



transportation transformation:

the current state of the autonomous car

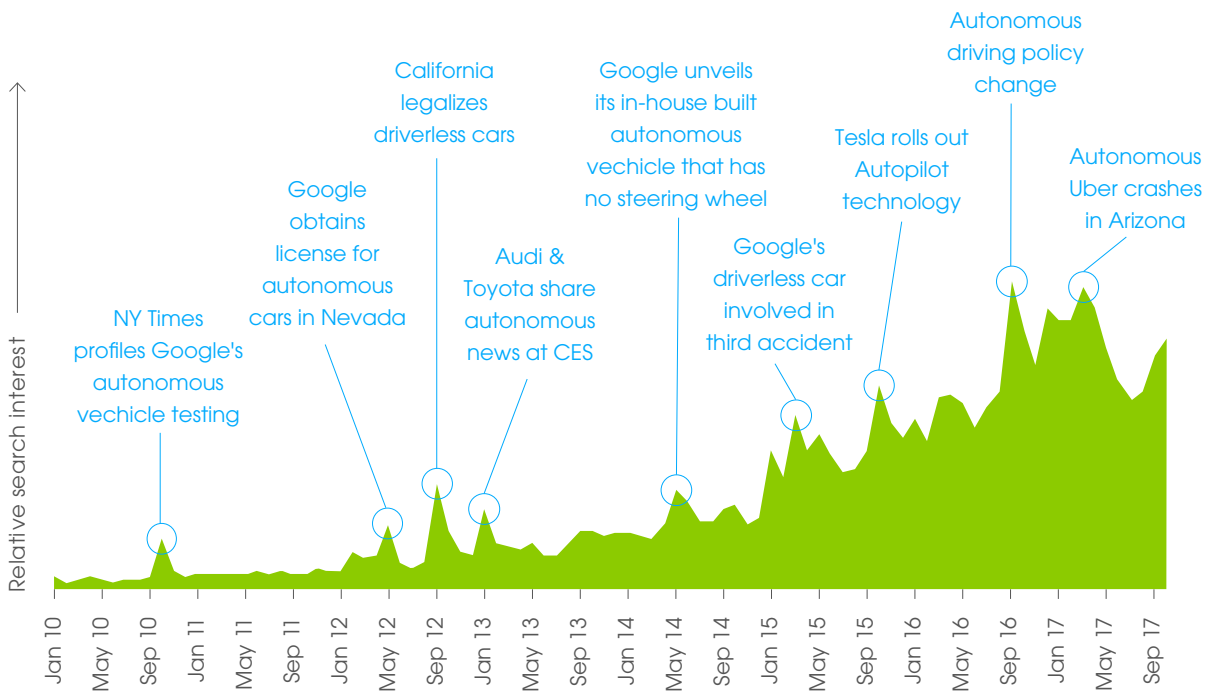
October 2017

Introduction

Autonomous technology has captivated the business world as automakers as well as technology companies are embroiled in a modern-day arms race to perfect their technology and bring it to market. There has never been a time in recent history when competition has been so fierce and innovation so plentiful in the auto space.

The speed of autonomous technology has come so swiftly that the question remains: Are consumers even ready for it? While most may be skeptical when asked if they want a car that drives itself, many consumers might not know that if they've bought a car recently, they could already be experiencing the early stages of automotive autonomy. It remains a heightened issue in the public consciousness, and spikes in interest are triggered by events as diverse as product debuts, autonomous-vehicle accidents, and policy changes — all as automakers and technology companies race to make self-driving vehicles a viable concept in the near future.

Autonomous cars



Source: Google Trends / Edmunds

Active safety is the precursor to autonomous vehicles

As we move toward an autonomous future, the groundwork is being laid by active safety features that use features such as cameras, sensors and radars to assess a vehicle's surroundings and prevent collisions. The availability of active safety features has grown rapidly and reflects a surge in customer interest as well as the proliferation and affordability of these technologies.

