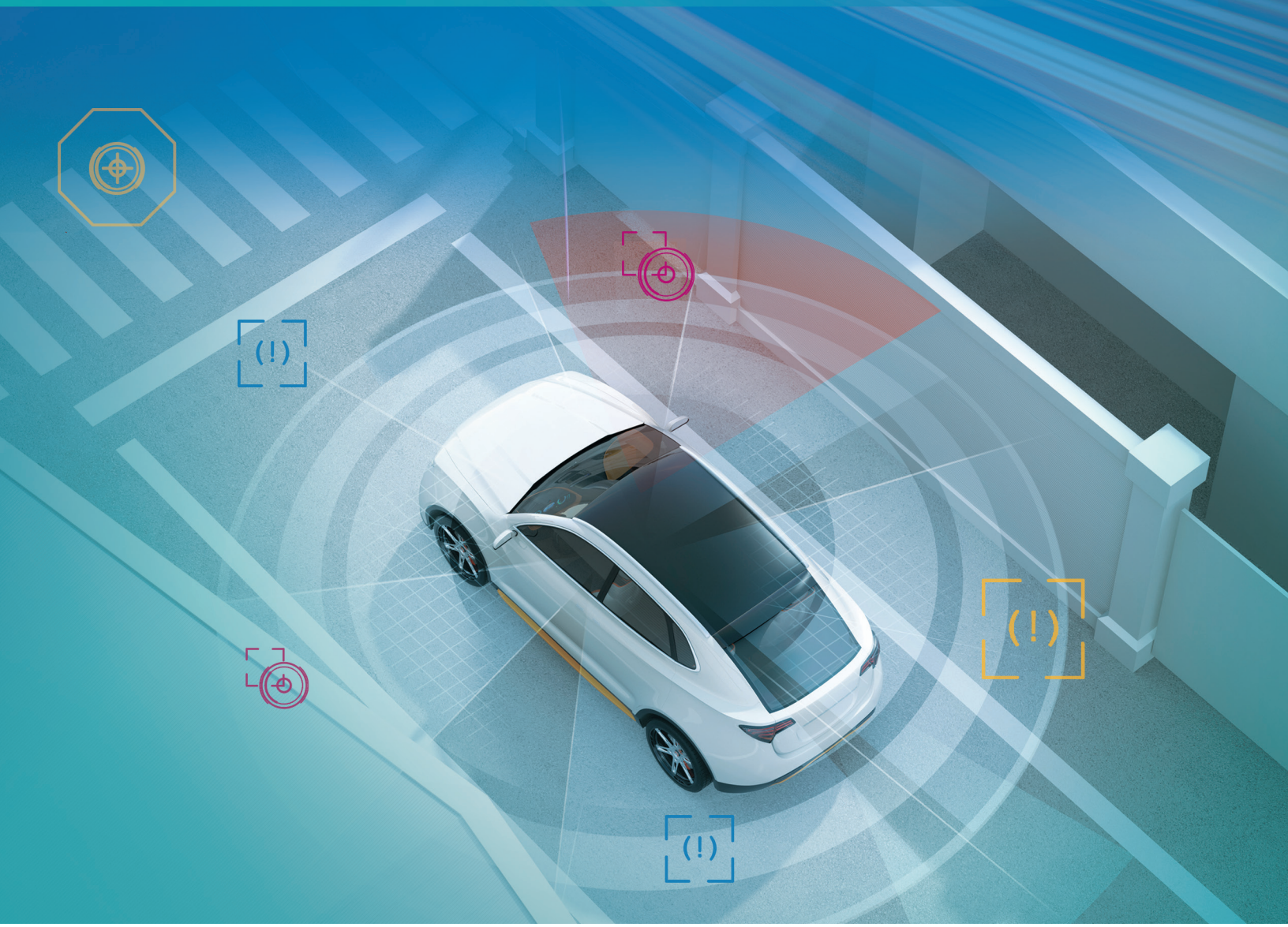
# 2019 AUTONOMOUS VEHICLES SURVEY REPORT

JANUARY | **2019**



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# Executive Summary

## Autonomous Vehicle Technology Races Ahead, But Industry Leaders Seek Consistent Rules to Allay Consumer Safety Concerns

*Executives from the tech and auto industries, as well as regulators, say consumer perceptions are the top impediment to industry expansion*

**WHILE THE AUTONOMOUS VEHICLE (AV) INDUSTRY JUGGLES THE PUSH FOR TECHNOLOGICAL ADVANCEMENT WITH** the need to instill consumer confidence, executives and regulators alike crave a comprehensive, coherent regulatory regime to govern the fledgling industry, according to a new survey.

