

The Dealership of Tomorrow 2.0:

America's Car Dealers Prepare for Change



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An independent study by Glenn Mercer
Prepared for the National Automobile Dealers Association

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Introduction

This report is a sequel to the original Dealership of Tomorrow: 2025 (DOT) report, issued by NADA in January 2017. The original report was commissioned by NADA in order to provide its dealer members (the franchised new-car dealers of America) perspectives on the changing automotive retailing environment. The 2017 report was intended to offer “thought starters” to assist dealers in engaging in strategic planning, looking ahead to roughly 2025.¹

In early 2019 NADA determined it was time to update the report, as the environment was continuing to shift. The present document is that update: It represents the findings of new work conducted between May and December of 2019.

As about two and a half years have passed since the original DOT, focused on 2025, was issued, this update looks somewhat further out, to the late 2020s.

Disclaimers

As before, we need to make a few things clear at the outset:

1. In every case we have tried to link our forecast to specific implications for dealers. There is much to be said about the impact of things like electric vehicles and connected cars on society, congestion, the economy, etc. But these impacts lie far beyond the scope of this report, which in its focus on dealerships is already significant in size. Readers are encouraged to turn to academic, consulting, governmental and NGO reports for discussion of these broader issues.
2. Secondly, while this report was commissioned by NADA, this report is not an NADA position paper. The views and opinions expressed in this report are those of the author's sources, as interpreted by the author, and accordingly in various cases do not align with NADA's own views or perspectives. The goal of the report is to project the most likely future dealers might face—not the future that dealers might want to face. The author attests that NADA personnel, beyond specifying the general scope of the report, made no substantive changes to any of the content of the report. There were only two exceptions to this general rule of complete editorial independence. First, the author did consult NADA attorneys for their review of any comments made on any legal or regulatory matters, as the author is not an attorney and sought to avoid errors of interpretation of laws or regulations. Second, the author solicited input from NADA subject matter experts for the “Data Challenge” appendix.

¹ The 2017 DOT is incorporated by reference into this update, as it contains useful material not repeated here, such as a discussion of the history of the U.S. dealer system.

3. The view of the author, developed over the course of three decades of automotive industry work, is that change takes place at a slower rate than most of the pundit class would prefer, and that change moves toward new periods of equilibrium, versus toward endless upward extrapolation. Many changes forecasted years ago never occurred at all (e.g., the rise to dominance of “build to order” [versus “buy from stock”], multi-branding of stores). Other changes have occurred, but more slowly than most expected (e.g., penetration of electric vehicles, aluminum displacement of steel in cars). And other changes have resulted in new equilibria (e.g., online services that once aspired to be disintermediators, are now mostly lead generators). There is in our industry such an enormous legacy of history, processes and institutions—the sum total of over a century of formation and dissolution of OEMs, suppliers, dealers, garages, rules, regulations, inventions, habits, traditions and more—that rapid change faces massive frictional drag. So you will see in this report, in many cases, agreement with the direction of various forecasts of change, but disagreement with the pace of change projected.
4. It is important to be clear that each dealership should decide itself the extent to which it agrees, if at all, with the matters set forth in this report and the extent to which, if at all, it will operate in response to any of the matters set forth in this report. Nearly every dealership that receives this report competes with another that receives this report, and each needs to make its own independent decisions regarding how it will operate its dealership—and not by communicating with any competing dealership regarding this report or regarding any matter that might concern competition between dealerships.

Report Summary

Our research convinces us of a positive outlook for the American franchised new-car dealership system. This is the same conclusion we reached in 2017, and we stand by it. While we do foresee much *change* to the dealership over the next decade, and probably some compression of profitability, we do not project revolutionary change or, as it is popularly put, “disruption.” But below this top-line conclusion some of our perspectives have shifted.

For one thing, it is clear that we are moving from a Recession Recovery era (in which rising sales lifted all boats) to the Age of the Operator, where better-managed stores are likely to open a clear lead. The steady recovery in sales since The Great Recession seems to have plateaued, if at a very satisfactory level, thus necessitating this shift in focus.

For another, there has been an inversion of the relative threat to the dealership system, to “inside” from “outside” trends. There had been worry that outside threats (e.g., EVs, AVs) would overwhelm the industry—while current operations stayed strong. Now that the hype around these outside issues has cooled, they’re seen as less worrisome—but conversely, dealers are more concerned about inside issues, such as erosion of near-term financial performance, and the impact of an (eventual) recession.

This is not to say that we dismiss “outside” issues: In particular we do recognize that if mobility services continue to grow, they may break the century-old linkage between being an adult American and owning a car, and that of course would have significant implications for the auto retailing industry.

Research Process

For both the original DOT and this update, the research process is the same. The author conducted dozens of interviews of industry participants (low- and high-volume dealers, public and private stores, OEMs, regulators, CPAs, specialist attorneys, investor groups (PE and family office), vendors to the industry and more). The automotive press was followed in depth, and, especially for ACES,² numerous academic and industry studies were analyzed. In order to learn from related industries, we also consulted with heavy-duty truck dealers and with dealer groups covering China, Canada and Europe. In order to ensure the greatest candor among interviewees, all were promised anonymity: No quote is tied to an identified person or company.

Report Structure

Because the automotive retailing industry is so complex (involving the sale, financing and repair of new and used cars) and is impacted by so many broader trends (such as the rise of electric cars, autonomous cars and mobility services such as Lyft), we have divided this report into two sections, in an attempt to simplify the story. The first section, “Inside the Store,” deals with issues dealers are facing apart from the so-called ACES trends. In effect, in this section we hold ACES off to the side. In the second section, “Outside the Store,” we bring the ACES trends back into the story.

² Automated vehicles, connected cars, electric vehicles and (shared) mobility services

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Section I: Inside the Store

As noted, this section assumes non-disruptive technological evolution, in order to generate a forecast baseline, with ACES impact to be added later.

Topics addressed in this section include, in sequence from a “macro” to a “micro” perspective:

- New-car sales outlook
- The nature of the store
- Ownership of dealerships
- Structure of the store network
- Dealer profit trends, by shop and overall (and how profits may be improved)

Along the way we will introduce sidebars on two special topics (the “affordability crisis” and the subscription model of vehicle usage). Finally, we are including a separate Appendix on “The Customer Interface and the Data Challenge,” focused on the increasingly important topic of how data is handled in the automotive retailing world. We have placed this in an appendix not because this is not a crucial issue, but because it presents a set of challenges that deserve special, deeper treatment.

Before We Begin: The Customer

Obviously, no retail industry exists without its customers. Therefore, no projection of industry trends can exist in the absence of a perspective about the evolution of the customer base. Despite this reality, no primary customer research was done for this report. This is because there is an abundance of pre-existing good research on customers already available (e.g., from Cox, from OEMs and from any number of market research firms).³ We saw no way, within the limited scope of this effort, to discover something new that has not already been said about the American car customer, and his or her evolution. However, we do have a point of view. We have drawn on many of the research sources mentioned to conclude that the retail customer of the future (fleet customers are different) on *average* will look like this:

- A bit **older** than today (as our population adds a year to the median age by 2030, to 39);
- Somewhat **richer** than today (we’re assuming GDP grows at 2%, but population at 1%);
- Even more comfortable **online**, but, as the offline experience continues to improve...
- ... seeking equilibrium: from “bricks *versus* clicks” to “bricks *and* clicks” (the distinction may in fact be meaningless by 2030);⁴
- *Probably*⁵ more open to different **ownership** models;

³ We caution readers to treat skeptically a large portion of publicly available research on American customer needs and wants. Recall, for example, that a vendor of IT systems aimed at improving customer satisfaction will always try to show research proving that customers are dissatisfied; otherwise, what is the value in their product?

⁴ Early signs of this trend are found among “digital native” new firms such as Warby Parker and Bonobos, whose roots are online, but which have been adding physical retail outlets rapidly.

⁵ Research on this topic is so far inconclusive, based as it is on solicitation of stated desires versus surveys of *actual* usage. For example, almost any person might answer “yes” to the question “Would you like to be able to subscribe to a car, the way you do for phone service?”—but how this approval translates into actually paying for a vehicle subscription is by no means yet clear.

- Ever more likely to default to used rather than new (already, about 40 million used cars are sold each year, versus about 14 million new units retailed); and
- Consistently insistent on more and more **convenience** (as “trained” by Amazon, Uber Eats, Spotify and other instant-gratification services).

And finally, but crucially, and in the face of a constant stream of reports asserting the otherwise (see again footnote 3), we believe that the American new-car dealership customer is actually relatively satisfied with the dealership experience (cars sales, financing and service). Where you stand on this point is crucial to how you will see the future, since many of the “disruptors” who are moving into the industry assert they are given an opening by high levels of customer unhappiness. We would beg to differ, and assert that the reality is brighter than the tired and poorly supported “car retailing is broken” trope. Let’s cite some evidence:

- DealerRater survey 1: “What part of the dealership sales experience could be improved the most?” Price negotiation 8%; salespeople 5%; delivery process 3%; F&I 3%; online responsiveness 2%; test drive 1%; **none of the above 79%**
- DealerRater survey 2: “What part of the dealership service experience could be improved the most?” Service advisor 8%; online responsiveness 5%; price negotiation 4%; service explanation 3%; F&I 1%; **none of the above 79%**
- Reputation.com survey of online reputation and responsiveness score (higher is better): banks 367, health care 401, retail 552, real estate 571, restaurants 584, hotels 605, **car dealers 607**
- Autotrader survey of new-car customers of dealers, percent satisfied with: length of process (time) 56%; F&I 69%; salespeople 81%; test drive 82%; dealership overall 79%
- ACSI (American Customer Satisfaction Index) survey: industries (manufacturers and channels taken together) that rank higher than automotive (OEM and dealer): credit unions, pet food, breweries, electronics; industries that rank lower than automotive in customer satisfaction: insurance, apparel, restaurants, appliances, athletic shoes, health stores, supermarkets, banks, hospitals, hotels, utilities, gas stations, phone service, cable TV, airlines.

A dealer—any retailer, in fact—can always improve customer service. There is no doubt that virtually every new-car dealer can further improve how customers are handled. But it may be more useful (and accurate) to place the dealer industry in context: Most of its customers are pretty satisfied, and most Americans are more satisfied with car dealers than they are with many other types of retailers. This perspective suggests that steady ongoing incremental improvements must be made—but that there is not much case for any kind of panicked raze-and-rebuild. Assertions that “the system is broken” are just that, assertions—and are not made more accurate either by being repeated or by being shouted more loudly.

“Inside” Topic 1: The Outlook for New-Car Sales

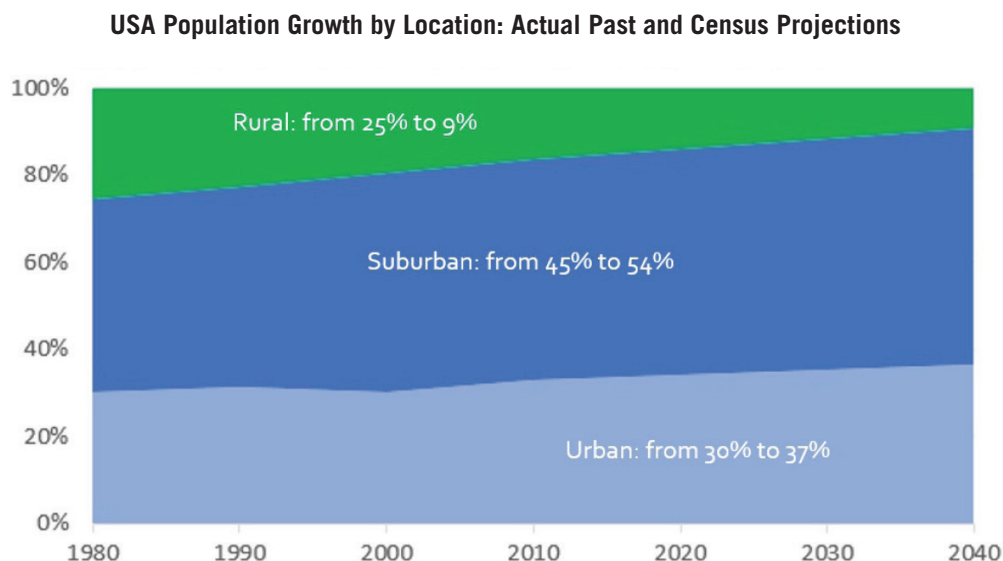
Before we can talk about the nature of the new-car dealerships of the future, we have to have a point of view on how many cars they might be selling. In the original *DOT* we forecast a steady-state sales rate of 17 million units through 2025, with peaks and valleys around that level (i.e., lower than that during a recession, higher afterward). We also forecast a slow but steady trend to higher prices, as the new-car industry shifted upmarket. We’ve been right on both counts, though it is in the early days, of course; and we are reiterating this same forecast today for the late 2020s.

In terms of the unit volume projection, our number is similar to numbers published by forecasters such as LMC/J.D. Power, IHS and CAR (the Center for Automotive Research). The drivers of our number include population growth (from about 330 million today to 360 million by 2030, according to the U.S. Census), VMT (vehicle miles traveled) growth (3.2 trillion today to 3.7 trillion in 2030, on current trend), and economic growth (using a widely accepted number for GDP gains of ~2% per year). More people driving more miles and having more money to spend supports a strong sales rate.

But the glass here is certainly half empty: In other decades these factors would generate volume growth, not just stability. We are thus being conservative by holding new-car volume down to 17 million. This is in part because we see used cars becoming ever more satisfactory substitutes for new cars, as used-car quality continues to improve (as demonstrated by the increasing age of the U.S. fleet, now pushing 12 years, up from about eight in the 1990s, per IHS Markit).

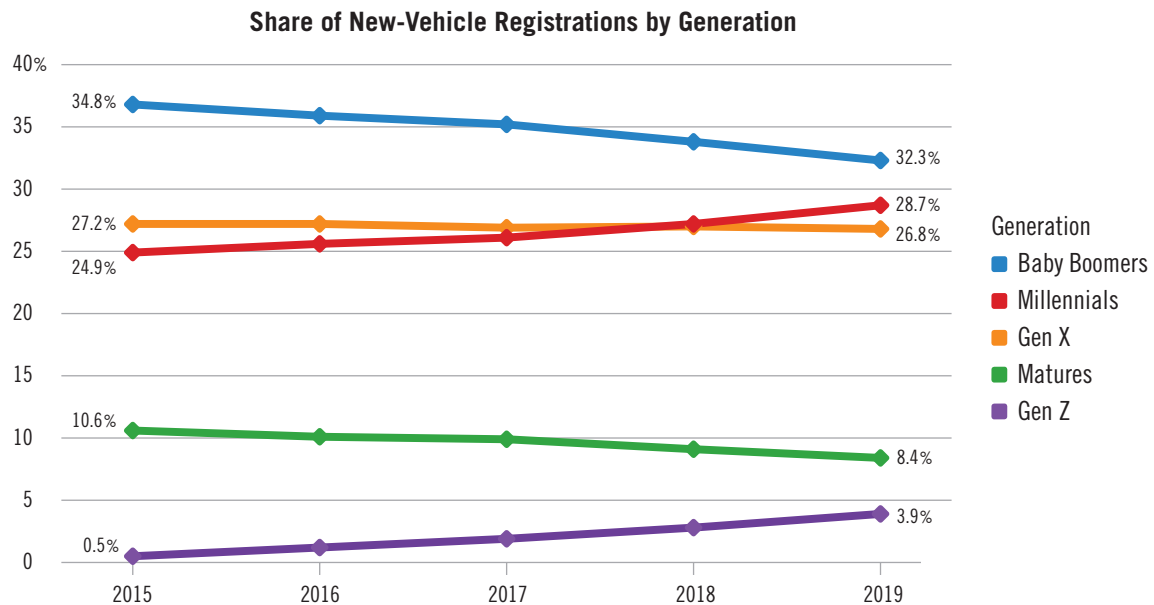
We should also discuss two other inputs into car sales forecasts that have gotten a lot of play recently: urbanization and millennials. Both are held forth as likely to suppress new-car sales; we disagree.

The **urbanization story** has been that “Americans are moving back to the cities in record numbers, and in cities there is less need to own a car, and so sales should decline.” This story is not quite true. Census data tends to lump together urban and suburban residences into one broad “urban” category, leaving everything else as “rural.” And by this metric indeed the “urban” fraction of the population is projected to increase, from about 75% in 1980 to about 90% in 2040. But if we look deeper into the numbers, as shown below, we see that the suburban population is gaining ground even faster than the true urban population, the former adding nine points of share while the latter picks up seven. Americans may be moving to the cities again, but they are moving to the suburbs faster, and the suburbs (and rural areas, too) are the natural homes for the personally owned automobile, given their far-flung sprawl and abundant free parking.



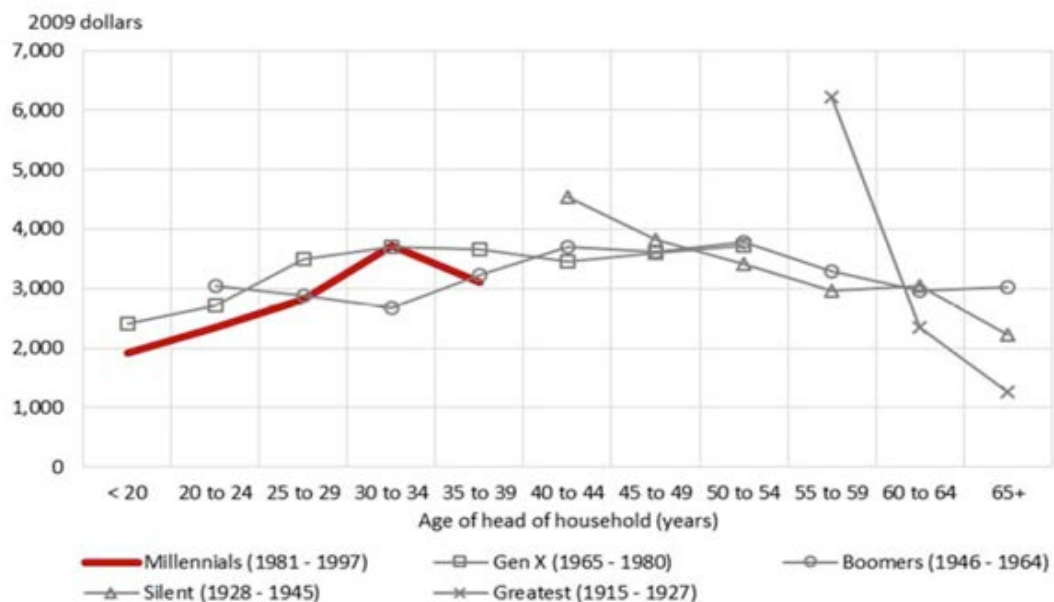
Source: Department of Transportation, from Census Bureau projections

The **millennial story** was that “young people are more averse to home and car ownership than prior generations, and so as they grow as a share of the population, car sales will decline.” This story has also proven to be false, as millennials now represent the second-largest segment of the car-buying public, with a trajectory that has them becoming the largest segment in a couple of years, as this chart shows:



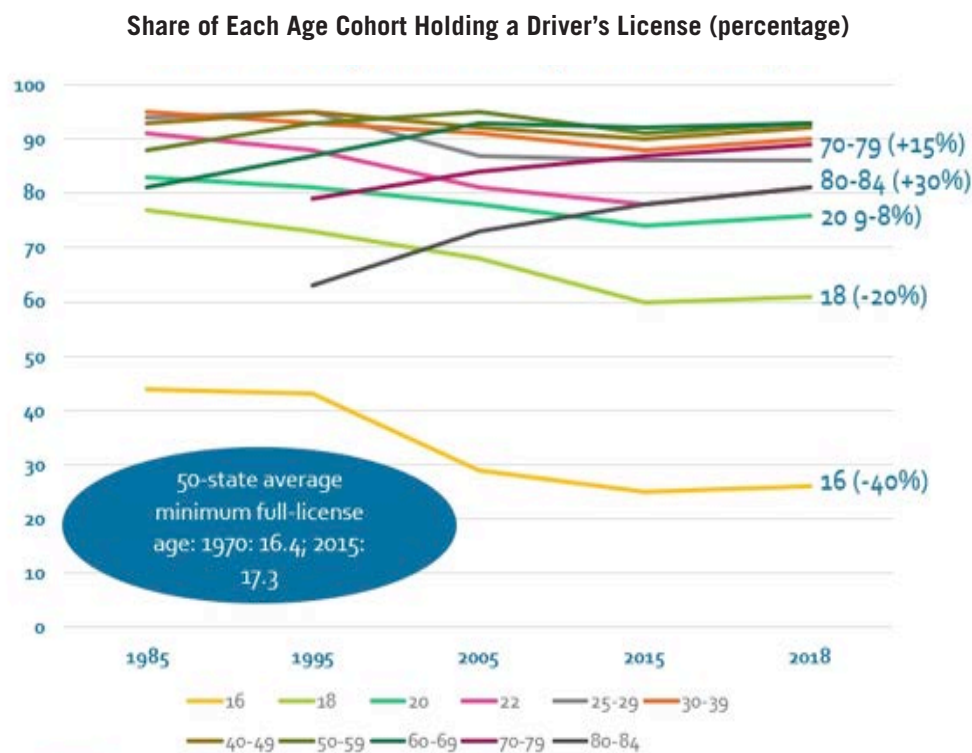
More support for the concept of millennials as robust buyers of cars comes from recent Federal Reserve Bank research on the topic. While their analysis is complex, the key finding is clear: “Conditional on their age and other factors, millennials do not appear to have preferences for consumption that differ significantly from those of earlier generations.” In specifically automotive terms, this chart reinforces the point:

Real Average Annual Household Expenditures on Vehicles by Age and Generation



Source: “Are Millennials Different?,” Kurz, Li and Vine, FRB, 2018

Part of the evidence some presented in support of this story was the fact that very young people were not acquiring driver's licenses at the same rate as in the past. Thus if one extrapolated from a decline in licenses among 16-year-olds to 35-year-olds, for example, one would expect a vehicle sales decline. But more complete data show that young people are mostly *deferring* driver's licenses, not *abandoning* them (partly because the minimum driving age has risen in many states). As the chart below shows, the decline in license penetration is greatest for 16-year-olds, then less for less for 18-year-olds, and so on. By their 20s, millennials have license rates roughly as high as their forebearers had at the same age. The deferral may simply be due to younger people suffering the greatest employment shock during and after the Great Recession: If you have no money it is indeed hard to buy a car, so why get a license? As millennials have entered the workforce, however, this has changed.



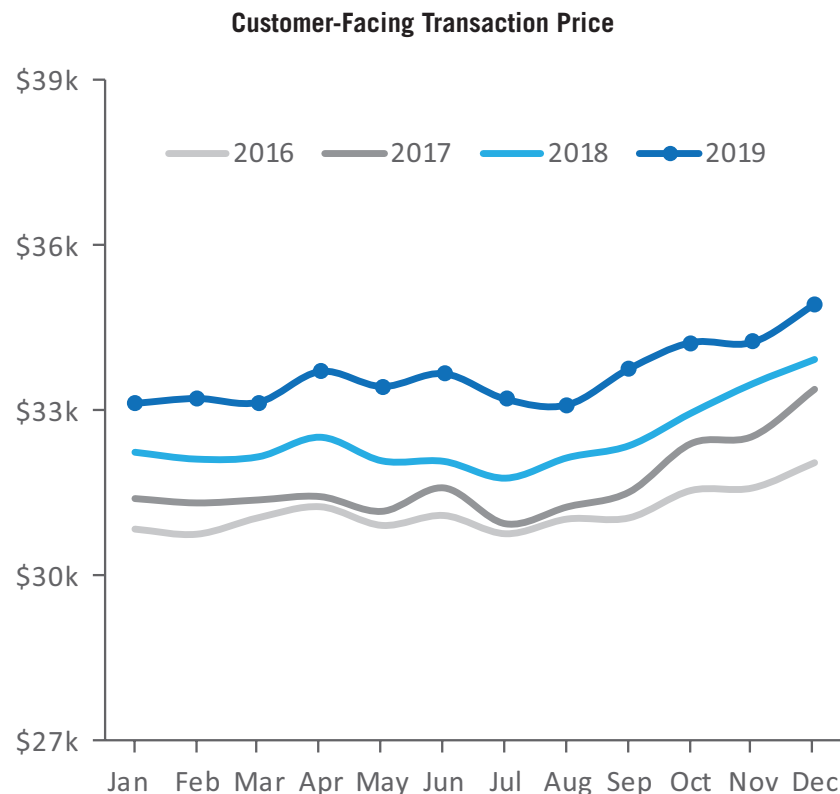
Source: FWAH

By the way, this focus on the youngest drivers misses a significant point: *Older* Americans are keeping their licenses longer. Licenses for those 65 and older climbed from 32 million in 2008 to 44 million in 2017 (see Hedges & Company data). Thus, over the last decade or so, America did indeed lose about a million drivers 19 and under, but gained about 2.5 million drivers in their 20s, and 12 million 65 or over (as per NADA data). In 2000, America had some 190 million licenses in effect, and the number has grown to over 225 million today.

Thus we see no drag on new-vehicle sales from either the urbanization story or the millennial story.

(Of course, more considerations go into the sales forecast than just these: We called out these two since they have been so much in the press lately. But we cannot ignore the fact the while total VMT has been and looks set to continue [slowly] growing, per-capita VMT is flat or down. Factors driving this shift include the rise in working from home or otherwise remotely, and a reduction in shopping trips as goods delivery soars thanks to online ordering [discussed further in the “Mobility Services” section]. However, we do not see enough pressure from these trends to alter our flat-at-17-million forecast.)

Next: If Americans will not be buying *more* new cars in the coming years, they will be buying *more expensive* ones, such that industry revenue will grow, even if units do not. With new units stable even as the population and economy grow, one can see that dealers are selling to a shrinking but more affluent part of the public. New cars are becoming the province of the better off. To illustrate this, note that in 2000 we sold 17.4 million units to a population of 282 million: 6% of Americans were car buyers in that year, more or less. In 2018 the industry sold 17.3 million units to a population of 325 million: Now only 5% are buyers. And indeed, income data supports the hypothesis: The average household income in the U.S. today is about \$60,000, but the average income of a household buying a new car is in the range of \$100,000 or higher (see Michael Sivak, Cox and Urban Science calculations). It is no wonder, therefore, that the average age of a new-car buyer today is at least 54 (and in 1990 was 44; see IHS, University of Michigan TRI, J.D. Power and Hedges data). The trend is visible in recent J.D. Power surveys of transaction price trends (“Industry Health Report: November 2019”):⁶



Of course, we are not projecting this trend to continue at such a rate indefinitely, but as the chart shows, we have been adding some \$750 to price (net of all discounts) each year, for several years now.

⁶ TrueCar's ALG division reported an even higher average price: for December 2019, \$35,900.

Is There an “Affordability Crisis?”

