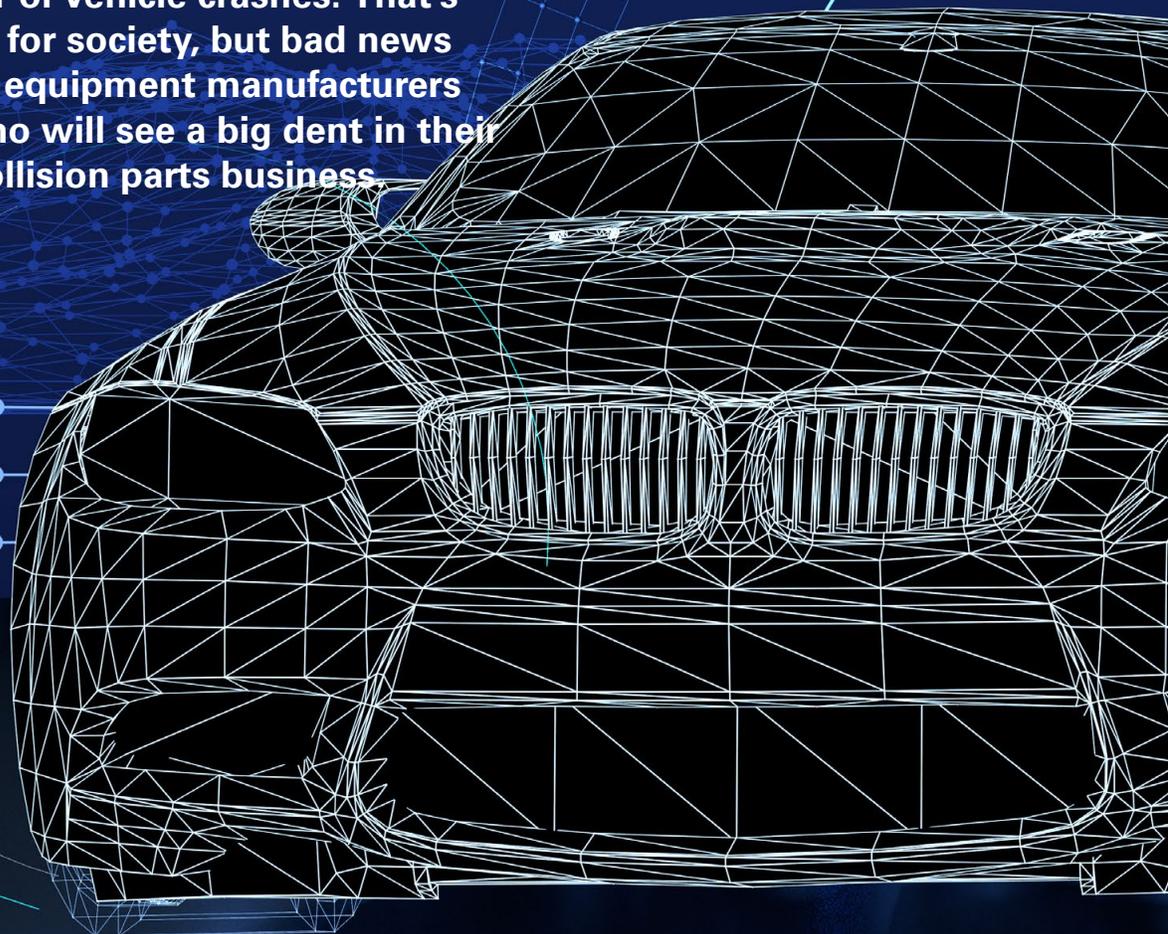




# Will autonomous vehicles put the brakes on the collision parts business?

**Self-driving cars promise to lower the number of vehicle crashes. That's good news for society, but bad news for original equipment manufacturers (OEMs), who will see a big dent in their lucrative collision parts business.**



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# About the Authors



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National Automotive Leader

Gary Silberg is the national automotive leader at KPMG, as well as the global lead partner for Delphi Corp. and Ford Motor Co. With more than 25 years of business experience, including more than 14 years in the automotive industry, he is a leading voice in the media on global trends in the auto sector. Silberg advises numerous domestic and multinational companies in areas of strategy, mergers, acquisitions, divestitures, and joint ventures. For the past five years, he has focused on the intersection of technology and the automotive industry, with groundbreaking research on self-driving cars, connectivity, and mobility-on-demand services.



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We would like to thank KPMG colleagues Eric Shapiro, Paul Jawlik, Yatin Agarwal, Yoshi Suganuma, Craig Scott, Peter Moot, Kenneth Fodor, and Tara Thompson who each contributed extensively to the research and analysis behind this white paper.



# Parts to spare

**Autonomous or ‘self-driving’ cars are widely expected to offer society a number of benefits. Most noteworthy is that they will be involved in significantly fewer accidents and be safer than human piloted vehicles.**

And while a decline in roadway crashes is undoubtedly good news for society, it’s bad news for automakers and repair service businesses, who will face a significant hit to their bottom lines as the market for their lucrative collision parts and services business shrinks dramatically—and sooner than they may think.

Although the public typically sees automakers focusing on the sale of their new vehicles, what’s not so obvious is that a good amount of car manufacturers’ profits comes from replacement parts—the new fenders, hoods, windshields, etc., that go to repair vehicles damaged in accidents—and the service fees that repairs provide. If self-driving cars lead to a big reduction in road accidents—and studies indicate they likely will—original equipment manufacturers (OEMs) and service providers will need to transform to find ways to make up for this knock to their profitability.

KPMG’s Automotive practice has been at the forefront of researching the widespread effects of autonomous vehicles on the transportation landscape and has published several white papers on the topic (see Appendix for list.) Our most recent paper, *I see. I think. I drive (I learn).*, briefly discusses how the enhanced safety of self-driving cars is expected to affect collision-repair revenue and profits, as well as reshape the auto insurance

market. KPMG’s Insurance practice, in their paper *Automobile insurance in the era of autonomous vehicles*,<sup>1</sup> performed an extensive analysis to better understand and quantify the impact self-driving vehicles on the auto insurance market. They evaluated a number of factors and found that autonomous vehicles could lead to a potential 40 percent decline in total loss costs by 2040.

