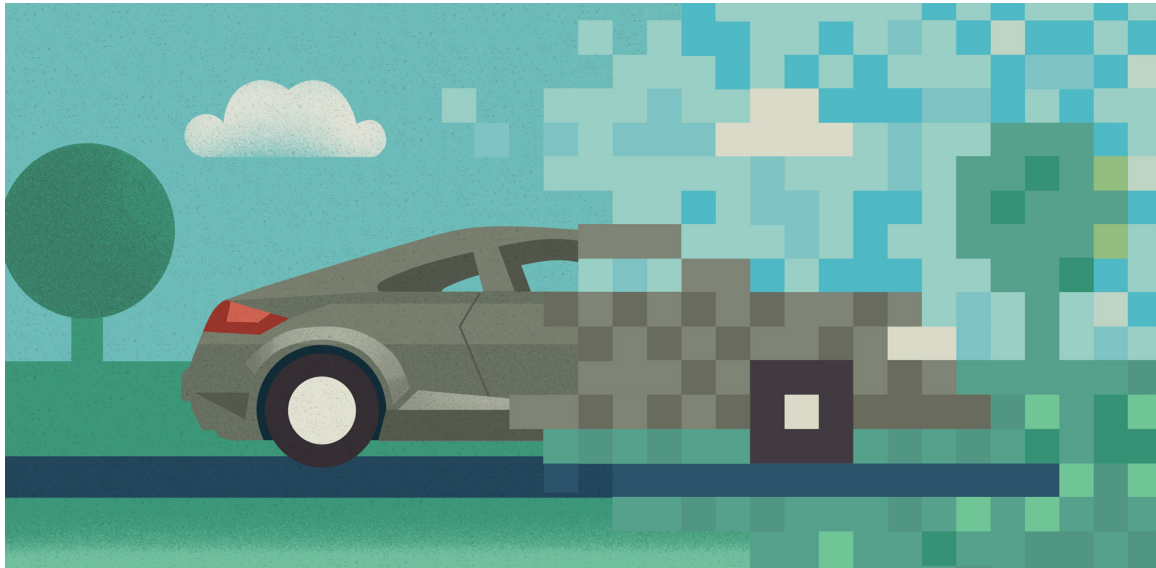
The difficulty these companies face is compounded by their need to make significant investments in a host of other areas, including mobility services, advanced materials, connectivity, and the digital transformation of the customer experience. In short, the cumulative demand for capital investment in the automotive sector is nothing short of astonishing, and while global consumer interest in advanced technologies is somewhat encouraging, their appetite to pay for any of it is very limited.

Going forward, the following three takeaways should be top of mind for industry stakeholders:

- **New business models will be necessary to capture a return.** Consider that dozens of companies are engaged in a gold rush to develop and own the predominant autonomous vehicle platform. Not everyone investing in this technology is going to win. And consumers are only willing to pay for certain technologies using current “sell-to-consumer” business models. At a minimum, autonomous technology investments will require new business models to monetize investments. This, in turn, may further open the door for disruptors to capitalize on your investment. If a comprehensive business model solution is needed to generate an appropriate return on the technology investment, be prepared for the Herculean challenge of creating new successful business models. As advanced and complicated as it is, the technology is actually the easy part.
- **Keep a watchful eye on regulators and policy makers.** Sooner or later standards will be imposed on all of this new technology. History suggests the fragmented nature of regulation across markets will play out here as well. Standards represent both an opportunity to moderate technology development and investment toward clearer targets, as well as a threat to undermine any competitive advantage for first movers. Early, active, and consistent involvement with regulators in tandem with ecosystem partners is essential to best inform investment decisions and market plans. Environmental policy pressure around the world is likely to grow, suggesting EV and similar alternative powertrain technologies are perhaps a safer bet, while the opportunities and challenges for autonomous technology are more varied and may need a different mind-set to calibrate the timing and level of investments.
- **Don’t lose sight of the present while chasing the future.** Finally, there are more than 325 million vehicles in operation in North America, with a further 390 million in Europe, and 165 million in China alone.²⁹ Given the sheer size of the global vehicle parc, or total vehicle population, and the fact that each one now lasts for 10–15 years or more, the kind of transformational change that comes with autonomous driving and electric powertrains will likely take several decades to reach a tipping point in an industry that has been maturing for well over a century. Players that forget this reality in the frenzy of making big bets on the future may not survive long enough to see that future eventually unfold.