Media coverage asserts that such price increases represent an “affordability crisis,” but evidence for this is mixed at best. Arguments for and against such a crisis existing include:

- **“It’s because of low interest rates.”** Undoubtedly, if rates climb demand will fall, but rates have been flat (at low levels) for years, and so do not explain the price rise.
- **“Customers’ ability to borrow is being stretched.”** Unclear. In 2014 (using Experian data), the share of open loans that were subprime or deep subprime was 19.7%—but in 2019 this has *dropped*, to 18.9%. Similarly, the 30-day delinquency share in 2014 was 2.4%, and today is 2.1%. Credit does not seem stressed.
- **“It’s subsidized by extending loan terms to historic durations.”** True, to a point: The average new-car loan term in 2014 was 66 months, and in 2019 was 69. But isn’t this in part a response to longer new-car life, thanks to quality improvements? Do we think 30-year house mortgages are excessively long, or just appropriate to the life of the asset?
- **“Consumers have to spend more, as there are no entry-level models anymore.”** Not true: Low-cost subcompact cars are on the market, but customers are simply turning away from lower-cost new cars. Used cars are the new entry-level cars, and dealers are indeed selling used cars at a record pace. This view was supported by remarks made by J.D. Power personnel at a recent conference, paraphrased as “It isn’t so much that everyone is paying more; it is that low-income buyers are leaving the new-car market for the used market, while high-income buyers stay with new, as products have gotten so much better (e.g., via added ADAS features and CUV offerings).”

It is thus somewhat unclear to us that we are facing a “crisis” in affordability.

“Inside” Topic 2: The Nature of the Store

Now that we’ve established dealers will have vehicles to sell, the next question is how they will be sold—specifically, whether they will be sold “online” or not. We are investigating this question due to widespread assertions that car buying will move wholly online, just as have most purchases of books, music, plane tickets and much more. What this might mean for dealers is a complex question, but it certainly is a trend to be monitored and understood.⁷ However, to date, contentions that the physical store would soon be replaced by purely online sales have not been proven.

Before we go on, we have to point out that one of the challenges in discussing this topic is that we have no clear definition of what “buying online” means. If we mean *purely* online (I type on my keyboard and then a car appears in my driveway), then virtually no cars are sold like that today in the U.S.: There is inevitably some physical paperwork, some phone calls to be made, some visits to a physical location (if only to pick

⁷ Some pundits erroneously equate “buying a car online” with “eliminating the need for a dealer.” The two concepts are related but not identical. A car can be bought online via a dealer, or not. And whether the car is bought online or offline, the dealer still has other roles to play, in the fields of service, financing, collision repair, trade-in remarketing, etc.

up the vehicle). But once we relax that purest of definitions, things get complex quickly, as shown in this DealerRater survey of car buyers in 2018, by percentage, who said:

- I bought online except for some paperwork: 8%.
- I did it mostly online except for some details in store: 7%.
- I did much online, but had to discuss F&I and other substantive matters at the dealership: 8%.
- I found my car online but did essentially the entire transaction at the dealership: 77%.

To take another source, Cox reports less than 5% of new-car transactions as “consummated online” (all paperwork executed)—*and* with the great majority of even those transactions still involving interaction with the physical dealership. As they put it: “Even customers who say they want to go entirely online, still ask to see the physical facility, the documents they are signing, and the real people backing up their transaction.” As one dealer we talked to put it, “Certainly customers like the ease of doing things online, but when it comes time to click that last button, and watch \$40,000 leave the bank account, caution enters in.” Nevertheless, it is hard to see how more and more transactions wouldn’t move in part or in whole online, especially for that segment of the buying public that views itself as time-constrained.⁸

It is not only customer conservatism that slows this trend: The transaction is highly complex (e.g., with trade-ins to manage) and highly regulated (e.g., with odometer statements to sign). All this will be streamlined over time, of course.

If readers feel it is only in America that the online movement is sluggish, they need only look at similar experiences in China and Europe. Expectations that China would crack the code on online sales haven’t been met (as we will see in the China section below). In Europe OEMs have launched numerous online-direct pilot projects, but they all seem either stalled or stunted, in part because (as Steve Young of ICDP put it to us) customers know “there is a deal to be had” at the physical store. Why click the online purchase button if a trip to the nearby dealer will probably get another \$300 knocked off the price?

And even in the U.S., Tesla, the pioneer in novel car-retailing methods, backtracked from an announcement that most of its stores would close, and seems now to be keeping most of them open (and, of course, all of the service facilities). The online trend is real, but it is slow.⁹

And there is one more subtle point to make (and thanks to Jeremy Alicandri for pointing this out to me). Suppose all OEMs offer all cars for sale fully online, just like airlines offer tickets. It would then be an easy step for a multi-brand online aggregator to emerge, like an Expedia or an Amazon, where customers could shop all brands at once. This not only would be destructive to brand values (as 99% of all cars around the world are sold in stand-alone single-brand boutiques), but the aggregator would certainly demand a cut of the profits. Is this really what OEMs would like to see?

⁸ Though even here we have to be cautious. In “the old days” a customer might indeed spend six hours shopping and negotiating at two dealerships, whereas nowadays they might spend only an hour at one. But often they have spent 10 more hours researching cars online. Have they actually saved time? And have they swapped salesperson time, which is paid for, for their own labor, which they give away for free?

⁹ But not slow for everyone: Pioneering online seller Dave Smith Motors, in Idaho, sells “about 99%” of its unit to online buyers, reports Rick Ford, the CEO of DSM’s owner, RFJ Auto Group (Automotive News, November 11, 2019). Of course, this is not online direct from the manufacturer. DSM sells its own cars. And a vast number of DSM buyers come to Idaho to pick up their vehicle themselves.

There is a second issue related to the online/offline topic: the nature of the physical store. Assume that the physical store does persist for years: Will it look the same as it does today? In theory, an OEM convinced that more of the customer interface is moving *online* should require of dealers less elaborate *offline* (physical) facilities. This shift in emphasis should be welcomed by dealers, since (as we demonstrated in earlier reports to NADA¹⁰) the return on investment to dealers of lavish store upgrades is essentially zero. In our work this year we did detect some signs of movement by OEMs away from requiring expensive “Garage Mahals,” but as dealers know, a change in any factory’s senior management can at any time unleash a new wave of costly design proposals. (And when other retailers, such as clothing stores, change their image, they mostly swap the mannequins and some posters; car makers like to pour concrete and erect glass walls!) We do encourage OEMs to take a more balanced online/offline approach (aka “omnichannel” marketing), wherein advanced websites are paired with appropriately cost-effective physical channels. We would advise watching carefully the “digitally native” retailers we mentioned earlier, such as Casper (mattresses), Bonobos (clothing), Warby Parker (eyewear), et al., all of which started life online but now are building physical presences (almost 500 across just these three). These tend to be appropriately small, simple and low-cost facilities.

In the automotive world, Geely/Volvo’s Polestar brand perhaps represents this concept (at least in intent if not in actuality yet), with its plans to require dealers to build only small, modest stores (called “spaces”) of 2,000-2,500 square feet in size and about \$750,000 in cost. Polestar dealers would indeed take most orders online, and hold minimal or no inventory on-site.¹¹ But even Polestar is moving cautiously, with no more than 5-15 “spaces” planned for the U.S. by the end of 2021.¹²

“Inside” Topic 3: Ownership of Stores

So dealers will have cars to sell, and physical facilities to sell them from (increasingly augmented by online sales). The question now is who owns the stores? Various options exist, but we’ll discuss just two: ownership by franchised dealers or by car companies (either directly or via sales subsidiaries).

Our original forecast was that dealers, then holding a 95%-plus share of new-car unit sales, would remain the dominant channel, with market share perhaps falling to 90% or so by 2025. The reason for the decline was an expectation that new entrants, especially at the premium end and especially in EVs, would enter in some strength by 2025 and (inspired by Tesla) opt for factory-direct sales.

Our revised forecast is for dealers to stay at that 95%-plus level through 2025, with a chance of a small decline thereafter (again, primarily in the premium segment).

The factors we’ve considered in this forecast include the facts that:

- The dealership model (with many variants) dominates globally. Japan and Korea represent major exceptions to the rule, but they have not exported their OEM-direct model elsewhere.

¹⁰ *Factory Image Programs*, phase 1 2012 and phase 2 2013

¹¹ All this being said, it is unclear that Americans, beyond a high-income time-constrained niche segment, are willing to move to a BTO (build-to-order) world from a BFS (buy-from-stock) environment. After all, Amazon and others have trained us to expect instant delivery! It is also unclear that car factories designed to run flat-out will be willing to accept the volume fluctuations BTO generates.

¹² *Automotive News*, December 23, 2019

- Superior economics of direct sales have never been demonstrated. Asserted, yes, but never proven. In fact, the limited research in this area shows inferior economics of “going direct.”¹³
- Incumbent OEMs lack the funds to buy out their networks’ massive investments in PP&E.¹⁴
- OEMs already have very effective control of dealership behavior anyway.
- If customers want what looks like “factory direct,” dealers can offer it (e.g., via mall stores).
- Conversely, new entrants can decide to own their own stores (as we might expect Apple to do, if it does launch its own car).

These factors were all in place in 2017, so we should point out the three reasons for revising our current forecast to show *slower* penetration of the factory-direct model in the U.S.:

- First, our conversations with new and incumbent OEMs have revealed that Tesla’s issues with delivery and service have cooled such OEMs’ interests in a direct model. (This is not new news: Prior attempts—e.g., Daewoo, Ford Retail Network—also collapsed, for various reasons.)
- Second, most if not all of the wave of high-end EV start-ups making news in 2016 and 2017 have at best experienced delays in launching here, and at worst have abandoned the intent.
- And finally, we continue to look to Canada for insights in this area, and the news from our northern neighbor is not positive for factory ownership. This is because in Canada, where OEM direct ownership of stores is broadly permitted, OEMs have actually *reduced* their store holdings, such that less than 1% of vehicle sales in Canada are via factory stores. (We thank Chuck Seguin for this insight.) Because of the absence of strong regulatory bans against direct ownership in Canada, we would have expected by now more experimentation with the direct model there. There has been some movement (see Hyundai Genesis), but no real momentum.

Accordingly, we’ll forecast the dealership model of store ownership remaining very dominant in the U.S. through the 2020s.

“Inside” Topic 4: Structure of the Store Network

In our 2017 report we projected a decline in the number of stores, based on strong consensus among interviewees that “scale mattered,” that “smaller stores are doomed” and that “the internet is killing geography” (since any customer can now buy from any dealer anywhere, skipping past local stores). We were wrong. Store count has not at all declined (since the sharp reduction, of about 2,000 stores, linked to the Great Recession over a decade ago), and by at least one metric (e.g., Urban Science’s index), has slightly risen.¹⁵

We did see factors that argued for a rise in *store* count (population growth, growth in suburban sprawl, customer preference for buying and servicing locally, maybe new OEM entrants), but on balance we thought the factors pushing for a decline were stronger. The source of our mistake, in retrospect, was a focus on economic and demographic causes, at the expense of paying attention to commercial realities: Specifically that (since the Great Recession anyway) no OEM wants to be the one to trim its network. Every rooftop represents incremental sales, and OEMs for a decade now seem to be willing to ignore the

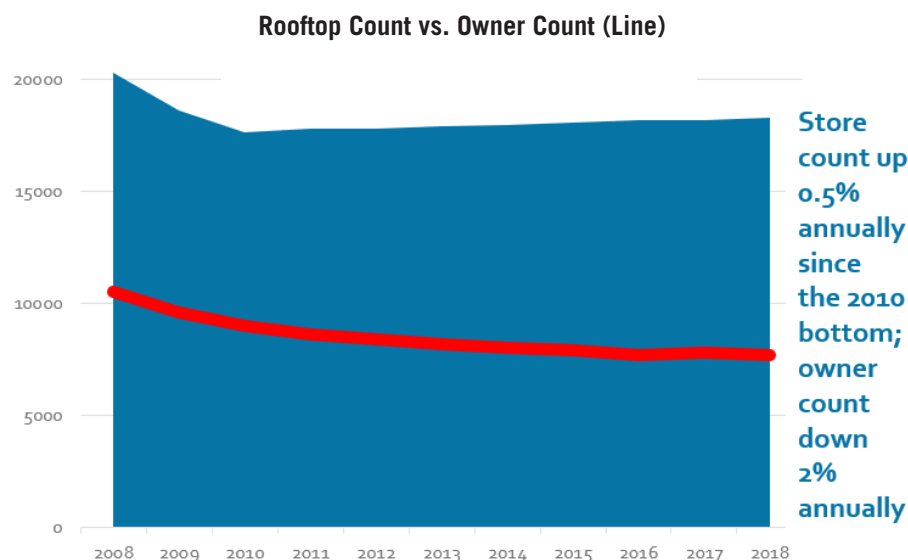
¹³ See for example the work of Benito Arruñada.

¹⁴ Property, plant and equipment

¹⁵ NADA and Urban Science produce slightly different dealership rooftop counts, but their trendlines broadly agree on “flat,” plus or minus a few stores.

risks of over-dealering in favor of the benefit of more unit volume. We don't see this behavior changing and so, learning from our mistake, are going with a flat store count for the next five to 10 years (at roughly 18,000). However, this view assumes a steady-state economy; if we encounter a sharp recession, it is likely that the industry will lose hundreds of rooftops (see the "Dealer Profit Trends" section, below).

Moving on from rooftop count, we come to *owner* count. In our original forecast we expected a decline in the number of owners, as smaller chains or single-point stores sold out to larger chains. In this we *were* correct. Before the Great Recession there were about 10,000 owners for some 20,000 stores; by 2018 we were down to some 7,700 owners (NADA data) and 18,000 stores (Urban Science data). We've thus moved from roughly two stores per owner to closer to 2.5. We expect this trend to continue, to perhaps 6,250 owners by the late 2020s, where we would reach almost three stores per owner. (And again, we may see lower numbers if we have a sharp recession.) Drivers of this consolidation in ownership include succession issues (how to share the store among heirs), aversion to ongoing investment (e.g., "I don't want to bet my family's wealth on yet another \$4 million facility upgrade!"), exhaustion from battling encroaching OEM and regulatory control, and erosion of the entrepreneurial opportunity.¹⁶ Even so, despite all the talk about it, ownership consolidation has been glacially slow (2% annual contraction since 2010): More dealers talk about "throwing in the towel" than actually do it.



Source: Urban Science for rooftop count. NADA for ownership count.

Finally, we reiterate our prior prediction that public ownership will remain a minority of total dealership ownership. Various factors enter into our thinking: that economies of scale are probably elusive beyond chains of 50-100 stores, that OEM preferences for owner "skin in the game" remain strong (and that OEM framework agreements keep a lid on public chains' growth), and that the public chains' P/E ratios are not generally high enough to make buying private chains accretive. And indeed the publics have in recent years sold stores as often as bought them. We do not in any way mean to imply that these are not well-run

¹⁶ Dealerships are fast evolving towards templated franchises such as found in fast-food chains. In the past dealers were truly dealers (buying inventory at wholesale and marking it up as best as they could), with great freedom to alter store processes and facilities as they saw fit. Over time they have become more typical retailers, with OEMs enforcing more standardization across stores—arguably beginning with the launch of Saturn in the 1980s. At present they more closely resemble chain franchisees, where the franchisor (e.g., McDonald's) establishes standardized processes for every aspect of the store (and where retail price negotiation has essentially disappeared). This evolution gives the dealer principal less and less room to innovate or deviate, so more entrepreneurial types may be leaving the business (even as it remains financially attractive for those who remain).

businesses—only that they have no inherent, built-in advantage over private ownership. This is contrary to very inflated claims about the publics’ advantages when they first launched; see, for example, this quote from a 1997 article: “It’s only a matter of time, experts agree, before AutoNation kills off traditional dealers the way Blockbuster squashed the mom-and-pop video stores.”¹⁷

A look at the facts shows how little movement has been made toward this “killing off” or “squashing:”

- In 2000, total U.S. new light vehicle sales were 17.3 million, of which approximately 2.8 million were fleet, leaving 14.5 million as retail. Of those 14.5 million, the six public chains sold just under 1 million, or about 7%.
- In 2018, once again total U.S. light vehicle sales were 17.3 million, of which approximately 3.6 million were fleet, leaving 13.7 million retail. Of those 13.7 million, the public chains sold about 1.1 million, or about 8%.¹⁸

Thus, in 18 years, the public chains’ share (measured in retail units sold) has moved only from 7% to 8%, hardly a scorching pace of consolidation.

“Inside” Topic 5: Dealer Profit Trends (by Shop and Overall)

Having established our perspective that we have cars to sell and that we still have thousands of independently owned physical stores to sell them from (whether online or offline), the next question is how the profitability of these stores will evolve over the next decade. Our view is that total profitability may decline somewhat, and that the sources of profits will shift somewhat (increasingly to service, aka fixed operations). This was our view in 2017 and remains unchanged today.

The total profit picture is built up from our individual shop forecasts, summarized as:

- **New car:** Margins flattened by internet, but partly offset by OEM bonuses and F&I gains
- **Used car:** Higher percentage margins than new car, but under some pressure
- **Service:** Good margins, large revenue upside, but dealers will have to work hard to capture it
- **F&I:** At historic highs, major profit driver, regulatory risk significant

Net, overall, we see some regression to prior “normal” levels of profitability, closer to NPBT (net profit before tax) of 2%, rather than the 3% average of recent years. As always, the natural diversification of dealers’ lines of business (e.g., typically when new is down, used is up) helps shield total profitability. However, especially if we have a sharp recession, many dealers remain at risk. We are especially concerned about midsized, undifferentiated, suburban stores (which may have over-leveraged in order to fund facility upgrades): Larger groups are well-capitalized, and smaller stores often benefit from low- cost positions.

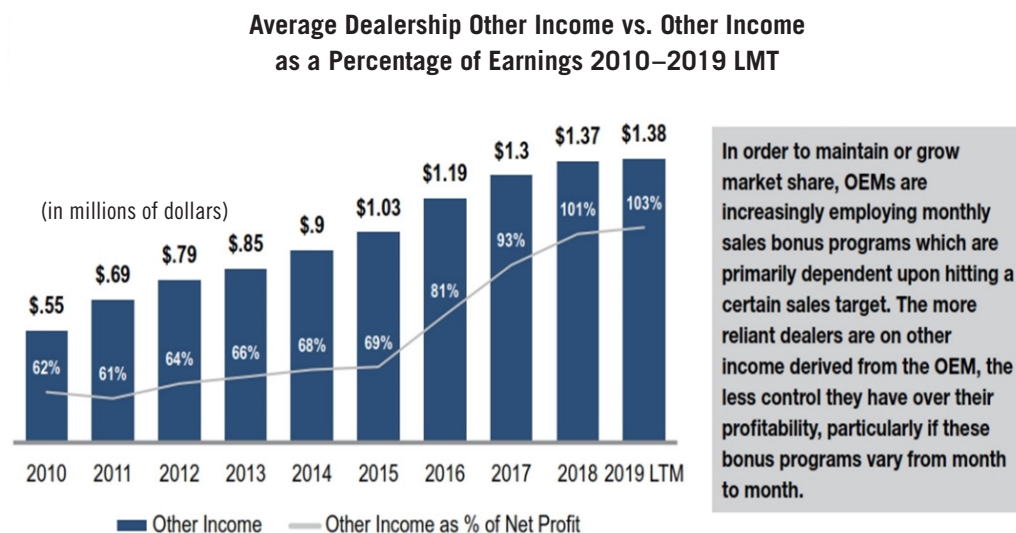
¹⁷ “A Cream Puff or a Lemon?,” Daniel McGinn, Newsweek, March 9, 1997

¹⁸ Notes on these calculations: (1) Berkshire Hathaway qualifies as “public,” but is excluded from this analysis due to limited data disclosure; (2) for 2000 UAG and Penske were not fully merged, but for this analysis were combined into one firm; (3) fleet sale figures are not as reliable as total sales figures, due to definition issues (e.g., what is the lower limit of vehicles bought together to be considered a “fleet”?). We used *Automotive News* data for total sales, and *Automotive Fleet* and J.D. Power data for fleet sales.

This outlook implies a shift in dealer management priorities from managing growth (across the past decade) to controlling the costs of operation. If the 2010s were the Decade of Sales Growth, thriving in a boom, the 2020s will be a Decade of Cost Control, working on a sales plateau.

New Car: More Fragile Earnings, with the Ongoing Shift from Margin to Incentives

The strong bottom line of the average dealership today conceals some fragility, especially in the new-car shop, since there, *margins* (which a dealer can somewhat control) have been partly replaced by below-the-line/back-end OEM *payments* (which are paid out almost entirely at the whim of the factory). The average store has therefore become wholly dependent on such payments for its bottom line, as Kerrigan Advisors eloquently argue (“The Blue Sky Report,” June 2019):



Source: Kerrigan Advisors, from NADA data

We see no reversal in this trend. Essentially, the market (enabled by the internet) sets both the price and the (minimal) margin on new cars, with OEMs providing bonus payments, both to keep dealers motivated to sell new cars and to induce preferred behavior (e.g., invest in specific training programs, hit specific customer satisfaction scores). Thus, in new cars, while total profitability may be acceptable (especially when F&I revenue is considered; see below), it is fragile. If we suffer a sharp recession or if an OEM changes its plans, dealers can see the payments on which they have become dependent evaporate overnight. It is therefore as critical as ever for dealers to maintain other profitable revenue streams to backstop the new-car department.

Will Subscriptions Alter the Very Nature of New-Car Sales?

Talk about subscriptions has flooded the automotive media in the recent past. And this is a fairly recent development: We didn't pick up on this topic at all in 2017, and so will address it here. But despite all the chatter about this model of (quasi)ownership, it has not taken off yet, and remains problematic.

We'll define a car subscription as a sort of car ownership, provided via a single monthly fee, and that covers most costs (e.g., insurance, finance, maintenance), excluding only gasoline. Typically there is no long-term commitment on the part of the consumer, and often the contract allows swapping one's vehicle for another (e.g., a sedan for an SUV), at specified intervals. Subscriptions can be provided by the OEM (e.g., Porsche Passport), by a dealer (via, e.g., Mobiliti), or by a third party (e.g., Inride). Motivations for offering subscriptions are varied:

- An OEM may use subscriptions as a marketing tool, encouraging trial.
- Marketers may see them as appealing to supposedly "ownership-averse" millennials.¹⁹
- Dealers and OEMs may see these as essentially a kind of lease.
- For premium OEMs, wealthy variety-seeking customers may be attracted to the swap feature.²⁰

So far (and it is indeed the early days) the record on subscriptions is mixed. We don't have solid numbers on how many subscriptions have been issued. Their regulatory status varies state by state, and in some cases there have been legal challenges to them (e.g., for violating OEM/dealer sales agreements). No one seems to be making money on them yet, but this may change. And in fact, the whole subscription question may become moot, because in a way we are already there: If a dealer is offering a leased vehicle, and the customer has added to it prepaid maintenance and various other voluntary protection products attached, is the dealer already providing a de facto subscription? (Although without any built-in swap feature.)

In the meantime, various experiments come and go:

- Some observers felt the new Polestar brand would focus entirely on subscriptions, in keeping with its modernist image, but it has since adjusted expectations: Gregor Hembrough, head of Polestar in the Americas, expects Polestar 2 sales to have a 70-30 split between leasing/subscriptions and sales. Subscription volume "will be based on consumer demand. There is absolutely no target for subscription."²¹
- Ford (actually, Ford Motor Credit) acquired, developed and then this year sold its subscription start-up Canvas. But of course, Ford may reenter the market.
- Conversely, Porsche has been expanding its Passport service in the U.S. (possibly primarily to introduce trial by customers new to Porsche, as the company's current customer base is almost too loyal, and so may need an infusion of entirely new drivers).

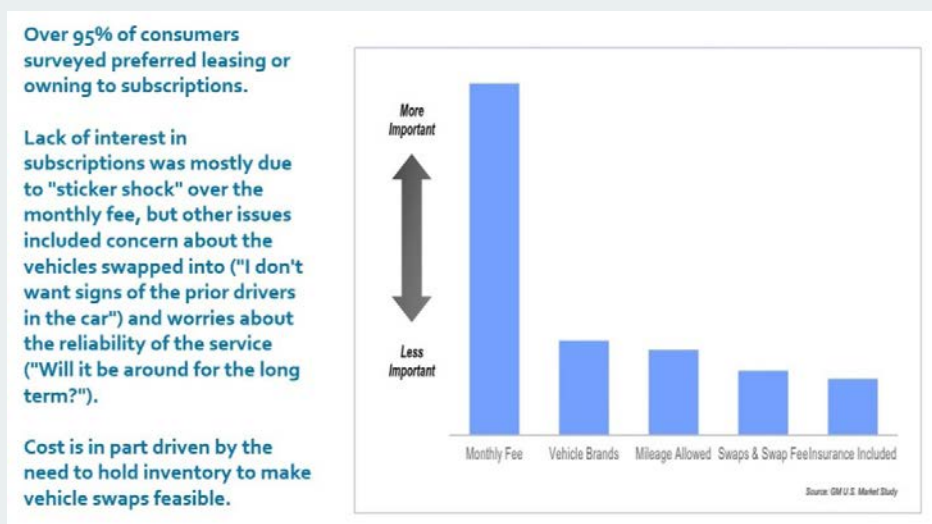
¹⁹ Though as we saw earlier, millennials are now buying cars at a high rate.

²⁰ Many of these customers are already effectively "subscribing" to cars, changing out one model for another in a series of short two- or three-year leases. If a wealthy family has three cars in the driveway, all on short-term leases, it may already be seeing a new car every year.