This paper will take that analysis further to explore the specific effects of autonomous vehicles on the approximately \$30 billion collision-repair market and the OEM collision parts business. Based on our analysis, OEMs should sit up and take notice because the impact on their business will be significant. Although collision parts typically account for less than 3 percent of OEM sales, they provide a highly stable source of revenue, and more important, account for 10 to 20 percent of operating profits. Particularly in lean years, as we saw following the financial crisis, collision parts serve as a critical buffer to offset the drop in OEM profits from new-car sales.

OEMs who think this challenge is still in the far-away future should be wary. KPMG’s analysis shows that increasingly sophisticated autonomous vehicle technology will become more widely available over the next five to 10 years. With this fast-approaching disruption, OEMs can’t delay to address this imminent threat to a highly lucrative part of their business, and should begin working today to position themselves to mitigate these risks tomorrow.

<sup>1</sup> <https://assets.kpmg.com/content/dam/kpmg/pdf/2016/06/id-market-place-of-change-automobile-insurance-in-the-era-of-autonomous-vehicles.pdf>



# Safer cars, thanks to technology

## We've all seen the commercials.

A car is traveling down a busy roadway. Its driver is distracted. The truck ahead stops short. The car screeches to a halt—automatically. Everyone is safe, thanks to the car's emergency braking systems.

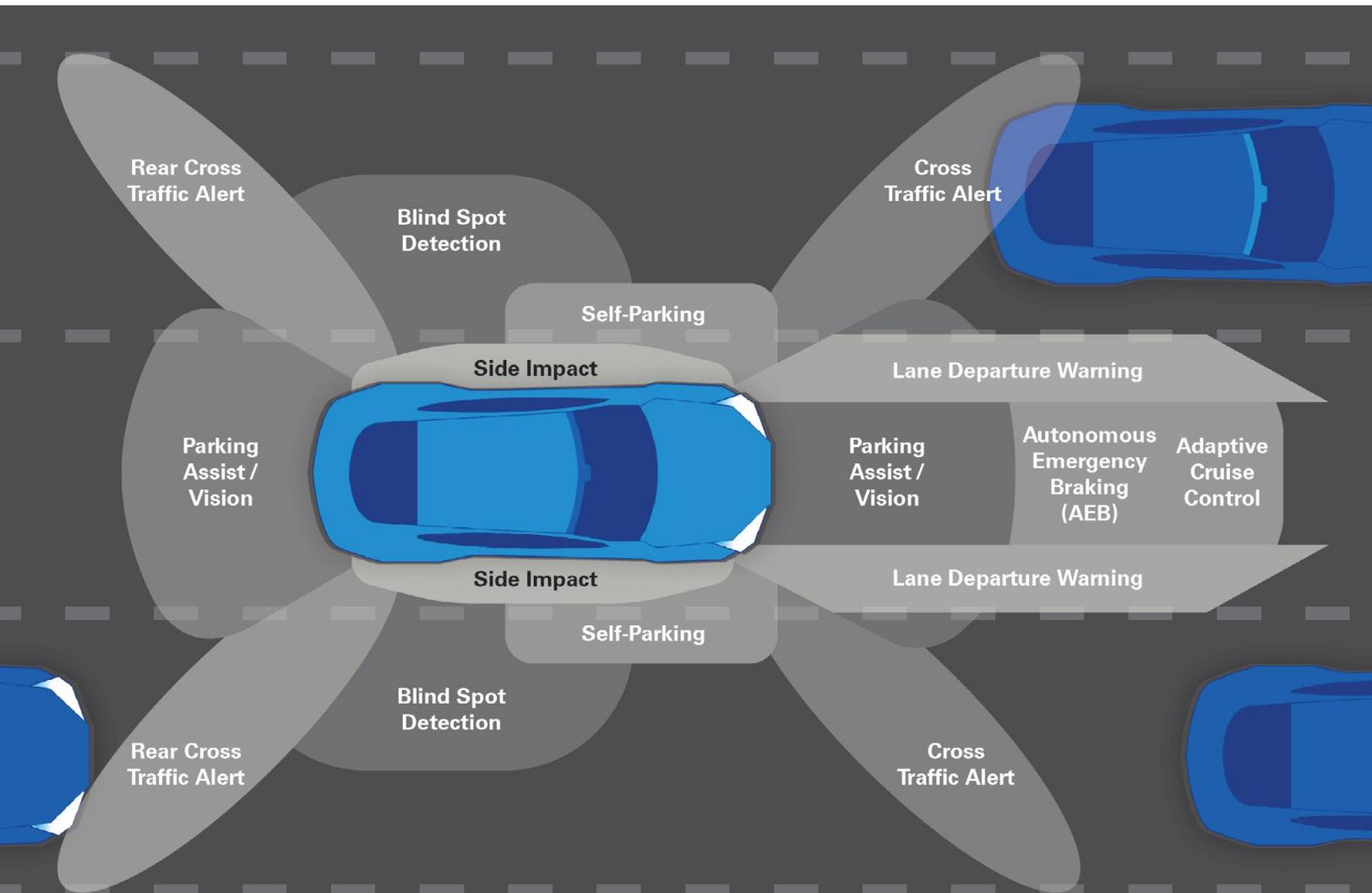
Since at least the 1960s, consumer advocates and later government agencies have encouraged automakers to install safety features—like seat belts and airbags—to protect passengers in the event of a crash. Today, with advances in sensing and computing technologies, car manufacturers are working on devices that can prevent crashes from

even occurring. These “advanced driver assistance systems” (ADAS) include lane departure warning and assist, autonomous emergency braking, adaptive cruise control, and blind spot detection, among others.

We know today that 94 percent of car accidents are caused by driver error; and almost half of these incidents stem from either slow or imprecise driver reactions.<sup>2</sup> So, as ADAS increasingly takes the decision-making out of the driver's hand, it follows that occasions for driver error declines dramatically.

*continued on page 5*

<sup>2</sup> Critical Reasons for Crashes Investigated in the National Motor Vehicle Crash Causation Survey. National Highway Traffic Administration. Traffic Safety Facts. February 2015. <https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812115>



# New driver distractions affect vehicle crash rates

Over the past several decades, vehicle accidents have generally declined, despite people driving more. That's mainly due to safety features, like antilock brakes, becoming more common.