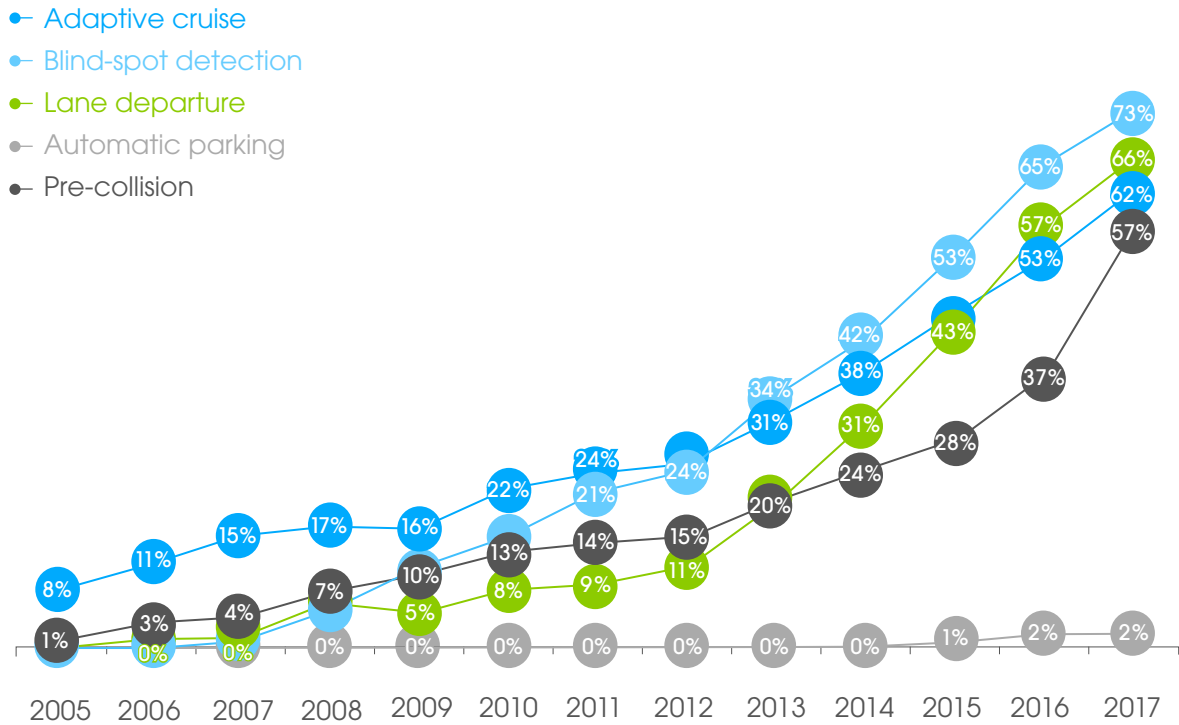
While these active safety features don't fully drive the car, they provide vehicles with relational awareness — the same awareness that will allow vehicles to be operated without a driver. Indeed, features such as pre-collision braking will stop a vehicle to prevent an accident and will serve as the first time many drivers yield control of their vehicles. As these features become more prevalent, they will become a critical proving ground for the future of autonomous features and be equally important in acclimating drivers with this technology.

Unprecedented pace of active safety availability

Safety ranks as a chief buying consideration for car shoppers, and manufacturers have raced to develop and tout active safety features as the latest round of safety offerings. In doing so, they've focused on the end — accident prevention — rather than the means — vehicle control by vehicles, not drivers. Nonetheless, competition is heating up to bring these active safety features to market, and they are now available on the majority of models.

These features have expanded in availability significantly in just five years — they were offered on less than a quarter of vehicles in 2012 compared with more than 60 percent of models in 2017.