²¹ *Automotive News*, February 25, 2019

- GM's Cadillac launched and then pulled back its service, Book by Cadillac, but has announced a relaunch in early 2020. GM CMO Deborah Wahl noted that the service was excellent in inducing trial: "...we learned that the Book model is enormously effective as a conquest mechanism: 70% of Book subscribers were new to Cadillac."²²

We would expect future growth in subscriptions to be modest, and focused almost entirely on upscale or premium vehicles. This is because of what we would call a "sticker shock" problem. That is, the typical new-car buyer may not completely grasp the all-in monthly cost of owning a car. The fuel bill is clear, and the cost of maintenance and repair—but it is a rare driver who knows her or his monthly insurance cost per car (especially if that person has multiple vehicles in the driveway), and we suspect almost no one knows the monthly depreciation cost. Thus customers who perceive their car to cost \$350 a month (say, \$100 in gas, \$200 for the car's loan and \$50 in maintenance) may be shocked to see a subscription to that car running at \$700 or more (as the subscription will include depreciation at perhaps \$250 and insurance at possibly \$100). Indeed, a market research study released by General Motors showed this to be the case. Pricing was the biggest obstacle to customer consideration of a subscription:



Source: Graph from General Motors, "Consumer View of Future Automotive Market Trends" (presented at SAA, 2019); words are the author's

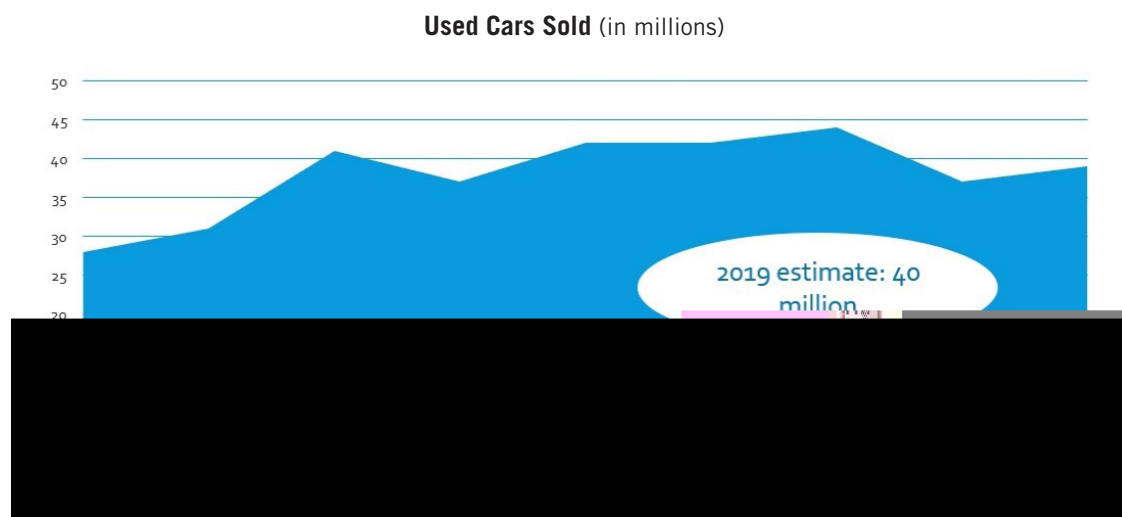
Given this, we'd estimate that the perceived high cost of a subscription (and other negative factors) may offset the major benefit of the swap feature, for the average customer. It's popular to assert that younger people "don't want to own things," but this preference (if it exists at all) may fade away if the perceived cost of ownership avoidance is so high. If our view holds true, variety-seeking wealthy drivers may be the primary segment for subscriptions. In which case subscriptions simply enter the dealer's inventory of financing options, along with outright purchase, loan financing and leasing. An interesting development, but unlikely to be a dominant or revolutionary one.

²² TechCrunch, December 2, 2019

Used Car: Solid Volumes but Some Profit Compression

As dealers saw new-car margins erode over the past years, they sensibly did what they have done before: rebalanced their portfolio of business lines to recover lost profits. One area they went after aggressively was used cars. Previously thought of as a sideline (mostly to support new-car sales by accepting used cars in trade), the used shop is now a major focus for active dealers. Many dealers sought to boost used volumes, aiming for a 1:1 ratio with new-unit sales. And indeed chains such as Penske and McLarty are *above* 1:1; others have gone further and bolted onto their core business lines modern used-car operations, including Sonic with its Echo Park stores, Lithia with its partnership with used-car online retailer Shift, and AutoNation with its stand-alone AutoNation USA used-car stores.

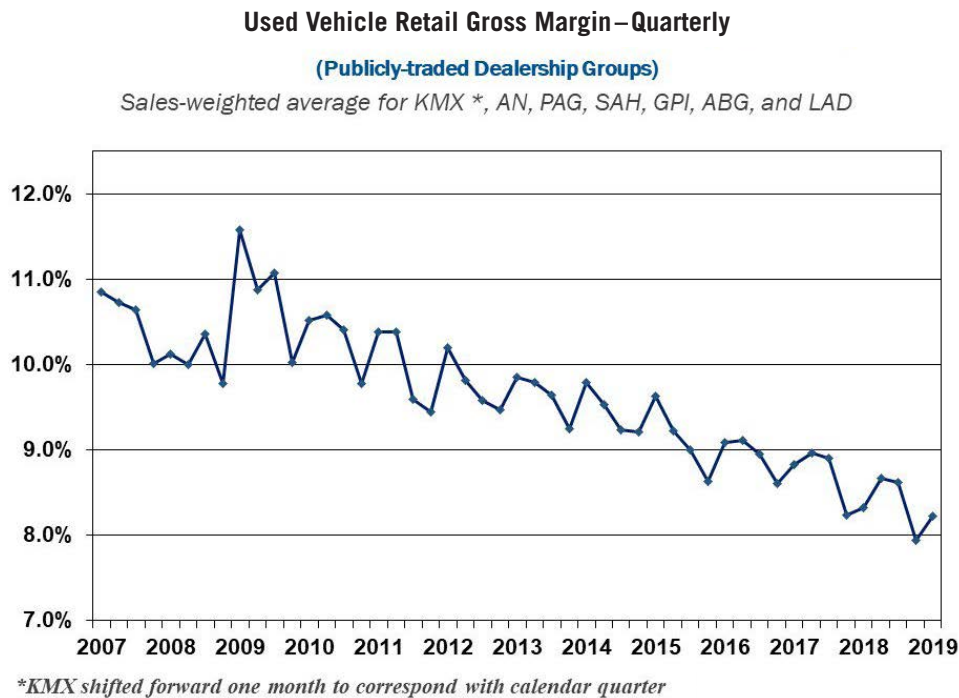
All this has become possible of because car quality has climbed and retailing a late-model used unit is no longer a high-risk transaction for both seller and buyer (as CarMax showed us all, starting back in 1993). Used-car volumes increased their lead over new-car volumes. The former are 2.5 times the latter today (but only 1.5 times greater back in 1965). And used sales tend to be less cyclical than new sales, growing at a slow but steady pace of about 1% annually since 1975 (see chart below). Finally, a used car is increasingly the first choice of most Americans, as the average age of a new-car buyer is well over 50. Many, if not most, 20-, 30- and 40-year-olds are buying used.



Source: US Bureau of Transportation Statistics, Cox Market Insights

It doesn't hurt that used-car profits are strong. They offer higher percentage grosses than new, though lower prices mean lower dollar grosses. Overall, the used-car department kicked in on average about 15% of the store's total profits in the 1980s, but about 25% today.

However, the sky is not entirely clear: Increasing price transparency, competition from inside the auto retail industry and from without (not just CarMax but Carvana and others²³), as well as “velocity” pricing (which trades margin per car for higher total profits over time, across multiple cars), are all acting to push margins down:



Source: Manheim Consulting/Cox

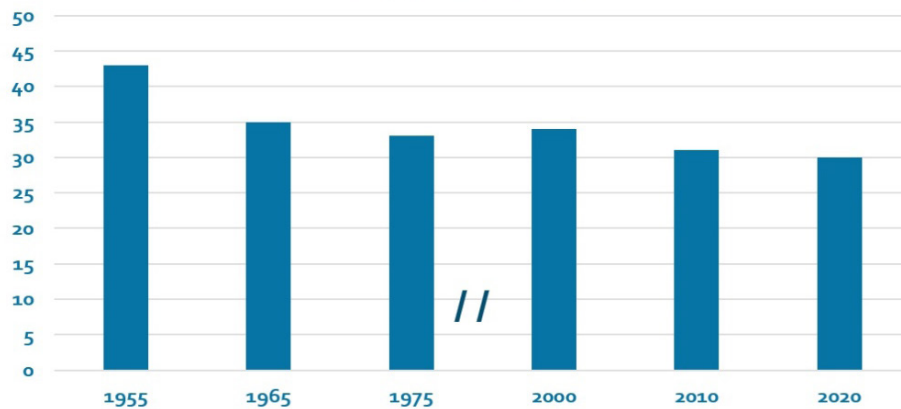
And a major challenge for growing this business is sourcing, as everyone is trying to buy the same good used cars. Increasingly, to acquire inventory dealers must go beyond dealer swaps, trade-ins and auctions, to buying directly from owners. CarMax pioneered this practice years back, and now in some years will source as much as 40%-50% of its inventory from individuals.

Service: Sales and Profits Steady, with Significant Revenue Upside Possible

The American maintenance and repair market is at least \$400 billion in size, and grows at a slow but stable rate, essentially having gained 3%-4% annually for a very long time now, fueled by the some 275 million light-duty vehicles on the road today. And over time, this service business has become more important to dealers (especially as new-car margins shrank): In the 1980s “fixed operations” contributed about 15% of total store gross, in the 1990s some 25%, and today over 45% (based on NADA data). But even with this growing contribution to the P&L of any one store, dealers as a group have lost market share in service to the independent aftermarket. The share that dealers take today is about 30%, down from the “glory days” of 1960s, when it was about 45%, though the share has been stable in recent years.

²³ We do not want to overstate the impact of new entrants in this market, despite the amount of press attention they garner. New entrants’ share is not yet major; even CarMax asserts it has only 4.5% market share of one- to 10-year-old vehicles in the markets it is in. And many of the new kids on the block have underwhelmed: Beepi and Carlypo were bought out, and Carvana is both not yet profitable and well below 1% of the national market. But these companies do serve to raise customer expectations across the board, so dealers need to up their game today or lose business tomorrow. Finally, one cannot ever count out independent used-car dealerships, which collectively sell about as many used units as do franchised stores. Depending on how you count them, there are between 35,000 and 70,000 of these stores, and even if they do not generate sexy headlines, they are determined and persistent and are found in virtually every community in America.

**Dealers % Share of Total Parts and Service Market
1955-2020 (est.)**

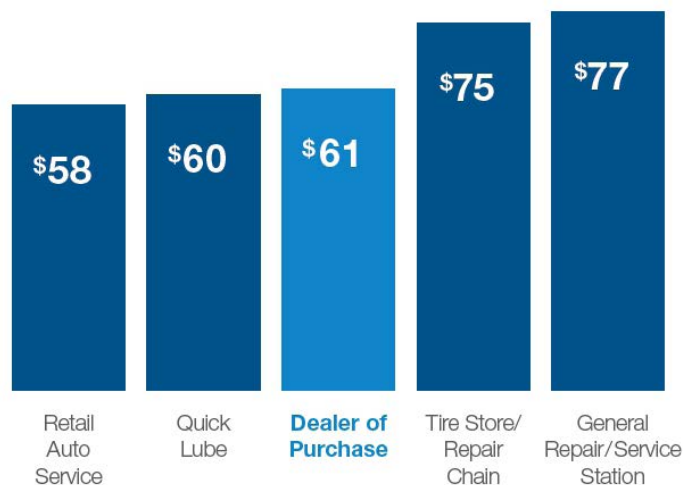


Source: NADA

The implications are both that there is enormous upside in this market (that 70% slice!), and that dealers will probably need to try something different to capture it, given the stalled state of their take. Yet growth in service will be crucial, if profits from new and used continue to be pressured. Further, if left untended, service profits also will tend to fall, as car quality continues to improve, as the fleet ages (since dealer retention on young used cars is over 80%, but only ~5% 10 years out), and as the trend to replace rather than repair parts swaps out high-margin labor for lower-margin parts.

Dealers do have a strong base on which to grow: Customer surveys show generally good satisfaction with dealer service work, increasing car complexity should favor dealers over the independent after-market,²⁴ and in many cases dealers are already fully cost-competitive with the aftermarket:

Dealers Are Offering Oil Changes at Competitive Prices



Source: Cox Service Industry Survey 2018

²⁴ But maybe not: Predictions that independent garages would fold their tents as car complexity increases have been made for decades, and have been consistently wrong. Aftermarket companies are just as tenacious as dealers!

And indeed dealers have been working hard to increase service revenue, by offering longer open hours to customers, by streamlining the appointment and service-writing processes, by setting up express lanes for light repair and more. But in our view the crucial remaining advantage the aftermarket has is that it is more convenient for customers (and recall our view that customers will only be demanding more convenience over time): Their outlets are an order of magnitude more numerous than those of dealers:

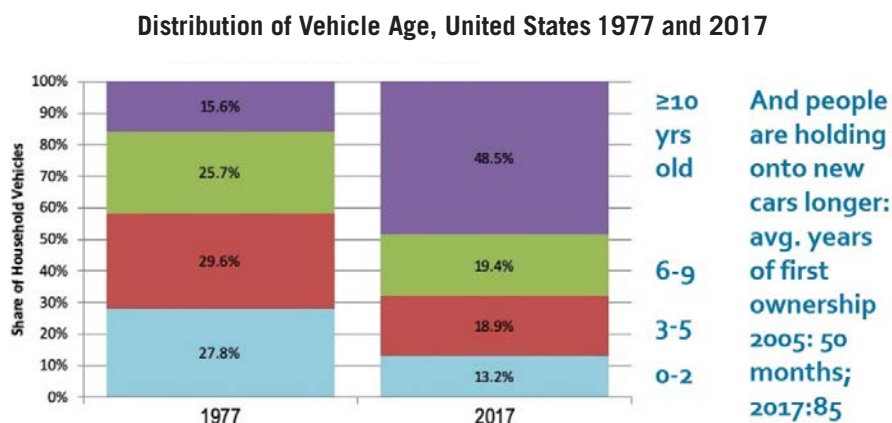
Outlet Type	Bay Count	Outlet Count
Dealers	290,000	18,000
Garages, service stations	430,000	145,000
Repair specialists (e.g. brake shops, muffler shops)	225,000	30,000
Tire stores	125,000	25,000
Other (speed shops, RV repair, C-store garages, etc.)	100,000	10,000
TOTAL	1,170,000	223,000

Source: Lang AM Annual

The Cox Service Industry Survey also supports our view, in that it shows “Not a convenient location” has moved up in the list of customers’ reasons for avoiding the dealership service department, from fifth place in 2015 to second in just three years (2018).

What can dealers do to offset this advantage? Increasingly they will need to get closer to the customer, via satellite service, mobile service, pickup and dropoff, etc. We know this will be a lot of work, but we are sure it must be done. Take as an example of an aftermarket company already active in this regard: Zohr, which comes to your driveway to change your tires. Having launched in just 2015, Zohr is now in 100 cities and is growing (see zohr.com). And of course, there are others playing the convenience angle, notably YourMechanic (yourmechanic.com) and its rivals. If dealers are to grow service revenue and profits, they will need to crack the code on convenience: Just adding more bays to the base facility will not be enough.

And dealers will have to follow the market into older cars. Newer used vehicles have been the bread-and-butter of the dealer service department for many years, but the American installed base of cars is moving away from them, as the chart shows. To maintain profitable service volumes, dealers must be moving to service older cars, despite the issues they raise (e.g., typically lower per-RO revenue, difficult repairs, etc.).



Source: NHTSA, Experian/Polk

The Special Case of Collision Repair Service: Steady... for Now

Over a third of dealers today have on-site collision repair, with the number rising higher if off-site body shops are counted. Dealers have fluctuated in their interest in body work: In the 1970s some two-thirds had on-site shops, and then around 2010 we bottomed out at about one-third, and have since recovered somewhat. (Almost all dealers, of course, participate in collision repair via wholesaling crash parts to independent body shops.) Any dealer's enthusiasm for collision work varies with the appetite for dealing with insurers, the scarcity and cost of skilled techs, the alternative use of valuable building space, and the ability to invest in ever-costlier equipment (e.g., sensor alignment machines).

The overall collision repair industry has been growing steadily for years and may even be improving in terms of profitability. Certainly, increasing penetration of ADAS (advanced driver assistance systems) and autonomous vehicles will eventually reduce collision frequency, but in the meantime ADAS fitment is acting more to raise collision *severity* (cost to repair) rather than reduce collision *frequency*. Thus the industry continues to thrive, in terms of both revenue and gross margin—at least for now.

The following chart shows the counteracting trends. In the long term these advanced technologies will reduce the rate of collisions: On the left, IIHS²⁵ estimates how selected ADAS technologies may drive down crash frequency, while on the right AAA²⁶ shows how much more expensive ADAS-equipped cars are to repair, once the crash does occur.

²⁵ "Real-world benefits of crash avoidance technologies," IIHS, June 2019

²⁶ "New Vehicle Technologies Double Repair Bills for Minor Collisions," AAA, October 2018

Forward collision warning

- ↓ 27% Front-to-rear crashes
- ↓ 20% Front-to-rear crashes with injuries
- ↓ 9% Claim rates for damage to other vehicles
- ↓ 16% Claim rates for injuries to people in other vehicles

Forward collision warning plus autobrake

- ↓ 50% Front-to-rear crashes
- ↓ 56% Front-to-rear crashes with injuries
- ↓ 13% Claim rates for damage to other vehicles
- ↓ 23% Claim rates for injuries to people in other vehicles

Lane departure warning

- ↓ 11% Single-vehicle, sideswipe and head-on crashes
- ↓ 21% Injury crashes of the same types



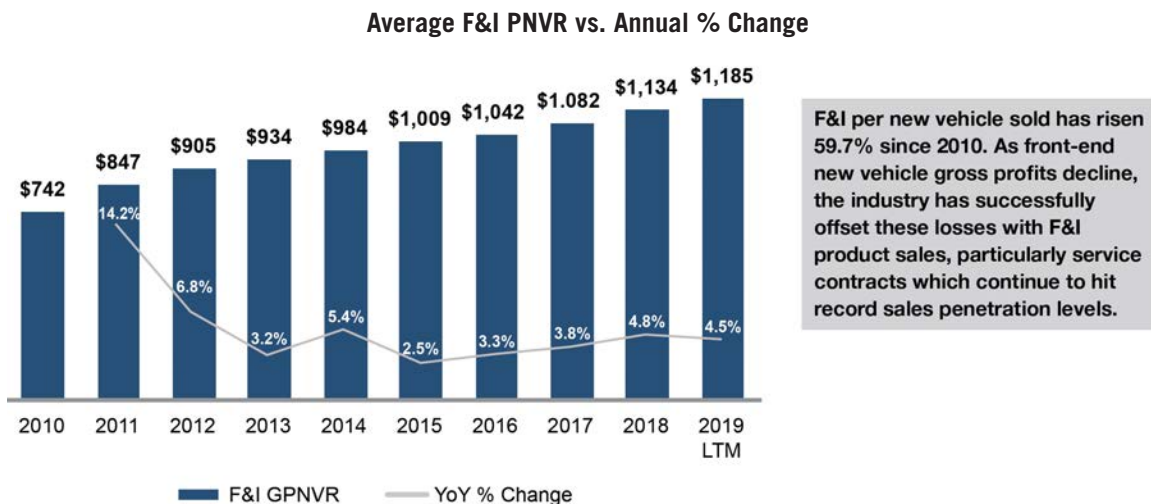
Source: See footnotes 25 and 26.

In sum, collision repair, if the dealer has the appetite for this demanding work, seems likely to offer good revenue growth for some time, but perhaps not for the longer term.

F&I: Amazing Past Gains, Future Gains May Be Under Threat

F&I (finance and insurance) revenue per new vehicle (PVNR) retailed has steadily grown over time, partly offsetting the decline in new-car gross margins. Additionally, customer satisfaction with the F&I process has only improved over time, so that it is no longer such a feared step in the purchase process. F&I, of course, consists of a mix of finance income and voluntary protection products (VPP), with the latter providing an increased share of the F&I total, as interest rates (which tend to drive finance margin) remain low. The steady—and to many, amazing—growth in F&I/car (see chart below) can be ascribed to greater dealer focus on F&I, greater professionalization of the sales process, broader use of IT tools (e.g., tablet presentations, DMS integration) and ongoing innovation in VPP offerings.

(VPP offerings now include GAP/DAP, extended warranties, prepaid maintenance, trade-in protection, credit insurance, tire and wheel, multiple appearance products, theft deterrence, key replace, PDR, windshield chip, end-of-lease protection, roadside assist and more.)



Source: Kerrigan Advisors

The growth in F&I penetration and products serves both to generate profits and to link the customer more closely to the dealership. In effect, as noted above, broad enough F&I coverage begins to act as a subscription, even if not called that. It's often funded by a lender, usually paid back over time, generally cancellable, frequently "one payment for all," etc.

However, there are issues on the horizon for F&I, whose recent rapid growth obviously cannot continue indefinitely. These issues include potentially higher (state-level) regulatory interest, greater compliance burdens and costs, challenges in the move to paperless operations, the need for ongoing IT investment, balancing the role of OEM versus third-party VPP sales, optimization of F&I marketing in a more online car purchase process,²⁷ and whether further product proliferation is optimal (e.g., due to customer confusion, and to a reduced ability to merge sales and F&I functions as F&I grows more complex, etc.).

With the increasing complexity of F&I, and the increasing magnitude of F&I dollars per car sold, we do think that it is crucial for dealers to maintain the highest possible standards, to avoid any unfortunate regulatory or legislative action. As a key step in this direction every American dealer should inform herself or himself about NADA's Model Dealership Policy for VPPs, which is available from NADA, and which will do much to ensure a dealer's continuing to thrive in the F&I world.

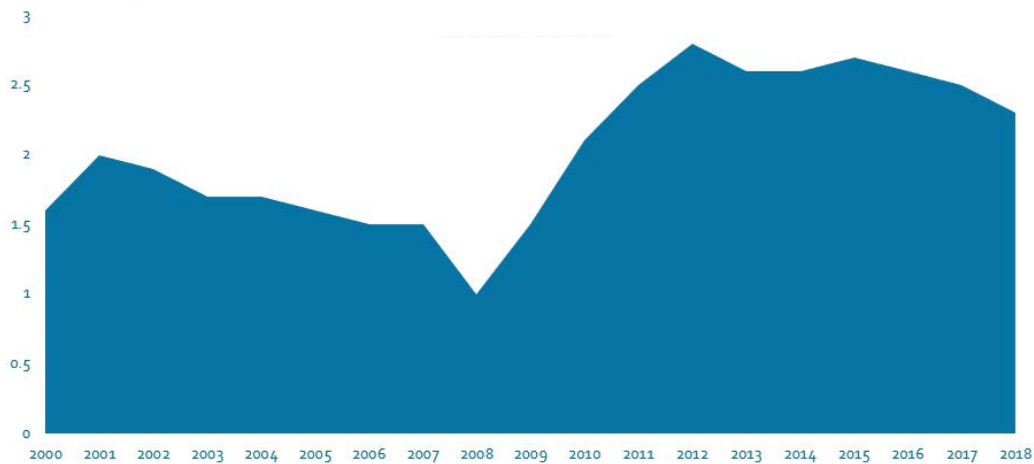
In short, F&I has been a very bright spot for dealers for over a decade. In fact, we feel compelled to disclose that we have underestimated the growth in F&I/car, consistently, for many years now. So we won't assert that the growth trend is over for now, given how wrong we have been! But it seems logical that with all this growth comes greater exposure to a backlash of one kind or another, so we urge every dealer to make sure that their F&I departments are run with the care and professionalism that their customers deserve.

Taking all the above into account, we arrive at a sum total forecast of "somewhat lower" dealer profits (as a percentage of revenues) in the late 2020s. We get there by adding up these views: New-car profits are reduced and fragile, used-car profits are good but pressured, service is strong but requiring effort to grow, collision repair is eventually threatened, and F&I is at all-time highs but perhaps exposed. To attempt a numerical answer, we'd look at the historical record and suggest that profits (here expressed as net profit before tax relative to revenue) may regress to the historical mean, and look more like 2% than the 2.5% or better of the recent recession-recovery years.²⁸

²⁷ Many dealers feel that the more online the car sales process is, the harder it is to sell F&I products, which may benefit from in-person interaction with the F&I department.

²⁸ For more support for this conclusion, see the new Auto Team America (ATA) report: *The Evolving Dealership—2030 and Beyond*. ATA is an amalgam of CPA firms and auto industry solution providers who serve thousands of auto dealers nationwide, and it is a group whose insights we greatly respect. Their detailed projections for the average dealer's P&L in 2030 are in broad alignment with our view: compressed grosses in every department (even as revenue rises), with quite a bit of this loss offset by an increase in other income. "Other income" can have many parts, but typically consists mostly of the volume bonuses, stair step programs, facility money, customer satisfaction rewards and other behavior-linked payments flowing from the OEM. The net impact on the bottom line, as grosses fall but other income rises, is fairly modest (a 10% or so decline). But ATA points out, as do we, that program cash is forever at the whim of the manufacturer, such that reliance on it makes dealer profits more precarious. We encourage every dealer to read the ATA report, which contains much useful information and analysis. See autoteamamerica.com.

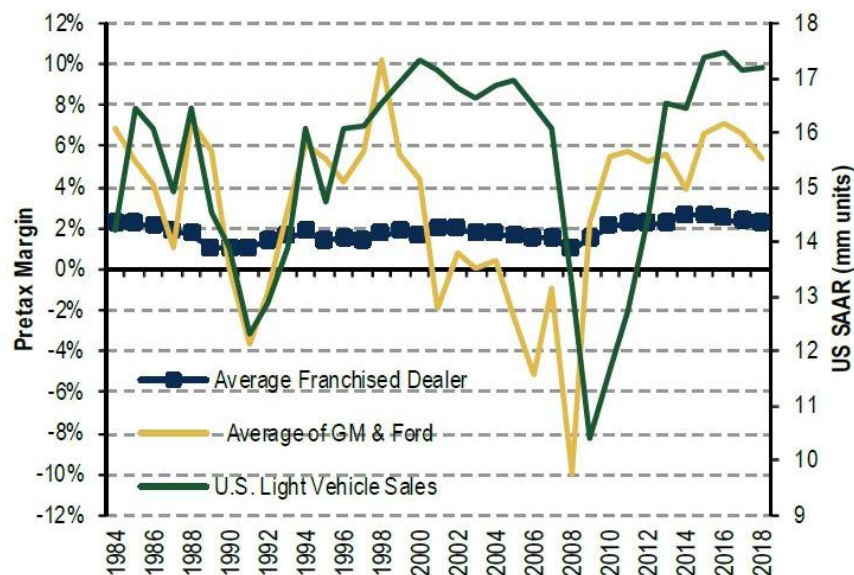
Average NADA Dealer Net PBT to Sales, Percentage 2000–2018



Source: NADA, note this data is periodically recomputed, so data by year may vary

But we are nevertheless only going so far as somewhat lower, as opposed to the views of many pundits, who argue for the collapse of dealer finances.²⁹ Bolstering our confidence is the historical fact that dealership profitability historically is highly resilient to market conditions, given the store's inherent diversification across the various lines of business. Even in the Great Recession, with new sales 70% lower than peak, the average store made money. As a recent report so clearly shows, in this chart, dealer earnings (on average) are historically rock-steady—especially when compared to the fluctuations of OEM earnings or car sales themselves:

Pre-Tax Margin of Dealers and OEMs, Compared to SAAR



Source: "Auto Dealer Manual," Bank of America Merrill Lynch, October 2019.

²⁹ In our experience, this perspective is often based on a fundamental misunderstanding of dealership economics, which equates new-car margin with total store profits, and assumes that as goes the new-car department so goes the entire store. This is obviously a flawed view.

We are not uniformly optimistic, of course. We have yet to consider the impact of ACES, which we will address in the second half of this report. But even without ACES in the picture, our interviews for this project did reveal a consensus as to which types of dealers might do worse or better in the event of a market downturn or recession. The consensus was not universal, but tended to these beliefs:

- Large chains were expected to survive, given their strong capitalization and inherent diversification across brands and regions (and even countries in some cases).
- Small, often-rural, stores should survive, as many of the weakest were closed during the Great Recession, and many of the survivors benefit from a low cost base and minimal competition.
- But midsized stores (often in suburbs ringing a city), if they are without a differentiating value proposition to use against competitors (who now come from the entire metro area, thanks to the internet's "destroying geography"), and if they are carrying a high debt burden (typically taken on for facility upgrades), may be the most exposed in a downturn.