However, gauging traffic safety can be complicated and involves a number of factors that can influence accident rates—including miles traveled, gas prices, and new driver distractions.

From 1995 to 2011, the number of light vehicles involved in traffic accidents declined by more than 20 percent, despite a 19 percent increase in vehicle miles traveled (VMT). This decline has been largely attributed to improvements in vehicle design and new safety features.

For example, antilock brakes (ABS), which became popular in the 1990s, have been estimated to reduce crashes by 6 percent, according to the National Highway Transportation Safety Administration (NHTSA).<sup>3</sup> Likewise, electronic stability control (ESC), which was introduced in 1997, also been estimated to reduce crashes by 6 percent, the federal government says.<sup>3</sup> And the popular sports utility vehicle (SUV), notorious for rolling over in a crash, began to be redesigned in the early 2000s to improve its stability in an accident.<sup>3</sup>

The picture has changed somewhat in the years since 2011, which has seen an uptick in crashes. However, industry observers attribute this increase to a variety of societal and demographic factors beyond vehicle design.

For one, people are driving more; VMT rose as the economy improved and gas prices fell.

The legalization of marijuana has added to the instances of driving while impaired. A study in Washington State found THC (the substance that causes the smoker's "high") in 17 percent of drivers involved in fatal crashes, compared with 8.3 percent prior to the state legalizing pot.<sup>4</sup>

Aging baby boomers may also be a factor. NHTSA studies show that individuals 70 years and older are riskier drivers.<sup>5</sup> However, this age group has only grown from 9 percent to just under 10 percent since 2010.

Perhaps the most likely factor is distracted driving, specifically from using smartphones while behind the wheel. While the research isn't settled, several studies do point to the dramatic impact of cell-phone usage on crash rates:

An estimated 2.2 percent of all drivers at a given moment were manipulating handheld devices in 2015 versus 0.9 percent in 2010.<sup>6</sup>

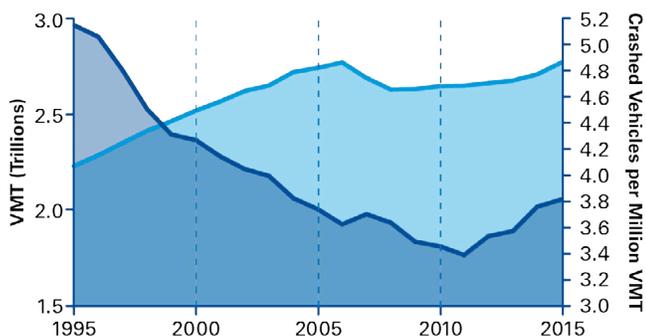
Texting doubles reaction times,<sup>7</sup> and sending or receiving texts increases the odds of a crash by a factor of 4 for novice drivers.<sup>8</sup>

Despite the recent uptick, crash rates are likely to revert back to a downward trend as the proliferation of ADAS, as well as new autonomous technologies, overcome the impact of distracted driving.

**Vehicles Crashed in the US, 1988–2015**



**Vehicles Crashed in the US, 1988–2015**



See appendix for sources

And research confirms that that these “guardian angel” technologies can have a substantial impact on vehicle crash rates.

A Virginia Tech study that modeled nearly 500 real crashes caused by unintended lane departures, estimated that 51 percent could have been avoided with lane departure warning (LDW) and lane departure prevention (LDP) systems.<sup>9</sup>

An Insurance Institute for Highway Safety (IIHS) study compared vehicles of the same model with and without automatic emergency braking (AEB) and found that AEB reduced forward collisions by 50 percent, which translates to a 16 percent reduction in all vehicle crashes.<sup>10</sup>

More impressive, Tesla’s Model S and Model X vehicles, which combine multiple ADAS features to enable semiautonomous “auto-pilot” functionality, have recently been shown to reduce crash rates by 40 percent, providing a glimpse at the incredible potential of autonomy on driver safety.<sup>11</sup>

Some of these ADAS features have been around for more than 10 years. Unfortunately, many of these systems have historically been available only as expensive options and mostly on high-end luxury brands, which means they are absent from most vehicles currently on the road.

That situation is changing, however. Today, ADAS features are being offered as options on more mass-market nameplates. Currently, more than 55 percent of vehicle models are being offered with at least one ADAS feature either as standard or optional.<sup>12</sup>

Although, consumer adoption is still low (only 9 percent of new cars sold in 2015 were actually equipped with ADAS<sup>13</sup>), this trend toward increasingly available driver-assist features will not only continue but also likely accelerate.



**NHTSA and DOT studies are documenting dramatic reductions in accident rates for early ADAS equipped vehicles. Savings of untold lives and avoided property damage will rapidly accelerate as ADAS, and eventually autonomy, become broadly available and increasingly valued by dealers and consumers. As part of their role in saving tens of thousands of lives per year, OEMs need to implement aggressive plans to right-size collision parts cost structures and identify new profit streams that will keep their shareholders and dealer partners whole, while maximizing showroom floor support for ADAS and autonomy.**

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**Tom Mayor**

National Strategy Leader for KPMG’s Industrial Manufacturing practice

<sup>9</sup> *Potential Safety Benefits of Lane Departure Warning and Prevention Systems in the U.S. Vehicle Fleet*. Virginia Tech. Paper No. 15-0080

<sup>10</sup> *Effectiveness of forward collision warning and autonomous emergency braking systems in reducing front-to-rear crash rates*. Insurance Institute for Highway Safety. November 2016.

<sup>11</sup> *National Highway Traffic Safety Administration. ODI Resume. Tesla Model S and Model X*. January 19, 2017.

<sup>12</sup> *Safe Car OE ADAS Guide USA*. (Ref: 534USA-151) <https://www.sbdautomotive.com/files/sbd/pdfs/534%20adas%20oe%20guide%20usa.pdf>

<sup>13</sup> *Jefferies equity research. Mobileye report*. January 13, 2017.

In fact, most OEMs, including Ford, General Motors, Toyota, Volkswagen, and Tesla, are incorporating multiple vehicle safety technologies, such as automatic emergency braking, lane departure warning, blind spot detection, and adaptive cruise control as standard features in their new car models by 2020.

At the same time, ADAS are becoming more affordable as the cost of the technology (sensors and computing power) declines and manufacturers achieve economies of scale. Lower costs will make these options more palatable to consumers. And this increased availability will also dovetail with a growing demand among consumers and regulators for safer vehicles.