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The future is now

Transforming the automotive customer experience

By Andrew Dinsdale and Andrey Berdichevskiy

Automotive original equipment manufacturers (OEMs) and dealers are anticipating massive changes in the industry over the next couple of decades.

At the heart of this change are technology and emerging entrants that are redefining how we buy, own, use, and drive our cars. Already today, we are witnessing how alternate mobility solutions being developed by these new entrants are challenging assumptions and forcing traditional automakers to rethink both their products and their business model. While the long-term future of alternative powertrains and fully self-driving cars will likely redefine the vehicle itself and how it is manufactured, it is the parallel path of new ownership and mobility business models that may more fully transform the century-old industry. For incumbents, the most significant challenge may be managing the duality—

developing new capabilities for this uncertain, mid-century future while in the short-term negotiating all the challenges in the current business model to stay ahead of the competition and deliver on customer expectations. We believe it is some of these shorter-term actions that will position the winners for long-term success.

Executives from Germany to France to the United States, Japan, and China are anxiously trying to solve for the uncertain future ahead. They are looking over one shoulder at a legacy, capital-intensive, wholesale industry, while looking over the other shoulder at an emerging set of new, lightweight, and less constrained competitors. This is no doubt an exciting time for the industry with many options to consider, but is there time for traditional automakers to watch the future of mobility unfold with more clarity, or is the need to transform imminent, particularly after nearly a decade of record sales volumes? Despite the success of the most recent past, we believe the short answer to the question

is a resounding yes: the future is now and time to transform is upon us. But, it is less about a rapid pivot to autonomous, electrified mobility and more about transforming the customer experience to one that is digital, omnipresent, and omni-channel, and reflects the customer experiences consumers enjoy from retail, banking, and a host of other industries.

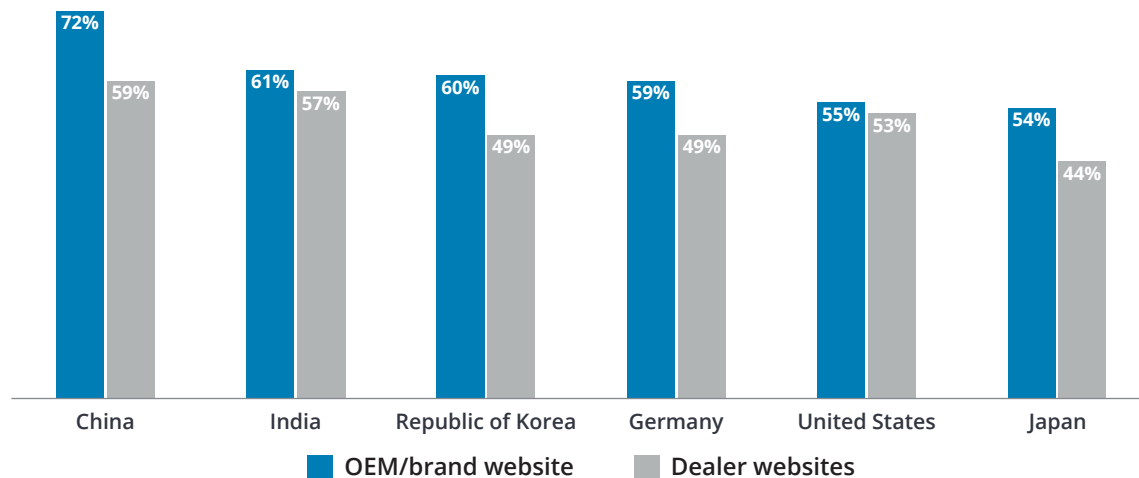
Examples of shared mobility solutions of various kinds are already here and growing. By many estimates, we will see the introduction of fully self-driving vehicles sometime over the next 5 to 10 years, which will kick-start the advent and expansion of shared autonomous fleets over the next 20 years and beyond.¹ For many consumers, however, access to shared robo-taxis will likely be an “and” solution that complements and coexists with car ownership and public transit. Just consider that, today, well over one billion vehicles are on the road worldwide² with an average life expectancy of approximately 10–15 years, and more than 80 million units are being added to the global number of vehicles on the road each year.³ That’s one billion-plus traditional vehicles under traditional ownership models, and growing. Even in areas where new mobility models become ubiquitous, it will likely be several decades for these traditional vehicles to cycle out of commission—unless there are significant regulatory interventions and customer incentives to speed up adoption.