So ... What to Do?

It is not the mission of this report to come up with strategies for dealers to follow. The purpose of the report is to outline a possible future for the entire industry, in order to help dealers themselves consider how best to succeed, each dealership devising for itself the best course of action. And further, it would be the height of arrogance for us to assume we knew better than the thousands of people who have been engaged in this industry for decades. Dealers, consultants, 20 Groups, state associations, NADA Academy and others are all engaged all the time with growing sales, improving productivity and reducing costs in the store. A survey of their best ideas would require an entire book. Nevertheless, during this project a few key operational themes emerged, which are recapped here, since various of our interviewees asked us to highlight these. Please take all these ideas as tentative, not suited for every store, and certainly not original with us!

In the New-Vehicle Department, Consider:

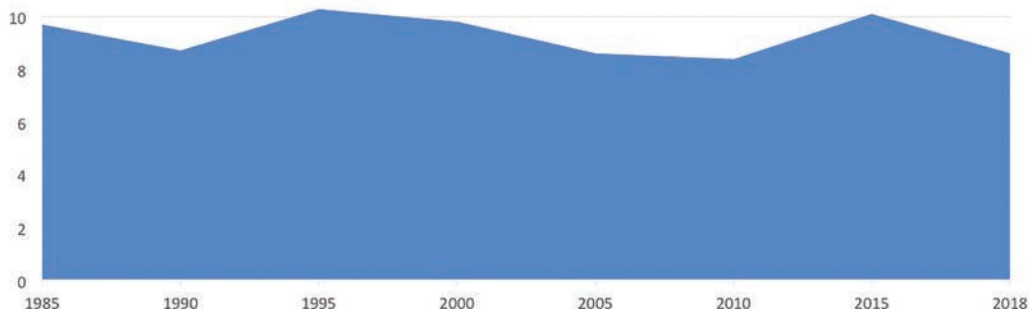
- Finally cracking the code on sales force productivity (see chart below)
- Merging new and F&I personnel
- Nailing the digital retailing process, as the new differentiator (that price once was)
- Devoting effort to optimizing OEM payments (including audit deterrence)

On sales force productivity: Despite all the training, all the pay plan ideas and all the IT tools provided, dealership salespeople have not seen any fundamental improvement in productivity (cars sold per head) since the last century. There are many excuses cited, but the numbers are in any case telling.³⁰

³⁰ When we compare car retailing against other forms of retailing, the average annual percent change in output per hour of personnel (as provided by the Bureau of Labor Statistics), between 1987 and 2010, shows car dealers at just 2% per year. Ahead of car dealers are electronics, office supplies, general retail, sporting goods, clothing, home furnishings, building supplies, books, health care, etc. Below us are only department stores (many of which have now gone out of business) and food and beverage service (since no one has figured out how to automate cooks or waiters—yet).

U.S. Dealer Sales Force Productivity Over Time

New and Used Units per Month per Head



Notes: Headcounts are from BLS NAICS code 441100, categories 41-0000 and 11-2022 (sales and sales managers); in earlier years mapped to SIC 551. Includes independent as well as franchised dealers. Units are from various sources (e.g., Manheim) and include used sales as both kinds of dealers but excluded person-to-person used sales.

Source: BLS for data, author's calculations.

In the Used-Car Department, Consider:

- Emphasizing sourcing from individuals
- Using data to optimize refurbishment spend

In the Service Department, Consider:

- Seeing that convenience will win, expanding hours, locations, pickup/dropoff, etc.
- Expanding reach into older vehicles as the car fleet continues to age
- In the body shop: growing scale as ADAS grows; investment in equipment will be crucial

In the F&I Department, Consider:

- Continuing to professionalize, streamline, standardize
- Merging sales and F&I personnel
- Preparing for any regulatory initiatives (see the NADA VPP policy initiative)
- Marketing high-VPP content as effectively a subscription

And Overall, Consider:

- Further diversifying revenue sources: rental, RV service, ATVs, etc.
- Finally rationalizing IT spend (now spread over typically 30-40 systems per store!)
- Consolidating, and moving off-site to lower-cost real estate, support operations (PDI, office, refurb, collision, etc.)

Summary of “Inside the Store”

Dealers will still have cars to sell, although not in growing numbers but certainly to more affluent buyers, at high prices. The physical store will still play a role (along with the digital store, of course), and will still be owned primarily by franchised (private) dealers, although ownership will consolidate even if store count may not. Overall profit levels should be good, if lower than today, as dealers use their natural hedge of diversified operations to offset widespread profit pressures, which will vary by department (with service offering the most upside). An implication of all this is that as sales remain flat and profit pressures high, there will be an ongoing shift from managing growth to cutting costs. If revenues do not go up much, and margin pressures remain strong, expenses must fall in order to keep the bottom line intact. The “Plateau 2020s” may be the decade of the Efficient Operator, whereas the “Boom 2010s” may have been the decade of the Best Salesperson.

Intermission: External Learnings

Before we move on to the ACES/“Outside the Store” section, we will pause here to highlight learnings from beyond the American car dealership world. It is always a good idea to try to learn from other countries and industries, so we have chosen four examples here. Each provides us with some insight into what U.S. dealers’ future may be.

Canada: Lessons About OEM Ownership³¹

The Canadian auto industry is a useful case study for us, because on the one hand its market is similar to ours, but on the other it has a different regulatory structure, so that OEMs might try out new retailing concepts there (e.g., most recently Hyundai’s new Genesis approach³²).

Many of the trends identified in this report surface as well in CADA’s (Canadian Automobile Dealers Association) own outlook report, *Driving the Road Ahead*, including an expectation of a period of growth transitioning to a plateau, a steady move to more transparent and fast customer interfaces, a consolidation of dealer ownership, etc. But in other arenas Canada is different; for example, sales are more evenly balanced between cars and trucks (versus the truck-heavy U.S. market), and regulations allow OEMs much more leeway to directly own stores. Given turmoil about this last topic here south of the border, we should highlight findings from the Canadian experience:

- While permitted by law in Canada, OEMs have been reducing their ownership over time.
- At present less than 1% of Canada sales are via factory-owned stores.
- New entrants looking at Canada seem wary of “going dealerless.”

The implication is clear: If Canada is at all a model for the U.S., OEMs may be concluding that indirect control of the distribution network is superior to direct ownership of it. This can be taken two ways: positively, in that this bodes well for the persistence of the dealership system; and negatively, in that it implies OEMs are confident they can control all important aspects of dealership behavior, much like a fast-food company can control its franchisees. These two views illustrate the two ways one can take a quote we had from an OEM executive: “I already control 95% of what dealers do; why would I buy them out just to get the last 5%?”

China: Lessons About Online Sales³³

China is a fascinating auto market in many ways, but today we will focus on how we might learn from China regarding online car sales. Given its aggressive adoption of e-commerce, China was thought to be the first country that would finally figure out how to do truly digital new-car sales.³⁴ And indeed we have a case study to examine: the Autohome experiment.

³¹ Special thanks to Chuck Seguin for his insights in this section.

³² It is our understanding that Genesis in Canada does all sales direct and online from the company. All test drives and servicing are via valet to customers’ homes. Dealers are in the loop but called “distributors” or “agencies,” and have less of a sales role than do American dealers, though they remain providers of maintenance and repair.

³³ Special thanks to Robin Zhu of Alliance Bernstein for his help with the Autohome case.

³⁴ We are discussing new-car sales here. Doing used-car sales online is much more easily done, and in fact is becoming fairly common in various countries. New sales are the more advanced challenge.

Autohome, a very successful online automotive information, lead-generation and advertising site (with current annual revenues over \$1 billion), took an aggressive run at online new-car sales, in 2015 announcing that it was going to take on physical inventory of cars, rent or build depots in various parts of China to handle the volume, and then sell cars online directly to consumers (delivering from the depots). Vehicles would be sourced in various ways, including from dealers.

Almost immediately it became clear that Autohome had gotten itself into the worst part of a dealer's business (new-car sales) without ever tapping into the much more profitable service business.

Financially, this meant its gross margin fell from around 80% in 2014 and 2015 to 60% in 2016, while operating margins and ROIC fell in proportion as well. The share price fell from around \$39 (averaging 2014 and 2015) to about \$26 in 2016, including a low of \$20.

The insurance firm Ping An (a large investor in Autohome) took over the company in 2016, killed the online direct sales business in 2017, and by 2018 profitability had returned to prior levels. The current share price is about \$75. "The experiment was an unmitigated disaster," as one observer put it.

While OEMs in China continue to run online-only sales pilots, and while surely another online player will attempt this again, the failed Autohome experiment has dampened enthusiasm for purely digital sales, as firms realize the complexities that lie behind online car sales and the profitability challenges associated with them. And Chinese customers, even with their online savvy, seem reluctant to make such a large purchase online, without, as one observer put it, "no person they can complain to if something goes wrong."

When we talk to Chinese dealership experts today, we find that in some ways China is becoming more like America than the other way around: Experiencing their first-ever decline in demand, Chinese dealers are keen to learn how to manage in a downturn (which their American colleagues have been through many times). We find Chinese dealers accordingly preoccupied with mundane operational topics such as cost control and inventory levels, with less focus on exotic new technologies or processes.

Europe: Watching OEMs Experiment with Omni-Channel³⁵

Europe is another useful case study for us, because while the market is quite different from ours (e.g., more vehicle inventory on consignment, smaller stores on average, quite a few OEM-owned stores³⁶), many of the OEMs active in the U.S. are based in Europe, and often bring here ideas first tried out there. We review a few below:

- Virtually every OEM in Europe is launching "omni-channel" pilots of mixed online and offline sales, and sometimes with new store formats. VW's "Future Sales Europe" plan is the most publicized of these, and is closely watched (see exhibit below). To date, true online sales are very limited, in large part because consumers realize there is almost always a better "deal to be done" at the store, so that a process started online usually at some point converts to offline.
- OEMs in Europe have made pronouncements at the headquarters level as to "no more palaces" (meaning, dealers will not be asked to invest in lavish facilities), but these intentions seem not to be adhered to in the field, where expensive stores are still being pushed.

³⁵ Special thanks to Steve Young of ICDP for his insights here.

³⁶ For example, in the U.K., Ford's owned retail network, TrustFord, operates 65 stores, making it the largest national dealer chain Ford owns anywhere.

- Both OEMs and dealers in Europe are talking a great deal about “owning customer data,” but it is very unclear anyone knows what to do with it once they have it.

It may be worthwhile to go a bit deeper into the VW “Future Sales Model” (FSM), as this OEM has been more forthcoming, in some detail, as to what it sees for the future of car retailing, summarized here:



Source: VW October 16, 2018, press conference release

The FSM is part of the VW's Transform 2025+ initiative, which more broadly includes a shift towards CUV/ SUVs, EVs, mobility service initiatives, etc. The FSM is intended to completely modernize the VW retailing process, in response to changing technologies and evolving customer needs. Key features of the model include (as excerpted from VW press releases):

- VW will digitally connect directly to shoppers, customers and owners via the VW ID program, where each of these will be specifically identified and tracked. (One does wonder how well this will go down with consumers concerned about data privacy, in Europe or anywhere else!)
- Purely online sales will be enabled, but penetration will be slow at the outset.
- Five physical store formats will be introduced, and further, “each dealer will only need to operate one full-function facility.”
- Greater flexibility will displace top-down rigidity: “The model ... [provides] greater entrepreneurial leeway for dealers, [with] leaner structures and new, simplified standards. We will significantly reduce the minimum requirements for dealers: We will not state requirements for minimum personnel levels, for the completion of training days, etc. We will focus less on how a service is performed and more on the fact that it is performed.”
- And crucially, dealers remain core. “Dealers are and will remain a cornerstone of our business model, because they are one of the elements that guarantee the satisfaction of our customers and our long-term success. This is why such a transformation... can only be accomplished together with dealers. Our dealers were involved from the outset in shaping the new model....”

We advise American dealers to keep a close eye on VW developments in Europe, as we expect that whatever is tried out there may eventually arrive here. American dealers may take some comfort, for now at least, from the VW assertion that the dealership system remains central to this OEM's future plans.

Heavy-Duty Trucks: Service and Diversification³⁷

New-car dealers are of course not the only vehicle retailers in America: For example, there are the truck dealerships that are represented by the American Truck Dealers (ATD) division of NADA, which has some 1,800 heavy- and medium-duty dealer members. We interviewed a selection of ATD dealers for their insights about the future, since one can make an argument that where trucks are today, cars will follow tomorrow.

For example, we have truck stores' high level of service revenue (expressed as absorption rate³⁸), where truck dealers are already at absorption rates that car dealers may be moving toward. For the typical truck dealer, absorption rates may start at 110% and go up from there, whereas for the typical car dealer absorption hardly ever tops 90%. There are debates as to why truck stores are so high in this regard (e.g., because uptime is more crucial to a commercial truck owner than to a car driver, or because trucks are run so hard that they consume more service per unit of time, etc.). But the key point is that car dealers can take some comfort in how truck dealers can thrive in a world where new margins are even lower than for cars (more like 4%-4.5% than 5.5%-6%), in part by running high volumes of service business.

Car dealers and truck dealers share some aspects of the future in other areas as well. For example, truck dealers are also more focused than ever before on used-truck sales (with their higher margins)—especially as used trucks become the default option for owner-operators (in parallel with used cars becoming the default option for the average American driver). And oddly enough, a loss in cars may be a gain in trucks: There is some evidence (see the “Mobility Services” section) that the usage of cars for shopping trips is declining as home delivery of goods soars—which translates into a surge in sales of light- and medium-duty delivery trucks.

There may be some less cheerful insights from trucks regarding car subscriptions (discussed earlier). To the extent increasingly popular comprehensive truck leases can be viewed like subscriptions (bundling the truck price, maintenance, financing, etc.), the news for car dealers if their subscriptions parallel the truck model is not so sunny. In this model it is likely for the OEM to handle all F&I itself (thus removing a dealer profit source), and to reimburse all the bundled maintenance and repair service to the dealer as if it were warranty work (thus likely trimming dealers' service profitability).

A last learning from truck to car dealers may fall in the realm of revenue diversification. While we have no quantified data on this, we informally observe that truck dealers often take diversification to levels beyond those of car dealers (who already have at least four shops and often five, if there is collision repair). If the future is uncertain, it pays to have more irons in the fire, to insulate against a downturn in any one area. And truck dealers such as Rush Truck Centers show just how far this can be taken:

³⁷ Thanks for help with this section to the various ATD members who agreed to be interviewed.

³⁸ Which can be defined in various ways, but usually as “gross profit from the ‘fixed’ shops (parts, service, body) divided by dealership overhead expense (not including expenses attributable to the ‘variable’ revenue shop, car sales).”

Rush Truck Centers Lines of Business

Rush Truck Centers
 Rush Bus Centers
 Rush Refuse Systems
 Rush Crane Systems
 Rush Towing Systems
 Rush Truck Leasing
 Rush Truck Insurance Services
 Rig Tough Truck Parts
 House of Trucks
 Momentum Fuel Technologies
 Custom Vehicle Solutions
 Perfection Truck Parts & Equipment
 Chrome Country
 World Wide Tires



Source: Rush Truck Centers

Not every car dealer should or even could take all this on, but the message is clear: A progressive dealer can find any number of ways to further leverage her or his business's footprint.

External Learnings Summary

Generally we take positive insights from our tour of these other four industry sectors:

- **From Canada:** There is probably little need to fear active forward integration into retail from incumbent OEMs (although dealers should of course monitor this area closely!).
- **From China:** Pure-play “digital interlopers” promoting a completely online sales process have a long row to hoe, and may not play a major role for some time (again, to be monitored!).
- **From Europe:** We should expect to see here in the U.S. increasing numbers of “omnichannel” experiments by OEMs, and be sure to see just how dealers fit in with these.
- **From heavy-duty truck:** A future more reliant on fixed operations can be profitable, and more diversification of business lines can be sensible.

Section II: Outside the Store

In this section we now add back in the four topics set aside in the first part, and then reassess the outlook for franchised new-car dealers (especially in terms of revenues and profits). Note, as stated earlier, that in discussing these so-called ACES topics, we will focus only on the *implications for dealers*, leaving aside broader questions about the impact on society, OEMs, cities, traffic, etc.

Taking the four in turn, from lowest to highest potential dealer impact, we will discuss:

CC—connected cars

EV—electric vehicles

AV—autonomous vehicles

MS—(“shared”) mobility services

Before we begin, the reader should know we are not Luddites. In all four of these fields we see progress—steady in the case of the first three, and much less steady in the case of the last. Connected cars we see as an inevitability, and soon; electrification³⁹ of the American fleet is unavoidable, if only so that OEMs can meet emissions regulations; every year more and more new cars sold here have more and more autonomous-driving features; and the amount of innovation (and funding) flowing into new mobility concepts is astonishing.⁴⁰ The debate many observers, analysts, consultants, pundits and academics will have with our perspective is over the rate of change, not over the fact of change itself. While we completely agree that CC will move very quickly, in EV, AV and MS we project slower inroads than do many others. In the following sections we will lay out our views on each.

Connected Car

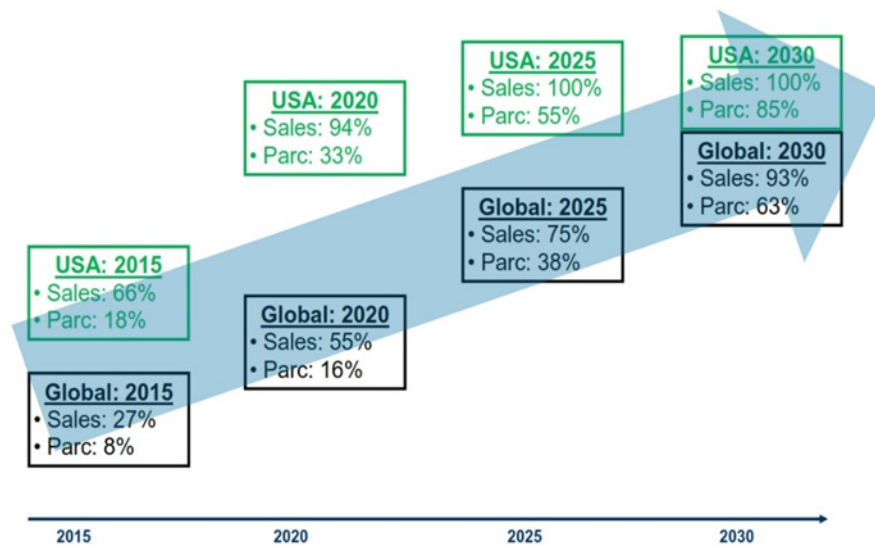
The definition of CC we use is this: A connected car is one that can communicate bidirectionally with other systems outside of the car, allowing the car to share communications access, and hence data (e.g., audio streams, car diagnostics, phone calls, location) with other devices and entities both inside and outside the vehicle.

Our prior forecast for the penetration of CC into new cars is unchanged for this edition: CC will penetrate very rapidly, soaring from perhaps 50% of new-car sales today, to effectively 100% by 2025. This should happen because it only requires installation of known, proven technologies that are easy to add to the car at fairly low cost, and for which there is high customer demand (e.g., to stream videos in the back seat). The chart below echoes our view:

³⁹ Defined as penetration of regular hybrids (HEV), plug-in hybrids (PHEV) and battery electrics (BEV).

⁴⁰ A key point: Predicting the future of CC, EV and AV is mostly about forecasting the pace of technological change. Predicting the future of MS is more about forecasting how human behavior might change. That is an entirely different realm, and we would argue is inherently more difficult to project, given that it brings into play the relative irrationality of human behavior.

Actual and Projected Penetration of Car Connectivity, U.S. and Globally

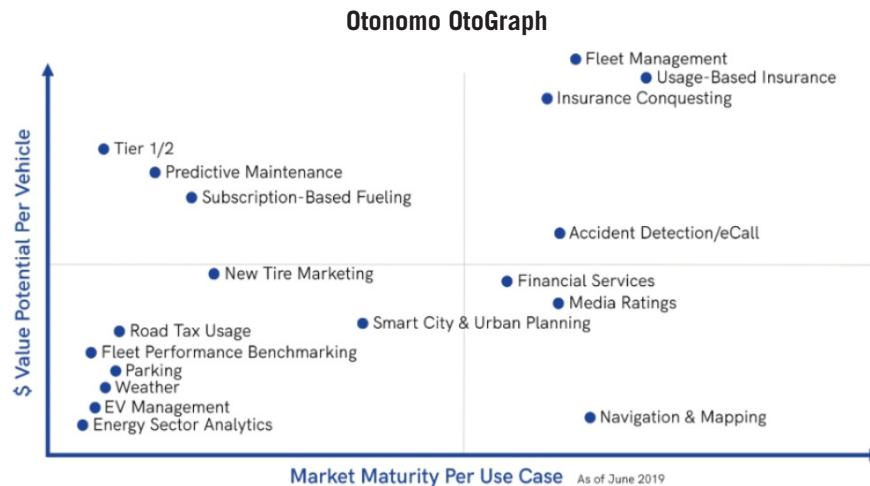


Source: IHS Markit

While rapid penetration seems certain, the business model for car connectivity seems much less so. It seems to us there are many issues with the hope that CC will generate high profits. Just because the car generates a lot of data, does not mean that it is valuable data. Issues with monetization include:

- CC services may be highly redundant to the phone (what can the car tell us about customers' needs and wants that their phones do not already tell us?).
- These services' value may be uncertain (do cars really break down so often that frequently updated diagnostics are worth much?).
- Customer WTP (willingness to pay) may be very low (do drivers accustomed to free access to Waze expect to ever pay anything for navigation?).
- Fully unlocking CC value may require AV operation, in that generating advertising revenues from drivers may only be possible if they can take their eyes off the road and direct them to screens.

We do see two likely sources of significant CC value: UBI (usage-based insurance) and fleet telematics. UBI (e.g., Progressive Insurance's Snapshot) seems a winning proposition, since it can enable drivers to lower their premiums (currently averaging over \$1,000 annually per car). And telematics can generate value for fleet managers by allowing them to optimize the usage and location of all the cars they have on the road. Other applications seem to us much more problematic, although the hype around them is very energetic. This chart highlights the monetization challenge, although we are less optimistic than Otonomo is:



Our view of the overall success of CC does not matter, however, since the real question for the purposes of this report is to understand just the impact of growing car connectivity on dealers. Our assessment is that this impact will be modest, mixed and generally positive. The primary positive of CC for dealers is that it can tie the vehicle closer to the store for service work, as these examples show:

More pings

Lexus' Service Connect program gives dealers and owners real-time information on Internet-connected vehicles' problems and service needs. Here's how the program affects Tom Wood Lexus in Indianapolis.

- 9 months ago, the service department got 7 to 9 service alerts daily from the program. Today, it's about 20 "pings."
- Almost 90% of alerts result in a service appointment, with a corresponding increase in service revenue.
- In January, the dealership assigned a full-time staffer to monitor the alerts, and probably will assign a second one next year.

Source: Tom Wood Lexus

"Whether your engine temperature is sky rocketing or you are too busy running around and can't recall if it's time for an oil change, FordPass will alert you to concerns with your vehicle. You will even be told the severity of the issue along with the steps to resolve it. FordPass will provide access to Roadside Assistance or online appointment scheduling with your dealer, making it easy to take action and have peace of mind."



- AUTOMATIC DIAGNOSTIC TROUBLE CODE ALERTS
- MAINTENANCE ALERTS
- VEHICLE HEALTH REPORT
- RECALL ADVISOR
- VEHICLE WEB DIAGNOSTICS



Source: Lexus via AN *Fixed Ops Journal*, BlueLink from Hyundai, Ford

On the other hand, CC-enabled OTA (over-the-air) updates may conceivably siphon off some service revenue. One way this can happen is if service can be done remotely, while the car is in the owner's driveway (rather than at the dealership). However, it is our estimation that 90% of the service work the dealer does now cannot be done OTA (e.g., tire rotation, suspension adjustment). Most of what is done OTA today seems to be updates of the infotainment system, which is not a significant revenue source for a dealer anyway. As the car becomes more software-driven, more of its maintenance may indeed lie in software, but it is hard to see how this displaces much physical service work (as opposed to adding incremental new digital work). Another way OTA can negatively affect dealers is, if the car no longer needs to come to the dealership for software changes (e.g., ECU reflashes), then there are fewer opportunities for dealer personnel to meet and interact with the customer, to build relationships and also market needed services and products.

In sum, we see relatively minimal—though net positive—impact of CC in the next five or 10 years on dealer economics, with a potential upside of closer linkage to the service bays perhaps being partially offset by some of the downsides of OTA updates. Again, the broader CC industry (e.g., of collecting and selling traffic data, or of offering variably priced insurance) may be both very large and very active, but most of this activity will take place outside the purview of the dealer.

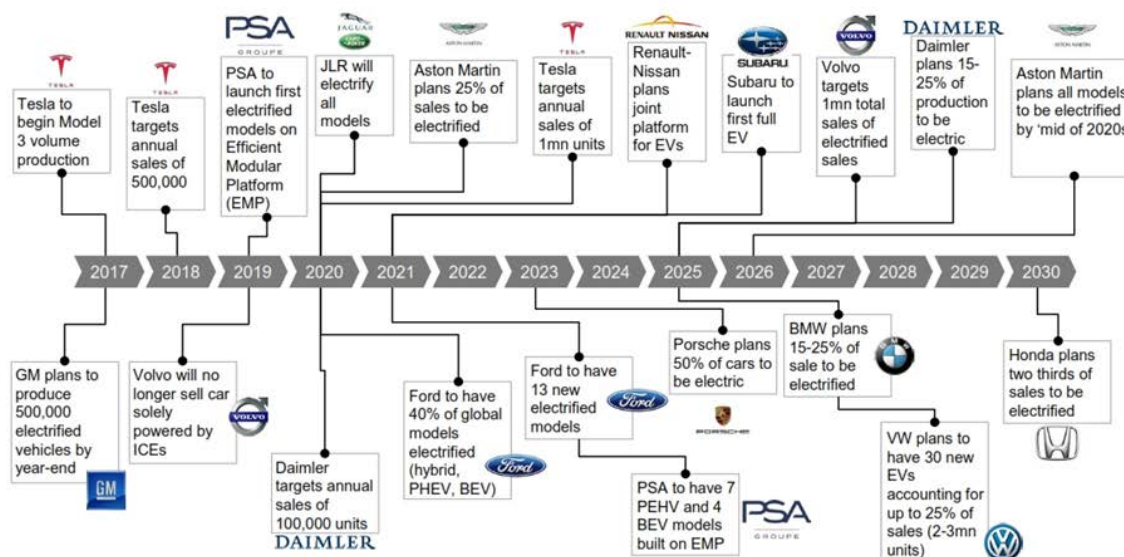
Electric Vehicles

To begin, the definition of an “EV” has shifted a bit in recent years. Previously, most people included as “EVs” both plug-in hybrids (PHEVs) such as the Chevy Volt, and battery-only vehicles (BEVs) such as the Bolt. Confusingly, these two types were sometimes lumped together as “plug-ins” (PEVs). As in the U.S. PHEVs have receded from the scene a bit (this is not the case elsewhere, such as in Europe), EV has shifted to mean only BEV. We will in this section mostly adhere to this BEV-only definition.