Availability of active safety features



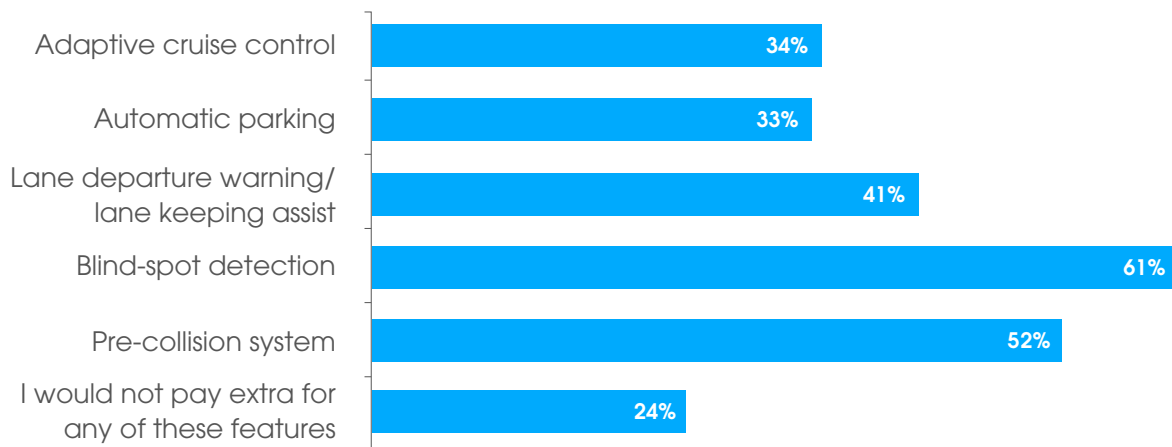
Source: Edmunds

These advanced safety features are slated to grow in availability and become standard equipment on ever more vehicles. Safety agencies have lauded the crash prevention capabilities of active safety features and, as a result, virtually all automakers have agreed to make automatic emergency braking standard equipment on all models by 2022. The expansion of active safety overall will also be facilitated by shared root technology, with features such as adaptive cruise control and pre-collision braking, for example, often employing the same technology to gauge distance.

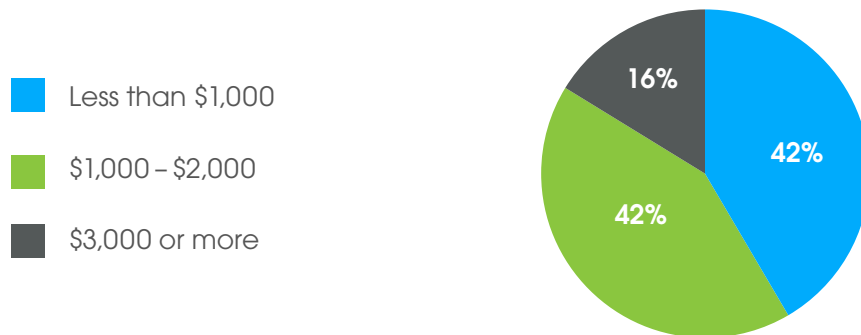
Autonomous features are growing but do consumers want them?

Automakers may be adding these features onto their cars at breakneck speeds, but are consumers ready for them? The reaction is somewhat mixed. In a recent Edmunds survey*, blind-spot detection was the active safety feature most in demand by consumers, with 61 percent of respondents saying they would pay extra for it on their next vehicle. On the other end of the spectrum, nearly a quarter of respondents said they would not pay extra for any of these features. Awareness of these features is expected to grow over time, which should further stimulate demand.

Which autonomous features would you be willing to pay extra for on your next vehicle?



How much more would you be willing to pay to have a vehicle with one or more autonomous features?