## In “Automobile insurance in the era of autonomous vehicles,” we outlined a road map for the four potential phases for the adoption of autonomous technology:



### **Phase 1: Training Wheels,**

represents the current environment where manufacturers are rolling out vehicles with the underlying ADAS technologies for autonomy. We expect that by 2018, most vehicles will be sold with at least one ADAS feature.



### **Phase 2: First Gear,**

is the next wave of autonomy starting in 2018, where partial autonomy (similar to Tesla’s current autopilot feature) will become widely available.



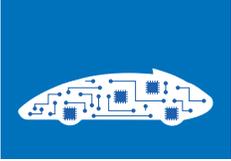
### **Phase 3: Acceleration,**

triggers the shift towards higher levels of automation with vehicle-to-vehicle (V2V) communication increasingly embedded in new vehicles and costs declining enough to appeal to a wide consumer base.



### **Phase 4: Full Speed,**

beginning in 2025, represents the start of broad-based adoption in a world where all vehicles have the highest levels of autonomy and V2V communications and enjoy the maximum safety benefits of autonomy.



# On the road to autonomous vehicles

**But the real endgame around ADAS technologies is that they are an integral part of the development of autonomous vehicles, which will eliminate driver error completely, or nearly so.**

And the development of self-driving cars is moving rapidly as well. Remarkably, most OEMs expect to be selling fully self-driving vehicles between 2020 and 2025, if not sooner—a mere three to eight years away. For example, all Tesla Model S vehicles are being sold with the required hardware for fully autonomous driving, and the company plans to launch a full AV that could drive from Los Angeles to New York City by end of 2017.<sup>14</sup> General Motors expects to begin production of test versions of autonomous Chevy Bolts and plans to deploy them in partnership with ride-share concern Lyft in 2018.<sup>15</sup> And Volvo has already initiated its plan to launch 100 AVs to be tested on Sweden roads in 2017 under the carmaker's Drive Me program, with plans to expand to China, the United Kingdom and the United States.<sup>16</sup>

Despite the rapid pace of ADAS and autonomous-vehicle development, it will be some time before self-driving cars make up a significant portion of all vehicles on the road (referred to as “parc”). Some in the auto industry would say that this “phase-in” period will allow OEMs to find new sources of revenue to make up for the decline in their spare-parts business.

But these new, safer cars—even in small numbers—will still have a substantial effect to lower crash rates for the simple fact that they will be driven more miles

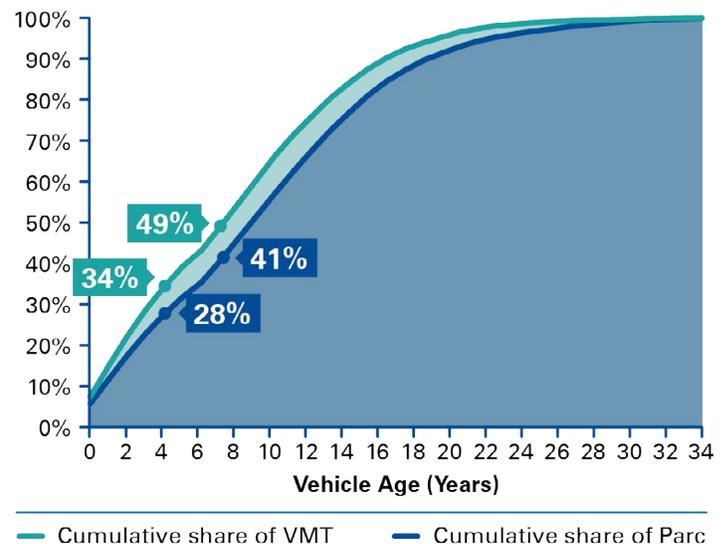
on average than older models. And again, these effects will begin to manifest in just a few years.

Experience shows that the younger the vehicle, the higher its utilization. Consider that a third of all VMT today is logged by vehicles four years old or newer, a segment that accounts for just over a quarter of the parc. And almost half of all VMT are logged by vehicles seven years old or newer, which accounts for about 40 percent of parc

Looking to 2025—less than a decade away—we estimate that nontraditional vehicles (that is, vehicles with at least one ADAS technology) could comprise 65 percent of parc, but almost 75 percent of VMT.

What's more, autonomous vehicles—which will be the newest cars on the block—could log as much as 10 percent more miles than cars driven today. That's because, with self-driving cars, the young and old will have increased independence. And not having to sit

**2015 Cumulative Share of VMT and Parc by Vehicle Age (miles)**

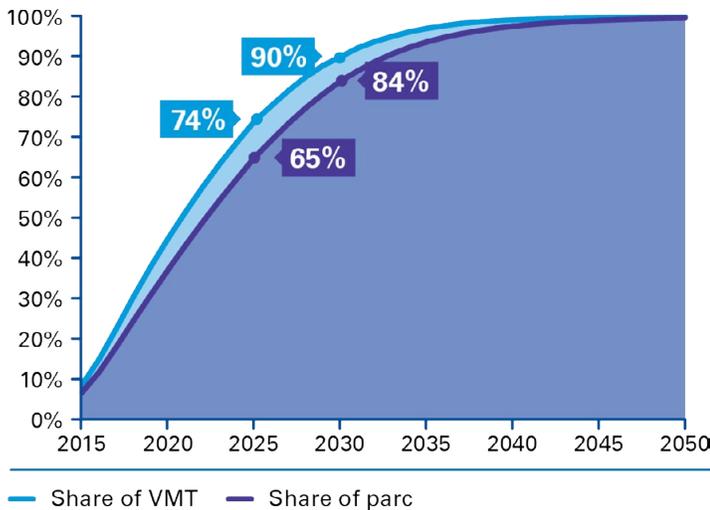


<sup>14</sup> Elon Musk Says Every New Tesla Can Drive Itself. Wired website. October 16, 2016. <https://www.wired.com/2016/10/elon-musk-says-every-new-tesla-can-drive/>

<sup>15</sup> GM plans to build, test thousands of self-driving Bolts in 2018 – sources. Reuters. February 17, 2017.

<sup>16</sup> Volvo plans self-driving trial in U.S. Automotive News. April 11, 2016.