There is a saying that doctors use: “When you hear hoofbeats, think of horses not zebras.” While preparing for the onset of the new world of mobility needs attention, The *2018 Deloitte global automotive consumer study* suggests there are closer and more immediate challenges (and opportunities). Over the long term, autonomous and new mobility models are a big bet, and OEMs and their dealer networks absolutely must navigate this new territory and define new roles together. The issue that requires immediate attention, however, is the need to get to know customers very well and better meet their needs and expectations of the customer experience. Industry executives that see the duality of a future comprised of both shared, autonomous vehicles and the long tail of today’s vehicles and ownership models need to be asking: “What should we do about transforming the customer experience?”

Over the last 20 years, we have seen a shift to researching and shopping for cars online. We use a brand’s website to build and price our vehicles. We search inventories on virtual lots and, according to our global consumer research, some 51 percent of consumers in China use a pricing service. We use a myriad of sources over the course of relatively short customer journey. From our 2018 study, we discovered that in the United States, over two-thirds of customers now take less than three months and spend less than 10 total hours to research their vehicle purchase—a reduction when compared to our 2014 study where the majority of US consumers surveyed spent more than 10 hours. In other mature car markets such as Germany, Japan, and South Korea, we see similar timeframes. In emerging markets, where many are buying their first vehicle, we see a comparatively longer customer journey and more time researching. For example, half of Chinese consumers spent more than 15 hours researching their current vehicle, yet, like the rest of the world, the majority still spend less than three months conducting research before purchasing a car.

This reduction in time researching vehicles only serves to highlight the importance of getting the digital experience right, helping to ensure the right content and shopping tools are available, and providing the customer with the right insights to move down the virtual funnel. Yet today, approximately half of customers in countries like the United States and Japan feel the digital customer journey is merely meeting expectations (figure 1). Consumers in markets like China and India have higher opinions of both manufacturer and dealer websites, but similar to consumers in other markets, no more than half believe the other aspects of the digital customer experience are meeting expectations around things such as: in-dealer digital tools (e.g., use of kiosks and tablets); dealer or manufacturer communications via e-mail, text, or chat; digital support to help calculate trade-in value; or in many cases, even vehicle configurator, build, and pricing tools. Moreover, consumers in the *2018 Deloitte global automotive consumer study* indicate that the digital experiences provided by brand and dealer websites are among the most relied upon sources for the global car shopper—and have significant impact on the vehicle decision (only family and friends ranks higher

Figure 1. Percentage of OEM and dealer websites that met consumer expectations (by country)



Source: 2018 Deloitte global automotive consumer study.

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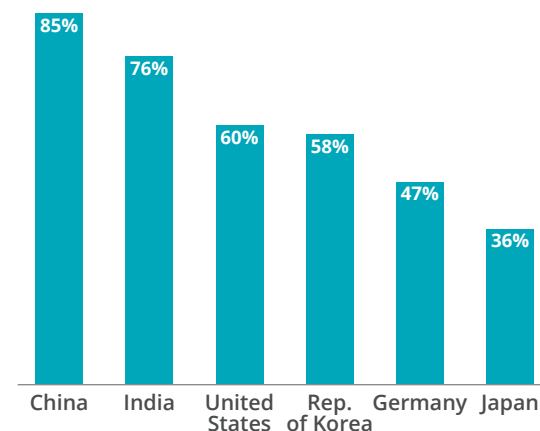
as an influencer). Yet, despite their importance in the shopping journey, there is an expectations gap to delivery of an exceptional customer experience. An automaker working in tandem with its dealer network and willing to make the investment to create a truly integrated, digital and smarter approach to the customer journey will likely be well positioned to create a competitive advantage and reap the benefits. Among those benefits include long-term customer loyalty in an evolving market where traditional brands are competing against other traditional brands and, at the same time, emerging players of offering solutions outside of vehicle ownership.

Our latest consumer study also reveals that across the major auto markets consumers are increasingly interested in buying their next car online, with China leading the way (figure 2). At the same time, consumers cite physical interactions with the vehicle as important with more than 8 out of 10 shoppers needing to see a vehicle, and 7 out of 10 wanting to test-drive a vehicle before purchasing. When digging into the data of our 2018 study, we begin to see a story emerge that consumers are generally happy with the dealer and sales experience. In fact, in many markets consumers enjoy the relationship aspects of working with the dealer and negotiating in person. A few key concerns do emerge, however, that a well-balanced and integrated omni-channel experience can help alleviate. These

include speeding up the sales process, increasing price and transaction transparency, and reducing paperwork—all potential improvements of a strong online-to-offline integrated e-commerce solution.