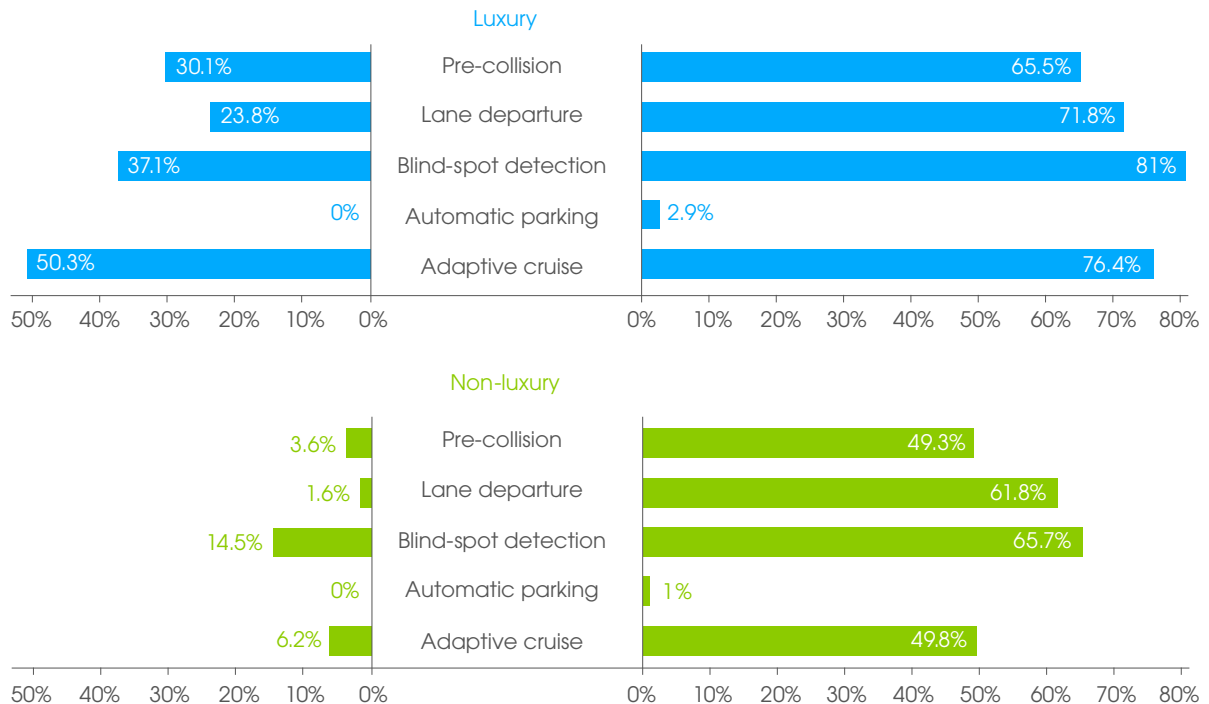
Source: Edmunds

*Methodology: National online survey of 1,500 U.S. residents ages 18-74 who purchased or leased a new or used vehicle within the past three years. The survey was conducted September 19 – 24, 2017. The sample was weighted to Census figures by age, gender, ethnicity and region.

The luxury trickle-down effect

One of the strongest indicators of the pervasiveness of this technology is how quickly active safety features have moved from the pricier luxury segment into mainstream vehicles. The availability of such features has grown rapidly in the non-luxury segment, with features including lane departure warning and blind-spot detection now offered on the majority of mainstream models. In other words, the majority of vehicles on the market today can be purchased at Level 1 (and some at Level 2) autonomy as defined by the Society of Automotive Engineers.