## Share of VMT and Parc of Nontraditional Vehicles – 2015–2050



<sup>17</sup> See KPMG's *I see, I think, I drive (I learn)*

behind the wheel means riders can catch up on work or reading or other activities, which will encourage longer commutes and longer, more frequent trips in general.<sup>17</sup>

Put more succinctly, in the next few years, an increasing number of cars on the road will be equipped with ADAS features which have the potential to reduce roadway crashes. Moreover, these safer cars will be logging more miles and spending more time on the road than older “less safe” models.

## Government, insurance industry encourage automakers to install ADAS features



**A good deal of impetus behind the increasing availability ADAS is coming from the Department of Transportation and the NHTSA.**

The Insurance Institute for Highway Safety (IIHS) has already added collision-avoidance system testing to its suite of safety evaluations, and a car now needs to have a forward-collision warning system with automatic braking to win top safety scores.<sup>18</sup>

The National Highway Traffic Safety Administration (NHTSA) also modified its five-star rating system for 2019 model vehicles and proposed to rate vehicle safety technologies such as automatic emergency braking, blind spot detection, lane departure warning, and pedestrian detection for their effectiveness.<sup>19</sup>

Furthermore, 20 leading automakers agreed with NHTSA to make automatic braking systems a standard fit on new vehicles by 2022.<sup>20</sup>

See appendix for sources

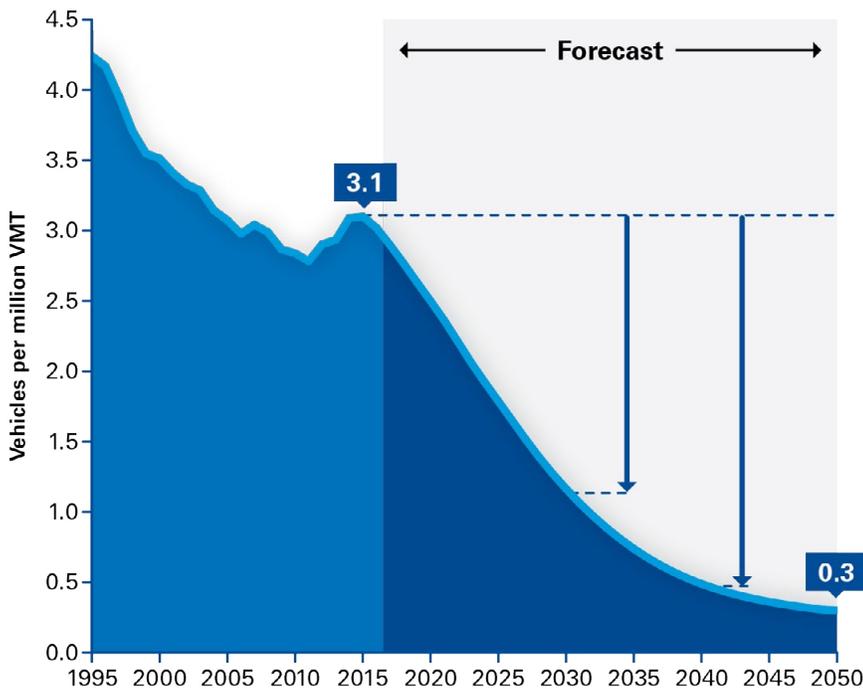


# Collision parts market takes a hit

**As these ADAS-equipped vehicles and self-driving cars increasingly take to the highway, the questions now are how much will they reduce driver error and lower the incidents of roadway crashes, and how the expected drop in vehicle crash rates will further disrupt automakers, particularly their collision parts business.**

To find the answers, we analyzed the long-term declining trend of crash rates over the past two decades and applied data from existing studies around the crash-reduction impact of ADAS technologies (e.g., Tesla study, IIHS study).

**Light Vehicle Crash Involvement (Excluding Total Losses) 2015–2050(a)**



In our projection, crash involvement rates could decline by over 60 percent by 2030 (that's just 13 years from today) and over 80 percent by 2040.

But declining crash rates are only one part of the equation when it comes to how this will all affect the collision-repair business.

As technology becomes more sophisticated, vehicle parts will become more expensive given the need for light detection and ranging (LiDar) sensors and other external sensing equipment to enable autonomous driving. Also, body shops will need new or more sophisticated diagnostic equipment to evaluate high-tech components and autonomous vehicle software.

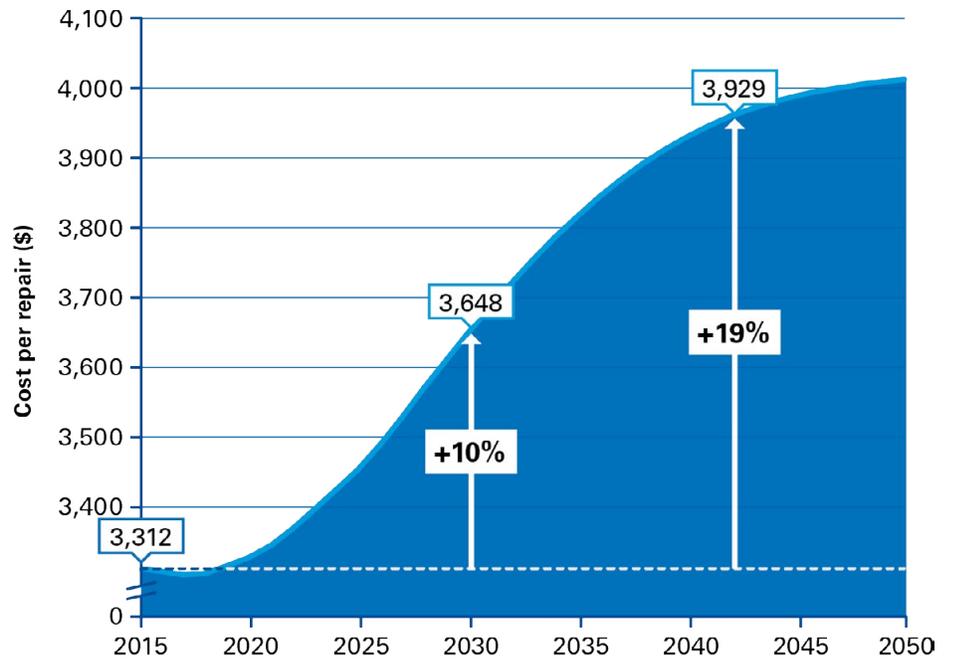
**Crash involvement rate could decline by over 60 percent by 2030 and over 80 percent by 2040.**

These added costs will be passed onto the consumer in the form of a bigger repair bill. While there may be transitional spikes as new technologies shift from low-take options to high-volume applications, based on the evolving mix of vehicles, we estimate that the average cost of repairs will increase (in real dollars) about 10 percent by 2030 and almost 20 percent by 2040.