Our forecast is for EVs to steadily increase their penetration of new-car sales in the U.S., from about 2% today to about 6% in 2025, and possibly 8% by the late 2020s. We have increased our forecast slightly since early 2017 (it was then 5% for 2025), primarily due to the acceleration of VW’s electrification strategy, in the wake of “Dieselgate.” Our numbers are more or less broadly in line with those of industry forecasters (such as LMC or IHS), and generally lower than those of out-of-industry forecasters (such as environmental organizations or academics), primarily because we are less optimistic about the growth of EV *demand* in the U.S. (We share most forecasters’ optimism regarding *supply*.)

On the supply side the picture is very positive. We won’t go into the details covered exhaustively in many other places, but with battery costs falling, charge points multiplying, new EV launches accelerating and performance improving (in terms of both range and acceleration), we are almost certain to see a flood of EV supply coming to America in the next few years. This chart makes that clear:

Selected Announced EV Launches by Various OEMs

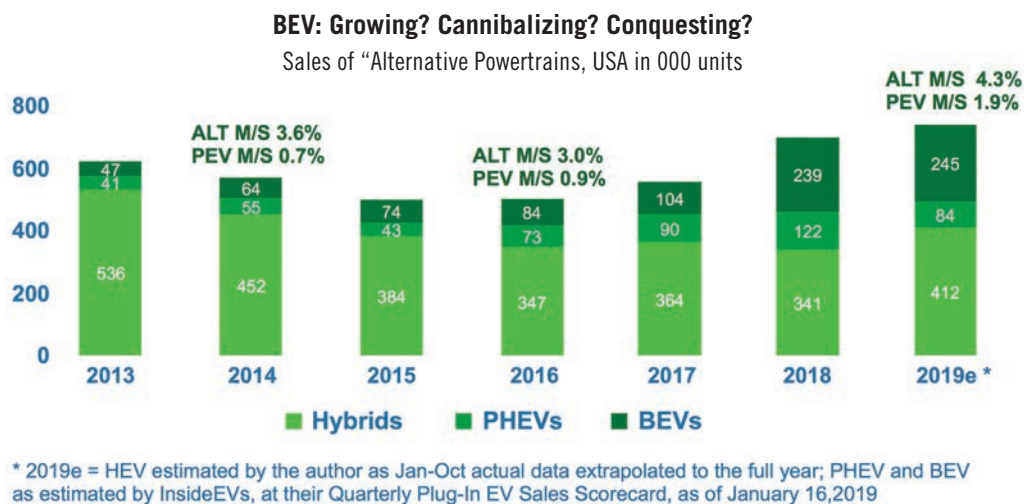


Source: BMI Research, FEV

There are any number of reasons for this tsunami of EV programs: the need to electrify the fleet to meet EPA/NHTSA emissions/MPG targets, a belief that the days of ICE are numbered and that one should start the move to EV now, a perception among German OEMs, in particular, that EV conversion will wipe away the effects of Dieselgate, a sense that going electric is good PR—or maybe just “FOMO.” In any case, these vehicles are coming and, as there is not much debate about that, we will spend no further time on the supply side.

It is the demand picture that is cloudier. For Americans, EVs are steadily moving out of their niche markets (buyers focused on “green” products, status buyers, buyers seeking HOV lane access, etc.) into the mainstream—but not very rapidly. And indeed, we’ve undershot most projections of EV sales before. When gasoline was \$4 per gallon across America, one OEM predicted it would have half a million EVs on the road by two years ago (2017), a target it has not yet hit. Another wanted to sell 1 million EVs by 2016, but it is only now closing in on 500,000 units globally. Of course, on the other hand we have Tesla, which has exceeded the expectations of many, but even Tesla has seen recent softness in revenue in the U.S. (though not globally).⁴¹

The chart below shows the problem, and suggests one of the causes—but we will discuss several more.



Source: EV-Volumes.com, Auto Alliance, Alliance Bernstein

Demand Issue 1: Cannibalization or Conquest?

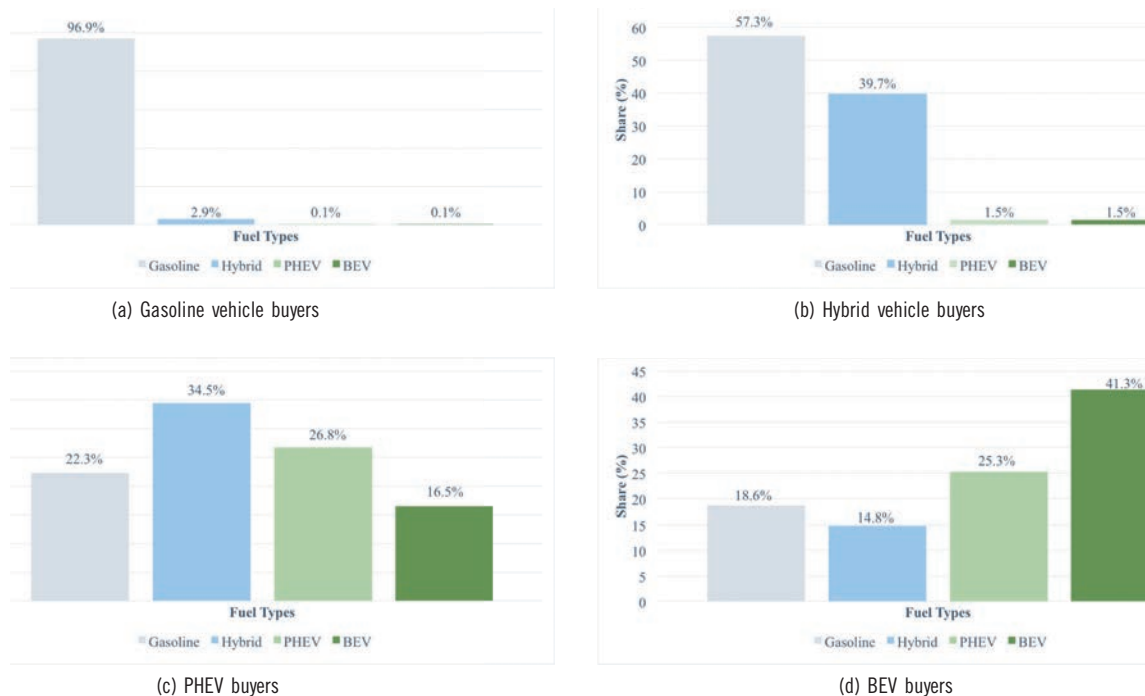
If we look at total “alternative” powertrain (HEV+PHEV+BEV) light-duty sales in the U.S. in recent years, we see very slow total growth, expressed either in units or in market share. Fundamentally, what seems to be happening is that EV is growing, but *primarily at the expense of HEV* (regular hybrids, such as Prius). BEVs are cannibalizing HEV more than they are conquering ICE.

We expect this situation to change (remember, we are predicting a *tripling* of market share!), but to the extent this pattern continues, it implies there is—to date—a relatively small hard core of “green” buyers in the U.S., and a much larger chunk of buyers not at all interested in any alt-fuel vehicle.

⁴¹ From the company’s SEC filings: Revenue for the first nine months of 2019 was lower than for the same period in 2018, though unit sales were up.

This next chart is a bit technical, but shows the problem in another way. If we look at the lower right, showing BEV buyers, we find about 60% of them would be willing to consider other powertrain types (ICE, HEV, PHEV) if they could not get their first choice of car. But if we look at the upper left, showing ICE buyers, less than 1% of those buyers would have as their second choice any kind of EV (PHEV+BEV). Currently, ICE buyers are just *not in the market for BEVs*. This we expect to change, but there is a long way to go.

Consumer Second Choices by Fuel Type



Source: "What Does an Electric Vehicle Replace?," B. Leard, S. Li and J. Xing

As Cox Automotive research shows, Americans believe EVs are coming—just *not for Americans*: The company's "Evolution of Mobility: The Path to EV Adoption" study, from August of 2019, sums it up nicely: While 70% of persons surveyed said they believe there will definitely be more EVs on the road in the coming years, less than 5% admitted they were considering an EV as their next car. And that low figure had barely increased over prior years.

Demand Issue 2: The Role of Tesla

Part of the challenge here is the current intense focus of EV demand on one firm's products. To put it bluntly, without Tesla, America can hardly be said to have an EV market. As Experian data shows, through September of 2019, 77% of all EV registrations in the U.S. were Tesla's, even though over a dozen OEMs offered EVs. Certainly congratulations are due to this company, but to the extent Americans are buying a *Tesla* versus buying an *EV*, this dominance is not healthy for the overall EV market. Again, this situation will change as more models launch, but for now the imbalance is real, as it distorts Americans' view of what an EV is. And Americans do need a better understanding of EVs: An incredible finding from Cox is that when Americans are asked which brands of all-electric vehicles (that is, BEV, not HEV or PHEV) they are aware of, 81% cite Tesla (understandably), and 52% name second-place Toyota—and *Toyota does not sell a BEV in the U.S.!* This confusion with hybrids persists, making it harder for OEMs to lay out a clear case for BEVs.

Demand Issue 3: Youth Demand Has Not Yet Shown Up

One of the most astonishing data points we found in our work on EVs comes from J.D. Power, which surveyed younger buyers about “green” vehicles. We had assumed that it was an established fact that younger buyers would be more interested in EVs than older buyers, and so as they entered the car-buying market the EV share would soar. Well, again, it might soar—and again, we are predicting strong growth. But it is not an open-and-shut case that younger buyers will ride to the rescue of EV demand. As Power reports,⁴² Gen Z Americans (born after 1995) as surveyed were less interested in 2018 than in 2017 in hybrids, in plug-in hybrids and in battery-electric vehicles. HEV consideration fell by half, PHEV consideration by a third and BEV by half. Any number of factors might have caused this surprising result, and many of them might be tied to factors that could change as these persons age (e.g., to the extent younger people rent apartments rather than own homes, they may not have a home charging point). But the result remains significant, and adds to the confusion around the strength of EV demand in the U.S.

Demand Issue 4: Dependence on Subsidies

It is well-known, and well-supported by academic studies, that—on average—EV sales depend heavily on federal, state and local subsidies in order to thrive.

Norway is the poster child for state subsidies of EVs. It has the largest share in the world of new-car sales that are EV (well over 50%), but also the highest subsidies: BEV buyers pay no sales tax (25% on ICE) and no annual registration fee, and have free access to all toll roads, municipal parking and bus lanes. (Norwegians also pay about the same as Americans for electricity, but over \$7 for a gallon of gasoline.) This is a very expensive way to stimulate EV demand, and certainly not one the U.S. is likely to emulate.

And Norway is not the only example: Even China, which is leading the charge in EV production, and which provides significant encouragement to both OEMs to make them and individuals to buy them, finds it hard to generate true grassroots demand. Alliance Bernstein estimates⁴³ that of the last year’s sales of EVs in China, about one-third went to mobility service fleets (the local version of Uber, e.g.), which are “guided” by the government to favor EVs, another third to state-owned companies and government agencies, and thus only about one-third to individuals. And most of these individuals lived in large cities with license-plate quotas (designed to alleviate traffic congestion), which are loosened for consumers choosing EVs. (That is, one is much more likely to be granted a license plate in Beijing if one declares an intention to buy an EV, versus an ICE.) Put more bluntly, Bernstein cites an anonymous OEM executive: “70% of all EVs sold to date in China were sold to the government, to state-owned enterprises or to fleets strong-armed by the government.”

Closer to home, the pattern of subsidy or regulatory dependency continues. For example, in Ontario, sales of electric vehicles fell in the first half of 2019 by more than 55% from the same period in 2018, as the government slashed purchase incentives.⁴⁴

It is hard to tell just how dependent on incentives U.S. sales of EVs are, but it is not a sign of healthy demand anywhere if incentives can have such a major impact on sales. However, as EV costs and thus prices continue to come down, this problem, too, may ease.

⁴² J.D. Power Pulse survey of electric vehicle sentiment, December 2018

⁴³ “China EVs: Did China just have a ‘red pill’ moment on BEVs?,” Alliance Bernstein, October 2019

⁴⁴ Allison Jones, “Sales of Electric Vehicles Plummet in Ontario,” The Canadian Press, December 15, 2019

Demand Issue 5: The Moving Target of Fuel Economy

Years ago, when EVs first started to be talked about as possibly becoming mainstream in the U.S., one of their advantages cited was lower operating costs. And indeed, as we shall see, EVs should have lower maintenance and repair costs than ICE vehicles.

But top of mind for Americans when it comes to car operating costs is fuel cost, typically gasoline. And the savings of switching from gasoline to electricity is just not as large as it used to be.

If we go back to 1980, the average American might have been thinking about cars that got 15 miles per gallon. Driving 15,000 miles a year thus meant burning 1,000 gallons, and with gasoline at \$3 per gallon in today's prices, \$3,000 annually at the pump. Fast-forward to 2019, and an HEV (which might be what most EV considerers are driving) could be hitting 40 mpg. Hold gasoline at \$3, and the annual tab is now about \$1,100. Assume a BEV needs 0.3 kWh to go one mile, and with electricity at 15 cents/kWh, that same 15,000 miles costs about \$700. If one could have had that EV in 1980, one would have saved over \$2,000 annually in fuel costs—but today the savings is under \$500 annually.

The fact is, ICE fuel economy, especially hybridized-ICE fuel economy, has gotten better (and continues to get better), so switching to a BEV no longer offers the massive fuel savings it once did. This is another depressant for BEV demand.⁴⁵

Impact on Dealers

Adding all this up, we cautiously forecast a 6%-8% or so penetration of BEV into new-car sales in the middle and then second half of the 2020s, as an equilibrium between surging supply and lackluster demand. The impact on dealers of this is likely to be modest. On the vehicle sales side, there should be minimal disruption, as dealers will always sell what buyers want (although dealers will need to step up training efforts so that their sales force can be more knowledgeable about EVs). On the service side, EVs should be a drag on revenues and profits (as EVs require less service than ICE vehicles), but this effect will be very slow to emerge, as EVs only gradually penetrate the installed base (currently at some 275,000,000 cars). Also, any per-RO (repair order) erosion may be offset by higher service retention, if dealers can fend off aftermarket attempts to capture business that is now overwhelmingly controlled by dealerships. (That is, the aftermarket has not yet convinced consumers that they have the tools and skills necessary to work on these new kinds of vehicles.) And of course there will be some cost to play for dealers, as OEMs will require service departments to add the required new equipment. To look at a few numbers:

- BEVs do seem to require less service per mile than do ICE vehicles, thanks primarily to fewer moving parts in the motor, and less need for cooling and lubrication. Precisely how much less service is unknown in these early days: One large municipal fleet reports that its EVs run up half the annual service bills of its ICE cars; a Wall Street analyst estimates the same 50% drop; the AAA estimates the gap at about one-third cheaper for EVs (with lower mechanical costs possibly partly offset by faster tire wear, due to the heavy battery pack); and our informal talks with Nissan dealers show the EV Leaf at about 35% below the ICE Sentra in annual service cost (although some report the exact opposite, due in part to higher warranty costs, which may decrease as the technology matures).

⁴⁵ One factor that could offset this is a rise in the gasoline price. But the Energy Information Administration's U.S. gasoline price forecast is for no more than a 50 cents per gallon rise over the next decade. This could change of course (e.g., if there is war in the Middle East).

- Conversely, while hard data are missing, every dealer we have spoken to indicates very high service retention rates for EVs. As one dealer put it, “EV buyers are my most loyal service customers!” We do note, of course, that the aftermarket is not asleep: One survey we’ve seen showed that while the average independent garage is unlikely today to work on EVs (perhaps no more than one in 10 have touched a BEV), three-quarters of the garages that *have* worked on EVs report that their EV business is steadily growing. Steps dealers can take to slow this erosion include marketing prepaid EV service plans, aggressively promoting the dealership’s ownership of specialized EV tools, and hiring specially trained EV techs.

In sum, the steady if possibly slow rise of EVs (especially BEVs) should have only a modest impact on dealers over the next five or seven years or so. Stores will have to gear up for the vehicles’ unique selling challenges (e.g., training salespeople to talk about charging points as well as about cars). Dealers will also have to prepare to do more EV service, working hard to keep retention up, as RO levels may go down. This challenge is not new for dealers, who have had to manage declining warranty work for years, as car quality (whether EV, ICE or any other powertrain) has improved. But we do urge action in advance of much sales or service growth in order to ensure customer loyalty to the store (versus to the independent aftermarket): BEV service volume is the dealer’s business to lose.

Autonomous Vehicles

Autonomous vehicles are not consistently defined, but at the broadest level one can say an AV is capable of sensing its environment, and then moving with reduced human input. Under this definition every modern car is *already* partially autonomous. For example, as anti-lock brake systems (which are found on all new cars) can sense tire slippage under braking, and take over some of the braking function in an emergency situation, then the car is partly autonomous for the brief period the ABS is active. (ABS senses its environment and acts with no particular human input.) So what we are really talking about is not whether cars will be autonomous at all, but what level of autonomy cars will achieve in the coming years. There are various schemes for measuring these levels, but we’ll boil them all down to two simple choices. In this report, a low-level (LL) AV has minimal abilities (e.g., automated cruise control, lane departure warning, etc.), and a high-level (HL) AV has maximal abilities (e.g., the driver can doze off while the car takes him or her to the next destination).

The debate about how quickly AVs will arrive on our roads is really about HL cars, as LL cars are rapidly proliferating even now. **Our forecast is for very rapid growth in LL applications, such that 100% of new- car sales in 2025 could be called low-level autonomous-capable.** We are confident of this forecast because the car industry was working towards this on its own long before new players such as Google/Waymo appeared. The goal of both groups of players (incumbent OEMs and new firms) was primarily safety: to use technology to avert some or most of the millions of crashes that occur on our roads annually, and their associated high costs in lives, injuries and property damage.

The difference between our current trajectory and the former incremental pace was that in the prior period autonomy was a *result*, and now it is a *goal*. In the 1990s and 2000s, OEMs kept adding new LL features (typically referred to as ADAS—advanced driver assistance systems) one by one. To ABS was added traction control, then ESC (electronic stability control), then perhaps BA (braking assist) and so on. At some point, if one thought about it, the layers of ADAS would be so numerous that the car would effectively be fully autonomous.

But the arrival of Google and other “disrupters” changed the trajectory, as these new firms saw autonomy as the *goal*, not as just something that would happen along the path of incremental ADAS improvement. Their belief was that as LL functions proliferated, they would not reduce the rate of collisions rapidly, since leaving humans mostly in control would mean allowing bad human behaviors (inattention, drowsiness, etc.) to continue. The new HL-focused firms believed that only total robotic control would save us from ourselves: Full autonomy would become the Holy Grail.

So how has the quest for HL autonomy been working out? First, no one can really agree on how quickly HL autonomy will arrive, as can be seen in the assorted forecasts below: There is just too much uncertainty about technologies, regulations, consumer acceptance, geographical variation and more.



Sources: various, as cited

What we can say is that, since our first report, virtually all of these HL AV forecasts have been scaled back, as the next chart shows. **And indeed, we have scaled back our own forecast, trimming HL AV penetration into new sales in the U.S. in 2025 from 10% to 5%.**

“It’s time to lower expectations about autonomous vehicles.” Danny Shapiro, Nvidia. The Information, 1/1/2019

“Level 4/5 will have no more than 1% of global sales penetration by 2025.” Veoneer CEO, Jan Carlson, February 2019

“Revenues from autonomous driving will not ramp up until 2030 and beyond. Until 2030, the market will be driven mainly by assistance systems.” Chief Executive of supplier Conti, Elmar Degenhart, May 2019

Uber CEO Dara Khosrowshahi: **“The future of mobility is electric and autonomous, but the arrival of driverless robotaxis will be quite a few years beyond 2020.”** (May 10, 2019)

“I’ve got some bad news for everybody: While you might be able to get groceries delivered to you by a slow-speed robot, you are still not going to be able to call a car on your phone and jump in the backseat and have it take you to Las Vegas. Driverless cars are still very, very immature technologies. I think there’s a ridiculous amount of technological illiteracy running amok.” Missy Cummings, Director, Humans and Autonomy Lab, Duke University (various interviews late 2018)

MIT’s Bryan Reimer: **“The timeline has further elongated from 2018, for AVs at scale. Deploying a couple of thousand AVs at a few hundred millions of \$ of losses is not ‘at scale’. Profits from large-scale AV fleets could be decades away.”**

“The hype around driverless cars came crashing down in 2018.” T. Lee, Ars Technica, 12/30/18

Anne Widera (ex-Waymo): **“We are becoming more realistic re large volumes of L4/5...mid-2020s at the earliest. We need software that is capable, cars that are scalable, hardware that is cheap, and we are quite a few years away from all these.”**

Sources: various, as cited

Perhaps most astonishingly, Chris Urmson, CEO of AV firm Aurora and arguably the most experienced AV developer in the U.S., recently was quoted in *Forbes* (October 29, 2019) as saying there will be hundreds or maybe thousands of self-driving vehicles on the road within five years. “Hundreds or thousands” by 2024 is a remarkable retreat from an authority who as recently as 2015 expressed hope that his son would not even need a driver’s license when he became eligible for one in 2019, as there would be AVs generally available.⁴⁶

Why have ambitions been scaled back? The quotes tell the story, but we’ll highlight three key issues.

First, the technological challenge proved harder than expected. The assumption had been that humans were very bad drivers, given between 35,000 and 40,000 persons were killed on our roads annually⁴⁷—and this level of fatalities is indeed tragic. But from another perspective, humans are very good drivers, with fatalities occurring only once in some 100,000,000 miles (just take total miles driven in the U.S., over 3 trillion annually, and divide it by the annual fatality rate). It is hard to beat, even with the best sensors, processors and software, a “failure rate” of one in 100 million. As Sacha Arnoud of Waymo has said, in AVs “when you’re 90% done, you still have 90% to go: The first 90% of the technology takes 10% of the time.”⁴⁸

Second, and related to the first point, the cost of developing an HL AV has proven higher than expected. It’s not just a matter of sensor prices and programmer wages and computing power, which are in themselves incredibly expensive, but other factors have emerged to drive up the investment involved. AVs may need remote human monitors, to catch errors in the system—and these people must be paid. The maps most AVs rely on must be updated all the time, which costs something even if done robotically, but often humans must work behind the scenes to assist the computers in identifying objects and changes. And there are the fleet costs: AV developers may not have paid sufficient attention to mundane issues like cleaning: Will people share HL AVs if the prior occupant left crumbs on the seat, or worse? In any case, the assumption that AVs would run at very low per-mile costs has had to be revisited (more on this later).

Third, the safety argument for AVs has somewhat receded. Just as EV developers have been challenged by the moving target of improving ICE fuel economy, so HL AV developers have been challenged by the moving target of improving ADAS effectiveness. In essence, by the time HL AVs arrive on our streets, LL ADAS may have already solved much of the safety issue. These comments illustrate the phenomenon:

- “Overall [NHTSA] estimates that, together, [four Level 2 ADAS systems] ... could potentially address nearly 89% of crashes....” —NHTSA V2V Rulemaking Notice, at 3863
- “No reason to wait for AVs to save lives: Most safety benefits can be achieved with ‘safe cars,’ without full automation.” —Professor Alain Kornhauser, Princeton University
- “According to the World Health Organization, 1.35 million people died in road crashes last year. Mass adoption of AEB, LKAS and IR vision DMS⁴⁹ might reduce this death toll by over 90%, equating to a 10x improvement in human driving. How this would influence the safety debate for machine-driven robotaxis if they must be 10x safer than human drives, is unknown.” —WHO

⁴⁶ Please be assured we are not picking on Mr. Urmson, for whom we have the greatest respect: He is just one of the more quotable AV pioneers. And we do think that eventually he will be right, in that HL AVs will be available. We are just debating the pace and extent of AV penetration.

⁴⁷ The lower number is from NHTSA and the higher from the National Safety Council (NSC), due to differences in counting fatalities (e.g., NHTSA registers only deaths that occur within 30 days of the crash, but NSC waits an entire year).

⁴⁸ “Driverless Cars,” by Chunka Mui, *Forbes*, February 28, 2018

⁴⁹ Automatic emergency braking, lane-keeping assistance systems, infrared vision driver monitoring systems

- “The three crash avoidance technologies [BSM, LDW, forward CW⁵⁰] could collectively prevent or reduce the severity of as many as 1,300,000 U.S. crashes a year, including 133,000 injury crashes and 10,100 fatal crashes.” —Cost and benefit estimates of partially automated vehicle collision avoidance technologies, C. D. Harper, C. T. Hendrickson, and C. Samaras, Carnegie Mellon University, 2016
- “Level 2 AVs delivers 80% of safety benefits for 20% of the cost of full automation.” —Aptiv
- As alcohol-impaired drivers are responsible for about 30% of all road fatalities in the U.S., a DMS (driver monitoring system) that could reliably detect inebriation (and lock the car down) might on its own save 10,000 lives or more. —*High-Risk Impaired Drivers: Combating a Critical Threat*, Governors Highway Safety Association, 2019

Absolutely thousands of deaths are a terrible waste, and *absolutely*, we must bring this number down, ideally to zero. But the old incremental add-ADAS trajectory may be turning out to be more effective at getting these life-saving features on the road quickly than the new “Great Leap Forward” to HL AVs.

As a result, we have seen a steady pivot of AV developments, if not *away* from safety, then *toward* convenience: self-driving robotaxis (RTs). The argument for successful RTs works like this:

- Private cars are idle 95% of the day (parked), so that they are expensively underutilized assets.
- But a taxi is highly utilized (e.g., in New York City often running 18 hours a day).
- Yet we cannot replace private cars with taxis as long as the latter have a human driver, because the wages of the driver result in a taxi cost per mile higher than that of a private car.
- So only if we can replace the driver with a computer system will the cost per mile of the resulting RT fall below that of a private car.
- And then millions of Americans will set aside car ownership, in favor of being driven around in an RT throughout their day.

If RTs can displace “only” 10% of American VMT, that is still 300 billion miles annually, and at any cents-per-mile assumption, the revenue becomes massive very quickly. Thus we see numerous firms announcing RT development initiatives, as the chart shows.