Availability of active safety features

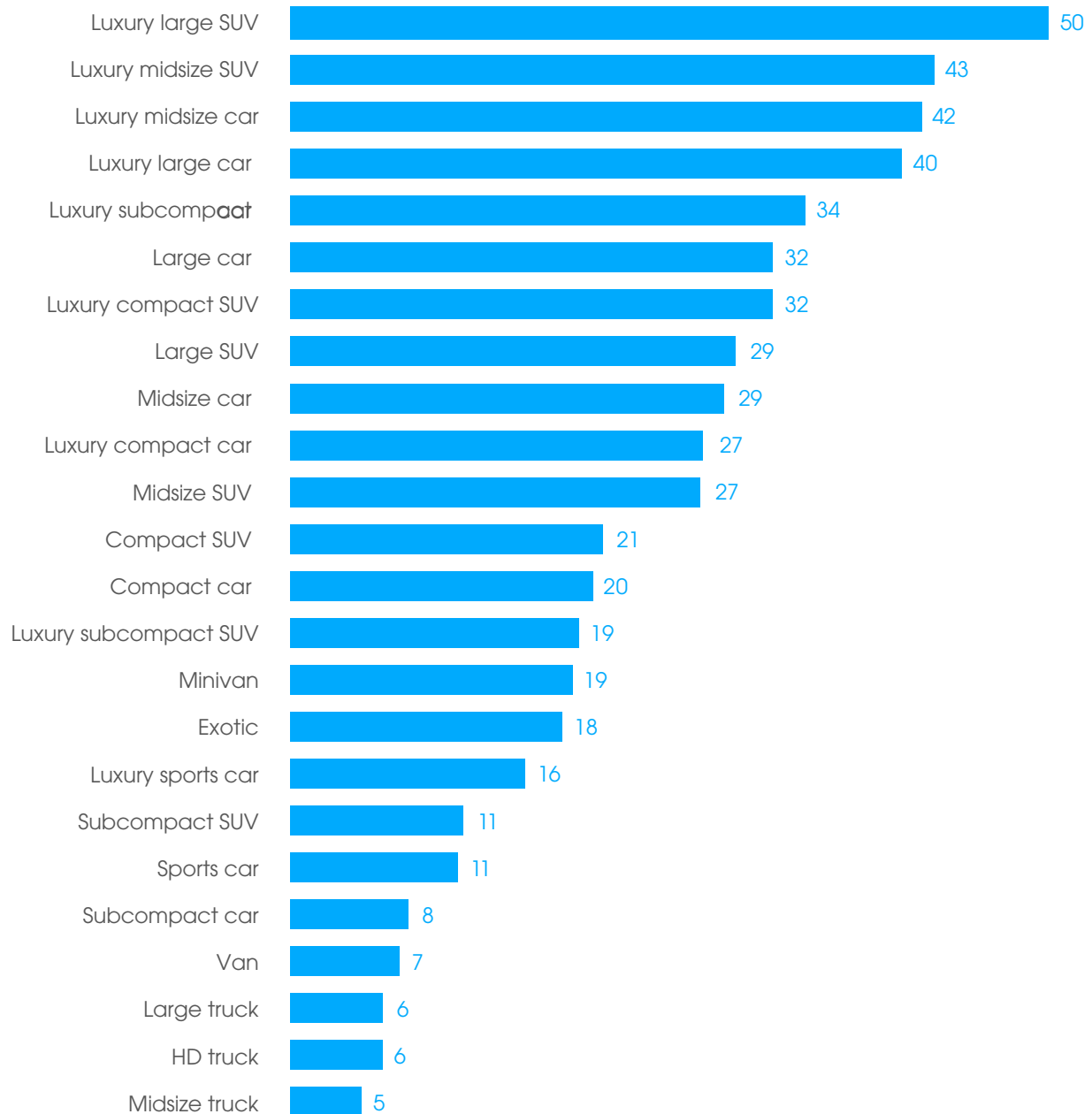


Source: Edmunds

While luxury automakers still lead in the penetration of active safety features, mainstream brands have certainly closed the gap, making these features available to a wider set of consumers. With the average price of a new vehicle hovering around \$34,826 in 2017, many car shoppers will be pleased to see these features offered on popular vehicles.

Despite high price tags, trucks and sports cars skimp on autonomous features

Autonomous features: segment ranking



Source: Edmunds

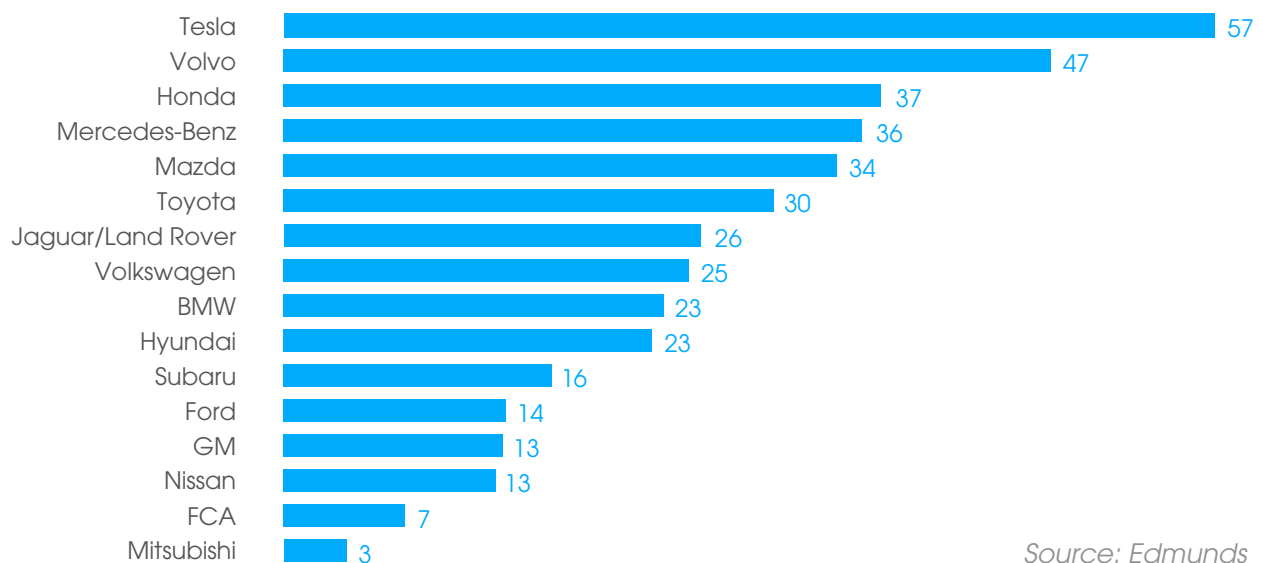
The luxury segments lead the industry in incorporating autonomous features. Technology has become a key differentiator for automakers, particularly in the luxury arena, so these features will continue to proliferate in these segments at an accelerated pace. The autonomous push represents just the latest trend in the dramatically changing luxury space. In just a few short years, the segment has transitioned from heritage-focused performance cars to SUVs showcasing future technology.