Customers are expecting a seamless shopping and ownership experience from all companies they do business with, from groceries to travel, from banking to utilities. Many customer channels supporting today's automotive consumer are already

Figure 2. Percentage of consumers interested in acquiring their next vehicle online from an OEM



Source: 2018 Deloitte global automotive consumer study.

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Figure 3. Aspects of the dealership experience consumers disliked most during the purchase process

	China	Germany	India	Japan	Rep. of Korea	United States
Pushy sales person	26%	14%	30%	10%	36%	28%
Poor showroom/ dealership condition	16%	10%	15%	9%	7%	10%
Lack of availability/stock	38%	30%	36%	38%	32%	30%
Dealer did not have access to information I had already provided	20%	15%	18%	9%	19%	11%
Poor dealer responsiveness to emails/texts/phone calls	23%	15%	18%	9%	12%	10%
Poor technology/digital tools	16%	9%	20%	19%	9%	11%
Overall purchase experience took too long	41%	27%	33%	32%	43%	42%
Poor demonstration of in-vehicle features/technology	26%	19%	20%	18%	10%	15%
Too much paperwork	40%	52%	49%	47%	51%	57%
Pricing issues/haggling	40%	36%	31%	48%	45%	40%
Location	11%	37%	25%	21%	21%	27%

Source: 2018 Deloitte global automotive consumer study.

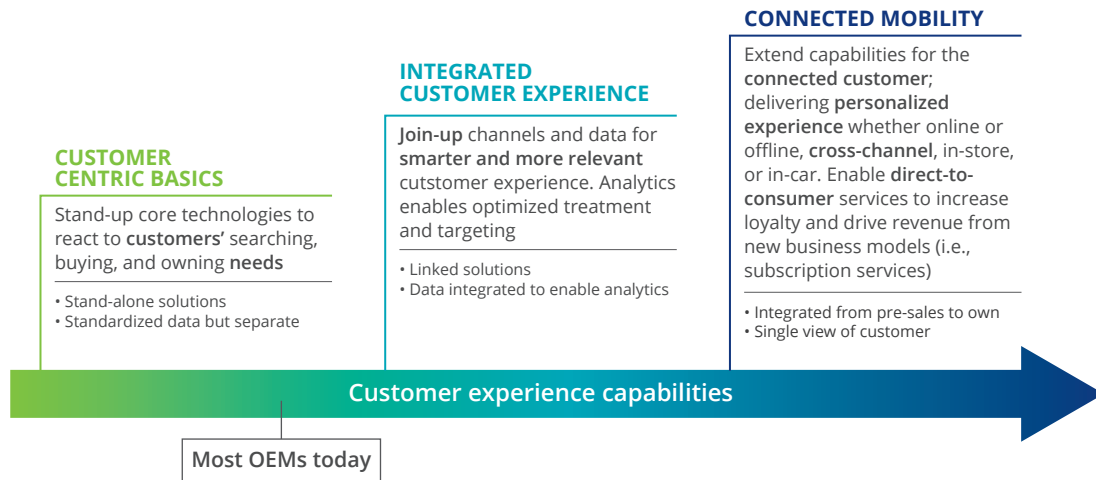
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insufficient for today's wholesale-centric business model; they are still siloed, and experiences are fragmented. Data generated by customers traversing the customer journey is not aggregated, including the journey from OEM to dealer, from online to offline, and between sales, service, and captive finance organizations. This fragmented approach also leaves the customer exasperated and bewildered as they have no single view back to the OEM. This disconnected view of the customer is hampering the ability to drive repurchase loyalty and service retention, let alone the delivery of what will be more direct-to-customer, context-based digital services. Similar to pre-sales, the post-sales digital experience also leaves a lot to be desired. As an example, according to the *2018 Deloitte global automotive consumer study*, less than 50 percent of consumers in the United States have tried or had the opportunity to experience digital services such as over-the-air (OTA) updates, connected services, owner apps, and digital service and maintenance tools. Consumers worldwide are also expecting advanced, connected vehicle solutions; between 70–

80 percent of customers in China, Japan, and South Korea responding to our consumer survey indicate they are interested in vehicles and related apps that can self-diagnose and book service, and then help manage the service experience.