Robotaxi Development Projects

	Pursuing U.S. Urban RoboTaxi?	Pre-AV Launch Assessment							
		L4 Launch Date	L4 Test Fleet Size?	Testing in Actual U.S. Cities?	AV Headcount	Annual Spend	Purpose Built AV?	Is AV an EV?	AV Mfg. Integration
Waymo	Yes	2018-19	~800	Yes, Phoenix	<1k	Unknown	Not entirely	No	2 OEM Partners
GM-Cruise		2019 (SF)	180	Yes, San Fran	~1.6k	~\$1bn	Yes	Yes	GM-Cruise
Zoox	Yes	~2020	Unclear	San Fran	>500	Unknown	Yes	Yes	Building its own
Aptiv	Yes. For customers	YE'19/early-20	~100 (~150 YE'18)	Yes, Vegas	Unknown	~\$160mln	No	No	Tier-1 to OEMs
Ford	Yes	2021 (Miami)	120	Yes, Miami	Unknown	~\$500mln	Yes	No	Ford-Argo AI
Tesla	Unlikely	2019-2020	Tesla Installed Base	Less Exposure	Unknown	Unknown	No	Yes	Tesla
FCA	Not Apparent	2021	~40 (~80 YE'18)	Not Apparent	- Intel/Mobileye etc. consortium-	---	Supplying Waymo---		FCA-Waymo
Daimler	Possible (EU 1st?)	Early next decade	Unclear	Call in 2019	-- Bosch AV co-develop--		Expected	Expected	Daimler
VW/Audi	Possible (EU 1st?)	2021 (urban)	Unclear	Not Apparent	Unknown	Unknown	Expected	Expected	VW/Audi
BMW	Possible (EU 1st?)	2021	~40 (~80 YE'18)	Not Apparent	- Intel/Mobileye etc. consortium-		Expected	Expected	BMW
Honda	Yes (GM-Cruise partner)	Unclear (ex. Cruise)	Unclear	Not Apparent	Unknown	Unknown	Yes	Yes	Honda
Nissan	Apparent (Japan 1st?)	Early-2020s	Unclear	Japan	Unknown	Unknown	Expected	Expected	Nissan
Toyota	Not Apparent	2023	Unclear	Not Apparent	Unknown	Unknown	Expected	Expected	Toyota-TRI
Zenuity	No	2021 (hwy)	100	Not Apparent	>500	Unknown			OEM customers

Source: “Car of the Future 4.0,” Citi, 1/2019

⁵⁰ Blind spot monitoring, lane departure warning, collision warning

When an AV is used as an RT, it moves into the broader world of “mobility services,” which we will address in their own separate section, next. For now we will set aside the RT and focus on LL and HL AVs just as vehicles—cars and trucks that people can buy that offer as features various autonomous functions (just as a regular car might offer features such as a larger engine or a better sound system). So, what would be the impact on dealers of near-universal installation of LL ADAS features by 2025, and some small amount of HL AVs on the market around that same time?

We think the near-term impact of AVs as defined (that is, setting aside RT applications for now) will be mildly positive for dealers, in both the service and sales arenas.

In the short term, there will be a boost to service work—first, because proliferation of complex ADAS systems will provide a new stream of service work, and, second, because even LL AVs will likely run up more miles annually (which translates into more wear and tear for service bays to deal with). In support of this view note two data points:

- In a study comparing the annual VMT of Tesla cars with and without Autopilot (an ADAS suite): “Very frequent and frequent users [of Autopilot] drive close to 15,000 miles per year, whereas semi-frequent and infrequent users drive around 10,000 miles per year. The results suggest that consumers who purchase partially automated vehicles... may travel more.”⁵¹
- And in a study where researchers attempted to mimic ownership of a self-driving car, families were given 60 hours of free chauffeur service for use within a seven-day period. Because the families no longer had to drive themselves (thanks in this case to a human, not a robotic, driver), vehicle miles traveled in the period shot up by over 80%.⁵² This of course increases the need for service.

Further, there may be a boost to sales, as some customers accelerate their purchase cycle in order to buy these newly enhanced vehicles. We might even see new incremental volume as drivers who have recently exited the marketplace (e.g., senior citizens facing cognitive issues in driving) return to the road, their confidence restored by the assistance ADAS systems offer. We might even see states offer special driver’s licenses for the elderly or disabled, contingent upon usage of a highly autonomous vehicle, much as states now require vision-impaired drivers to wear glasses or contacts.

In the longer run, robotaxis (AV-equipped mobility services fleets) come into the picture, and that outlook is much more negative for dealers, as we shall see. But before such fleets arrive, the many LL AVs and the fewer HL AVs, which should be on the road by the middle of the next decade, are likely to boost dealer fortunes, rather than detract from them.

⁵¹ “How do drivers use automation?,” by S. Hardman, J. H. Lee and G. Tal, University of California at Davis and Korea Research Institute for Human Settlements, 2019

⁵² “Projecting Travelers into a World of Self-Driving Vehicles,” by M. Harb, Y. Xiao, G. Circella and P. Mokhtarian, 2018

Mobility Services

Finally, we come to potentially the greatest challenge to the dealership system of the four “outside the store” trends: mobility services (MS).⁵³ This we believe is the hardest of the four to forecast, as the other three are essentially about technology (and technology tends to improve over time), whereas this one is as much about behavior as technology (and forecasting human behavior is as much an art as a science). We have no precise forecast for the growth of MS, for this reason and because MS includes so many disparate pieces.

These include at least ridehail (Lyft), bikeshare (Ofo), e-scooters, carshare, rideshare and integration of cars with other transport modes, such as subways. At heart, all these services adhere to the core belief that there is more money to be made in selling mobility as a service than in selling the car as a product. In this report we will focus primarily on ridehail, as this is the closest, most direct substitute for car ownership.

While we have no precise forecast for the growth of MS, to put a bet down, here is ours:

- Assuming 330 million people and 130 million households in the U.S. (Census data) today and 280 million light-duty vehicles on the road (Experian data), we have about 2.2 vehicles per household.⁵⁴
- Our guesstimate for car-based (taxi+limo+ridehail) MS growth is to increase from less than 2% of total VMT today to possibly as high as 10% by 2030. We offer no point estimate here, due to high uncertainty, but think that we are approximately in the ballpark.
- If this view is correct, that MS will continue steady but slow growth over the next decade, we’ll predict that the vehicles-per-household number will drop by about 10%, or 0.2 vehicles, to 2.0. Our projected decline is modest because other factors discussed earlier will work in the opposite direction (e.g., increased suburbanization, increased wealth per capita).
- At 360 million in total population in 2030 (Census projections), and 160 million households (assuming a decline in household size due to an aging population), at 2.0 cars per household, our 2030 fleet is 320 million. **We believe this is sufficient to let us maintain our steady-state annual new-car sales forecast at 17 million.**⁵⁵
- However, there is always the possibility that ridehail could surge to much higher levels of utilization, especially if automated low-cost-per-mile “robotaxis” could be made to work. If this happens, vehicle sales would shift dramatically from privately owned to fleet-owned, to the detriment of the dealership system as it exists today. Therefore, we see it as crucial to monitor developments in ridehail closely, and for dealers to be prepared to evolve accordingly.

To see how we came up with this forecast, which is a mixture of short-term optimism and long-term concern, we’ll discuss the MS story in three chapters: “The State of Ridehail Today,” “The Impact of Ridehail Today” and “The Impact of Ridehail Tomorrow.”

⁵³ In this report we are looking at new mobility services, as listed. We should make clear here that mobility services generically are far from new: planes, trains, rental cars, buses and more are all mobility services, and some of them have been with us for decades. If we consider only car-based MS, even Hertz, the first significant rental car company in the U.S., was founded over a century ago, in 1918.

⁵⁴ Fleet size is more closely related to household count than raw population.

⁵⁵ Another factor propping up new-car sales is MS growth itself. As we will see later in this section, the arrival of ridehail in a given city tends to increase sales of new cars, as ridehail stimulates demand for incremental new trips, rather than replacing owned-car trips with hailed-car trips one for one.

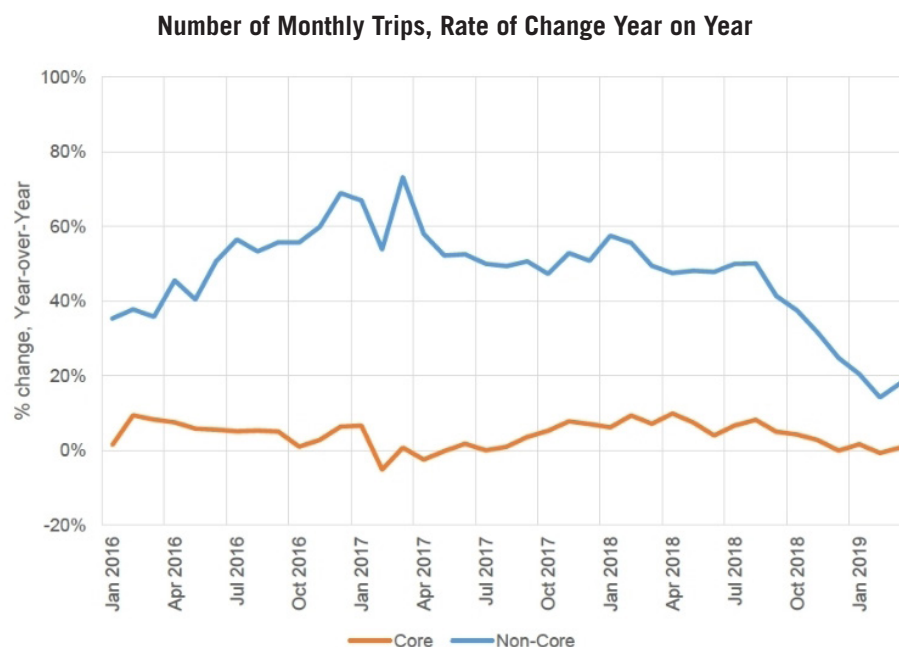
The State of Ridehail Today

To begin, ridehail today (mostly Uber and Lyft) is a story of rapid recent growth, combined with low VMT penetration, massive losses and possible demand maturation.

The rapid **growth** story is clear: The two companies have combined revenues of over \$20 billion annually (globally), though they scarcely existed a decade ago. They have captured vast swathes of market share from taxi fleets and transit systems, and generated millions of entirely new trips that might otherwise not have been taken at all. (In the process, of course, they have contributed to a dramatic rise in congestion at cities across America, congestion that is especially visible at airports.) In terms of **penetration** of the total driven VMT of America, however, they remain well under 2% (and some of that share is simply displaced taxi miles), in part because as mostly urban services their average trip tends to be very short. As for massive **losses**, it is well known that the two firms have burned through about another \$20 billion or so since they began operation, with—in our view at least—no very clear path to ever making money.⁵⁶

All this is well-known, but we'd like to also highlight something less discussed about ridehail: Its usage (in markets where it has been in action for a while) may be **maturing**, or plateauing. If this is true, ridehail as an eventual rival to private car ownership may be receding. We do not have conclusive evidence for this, but the circumstantial facts point in this direction. Let's look at a few:

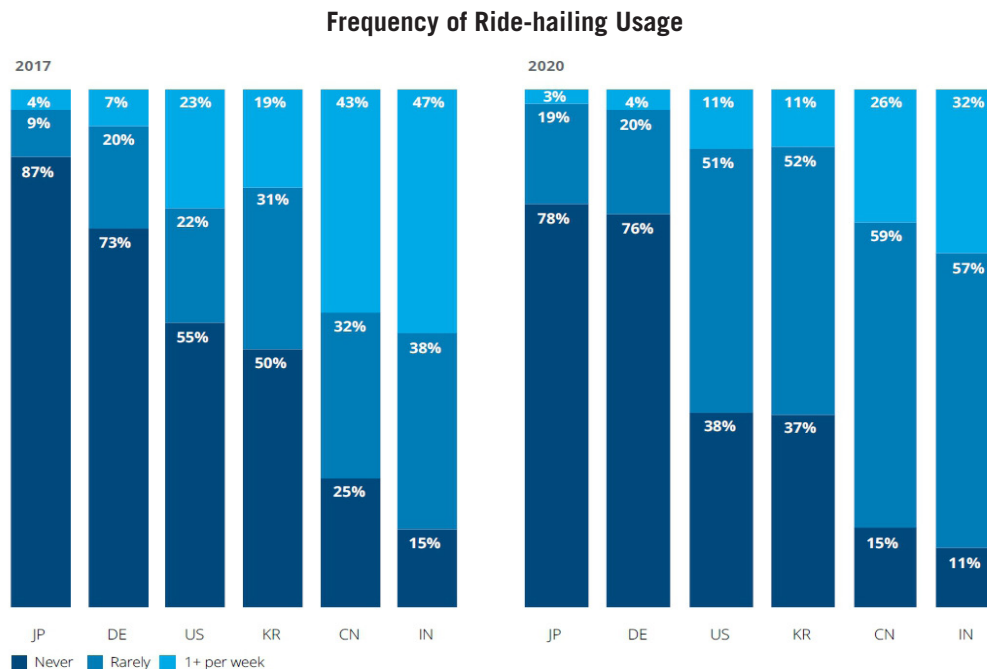
- In some major markets, ridehail usage has stopped growing. Let's take New York City for example, where ridehail usage in core areas such as Manhattan has flattened out, and where usage in “non-core” areas such as the outer boroughs is slowing:



Source: NYC Taxi & Limousine Commission, “Improving Efficiency...” report 6/2019

⁵⁶ Many others would disagree with us, of course. And note that perhaps these companies will end up making money in other ways, e.g., via food delivery.

- In various markets, even as more people are at least trying ridehail, the heavier users are actually *cutting back*, as this survey from Deloitte comparing January 2017 with January 2020 usage shows. In the U.S., the fraction of the population that uses ridehail once a week or more (a low bar for “heavy” usage) has fallen by more than half, from 23% to 11%:



Source: “2020 Global Automotive Consumer Study,” Deloitte

- And while it is risky to make comparisons across different countries, we learn that in China, which is one of the global leaders in ridehail, there is a similar moderation:

“Ride-hailing is declining in China. In recent months, data we track suggests the usage of ride-hailing apps may be declining in absolute terms. According to data from TalkingData... total daily active users (DAUs) across all ride-hailing rider apps in China declined by 6% year on year in Q3 2019. Even more worryingly, Q3 was the fifth consecutive quarter where the usage of *driver* apps had fallen—and the fourth straight where the declines had exceeded 20%. [ridehail service] Didi [the dominant player in China]... saw rider and driver app usage fall by 5% and 22% in Q3 2019.”⁵⁷

In the U.S. at least, our opinion is that this period of moderation or stagnation is part of the natural evolution of any new product or service. In the early days “taking an Uber” was novel, in many ways superior to existing taxi services, and a signifier that the user was modern and comfortable with the app-based economy. It seemed like the sky was the limit for ridehail. Over time, however, a new equilibrium started to set in:

- To the extent ridehail was cheaper than taxi, it was in part because of massive subsidization from investors, who funded the incredible cash burns of these companies. This was unsustainable, because there is no inherent cost advantage in ridehail versus taxi (both have to pay for a car,

⁵⁷ “Chinese Autos: Ride-hailing is declining in China—is this temporary, or something more serious?,” Robin Zhu, Alliance Bernstein, December 2019

a driver, fuel, insurance, etc.), and in fact with its massive overhead structure⁵⁸ Uber was at a distinct cost disadvantage. If ridehail firms want to ever achieve profitability, they will need to raise fares, trimming their advantage over cabs.

- There is also an unsustainable hidden subsidy provided by ridehail drivers themselves. Many drivers see only fuel, insurance and maybe maintenance as their costs of operation. To the extent they do not include depreciation of the car in their calculations, they further subsidize the rider. (This error tends to be corrected in cases where the driver has purchased a car specifically to drive full-time: In these situations the depreciation charge is harder to overlook.)
- To the extent ridehail was cheaper than taxis because of regulatory evasion, this edge is also eroding. Increasingly municipalities demand ridehail firms play by the same rules as taxis, with their labeling of cars, driver background checks, payments of taxes and congestion charges, and even relegation to the same airport holding pens that taxis use.
- Thus, as ridehail companies seek to stem their losses, and as ridehail services begin to be regulated evenly with taxis, ridehail's fare advantage seems to be evaporating. A look on RideGuru at the time of writing shows the price of a ride from the Village Vanguard to the Empire State Building, for example, to cost \$13 on Lyft or Uber, and \$14 with a taxi. This is hardly a disruptive fare advantage.
- And riders seem to be maturing as well, in that they are adjusting their use of ridehail to fit into a portfolio of travel modes, rather than relying it on for all trips (as the Deloitte study shows). Whereas ridehail once would have been a default, now it is one of many options: take a scooter across town, drive my own car to visit the parents, use ridehail to get to the airport.
- Finally, of course, taxi fleets have not conceded defeat, and have adopted some of the same tools of ridehail (e.g., adding their own app-based dispatch systems), such that the experiential difference between a ridehail and a taxi has narrowed. The typical ridehail driver is no longer a relaxed college kid driving Dad's late-model Acura in the evenings for extra cash, but an intense full-time driver who bought his or her car specifically to drive for ridehail, who needs to drive round the clock to make a living, and who is thus beating that car into the same sorry state as a taxi.

So the baseline from which we build our MS forecast is one of recent rapid growth, still-low VMT penetration, massive financial losses and possibly a period of stagnation setting in. All this makes ridehail seem less threatening to private car ownership than it did when we wrote the first version of our report. But that is just our perception. What do the actual data say about ridehail's displacing of car ownership, and therefore possibly car sales?

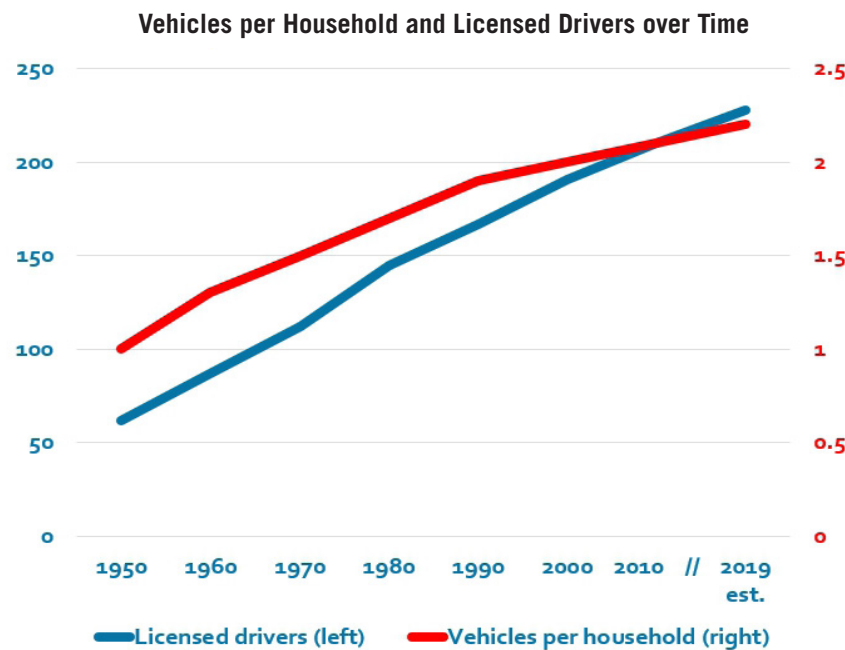
The Impact of Ridehail Today

Looking just at ridehail as it exists today, the impact on car ownership is undetectable. We'll examine this from several angles.

First, if ridehail were persuading people to give up cars (not to say they were giving up cars, as in an opinion survey, but *actually disposing* of a car), then we should see a drop in the number of cars per household in the U.S. We do not, as the chart shows. At worst we could guess that maybe the number would be higher if ridehail never existed, but this is hard to prove. If people were giving up cars, we should

⁵⁸ And no one has overhead as low as a classical taxi fleet: Typically "headquarters" is an office in a garage in a low-rent district, and the dispatch system a few people with a phone bank and radio.

also see some decline in driver's licenses: Why get a license if you do not intend to drive? Again, we see no decline in this number (partly, as discussed earlier, because older people are keeping their licenses longer at a greater rate than younger people have been deferring getting them).

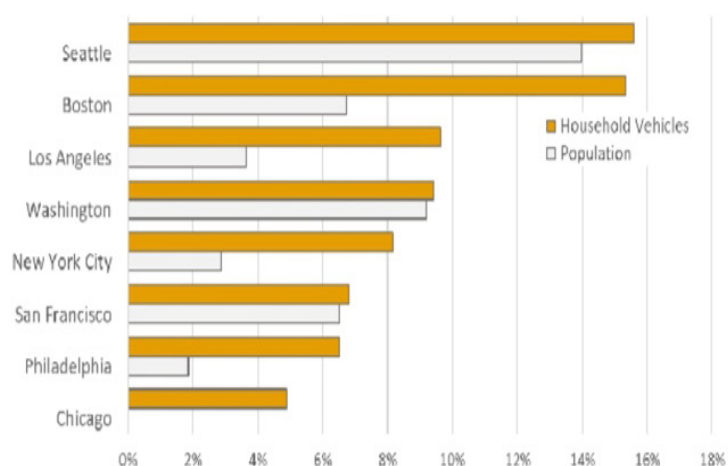


Source: *Transportation Energy Data Book*, ORNL; Hedges & Co. for 2019 LD est.; Experian for V/HH est.

But one might object to our use of national statistics. It's a diverse country, so maybe we should look at the big cities, where ridehail should in theory make the most sense, and put these forward as harbingers of the future. What is in downtown Boston today might be what we see in rural Texas tomorrow. But we don't see personal car ownership declining even in most major cities, as the chart shows:

"Household Vehicles Ownership Has Increased in Cities Where Uber and Lyft Are Most Heavily Used"

Change in Household Vehicle Ownership and Population 2012–2017



Source: "In a Reversal, 'Car-Rich' Households Are Growing," Bruce Schaller, CityLab, 1/7/2019, U.S. Census Bureau

In all the cities for which transportation expert Bruce Schaller has shown data, the number of household (personal, not commercial use) vehicles registered has grown faster than population, implying more cars per household rather than less. And this has happened during the period of fastest ridehail growth.

Now, we must be fair: By 2018 the data shows stabilization in San Francisco (that is, car ownership is no longer increasing there), and in Seattle population growth overtook vehicle growth (meaning cars per capita fell). However, we do not feel we can safely extrapolate from these results:

- In San Francisco, the proximity of Silicon Valley makes it “Ground Zero” for mobility services, thus inducing, we believe, more use; and San Francisco is the major American city with the fewest children (as a percentage of population), which also makes ridehail easier to use: no child seats to tote around, no sports equipment to stuff in the trunk, etc.
- And in Seattle one would expect a reversal in car ownership, given that the city in recent years has spent more capital on transit projects than any other city in America (about \$75 billion since 2008 or so). Thus this reversal was not due to a surge in *ridehail* usage, but in *transit* usage: “The share of households living within a 10-minute walk of 10-minute transit service rose from 25% in 2015 to 67% in 2018. Transit ridership has swelled since.” The reader is left to consider which cities in America would make investments of similar size. Regardless, the impact has still been modest: After a decade of time and \$75 billion of money, the share of households in Seattle owning a car fell just from 84% in 2010 to... 81% in 2018.”⁵⁹

So we see no national drop in car ownership, and little in major cities.

Another way to look at this is via the simplest of usage statistics. The Bureau of Transportation Statistics tells us Americans take about 1,500 trips per year; Alliance Bernstein tells us the average “active” user with Lyft takes about 40 trips per year with the service.⁶⁰ Double that to include Uber, and then cut it back to compensate for “inactive” users, call it 60 trips per year, and that’s under 5% of trips. It is a very far cry from peeling a marginal 5% of trips away from cars to impacting car ownership overall.

But one more thing about ridehail eroding car usage and sales: There is increasing academic evidence that the introduction of ridehail has had the opposite effect, tending to increase car registrations, as individuals buy cars to drive for Uber or Lyft faster than individuals discard their own cars in favor of Uber or Lyft rides. In essence, ridehail may be stimulating more use of cars. Here are a few pieces of research making this point:

- From China: “We examine how sharing-economy platforms affect durable goods purchase. On the one hand, the introduction of such platforms may cannibalize sales... by offering a lower cost ‘rental’ option in lieu of purchase. On the other hand, such platforms might stimulate purchase, as their presence enhances the value of ownership by allowing participants to capture rents through [driving for rideshare]. Findings [in the areas of China we survey] suggest **Uber entry is associated with a considerable (8%) increase in new-vehicle ownership....**”⁶¹

⁵⁹ From “There’s No App for Getting People Out of Their Cars,” David Zipper, in CityLab, November 13, 2019

⁶⁰ Alliance Bernstein: “Initiating coverage on US Internet: A bountiful harvest, but disruption clouds are on the horizon,” January 9, 2020

⁶¹ “Uber Might Buy Me a Mercedes Benz: An Empirical Investigation of the Sharing Economy and Durable Goods Purchase,” J. Gong, B. N. Greenwood, Y. Song, Temple U, U of MN, Fudan U, revised 2019

- From the U.S.: “Exploiting the staggered entry of ride share across cities and within city variation in income, I find that **ride share entry [in a city] coincides with sharp increases in auto sales**, auto loans, auto employment and vehicle utilization...”⁶²
- From the U.S.: “Contrary to prior research on the topic, we found that **ride-hailing users on average do not own significantly fewer vehicles than their non-ride-hailing counterparts**. We find, as others have, that the key drivers of vehicle ownership are household income, household structure, and urban density, the latter of which is strongly correlated with limited parking.”⁶³
- From the U.S.: “The arrival of ridehailing [in a given city] is associated with... at the extensive margin, **a 3% increase in new car registrations**, consistent with RH services creating a new productive use for vehicle ownership.”⁶⁴
- From the U.S., Wall Street analysis: Among a survey of thousands of American consumers, **users of ridehail are more likely to say they will probably buy a car in the near future (82%) than the average consumer (72%)**. And this gap has only widened in recent years.⁶⁵

In summary, we can see no data at present that shows how ridehailing mobility services are having any significant impact on Americans’ propensity to buy and own personal cars. On the contrary, they seem complementary to car ownership, serving as just one more tool in the mobility toolbox that Americans have at their disposal.

It is true that if *no* taxi (ridehail or otherwise) existed, car sales would be higher. But this has always been true: If we had no airplanes we’d have to drive more. If we had no rental cars, we’d have to own more of our own cars. If New Yorkers had no subway, they’d drive more. These are all mobility services, which coexist in relative equilibrium. Sometimes the equilibrium shifts: When Southwest and other airlines introduced discount fares, air travel expanded and probably, yes, took away some 500-mile trips that otherwise would have been made by car. There is no holding back these kinds of long-term shifts. But as for ridehail today, we see no significant impact on the car-ownership equilibrium.

The question for the future, however, is whether ridehail can eventually alter that equilibrium. And to do that, most analysts feel AVs running as ridehail cars will be the key: the so-called robotaxi.

The Impact of Ridehail Tomorrow

The great hope of ridehail companies may be the robotaxi (RT), a driverless vehicle operated by computers enabled by advanced sensors. With the driver gone, the cost of riding in an RT will fall dramatically (so the argument goes), inducing Americans to give up owning their own cars in favor of taking RTs everywhere they need to go. (Of course, this summary is a caricature: Even the most zealous RT advocates do not see them as capturing every single mile of travel, e.g., in thinly populated rural areas.) The argument for robotaxis seems to be based on two premises, one regarding efficiency (doing things right, for the lowest cost), and one regarding effectiveness (doing the right things, for the highest value).