Models that focus on utility, performance and, to a lesser extent, economy trail the industry leaders in inclusion of autonomous tech. Even with ballooning MSRPs, pickup trucks have largely forgone these technologies, ranking at the bottom of the industry in their availability. The driver-focused sports car segment — both luxury and mainstream — are also far behind other segments. Here the notion of autonomous features conflicts with the more enthusiast-oriented selling points of these vehicles. Lastly, the subcompact vehicles with thin margins and a focus on affordability omit this technology to maintain the lowest possible MSRPs.

**Ranking methodology: For each autonomous feature (adaptive cruise, automatic parking, blind-spot detection, lane departure warning, and pre-collision system), a score of 3 for standard, 1 for optional, or 0 for not available was assigned to each model trim level. Those numbers were aggregated and divided by the maximum potential score to determine segment ranking. Only 2017 model year was scored.*

Among automakers, Tesla comes out on top

Current active safety features: automaker ranking



Source: Edmunds

Even without posting huge sales, Tesla has managed to be a major disruptor in the auto industry. It's challenging the status quo and has cultivated an impassioned fan base in addition to constant media coverage. The Silicon Valley company has pushed the envelope on autonomous driving nearly as aggressively as it has promoted electrification. Unsurprisingly, and not without controversy, Tesla is leading the way in the adoption of autonomous features. The company expects to have a cross-country demonstration of its self-driving technology toward the end of 2017.

Tesla takes the top spot of the automaker rankings — 43 percent of its trim levels have standard active safety features. Another 43 percent of Tesla trim levels have active safety features as an option. Mercedes-Benz, which has touted its autonomous technology, ranks behind the Silicon Valley company. Only 17 percent of its trim levels have standard active safety features while 55 percent of trim levels have optional active safety features.

While Tesla holds the top spot among 2017 models, the speed with which autonomous development is moving could produce a much different ranking in subsequent model years.

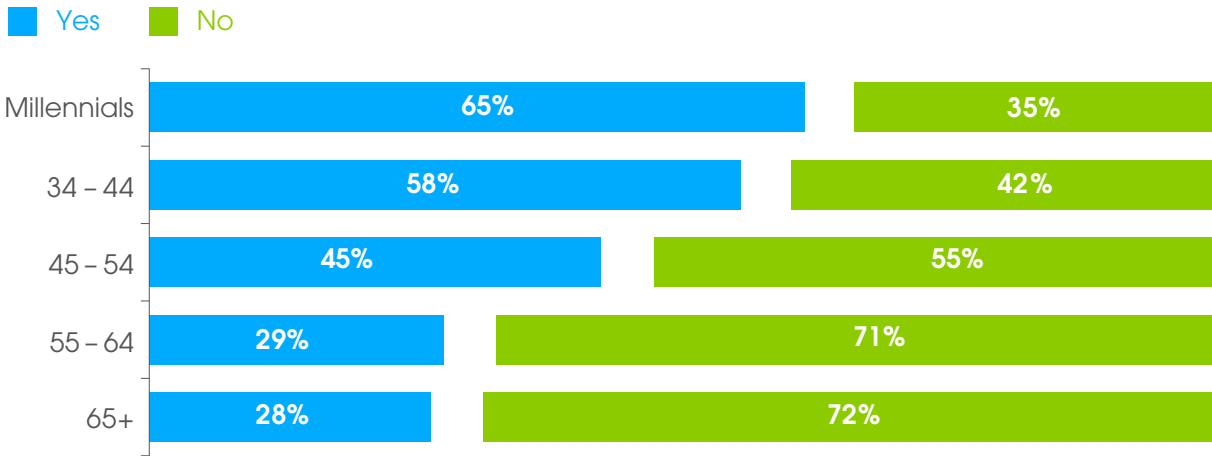
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Looking ahead: Autonomous vehicles will alleviate market issues