There is no question that the transformational strategies being discussed and planned by OEMs who want to jump to become “digital mobility service” providers will be vital. The prospect of connected and autonomous vehicles delivered via new ownership models and digital subscription services will give customers more options and choices. But before we can get there, we need to integrate the data and channels we already have to deliver a more value-added customer experience today and lay the foundation for new service models in the future that require more insight and analytics than ever before. To get there, to truly serve the customer, one has to know the customer. Yet today's CRM, Web, captive, and service systems are stand-alone and rarely standardized. Some of the most modern thinking and customer-savvy OEMs still manage customer data around the vehicle identification number (VIN) and do not think

Figure 4. OEMs and dealers need to invest aggressively in customer-centric capabilities and data to be ready to deliver connected mobility



Source: Deloitte analysis.

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about the broader “customer”—the driver, the user, the payer, let alone, the emerging mobility user.

The shift required takes a wholesaling business model that relies heavily on a single transaction to one of managing customer lifetime value. To get there, OEMs and dealers need to focus on several core foundations:

Managing the experience: From research to purchase, to delivery to use, all steps in the journey need to be better orchestrated into a consistent experience that builds a lifetime view of the customer. Starbucks manages customers closely across all channels—in-store, online, and via their ordering and loyalty app.⁴ The data they collect drives insights to continually improve how it interacts with customers and drives significant brand engagement and customer satisfaction. In the world of automotive, such an integration will both be necessary to deliver on emerging customer expectations, as well as enable the transformation of retail and mobility models.

Organization: Current organizational structures within OEMs and operating methods with dealers create a fragmented and inconsistent approach to the customer. We often see multiple, uncoordinated initiatives and duplicative projects, agencies, databases, and tech investments. The steps to fix this are not easy. OEMs need to break down their own silos, put the customer in the mid-

dle, and establish a cross-capability customer organization that drives the change, identifies and fills talent gaps, instills governance, and tracks engagement, progress, and value created over time.

Digital platform: Almost as critical as accelerating organizational change, and almost certainly dependent on it, is the need to improve and align digital platforms, leverage data, and integrate channels to enable the customer journey. Regardless of the mobility future, it will be table stakes to create an integrated and individualized set of customer channels. Across most OEMs and dealers, today's solutions are fragmented. Certainly, very few can profess to having a single view of consumers across brands, service, captive finance organizations, and their dealers. This leads to inefficient customer contact and inconsistent messaging. More than half of German consumers do not recall post-sales communications from the brand or dealer after acquiring their last vehicle. In contrast, 42 percent of Chinese consumers responding to our consumer survey report hearing from their dealers three or more times after they purchased their vehicles. The need for a consistent and an integrated experience platform becomes even more critical if we move away from the product-centric and single-transaction focus of our current industry and move toward managing lifetime value and delivering customer value. The digital platform will need to include direct e-

commerce capabilities to support not only online car-buying, but also support integrated payments for anything from on-the-go payment of parking to connected services, as well as emerging future mobility solutions. These are all expectations that our *2018 Deloitte global automotive consumer study* highlights as emerging customer needs.

Data and insight: Developing a data strategy that enables a single view of a customer and enables the creation of a unique customer ID is a critical foundation. Amazon personalizes offers and recommendations based on behaviors, previous visits, and purchases—each customer journey is unique thanks to this “lifetime” view and a focus on metrics that matter to the customer.⁵ Like Amazon, OEMs and dealers need to think beyond the transaction, and beyond the VIN, to consider all the behaviors (by all potential users) in the buying and usage journey. With this integrated view of behaviors, we can begin to join up the channels that will improve the digital journey and deliver on consumers’ rapidly evolving expectations. This will improve both marketing effectiveness and efficiency thanks to improved relevance, better support customers across all forms of engagement, as well as enable customers’ control of their own preferences and “mobility life.” Leveraging such insight will be critical as we move into the provision, selling, and delivery of digital services.

The future is now

The time to act is now. The focus needs to be placed on establishing experience platforms as well as on product platforms. The critical capabilities needed to build customer relationships and trust, which will be the currency of the future, must be developed today. We will likely see change and consolidation over the coming decades between now and the fully autonomous, shared future. But the existential threat is likely closer to home: the inability to build customer relationships and meet customer expectations. This is not just about technology projects to digitize and automate parts of the traditional automotive business and value chain. This is about getting closer to the customer through data, insights, and continuous improvements of the customer experience across channels.

Automotive companies are thinking a lot about “transformation,” and many are at various stages of standing up teams or separate companies—as they see the need to pivot to become a mobility services company. They are investing in product development and engineering teams to build autonomous, self-updating and connected cars, and building data lakes to analyze and monetize these new “mobility devices.” We believe, however, that the ultimate winners will be those that also truly *connect with the customer*.

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