⁶² “Financing the Gig Economy,” Greg Buchak, University of Chicago, 2018

⁶³ “Disruptive Transportation: The Adoption, Utilization, and Impacts of Ride Hailing in the United States,” R. Clewlow, 2019

⁶⁴ “The Cost of Convenience: Ridesharing & Traffic Deaths” Barrios, Hochberg, Yi; Chicago & Rice University, 2019

⁶⁵ “Are consumers ready to shift from private cars to ride-on-demand?” UBS, September 28, 2018

The Efficiency Argument

The before-and-after of RT introduction might be striking, in terms of reducing the cost per mile of travel (making travel more efficient). Current taxi cost components are along these lines: 50% of total cost is incurred by the driver (wages, benefits), 10% goes to fuel, 8% for cleaning and maintenance, 8% for operating overhead,⁶⁶ 10% for insurance, 9% to lease the car and 5% for the network (the entity that receives taxi ride requests and dispatches the vehicles).⁶⁷ If in an RT the 50% for the driver disappears, and the cost per mile plummets, even if some other costs go up, such as the leasing bill (given all the added electronics will cost quite a bit), the RT seems to beat the taxi—but can it beat the personally owned car, where the driver is paid... zero? See the exhibit below:

WHAT COST DOES THE DRIVER SEE?

IF I OWN my car...

The IRS says the reasonable reimbursement rate is 58 cents per mile; The BLS (Bureau of Labor Statistics) says the actual spending rate is 44, some academic research (Nunes, MIT) has it closer to 70; and the AAA says it's 56.

The AAA number breaks down roughly to 26 cents for depreciation (assuming a new, small SUV driven 15,000 miles per year), 11 for fees (insurance, registration, tax, etc.), 9 for service (repair, maintenance, tires, etc.) and 10 for fuel (e.g. 25 mpg @ \$2.50 per gallon).

Assertion: most people will “see” the cost of driving as closer to 10 than to 50 cents per mile: fuel.

- Few Americans have any idea of their depreciation cost, for example (the cost of the car is “sunk”).
- Further, these numbers tend to assume the car is NEW. But most Americans are driving USED cars, where depreciation is typically half the rate for a new car (though service costs may be a somewhat higher).

IF I RIDEHAIL...

A typical USA taxi rate (including profit) is \$2.50 (250 cents) per mile (from TaxiFareFinder), and a typical current ridehail fare (every ride sold at a loss) is \$1.50 (150 cents) per mile (from RideGuru). The owned car is today more economical.

But a future automated (driverless) robotaxi may cost 40–50 cents/mile, though this is highly speculative (depending on factors such as future cost of hardware and software, cost of any human remote monitoring, rate of recovery of the billions of dollars already invested, etc.)

NET: the robotaxi may be cheaper than an owned car in terms of total cost, but in terms of out-of-pocket daily expenditures (mostly gasoline or electricity), the owned car looks to the driver as a much better deal.

Sources: Various, as cited; author's calculations; based on work of Steven Polzin, Center for Urban Transportation Research, University of South Florida

The current cost of ridehail clearly beats the current cost of a taxi, partly because the former deliberately operates at a loss, and partly because the latter (for now at least) carries more regulatory costs. As for the RT, there are any number of forecasts available, but one number cited is 50 cents. These numbers would indicate that an RT (at 50 cents per mile) could be quite competitive with a privately owned new car (at 45 to 70 cents per mile).

However, there are various issues with this conclusion. First, we do not know that 50 cents per mile is achievable with RT. A few challenges:

- **Paying off the massive investments in software and mapping efforts:** These have collectively cost the industry billions over the years.
- **Paying for the necessary hardware (processors, sensors, etc.):** Estimates for the hardware hover around \$10,000 per car, but this number seems to be based on argument rather than on any discoverable facts.

⁶⁶ For example, the costs of the taxi fleet owner, who will find and schedule drivers, ensure regulatory compliance, contract for or provide refueling and repair facilities, pay the municipal license fee, etc. In the case of drivers owning the taxi themselves, these costs will be covered by the driver.

⁶⁷ We exclude here the cost of the taxi/ridehail license, since this will vary immensely, from many thousands in big cities to almost nothing in a small town.

- **Monitoring costs:** Dr. Nunes at MIT believes a fleet of RTs will require remotely based human monitors to keep an eye on the vehicles, in case of problems—at least during the early years of RT fleet operation. This would put human wages back into the equation, and, depending on assumptions about how many cars one monitor could track, likely erase any edge RTs would have over owned cars.
- **Appropriate competitive pricing:** What is the price per mile to beat? Most analysts assume that the RT trip must be cheaper than one in a new car, and model costs per mile accordingly. One of the costs is of course depreciation (26 cents per mile in the AAA formula). But if RTs are to become widely adopted, they need to beat the cost of what 200 million or more people are driving, not just what 15 million or so are buying, and as we have shown earlier, most people in the U.S. are buying and driving used cars. Used-car depreciation rates per mile are much lower than for new cars, with our estimate at 10 cents per mile on average tilting the cost equation clearly back to the personally owned car.
- **Finally, the real versus perceived cost problem (as the prior chart showed):** (This is the same problem facing subscriptions as a form of car acquisition, discussed earlier.) Let's say that all the numbers in our exhibit are correct, and that RTs come in at 50 cents per mile—very competitive with owned cars at 45, 50 or even 70 cents per mile (ignoring the used-versus-new problem). The question is, will drivers perceive RTs as cheaper? We assert that average American driver has no idea of his depreciation, insurance or maintenance cost per mile (and the depreciation cost is sunk, anyway, once the car is bought). And whether the taxi is driven by a human or by a robotic brain, neither can beat the cost of me driving myself: *Most people price their own labor as free*. For that average person, the cost of taking a specific trip boils down to the cost of fuel, at maybe 10 cents a mile. Assuming a daily commute of 20 miles each way, will an RT at 40 cents per mile, \$8 each way, \$16 every day, \$80 a week, look cheap or affordable, relative to a fuel bill for those trips at perhaps \$20?⁶⁸

The Effectiveness Argument

Even if RTs can become as efficient as personally owned cars, they will not be as *effective*. That is, the personal car provides value that is not measured in typical cents-per-mile calculations (just as owning your own home versus renting a hotel room cannot be reduced to simple dollars per night). Here are some of the sources of value an owned car can and does deliver—and while these are hard to put a price on, they are real, and they are significant:

⁶⁸ There are other issues with RT costs. A key assumption is their utilization rate, as Nunes also points out. Every calculation of RT cost must pick a utilization rate over which the capital cost of the vehicle can be amortized. We do not yet know how utilized these vehicles will be. Part of the problem is that RTs will drive some number of miles for which they are not paid (as they move to pick up a new rider), and this portion of utilization is thus “empty.” As one researcher put it, “Every trip you take in your own car is intentional, and valued, whereas taxis of any kind must periodically drive unpaid miles.”

A Sample of Sources of Ownership Value

AND THERE ARE
“EFFECTIVENESS”
FACTORS TO
CONSIDER,
BEYOND PURE
“EFFICIENCY”
(CENTS/MILE)

ADVANTAGES TO OWNERSHIP BEYOND PER-MILE COST

1. **Convenience:** it is more convenient to jump in your car whenever you want. We value our time – and not having to plan our time.
2. **Comfort:** you can set up your car to cater to your tastes, needs, and preferences. Seat position, temperature, and much more.
3. **Stuff:** many of us treat the car as luggage. We can have stuff on hand to meet varying needs, from golf clubs to makeup to umbrellas.
4. **Individualization:** having your car as a statement of the kind of person you wish to project to the world, offers its own value.
5. **Control:** with your own car you have leeway to set your transport budget. Once you give up your car, you are at the mercy of the mobility providers, who can change prices or schedules at any time.
6. **Privacy:** you may often wish to ride alone, to sing along to music or to have a phone conversation with loved ones – without an audience.
7. **Security:** my car can offer protection. I know who my driver is (me): but in a shared car, I am inhaling the germs of the last few riders.
8. **Destination flexibility:** in my own car I can drive to places that mobility services may not cover, or change my routing as I please.

(We'll come back to that sharing point in a bit.)

Because the trajectory of MS is so crucial to the future of the American personal car market, we will call upon two more sources for perspective on the effectiveness argument, as it acts to perpetuate personal car ownership. One of these writers explains the value of ownership as “purchased time,” and the second discusses its value in terms of “bundling.”

On ownership as purchased time: As Michael Sena, in his *Dispatcher* newsletter, writes:

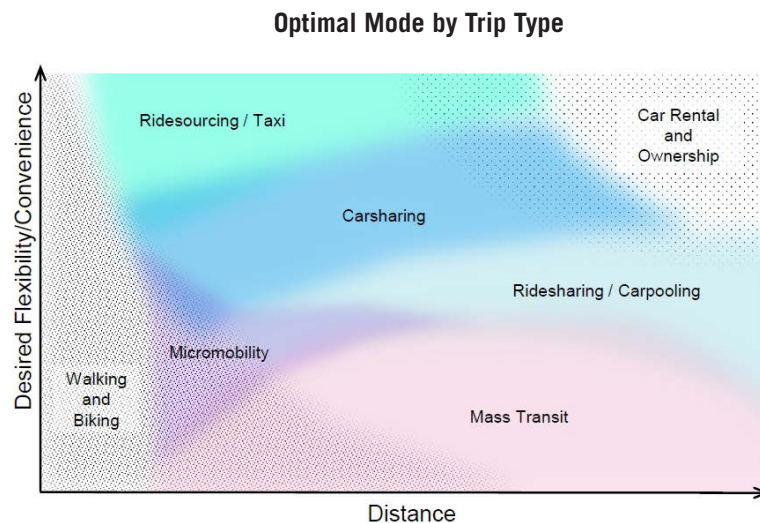
“I bought a tuxedo 45 years ago. During that time it's been sitting in the closet in a garment bag for 99% of the time. It never goes out of style, and, given the time it would have taken to rent one each time I needed it, as well as the cost, it was definitely a great investment. I have a burial plot in a family grave that has been unused 100% of the time by me since I obtained an interest in it 35 years ago when my wife and I married. At some point, I will be using it 100% of the time, but I can wait for that day to arrive.

“Humans own things to maximize our freedom.... From birth to death, free humans have one possession which is theirs to dispose: time. We spend that time in one of two ways: doing the necessary things to keep ourselves alive; and doing things that are unnecessary for staying alive, some of which we enjoy. If we have to spend all of our time doing the necessary things, we have no time left over for the unnecessary. We cannot save up time in a jar and take it out when we want it. But we can generate value by buying things that generate time savings. This is the reason we own things. **We buy a car and park it in a place that is convenient so that when we need it, it is there for our use. We don't need to book it, find it and fulfill obligations when we have finished using it. It may cost us more in money terms, but we are willing to pay for the convenience.**”⁶⁹

⁶⁹ See www.michaellsena.com

In brief, owning a car is owning saved time. No waiting for the Uber to appear. No taking time to move my stuff out of one MS vehicle and into another. No taking time to plan where to put my groceries when I stop in at a friend's to chat. No time spent researching rental car options and rates for my weekend trip. And on and on.

On ownership as a bundle. MS advocates like to “unbundle” movement, which makes sense, since they are focused on efficiency. And we all do this: We don't drive a car 2,000 miles if we can help it; we fly. We don't call a Lyft for a five-block trip; we walk. Thus MS advocates see the world as in this chart, in which every trip has an optimal mode. Thus it is logical to adjust your mode according to your trip.



Source: Center for Automotive Research, “The Future of Mobility,” May 2019

The trouble is, the car already does all this. Yes, a car is suboptimal for a five-block errand, but it can do it. Yes, the car is slower than the subway for a one-mile trip, but it can do it. Bundling is perhaps optimal from an efficiency point of view, but ignores costs of switching from mode to mode, or waiting for next mode to show up. For another perspective on this, see what Alex Danco writes in his blog:⁷⁰

“Once you have a car, it makes sense for you to use it all the time, since you’ve already paid for it. Economically speaking, dragging 2 tons of car along with you just to go get groceries... is a giant waste. But from a bundled economics point of view, it’s still one of the greatest free lunches you’re ever gonna get.... car ownership is a compelling deal because it bundles together four core jobs, and practically all car owners use them for at least two of these things: commuting, shopping, kids and recreation. If one or two of those tasks are essential for you, the car will hold pretty strong as an indispensable possession for most people, at least in North America. That’s why ditching car ownership is going to be really unattractive for a lot of people—no matter how attractive you make the alternatives. Unless you can replace all of the important jobs that a car does for you, all at once, then competing against the car means competing against free. Actually, it’s worse than that—it means competing against free and nice. Bundle economics (and also ego issues) are powerful enough that it’s pretty rare to see people downgrade their cars, even if their car requirements have gone way down (like they had kids go off to college). Once you go SUV, you don’t go back.”

⁷⁰ www.alexdanco.com, November 24, 2019

Adding all these arguments up, efficiency and effectiveness, purchased time and mode bundling, and we remain optimistic that MS erosion of personal vehicle ownership will be slow and minimal.

But there is yet one more point to make. Let's return to sharing, as promised earlier. **Robotaxi MS really hit sales of cars only if the cars are shared.** That is, simply moving from personally owned cars used 95% of the time to MS or RT cars used 50% of the time (pick a number) very likely doesn't reduce sales of cars—though it does shift those sales from retail to wholesale, as MS are run by fleets. Let's run the numbers to show what we mean:

- Assume 10 people each drive 20,000 miles every year, for 10 years, in 10 cars that wear out in 100,000 miles. Total miles driven are 10 drivers x 20,000 miles/year x 10 years: 2 million. To cover 2 million miles, 20 cars are sold in 10 years (2 million/100,000): 10 every five years.
- Now, assume robotaxis appear, with ultra-low mileage costs. All 10 people abandon their cars and take robotaxis everywhere. With their ultra-low costs, and with no need to drive themselves, the 10 people each now cover 25,000 miles annually. That is 2.5 million miles, which will require 25 cars sold in 10 years, five sold every two years, due to more rapid wear. Robotaxis have increased car sales in this case, although via fleet, not retail, sales.
- Finally, assume every trip is shared by two people. Total miles are still 2.5 million over the decade, but we need only half the cars due to sharing: 12.5 cars are sold in 10 years.

You can change the assumptions how you wish, but the arithmetic comes out the same: Only in the last case, with true sharing of rides (multiple passengers in the car, not one passenger “sharing” the car with the driver) are sales impacted significantly. If the math is tedious, here's another way to look at it: With unshared MS or RT, total miles traveled do not fall, they are just bunched into fewer cars, which wear out faster and thus have to be replaced (bought) more often. And in the example above we assume that the availability of RTs will drive up VMT (recall the studies cited in the AV section), so that car sales likely increase in an RT world. Therefore, only if Americans start sharing cars with other passengers (no, “sharing” the car with the driver is not sharing) can ridehail—RT or not—really bring down car sales.

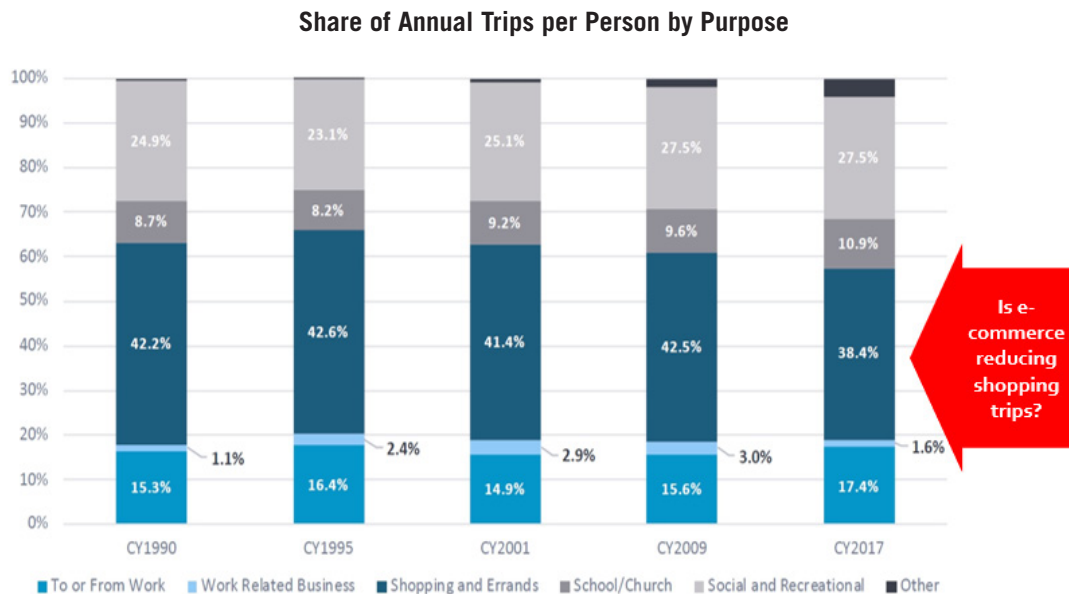
But will Americans share? Well, history shows that if they have the chance, they will not. We have a natural experiment for this: carpooling, the low-tech form of rideshare. As America has grown wealthier, it has shed carpooling. In 1980 an amazing 20% of commutes were carpooled. By 1990 it was 14%, by 2000 12%, by 2010 10%, and in 2018 9% (Census data). We do not see why this trend would change with the advent of RTs. And frankly, RTs are caught in a bit of a trap here: If they are priced low enough to persuade Americans to ditch the car, there is less incentive for riders to further lower costs, and opt for a shared ride. As it is today, while data is sketchy, we think that no more than 20% of ridehail trips are shared, and the ones that are, are shared for social reasons (e.g., going to a restaurant together), rather than to cut cost.⁷¹

In sum, our view is that the impact of MS (RT-enabled or not) on vehicle sales (and indirectly, on service) will be minimal in the near- to mid-term.

But we are not complacent. There are other developments that may present more of a challenge. One is the replacement of shopping trips with home delivery, and another is micromobility.

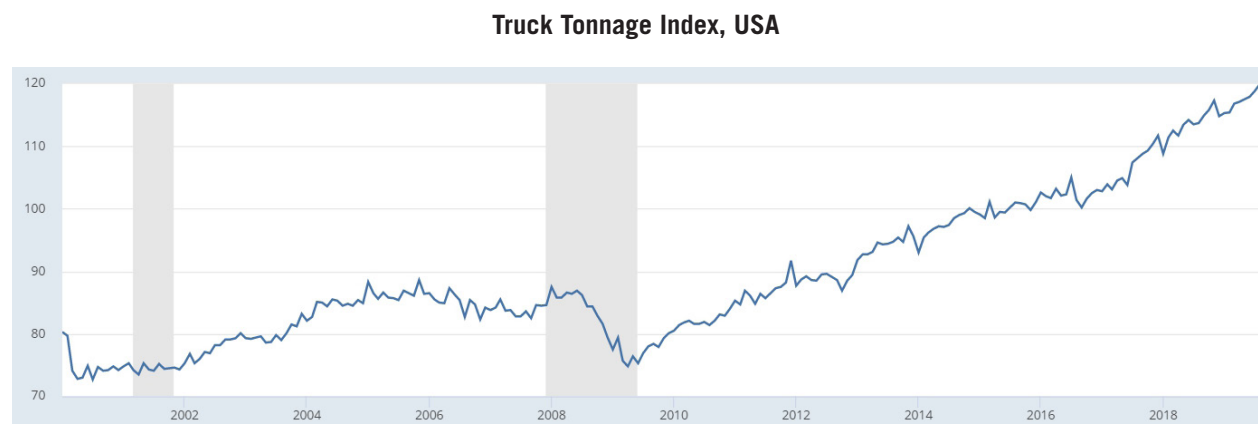
⁷¹ And recent press reports indicate that one of the big ridehail firms has been unable to attract riders to its multiple-passenger true ridesharing option, at least not at fare levels that can cover costs.

Home delivery of goods and services. To the extent that people see less need to drive somewhere to acquire some shoes or a pizza, there could be downward pressure on personal car sales. As this exhibit shows, there is evidence that moving goods rather than people may be where the big change lies. The portion of trips a person takes for shopping purposes is definitely on the decline:



Source: 2017 National Household Travel Survey, CCC analysis

Even here, however, there is some silver lining: To the extent we swap personal pickup for third-party delivery, we may erode car demand—but boost demand for light- and medium-duty (and indirectly, heavy-duty) truck and van sales. As this chart shows, total truck tonnage shipments have been growing steadily for years, and this growth does seem to coincide well with the rise of e-commerce:

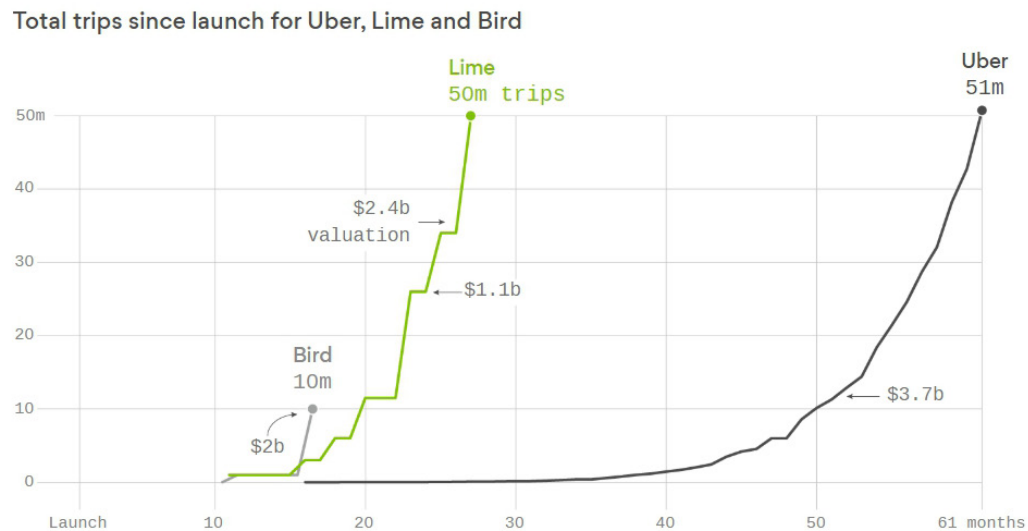


Source: U.S. Bureau of Transportation Statistics

Micromobility. Finally, before we wrap up this MS section, we need to address something that was not at all on our radar in 2017: “micromobility.” We’ll use expert Horace Dediu’s definition of the term: a wheeled vehicle weighing less than 500 kilograms, which includes electric scooters, bikes, electric bikes, mopeds and more. Typically these are provided on a paid “shared” basis (e.g., bikes picked up at a docking station), but they also can simply be owned (like the bike you ride to work).

If we leave aside “traditional” micromobility (like that bike you own), the rise of this new wave of the concept shares many features with the rise of ridehail: very rapid growth (see chart below), multiple run-ins with regulators (do I need to wear a helmet? Can I ride on the sidewalk?), massive financial losses and numerous teething troubles (e.g., scooters wearing out quickly, vandalism).

Scooter Companies Meteoritic Rise in One Chart



Source: Axios, May 20, 2019

From the personal perspective of someone who has been around the world of transportation for several decades, this surge is a bit ironic: Developed countries now seem to be falling in love with the very technologies (e.g., mopeds and bikes) that the developing world (e.g., India and China) has been trying to discard for decades, in favor of cars. But no matter: It is clear there is a real trend here.

For the purposes of this report, we feel that the American market for micromobility is too young and too fluid for us to make reliable predictions about the impact on the automobile dealership system. Various specific factors dissuade us from making any kind of call in which we are confident:

- We can't yet distinguish fad from fundamental change (Segway, anyone?).
- Seasonality may be a real problem, especially outside California (e.g., scooters in the snow?).
- Multiple modes and models are contesting: scooters versus bikes, docked versus dockless, owned versus rented, etc. We can't yet see a stable balance emerging.
- There are vast regional differences (e.g., bikes already dominate in Holland, U.S. bike lanes are scarce, European cobblestones kill scooters, etc.).

Thus our initial view is more of an opinion than a projection based on good clear data. We will assert for now micromobility's use cases are too limited, and the economics too uncertain, for this to be seen as a major challenge to car ownership. Wherever micromobility makes sense (e.g., in dense urban cores), the car already didn't make much sense to own (try, for example, to explain why about 25% of Manhattan households own a car today). We'll guess therefore—while we watch the situation and wait for more data—that micromobility will serve more as a supplement to automobile ownership than as a replacement, in most cases. But stay tuned. Certainly, if American cities become as active as European towns in actively

banning cars from urban centers, usage of micromobility will soar. Whether this happens on a broad scale or not in the U.S. is a political question beyond the scope of this report.

For those readers patient enough to have gotten this far in this very complex chapter, our overall conclusions, at least, should be clear. As configured today, MS (mostly ridehail) has had no significant impact on sales, and possibly is providing even a modest boost to sales (and thus service). But if AVs and MS are linked up (as low-cost robotaxis), we enter a world of “eternal rental” that, even if it does not displace total unit sales of cars (especially if true sharing does not emerge), shifts them from the retail to the wholesale category, which is less profitable for dealers on both the sales and service side. However, for the RT revolution to work on a broad scale, we need to see clearer evidence that these vehicles can be both more efficient than owned cars (cheaper to run), and more effective than owned cars (providing more value). So far, both of those criteria are not being met. However, given the massive investment flow into MS, and the towering expertise of tech firms such as Waymo, we are forecasting that these services will grow, if slowly, and may at some point start to affect sales and service. Thus we do consider AV-enabled MS as the biggest challenge to dealers of all of the four outside forces at work.

Summary of “Outside The Store”

We are generally more upbeat about the impact of these four trends on the dealership system than we were a few years back:

- Connected cars should produce a relatively minimal—though net positive—impact in the next five or 10 years on dealer economics, with a potential upside of closer linkage to the service bays perhaps being partially offset by some of the downsides of OTA updates. We see CC penetration at 100% of new-car sales by mid-decade.
- As for electric vehicles, the steady if possibly slow rise of EVs (especially BEVs) should have only a modest impact on dealers over the next five or seven years or so. Stores will have to gear up for the vehicles’ unique selling challenges, and dealers will also have to prepare to do more EV service, working hard to keep retention up, as RO levels may go down. We see EV penetration of new-car sales at 6% by 2025, and continuing to steadily rise thereafter.
- Regarding autonomous vehicles, we think their near-term impact will be mildly positive for dealers, in both the service and sales arenas. In the short term, there will be a boost to service work because of the complexity of ADAS and the tendency of AVs to rack up more miles. And there may be a boost to sales, as some customers accelerate their purchase cycle or as some senior citizens return to driving, their confidence boosted by ADAS assistance. We forecast 100% penetration of low-level (ADAS) AVs by 2025, but only 5% of high-level AVs by then.
- Mobility services, as configured today, have had no significant impact on sales or service. But if RTs arise, we enter that world of “eternal rental,” with all its negative effects. We do not see that happening in the near- to mid-term. Leaving aside RTs, while we do not forecast a specific amount of MS activity, we do see that it will probably slightly trim the number of cars the average American household owns, thus providing some headwind to vehicle sales.