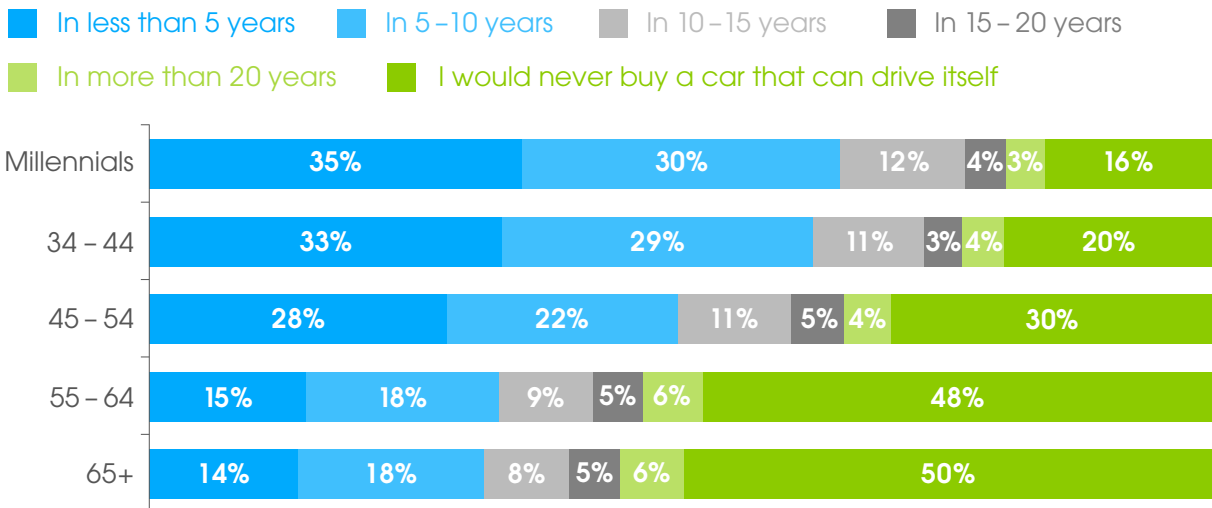
Automakers have spent billions of dollars developing electrified powertrains that haven't exactly been met with overwhelming consumer support. In the U.S., electrified vehicles make up 3.2 percent of the market, with pure EVs constituting a scant 1.0 percent. This is most likely going to change as global regulations push massive adoption of electric vehicles in the coming years, with some countries proposing bans on internal combustion engine sales in the next 25 years. With the future looking increasingly autonomous, electric powertrains are the natural accompaniment; they have fewer moving parts when compared to internal combustion engines and are simpler for computers to drive. Electric powertrains make sense for a growing autonomous world and may finally find a way to exist en masse.

Another promising sign for the future of autonomous vehicles is their acceptance by millennials. This populous group makes up about 30 percent of the adult population but accounts for only 10.6 percent of all new-car sales. Millennials' reluctance (and financial limitations) has been a puzzling issue for automakers to solve. On the positive side, millennials unfailingly seem more receptive than every other age group to autonomous technology. The continued advances in autonomous technology should coincide with millennials' long-awaited mass entry into the market. Sixty-five percent of millennials surveyed said that they would feel safe in a Level 4 autonomous vehicle compared to just 28 percent of people over 55.

Would you feel safe in a vehicle that drives itself, but requires someone to sit in the driver's seat and be able to override the system and take over at any time?



If it was available, when do you think you would be willing to buy a car that drives itself, but still requires a human to sit in the driver's seat to take over control if needed?



Source: Edmunds

Autonomy in the transportation space is a movement that is showing no signs of slowing down, and it is coming at a much faster clip than any other mass automotive technology. Many hurdles lie ahead, such as legislation, technical integration and consumer acceptance, but the basic foundation has already been laid. The world must ready itself for an autonomous future as we will witness the automobile evolve further in the near future than at any other time in its 100-plus-year history.