Nevertheless, by combining the crash rate and cost per repair estimate, we could see a roughly 50 percent decline in the overall collision repair market by 2030 and around a 75 percent decline by 2040.

So, the decline in repair business will be somewhat offset by the cost per repair. However, it will not be nearly enough to overcome the dramatic decline crash-involvement rates.

### Projected Average Repair Cost – 2015–2050



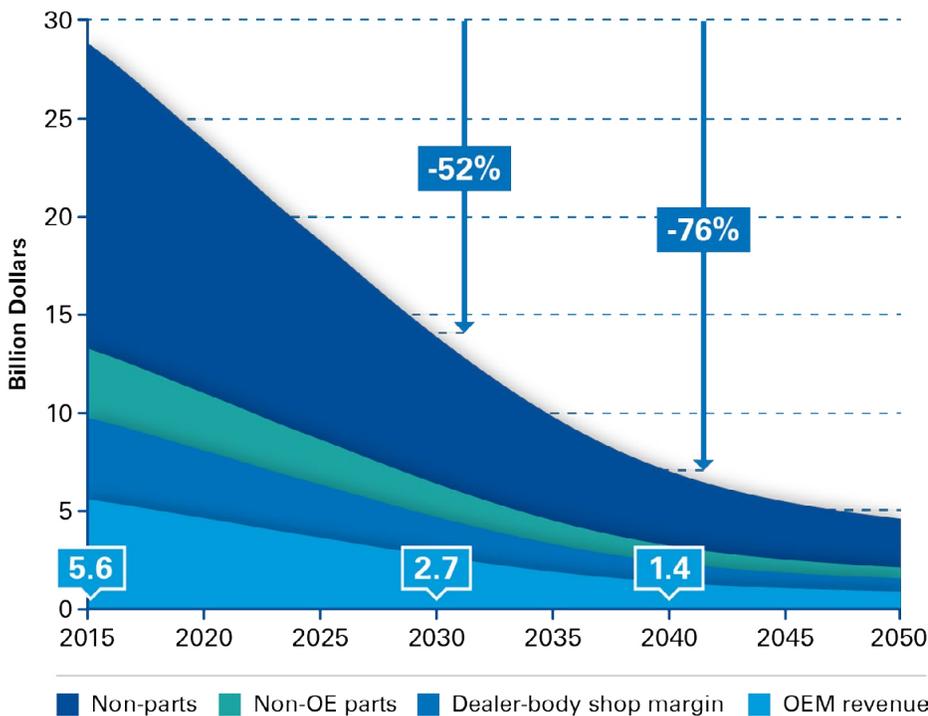


# Lower profits down the value chain

## What will this all mean for OEMs?

As automotive crashes decline and the subsequent reduction in the auto repair business takes hold, OEMs' revenue from the sale of collision repair parts will begin to dwindle. More specifically, OEM revenue is expected to decline in line with the overall collision repair market from about \$5.6 billion in 2015 to \$2.7 billion in 2030 and \$1.4 billion in 2040.

**Total Collision Repair Retail Market (billions) – 2015–2050**



Moreover, the impact to the bottom line would be substantial. Despite accounting for less than 3 percent of OEM revenue, collision parts make up on average 10 to 20 percent of operating profits. This is in part due to limited competition from aftermarket substitutes, given the proprietary design and tooling maintained by OEMs, as well as limited commonality of collision parts across car models (making it harder to justify the investment for aftermarket competitors). Furthermore, car owners typically have a high willingness to pay for collision parts (compared to maintenance parts) thanks to insurance coverage.



**This is a great source of concern for people in my line of business. I'm already seeing a 10 to 15 percent decline in repair jobs in my own shops among vehicles that come with ADAS.**

**In 15 to 20 years, this line of work is going to be decimated. ... I have already begun developing my exit strategy out of this business.**

**Any individual or OEM that doesn't believe in the urgency and magnitude of this is in denial.**

*Owner of one dealership and two body shops and a member of the Alliance of Automotive Service providers*