We’ll close the “Outside the Store” section with remarks from a journalist we respect, Ed Niedermeyer, that we feel neatly encapsulate our view of ACES overall:

“Roughly speaking, and with apologies to the outliers, Silicon Valley has launched no fewer than four broad assaults on the century-old primacy of the automobile since the turn of the millennium. Each of these efforts—electric drivetrains, ‘car sharing,’ ride-hailing and autonomous vehicles—has been hailed

as a long-overdue ‘disruption’ of the privately-owned gas-powered car, only to fall well short of those lofty expectations. The most successful companies in each of these categories may have certainly changed aspects of traditional automobility, like premium market tastes, car rentals and taxis, but with more than 17 million internal combustion car sales in the US last year there are few signs of the promised ‘disruption’... at least so far.” (Writing in *The Drive*, February 4, 2019)

Conclusion

To restate our opening summary: Our research convinces us of a positive outlook for the American franchised new-car dealership system. This is the same conclusion we reached in 2017, and we stand by it. While we do foresee much change to the dealership over the next decade, and probably some compression of profitability, we do not project revolutionary change or, as it is popularly put, “disruption.” But below this top-line conclusion some of our perspectives have shifted.

For one thing, it is clear that we are moving from a Recession Recovery era to the Age of the Operator, where better-managed stores are likely to open a clear lead. The steady rise in sales since the Great Recession seems to have plateaued, if at a very satisfactory level, thus necessitating this shift in focus.

For another, there has been an inversion of the relative threat to the dealership system, to “inside” from “outside” concerns. There had been worry that outside threats (e.g., EVs, AVs) would overwhelm the industry—while current operations stayed strong. Now that the hype around these outside factors has cooled, they’re seen as less worrisome—but conversely, we are more concerned about inside issues, such as erosion of near-term financial performance, and the impact of an (eventual) recession.

This is not to say that we dismiss “outside” issues: In particular we do recognize that if mobility services continue to grow, they may break the century-old linkage between being an adult American and owning a car, and that of course would have significant implications for the U.S. auto retail industry.

* * *

To step aside from the authorial role for a bit, and close with my strictly personal opinions, I will say that the American new-car franchised dealership system is about 125 years old. For some, this means it is time to reinvent such an elderly apparatus; for this researcher, the industry’s persistence is an indicator of its ability to adapt to changing circumstances. The current challenges are not our first: In recent memory the system has seen, responded to and survived, threats from the rise of the public chains, forward integration attempts by several OEMs, the launch of online disintermediators, and the arrival of Tesla, which was to invent a “better mousetrap” in both sales and service.

The first three of these so far have failed conclusively, and the fourth, after a decade in operation, has not in our view yet made its case.⁷² The auto retailing industry must not become complacent, but it does have a long track record of identifying, responding to and overcoming its challenges.

⁷² Speaking purely of the sales and service model, not of the products—the cars, themselves

Acknowledgments

The author would like to offer his heartfelt thanks to all the people who made this report possible. While he remains entirely responsible for his interpretations (or misinterpretations) of the data—and any errors of fact in the report—the data was gathered from at least 200 sources, here and abroad. I'd like to thank the numerous academics and consultants who worked on the dozens of reports and white papers I consulted; the government researchers and regulators who contributed their own points of view; and the journalists who worked hard to try to sort fact from fiction in our industry (especially in the world of ACES). I'd like to also thank NADA staff for tirelessly assisting me with introductions to key interviewees, and for lending me their expertise in many areas. But the most important people I need to thank are the dozens of dealers who spoke with me, both in person and by phone. (Their names will not appear here, as from the very outset confidentiality was promised to everyone.) They are the ones who have invested their careers in this industry, not us pundits commenting from the sidelines. And they are the ones with decades of experience, accumulated in direct contact with customers, not us analysts who have never sold anyone a new car. As such, it was their insights, freely given to me, which kept this reported grounded in pragmatism, and in the daily reality of providing Americans with the vehicles that keep the U.S. moving. My thanks to the new-car dealers of America, who have been with us for more than a century, and who I expect will be with us for a century more.

Appendix:

The Customer Interface and the Data Challenge

Years ago this section of our report would not have had a reason to exist. The data associated with the car would include customer contact information and perhaps a credit report, with product data limited mostly to the VIN, and dealer customer interactions limited to some mailings and the car's service record. All this has dramatically changed, which is blindingly clear to everyone. However, even if the data flow has raced ahead, in terms of types of data, volumes of data and means of data transmission, automotive retailers are only now really catching up to what this all means for the industry. At least two major streams of issues have emerged: data security and data usage. We will not go into any depth as regards security (as this is a highly technical field on the one hand, and as on the other we hope that it may be resolved in the coming years, with advancements in information technology). However, the second stream, that of data usage, can and should be tackled by businesspeople involved in the industry, and must be tackled now, as future resolution of usage issues is by no means clear or certain. Hence this separate “deep dive” into the topic.

History and Outlook

The “Old World”: Rolodex and Fax

Perhaps 30 years ago dealers had—in theory—a dominant position in terms of access and control of customer data. OEMs had names and addresses of buyers, at least, for recall notices (for example), and OEM finance captives had somewhat more information. But in terms of behavioral data, such as when the customer last bought a car, what was traded in, etc., the dealer had much better access. It resided on paper databases, in Rolodexes, and in the memories and experiences of the store's staff.

(Unfortunately, why we add the qualifier “in theory” to this narrative is that in practice dealers and OEMs alike typically did very little with their data: The dealer's salesperson might never have checked on past purchases, and the OEM captive might never have mailed the customer a new-car offer, even if it knew the current lease was about to expire. And the data was poorly maintained. We all recall stories of mailing free oil-change coupons to customers who had passed away years ago.)

But beyond the dealer and the OEM/captive, no one else had any significant data on the customer, except certainly the DMV and probably the customer's insurance company.

The Present World: Databases and Email

In the intervening years, IT advanced so rapidly that at least two things happened. First, it became economical and easy to collect lots of data digitally, and then to process and analyze it for insights (the oft-used example is “If we see the customer has had a baby, we offer a minivan discount”). Secondly, hundreds of additional firms, enabled by IT, emerged to try to leverage the data flow for their own commercial purposes (e.g., CRM—customer relationship management—systems that will help the dealer convert leads to sales).

Of course, even now it is unclear how much use is made of these customer data streams: Actual usage has—so far—fallen short of potential usage. There is no doubt that the data are valuable: For example, dealers use IT to analyze their used-car inventory in order to determine appropriate pricing, and OEMs use warranty claim data to support their periodic audits of such claims. But while it is safe to assume that leveraging of data will only increase, it is also clear that for now, at least, we are somewhat acting on the

faith that data will be increasingly valuable. As one interviewee put it: “Sure, the OEMs know they want data, but they seem pretty clueless as to why, or what to do with it when they get it.”

The “Brave New World:” Seamlessly Integrated Big Data

By 2030, to the delight of some and the dismay of others, we will see IT advances that permit a seamless flow of data among customers, dealers/distribution channels and OEMs. To use a fast-food restaurant franchise metaphor, the customer’s meal preferences will be known before the order is placed, the franchisee will know which employees are most efficient in filling the order, and the company will know exactly how many more cows to raise. It is hard to see how this future does *not* emerge, given expected advances in IT on the supply side and rising consumer expectations for ever more speed and transparency on the demand side.

This future is hoped for by OEMs and probably most customers, as they are both interested in efficiency: lowered costs and seamless and easy transactions. The customer may be happy to be able to buy a car as easily as a hamburger. However, the fast-food analogy is *not* completely accurate, and this is why dealers are more skeptical about this future. They are concerned about full or partial disintermediation, and the resulting stranding of their investment, in a way that a burger franchisee would not be:

- For example, even if Burger King gains control of all customer data, and so knows as well as or better than the local franchise what the customer wants, it is unlikely to want to close franchises and to supply customers from its own regional holding compounds. Automotive OEMs, however, may be able to do so, given that cars are infrequent and expensive purchases that a customer might wait a few days or even weeks for.
- In addition, direct knowledge and connection to the customer may allow the OEM to make direct sales of F&I products (and other sources of ongoing revenue, such as streaming media), which are or could be a valuable source of income to dealers, whereas Burger King has no such intangible products to sell to its customers.

Thus, for dealers the Brave New World may be a threat as much as an opportunity. In effect, dealers may share in the *benefits* of improved data flow, but they keep all the *risks* involved (e.g., an eroded role, impaired investment).

The fundamental problem is that as data flows become larger, faster and more available, they tend (from the OEM’s perspective anyway) to erode the dealer’s value proposition. At present the dealer fills at least these channel tasks:

1. Display the product and provide customers information about the product
2. Hold product inventory, to help buffer demand/supply imbalances, and offer customer choice
3. Perform service on the product (M&R, recalls, warranty), which includes stocking parts
4. Manage the exchange of used cars (trade-ins)
5. Arrange purchase financing
6. Execute marketing and advertising tailored for the local market
7. Provide feedback to the manufacturer
8. Supply the capital to build and run all the above (land, buildings, equipment, inventory)
9. Negotiate the multi-part deal involved in selling a car

In a Brave New World of ubiquitous data flows, it is clear that 1, 2, 5, 6, 7 and 9⁷³ may erode in value:

An OEM might assert that the internet gives the shopper more of the product data required; better product data should in theory allow an OEM to move to build to order and thus reduce dealer inventories; easy online communication makes it easier to move F&I online and away from the physical store; better consumer insight at a granular level makes local advertising easy to manage from a distance; direct customer contact makes dealer feedback less relevant; and internet information makes price bands narrow and transparent.

In this world the OEM,⁷⁴ encouraged by its ability to collect and analyze customer data, might attempt to trim the role of the dealer down to just a service point and trade-in processor, with some residual display functions. A dealer will of course push back on most of this, asserting that:

Online product data cannot replace physical inspection of the car (test drives, interior experience, side-by-side model comparisons); that local inventories are necessary as long as the customer wants “instant gratification” for her or his \$35,000; that online financing still is accompanied by many particular questions that only a human can interpret;⁷⁵ that local market presence still has a role (e.g., sponsorships, “putting a face to a name,” etc.); that dealers can interpret customer needs for OEMs better than they can⁷⁶; and that a car purchase (with trade and F&I) is so complex, that detailed in-person price discussions are almost always necessary.

In this world the dealer, encouraged by the realities of human purchasing behavior, might see its future as fairly secure.

Which world is most likely to emerge in the next decade?⁷⁷ Let’s call them, roughly, OEM-centered and dealer-centered.

The Path We Are On

It is clear, for better or worse, that over the last two decades or so the trajectory is toward the OEM-centered world.

OEMs have increased their direct interaction with customers dramatically, through use of the internet. And they have, slowly but very steadily, increased their access into dealership data (both the store’s own and their customers’), via an ever-expanding web of IT connections. In some cases, the motivation was purely operational: customer contact data for recall alerts, or for finance payments. But over time OEMs asked for more data for its own sake, to build a complete picture of the store and its customers. Often these inroads were made by linking data access to programs of actual benefit to all concerned: e.g., “Let us see your used-car inventory so we can better understand how to design our CPO program,” or “Let us see your parts pricing so we can optimize replenishment deliveries,” or “Tell us about your service operations and we will share with you vehicle diagnostic telematics data.”

⁷³ And perhaps 3 as well, if OTA (over-the-air) vehicle service revenue becomes material.

⁷⁴ Or a third party (perhaps Amazon?) could seek to similarly interpose themselves.

⁷⁵ E.g., “Do I need a certified check or a cashier’s check?”

⁷⁶ E.g., “Your survey asks them what they want, I can tell you what they do.”

⁷⁷ Realizing, as always, that the real answer is always “it depends.” The trajectory for the distribution of high-end EVs in Singapore is likely to be radically different from that of the pickup truck sales center in Wyoming.

And dealers pretty much let this happen (either willingly or against their will), for any number of reasons, including:

- They were busy and distracted.
- The inroads were made so slowly that they did not notice the cumulative effect.
- They saw IT only as a tool rather than also as a weapon.
- IT was not where their skills and interests lay.
- They were more involved in fending off more direct OEM assaults on their independence.
- Because the OEMs strong-armed them into accepting invasive IT applications as part of their acceptance of “voluntary” incentive programs.

Now we are, for better or worse, at a place where dealers can no longer afford to ignore this IT-led encroachment on their independence. Individual dealers have spoken up, state associations and NADA have provided information and advocacy, state-level regulators have entered the fray, and IT providers have been drawn into the fray as well.

What is to be done?

Multiple Issues to Address

One difficulty in dealing with these developments is that they are multifaceted. The core issue may be the IT-driven steady shift in the balance of power from the dealer to the OEM.⁷⁸ But there are several related problems, all asking to be solved simultaneously. These include:

- **Cyber security:** As all this information—whether from the OEM, the dealer, the customer, the car, the finance company, the DMV or others—sloshes around the American telecoms network, there are massive issues as regards data security.⁷⁹ The technicalities of this are far beyond the scope of this report. But the impact on everyone in the system is clear: Ensuring security of data means restricting data sharing and use, and it costs money, in terms of training, software and more.
- **Data privacy:** If dealers have secured the data, now they must also ensure consumer privacy (these are two different issues). At the federal and state levels there are proliferating laws and rules, all well-intentioned, all designed to protect customers’ data from illicit use. The vast range of all this activity is again beyond the scope of this report, but if we were to narrow the topic down to its clearest impact on dealers, it is that of increasing restrictions on data use, and climbing compliance costs. Well-meaning regulators, determined to defend the data rights of consumers, are more than happy to order dealers to defend those rights, and generally not willing to acknowledge how much this will cost. Larger dealers can probably muddle through, but many smaller dealers may be driven out of business by data compliance costs that can run into the

⁷⁸ And indeed, this has been going on for years. As one dealer put it, “I am on my way to becoming a privately owned company store, where my only real function is to manage HR—staff hiring and firing.”

⁷⁹ There is a contrarian opinion as to the difficulty of solving data issues that runs against the popular narrative that these issues are (a) gigantic and (b) incredibly hard to solve. One interviewee pointed out to us that various firms now offer online mortgage origination. And the amount of data home-buying requires, and the sensitivity of that data (bank account numbers, etc.), are such that in comparison the burden of protecting car-buying data seems modest. We don’t mean to imply by this comment that the challenges are easy, or that they won’t cost billions to solve, or that the mortgage industry has fully resolved its own issues—only that we in automotive should not view our challenges as either unique or as uniquely hard to overcome.

hundreds of thousands of dollars annually. And the situation is not static: New rules are being enacted on a regular basis, some conflicting with each other, and others dramatically expanding the dealer's liability (e.g., by tasking the dealership to ensure not only that it keeps data X private, but that its business partners, such as IT vendors, do the same with X once it is shared with them).

- **Data ownership and usage:** Assume the data is secure (e.g., against hackers). Assume the data is private (e.g., not shared with unapproved entities). Now we still have the issue of ownership, or as we have expanded the concept, ownership and usage. "Ownership" gets all the press, as in hospital patients insisting that their health care data is theirs, owned by them. The problem with this narrow definition is that it is pretty much meaningless: *What we really care about is not who owns the data but who has the right to use it—or to prohibit others from using it.* Staying with health care, what does it mean for a patient to "own" her or his records, if doctors, hospitals and insurers have access to them, and the patient cannot prevent them from being used (e.g., to calculate insurance premiums)? The same issue applies in automotive: What does it mean for an OEM to assure a dealer, or a dealer to assure a customer, that "you own your data"—if the OEM embedded in its latest incentive program the right to access data on the dealer's used-car inventory, or if the customer clicked right past the EULA that gave the dealer's CRM system access to contact information? In cases like this, the data may be secure (unhacked), private (unshared) and owned (in name at least), but used in a way that the owner never imagined. Again, we in this report can hardly take on this vast issue, but—addressing just dealers here—we can plead with dealers and their partners to be aware of what is going on, if and when they sign away the usage rights to data. "Ownership" of your front yard is no comfort if your town has the right to build a road across it.
- **Data access economics:** If the issue were simply one of a three-way interchange among customers, dealers and OEMs, it would be complex enough. But for better or worse, hundreds of third parties are in the mix, ranging from the DMS⁸⁰ suppliers of the store's IT backbone, to providers of apps to customers, and to IT firms providing solutions to dealers (e.g., CRM systems, service scheduling applications)—typically by integrating with the DMS. There is currently much anguish over the fact that these various firms seek to "manage" data access—especially how they charge for it. (Please see "One More Thing: The Battle Over Data Access," below, for more on this.)
- **Data standards:** Nothing will cause eyes to glaze over faster than lectures on data standards, but there has to be progress made here. Discussions about data access, security, fees, etc., cannot ever be conclusive if data cannot flow freely from one entity to another, or even within entities (we all know how many times dealer staff have to reenter data that is supposedly "shared" between systems inside the store). In theory, industry working groups can get together to resolve this issue, but in practice we all know that some participants will prefer to maintain proprietary standards, for their own benefit and to the detriment of the industry as a whole. To the extent this occurs, leveraging data productively will only become more difficult to do.
- **Customer behavior:** Finally, let's bring the customer back into the equation, with a note of caution. Just because vendors and consultants *assert* that customers are eager for the seamless Brave New

⁸⁰ DMS = dealer management systems, defined as "a bundled management information system created specifically for automotive industry car dealerships... that cater to the [diverse] needs of the finance, sales, parts, inventory and administration components of running the dealership." (Wikipedia, edited)

World of the future, it is not clear that they really *are*. As one dealer said to us: “Not one of my customers has ever even mentioned to me their experience with any digital interface between them and my store.”⁸¹ Many dealers report that the sales and service process is as hands-on as ever. And if customers do want some change here, it doesn’t appear in surveys of their satisfaction with the dealership process: Sources referenced elsewhere in this report show that on average customers are very happy with dealership processes. Are we getting ahead of ourselves in this regard? Our point here is not to turn a blind eye to the march of IT progress: Technological change here will remain rapid and will require close dealer attention. But there is likely an equilibrium point from a customer point of view, between faceless but efficient *computers* and humane and effective *people*. A dealer who does not update the store’s IT is ensured of losing business from customers who expect an ever more seamless, convenient and fast process. On the other hand, a dealer whose customers cannot find a person to talk to, or an answer to a question not on the FAQ, will also lose trade. As noted elsewhere in this report, even formerly pure online retailers are opening physical stores, and even dealers who boast of a completely digital sales process are sure to have personnel standing by the phones. The issues listed above are very real, but dealers facing OEMs fascinated by the latest AI tech, or vendors eager to sell the next shiny new thing, should not lose sight of what their customers want.

Where Do We End Up?

The honest answer is, “We don’t know.”

The best-guess answer is, “A more data-intensive world that possibly enhances the customer experience, probably requires more dealer spending on compliance, and certainly gives OEMs even more control of the distribution network.” A possible outcome here is the *de facto* (if not *de jure*) evolution of Dealers into Agents, where the OEM sets prices and sells F&I directly to customers,⁸² and pays “dealers” flat commissions to move metal, letting them make most of their money on service and used cars. The barrier to this transition, even if desired by some OEMs, is capital: What factory can afford to carry vehicle inventories on its books, if we remain in a buy-from-stock world?

The practical answer is, “Don’t worry too much about the bigger picture, about how channel control shifts, but focus on what goals may be achievable for the Data Challenge specifically. A sensible if optimistic set of goals might include: Let’s ensure standardized data flows freely and at low cost to the entities that need it, with strong regulations in place to protect dealers from abuse by both vehicle and IT suppliers (and to protect dealers and OEMs alike from third-party data brokers and others in the data business).”

Indeed, it should be noted that this area is one where dealers and OEM interests actually align strongly, if not entirely overlap. Simply put, it will be better for both dealers and OEMs if the data is secured, securely transferred, and if is protected against third parties who seek to exploit the data for their own use or business model. If, for example, Mazda dealers and Mazda are the only entities that have certain information about Mazda customers, then it will enable them both to provide better service—and it will create more value for both—than it would be if every data broker out there also had access to that

⁸¹ It was interesting that this same dealer said (perhaps half in jest): “I think I would prefer a pure digital interface more than my customers! Less hassle for me, fewer people for me to manage, etc.!”

⁸² Again, we cannot skate past complexities here. It is not as simple as a factory waking up one day and deciding to “go direct” with F&I. For example, it is unclear that any OEM really would want to assume the regulatory and liability burdens of TILA (Truth In Lending Act) compliance!

information. Getting this right will be important not just for the age-old “dealers versus the OEMs” debate, but for dealers and their OEMs together protecting their brands and their common interests.

While there are some promising signs on the horizon, whether the industry can set aside a history of mutual mistrust long enough to work towards that answer is a prediction that’s too much of a stretch for us to make.

One More Thing: The Battle Over Data Access

We’ve so far talked mostly about the future, which makes sense given our brief to look ahead a decade or so. But there is one very immediate aspect of the Data Challenge that is being battled over right now, and whose resolution will shape the future for years to come. This is the struggle over data access, and the dollars attached to that access. An argument that many industry participants make is that on the way to a future where data flows freely to its best uses (whether that is to customers, dealers, OEMs, IT vendors or others), there have been barriers thrown up by a few dominant IT firms that seriously distort industry economics in a way that significantly slows the pace of innovation.

The topic is complex and there is no consensus on it, but we’ll try to sketch what seems to us to be an objective review.

Let’s start with a few facts that we think most will agree on:

- It is clear that the small number of firms that have created the dominant DMS offerings have historically created enormous value for dealers, by offering, in one top-level IT system, software applications that can manage virtually every part of the store, from new car to used car to service to payroll and more.
- It is also clear that these firms have historically been indispensable to dealers, and even today, not much can be done at the store without involving the DMS.
- Further, it is clear that for a variety of reasons—competitive and extra-competitive—the DMS marketplace has relatively few viable options for most dealers, so that most have limited choices among DMS vendors.
- However, the competitive landscape for a variety of other, complementary dealership software packages and services has grown tremendously, and these third-party software providers have been the engine for a great deal of innovation in automotive retailing.
- Finally, it is clear that any of these third-party IT vendors providing additional services to a dealership (e.g., a CRM supplier) must integrate with the DMS in order to provide a viable software product to dealers. In other words, they must be able to get data out of, and send data into, the DMS in real time, in an efficient and secure manner. Several of the DMS vendors charge “certification” or other similar fees to third-party vendors, however, before they are allowed to connect. In effect, the DMS acts as a gatekeeper between these vendors and the dealer. This has raised costs for these vendors, their dealer customers and ultimately for consumers, while depressing innovation in the third-party software space. The way these fees are managed is crucial

to dealers, since these separate “plug-in” applications, which might have represented no more than 10% of a typical dealer’s IT spend 25 years ago, may represent 75% of that spend today.⁸³

Critics of the DMS vendors allege that these firms may use the facts of their indispensability, their oligopolistic position and their gatekeeper role to extract economic rent⁸⁴ from dealers (via their vendors), by setting access fees at levels far above where they would be if the market for access were able to clear freely.

These fees have historically had at least a veneer of economic rationale, for example as regards security costs: The DMS vendor must expend effort to ensure that data moves safely and securely and without malware through the whole system, and so could expect to be compensated for this work. But technology has changed, and such data integration is now virtually off-the-shelf technology, and to the extent that the fees (and other conditions of “vendor certification”) exceed the rates expected to cover DMS effort, they are alleged to provide unwarranted economic rent income to the DMS firms. (Further, as many of these third-party software packages compete directly with offerings from the DMS providers themselves, there are also allegations that certain DMS companies further abuse their position by favoring their own products over those of independent firms.)

Why does this matter? Isn’t this just a commercial argument to be resolved among industry participants? In one respect, yes, this is just about cost. The existence of economic rent serves to systematically raise costs. If a fee is \$10 but would otherwise be \$1, the first harm is that dealers, vendors and ultimately customers pay more, to the benefit of the DMS firms.

However, there is a broader implication, relevant to the discussion as to how the industry improves its overall IT performance, thereby meeting rising customer expectations. The implication is this: To the extent costs are “too” high, or to the extent DMS vendors offer their own plug-in apps preferable access to dealerships, then there is a reduction in the ability of vendors to enter the industry, thereby reducing the rate of innovation and improvement in the customer experience. There have been anecdotal reports of flagging venture capital interest in the automotive retail software space directly related to these issues. Vendors (or their financial backers) might not enter the fray at all, discouraged by high fees and other restrictions and requirements. Or dealers might not opt for an improved software app, discouraged as well by the high fee burden.⁸⁵

Taken to its logical end, one can argue that the dealership industry, through under-investment in IT (throttled by high access fees), improves its customer interfaces so slowly that an opportunity emerges for entirely new entrants to disrupt the entire system, to the eventual detriment of dealers, OEMs and all vendors together. One scenario argues that if customers are frustrated by the slow rate of improvement in dealership sales and F&I processes, they will be more open to moving their business to a “disrupter” such

⁸³ These numbers are really only educated guesses, albeit from a well-informed source, and should be taken only as illustrative of relative magnitudes, not as accurate estimates.

⁸⁴ “Economic rent” sounds like a neutral term, but economists use it to label profits that are excess to what would normally flow, due to a supplier having an advantaged position. For example, a farmer whose land is worth \$1,000 based on the profits from crops he or she can raise on it, might be able to charge \$100,000 for it if the airport nearby wants to extend its runway across his or her land. The “economic rent” windfall here is \$99,000, due entirely to the farm’s location, not as a result of actually operating the farm. Thus if a DMS was the only way for CRM vendor X to access its customer (the dealership) and its IT system, the DMS vendor could charge economic rent above a free-market level (which typically would be calculated as the DMS vendor’s cost to provide access, plus its normal profit margin).

⁸⁵ Of course, there is enormous room for debate here. It is very difficult to know the true cost structure underlying “certification” fees. There may be certain connection costs, coding costs, data security costs, costs of ensuring all privacy and security regulations are complied with, etc. While some of the direct costs for providing integration with dealer data may be legitimately recoverable by the vendors, the argument is that they are alleged to be excessively high. Certainly, they can run to thousands of dollars a year per dealer, per specific plug-in application—and many dealers have dozens of such third-party software packages.

as Amazon, which could offer an end-to-end integrated seamless IT solution. We leave it to the reader to imagine what this might mean. One can imagine a pitch along the lines of “We make buying a car as easy as ordering a book online!”

So far, industry participants have tried to resolve this issue⁸⁶ by B2B negotiation, discussions published in the press, lobbying of regulators at the state level and even lawsuits. There may be federal action as well.

But even if there is a desire to resolve the issue, the pace of resolution may be glacially slow. Regulators may be reluctant to wade into complex issues that they may feel are best settled by the companies involved. Dealers may grumble about costs, but be reluctant to rock the boat, given how crucial to their operations uninterrupted DMS functionality is. Vendors feeling blocked by DMS firms may not want to take action against the very companies they need to work with. Yet if there is no meeting of minds here, and soon, we are likely opening the door to a perilous future.

This concludes our discussion of the Data Challenge. We will close with an admonition: It is not within the scope of this report to comment on any of the actions any players have taken, or to recommend any particular course of action that they should take. But we hope we have made clear to all readers the scope and import of these issues, and the need for all industry participants to address them—and soon.

⁸⁶ We mentioned this is a complex issue, so we don't mean to boil it down just to the access fee dimension. Some topics we've excluded include: the separate problem caused for dealers when OEMs require their dealers to use specific IT vendors and dictate the terms under which they (or the OEMs' own IT systems) are used; OEM data agreements, and “program” requirements that expose dealer data to abuse and dealers to regulatory and legal risk; and we have not touched and are not discussing here any allegations involving antitrust issues, such as unlawful tying or uncompetitive collusion, etc.