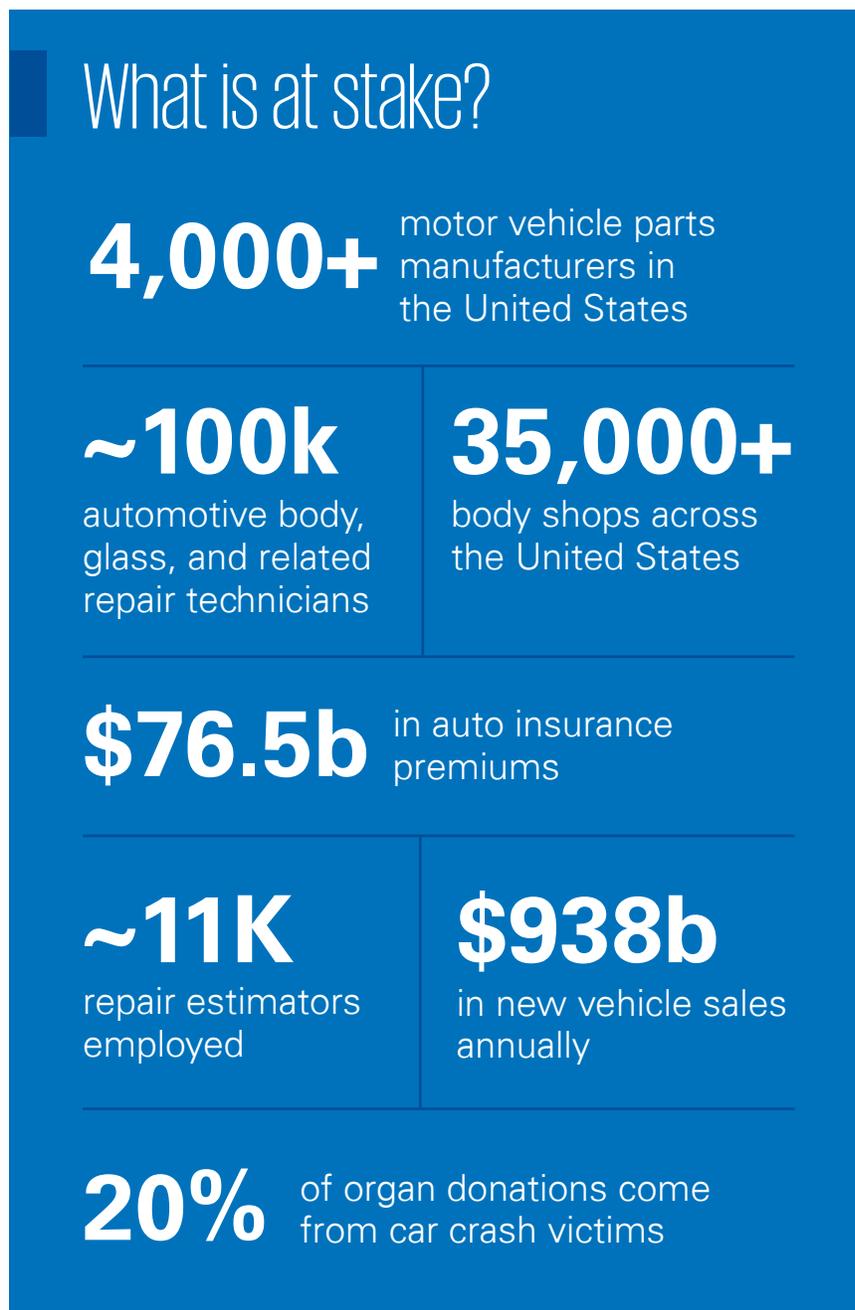
Based on the revenue impact, we estimate a potential 4 to 9 percent reduction in OEM operating profits by 2030, and a 6 to 13 percent reduction by 2040. The losses would be even greater in lean years, or in a scenario where the OEM has not taken steps to “rightsize” the spare-parts business. OEMs will also need to be wary of the impact to their dealers, most of whom will see a similar hit to their bottom line—particularly, the approximately 6,300 dealers with on-site body shops.

But that’s not the only worry for OEMs. Of the accidents that do occur, fewer will likely result in a vehicle that’s been “totaled.” That will affect new car sales, since fewer buyers will be looking to replace a car that’s headed to the scrap yard.

**Given the expected lower crash rates, operating profit for OEMs could fall 4 to 9 percent by 2030, and 6 to 13 percent by 2040. Losses would be even greater in lean years.**

And OEMs won’t be alone in feeling the effects of this trend toward fewer crashes. Other stakeholders in the value chain, including body shops, parts suppliers, salvage yards,

and insurance companies, will naturally face similar impact. As the revenue and profit pools for each of the constituents are compressed over time, we will likely see increasing competition and downsizing within each submarket, until the low performers ultimately are pushed out or absorbed into larger, high-performing players with scale advantage. The inevitable outcome of this competition and industry consolidation will likely be job loss and unemployment across the value chain.





# Call to action

**As KPMG has repeatedly asserted, we believe the production and adoption of ADAS-equipped vehicles, and ultimately autonomous cars, will happen at an accelerated pace.**

And more importantly, the effect on crash rates and the collision repair market will be dramatic. Thus, OEMs should start evaluating this development now and begin taking preemptive actions to mitigate the risk to their collision parts business. They must:

- Understand and quantify the risk to their own business, as well as identify the suppliers, dealers, and regions that may also be subject to substantial risk.
- Analyze and anticipate the declines in the types of collisions (rear end, blind spot, etc.) and their impact on the business as AV technologies are introduced.
- Develop a plan to rightsize their collision parts business and variabilize costs efficiently in response to a shrinking collision repair market.

As we mentioned earlier, failing to rightsize the business in a timely manner could lead to an even more pronounced hit to the OEMs' profits. And while it is critical to manage and contain the bottom line impact, it is almost equally important for OEMs to identify opportunities to fill this gap left by collision parts sales in the new era of autonomous vehicles.

Despite the enhanced safety afforded by autonomous vehicles, collisions won't completely go away, particularly during the phase-in period following their introduction.

As a result, the need for some collision repair parts will remain, and cars will have embedded new, high value components, such as sensors and cameras. OEMs should analyze and anticipate the types of crashes that will continue to occur. To ensure the integrity of these safety systems, the vehicles' digital plan and system architecture may need to ensure that these safety-critical parts are certified to work in the system as a whole—in other words, original-equipment parts would be the only valid replacement for a safe operating system.

With this collaboration between product development and the parts business, OEMs can effectively create a high-value proposition based on the safety needs of the vehicle.

Finally, OEMs should investigate additional sources of profit from new services and business models, including:

Providing alternative mobility solutions such as ride hailing, ride sharing, or car sharing

Offering vehicle management as a service to corporate fleets

Displacing auto insurance companies by providing bundled insurance with autonomous vehicles.



# Final thoughts

**OEMs have already begun to deal with the design and engineering challenges related to autonomous vehicles. And while their focus may be on bringing the first self-driving cars to market, OEMs must also grapple with the other effects these self-driving cars will have on their business—specifically, the decline in demand for collision parts that these safer, autonomous vehicles are expected to bring about by reducing driver error and consequently lowering roadway accident rates.**

Automakers rely on their spare parts business for a good percentage of their operating profit as well as a source of revenue during challenging economic times. To ignore this potential loss of revenue could have significant consequences to carmakers' bottom lines.

The era of the self-driving car will be here much sooner than most think. OEMs need to begin now to reevaluate their lucrative collision parts business and align its operations to fit the new reality that autonomous vehicles will bring.





## KPMG's Strategy practice can help your business transform with focus and agility

KPMG Strategy combines rapid analytical capabilities, cutting-edge tools, and deep industry knowledge to produce value-based insights for our clients. Our strong operating model and business transformation capabilities help turn strategy into a reality.

Our unique perspectives on the future of mobility and underlying market dynamics can help clients identify and prioritize emerging opportunities centered around value and innovation. We are currently assisting several OEMs and suppliers in addressing the disruption from autonomous vehicle technologies and navigating today's uncertain market environment, including:

- Quantification of threat to bottom line and upside from emerging opportunities
- Developing portfolio management, participation and business growth strategies
- Supporting business portfolio realignment with Buy-side, Sell-side and partnering strategies and implementation support
- Understanding consumer response to new offerings and the likely progression of the market
- Developing and supporting implantation of transformation programs
- Defining technology investment and development roadmaps
- Right-sizing and re-aligning the organization for changing business needs
- Supporting stand-up of corporate venture groups and incubators
- Identifying forward looking metrics to incubate and development future businesses

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## KPMG U.S. Manufacturing Institute Automotive Center

The KPMG U.S. Manufacturing Institute Automotive Center is an open forum where industry experts share knowledge, gain insights, and collaborate on timely and relevant issues facing the automotive market. KPMG recognizes that success in business is not a result of random inspiration, but rather of focused, strategic adaptations to ever-changing conditions. And with the unprecedented amount of change happening in business today, KPMG inspires automotive companies to confidently empower organizations to evolve rapidly and to capture value in emerging opportunities.

For more information on the Manufacturing Institute Automotive Center, please visit:

[www.kpmg.com/us/automotive](https://www.kpmg.com/us/automotive)





# Appendix

## Other KPMG automotive thought leadership.

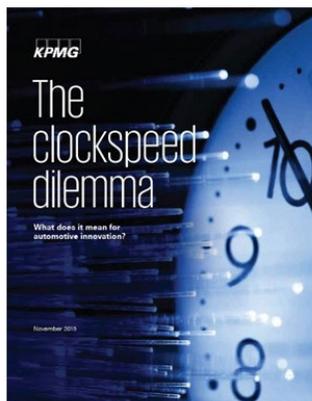
In case you missed them, here are previous papers related to the future of the automotive industry.



### [I see. I think. I drive. \(I learn\).](#)

**November 2016**

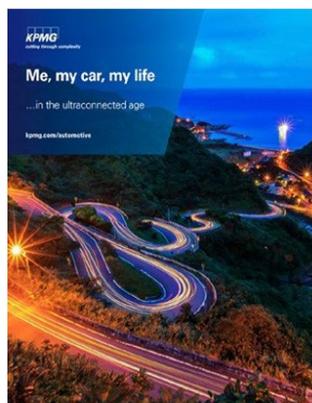
Thanks to deep learning, what once seemed like fantasy is swiftly becoming reality. An advanced form of artificial intelligence, deep learning is accelerating to the point of transforming the development of autonomous vehicles. And it will impact virtually every corner of the industry. Whether you are an automaker, automotive supplier, technology firm, or any other player in the automotive value chain, opportunity is up for grabs. So how will you seize it?



### [The clockspeed dilemma: what does it mean for automotive innovation](#)

**November 2015**

The convergence of consumer and automotive technologies, the rise of mobility services, and the development of autonomous vehicles are revolutionizing the automotive industry and the way we live our lives. There will be profound impacts on vehicle miles traveled, vehicle sales, car ownership models, energy demand, and infrastructure. KPMG examines how the automotive industry must innovate to thrive in this new and evolving ecosystem.



### [Me, my car, my life ... in the ultraconnected age](#)

**November 2014**

Not since the first automotive revolution has there been such stunning innovation in the industry. The convergence of consumer and automotive technologies and the rise of mobility services are transforming the automotive industry and the way we live our lives. How will the automotive industry adapt to this new world? How is technology reshaping the automotive ecosystem—and how will these industries work together?



## **Self-driving cars: Are we ready?**

**October 2013**

Gaze out at the automotive horizon and you can almost see a new era coming into focus: the age of self-driving cars. Ultimately, the shape of the automotive future will depend on consumers—their needs, preferences, fears—and their pocketbooks. Will they trust these new vehicles? What will future care buyers care about? If we build self-driving cars, will they come? KPMG seeks to answer these questions through the lens of real consumers who provide us with their unique perspectives on the self-driving market.



## **Self-driving cars: the next revolution**

**August 2012**

For the past hundred years, innovation within the automotive sector has brought major but mostly evolutionary technological advances. Now, the industry is on the cusp of revolutionary change with the advent of autonomous or “self-driving” vehicles. KPMG LLP and the Center for Automotive Research (CAR) together examine the forces of change, the current and emerging technologies, the path to bring these innovations to market, the likelihood that they will achieve wide adoption from consumers, and their potential impact on the automotive ecosystem.

### **Sources to sidebar, “New driver distractions affect vehicle crash rates”:**

<sup>3</sup> *Lives Saved by Vehicle Safety Technologies and Associated Federal Motor Vehicle Safety Standards, 1960 to 2012. National Highway Traffic Safety Administration. January 2015.*

<sup>4</sup> *Prevalence of Marijuana Involvement in Fatal Crashes: Washington, 2010-2014. Automobile Association of American Foundation for Traffic Safety. May 2016.*

<sup>5</sup> *Motor Vehicle Crashes, Injuries, and Death in Relation to Driver Age: United States, 1995-2010. Automobile Association of American Foundation for Traffic Safety. November 2012.*

<sup>6</sup> *Driver Electronic Device Use in 2015. National Highway Traffic Safety Administration. Traffic Safety Facts Research Notes. September 2016.*

<sup>7</sup> *An Investigation of the Effects of Reading and Writing Text-Based Messages While Driving. Texas Transportation Institute, The Texas A&M University System. August 2011.*

<sup>8</sup> *Distracted Driving and Risk of Road Crashes among Novice and Experienced Drivers. The New England Journal of Medicine. January 2, 2014*

### **Sources to sidebar, “Government, insurance industry encourage automakers to install ADAS features”:**

<sup>18</sup> *Collision-Avoidance Systems Are Changing the Look of Car Safety. Consumer Reports. December 17, 2015*

<sup>19</sup> *U.S. DOT brings 5-Star Safety Ratings into a new safety era. National Highway Traffic Safety Administration. December 8, 2015.*

<sup>20</sup> *U.S. DOT and IIHS announce historic commitment of 20 automakers to make automatic emergency braking standard on new vehicles. Insurance Institute for Highway Safety. March 17, 2016.*

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