The survey was conducted by global law firm Perkins Coie LLP and the Association for Unmanned Vehicle Systems International (AUVSI), the world's largest nonprofit organization devoted to advancing the unmanned systems and robotics community. It validates the notions that AV technology is making powerful strides and that it provides clear opportunities to increase convenience and reduce traffic accidents. But it also shows that industry leaders and regulators are well aware of the obstacles they face, from consumers' safety perceptions to a patchwork regulatory environment to the high price of investment in the rapidly evolving space.

More than 260 leaders from the automotive and technology industries, in addition to state and federal regulators, responded to the survey. They largely aligned on questions of design, licensing and training—where they mainly supported the status quo—but

While a majority of survey respondents (54%) preferred that AV-related regulations come from the U.S. Department of Transportation, respondents from the regulatory side tended to expect a new federal regulatory framework much sooner than industry respondents.

no clear majority agreed on which regulatory authority should drive oversight. In fact, the survey revealed a near-even split in preference between federal and state supervision.

While a majority of survey respondents (54%) preferred that AV-related regulations come from the U.S. Department of Transportation, respondents from the regulatory side tended to expect a new federal regulatory framework much sooner than industry respondents. This in part reflects ambivalence within the tech and automotive industries about the role guidelines should play in developing a new product. While rules can inhibit innovation and testing early in the process, without a comprehensive and coherent regulatory framework, companies may struggle to broadly deploy new technologies.

Reflecting further on consumer perceptions, some respondents (30%) considered loss of consumer confidence the most significant consequence of recent high-profile accidents and fatalities involving self-driving cars. The survey results confirm that such events have not gone underappreciated by those who build, test and regulate these vehicles; while 25% of respondents think consumers may believe that technology is moving too quickly, 81% of regulators said that continued efforts to develop and plan safety standards for experimental testing range are necessary.

## Liability and Consumer Perception Are Top Challenges

Industry leaders and regulators face a host of other challenges in preparing for a market that includes AVs, beginning with liability concerns. All survey respondents ranked this highest on the list of obstacles (50%), followed closely by consumer perceptions of safety—even as participants broadly reported expecting overall liability to decrease as the accident rate drops.

A handful of external forces also pose challenges to the growth of the AV market. Consumers' perception of safety, shaken by a few highly publicized accidents, tops the list of respondents' concerns, ahead of the price of investment. It's not surprising, then, that respondents saw a pressing need for infrastructure upgrades aimed at making AV-populated roads safer for drivers, passengers and pedestrians. Respondents ranked smart technology for road signs, traffic lights and merge lanes as the top priority among a list of such upgrades.

## As Market Grows, Investment Opportunities Abound

The market for driverless cars is projected to grow as large as $7 trillion a year by 2050[1]; in that time, we will see both the technology and the market for cars encompass traditional automobiles, augmented driving systems and fully autonomous vehicles.

This growth creates a vast scope for investment, and respondents perceived multiple opportunities as equally attractive and urgent. They ranked vehicle-to-vehicle and vehicle-to-infrastructure communication technology, 5G technology and Advanced Driver Assistance Systems as the most enticing investments, followed closely by precision mapping and location technology.

Overall, the survey results portray a young industry with almost unimaginably large potential experiencing the growing pains that can be expected when revolutionary technology is injected into the machines that move nearly everyone in the world everywhere they go, every day. As the industry works diligently to solve those challenges, we expect the growing pains to ease and lawmakers, consumers and regulators alike to embrace the clear advantages of the impending AV era.

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[1] https://newsroom.intel.com/newsroom/wp-content/uploads/sites/11/2017/05/passenger-economy.pdf?cid=em-elq-26916&utm_source=elq&utm_medium=email&utm_campaign=26916&elq_cid=1494219

# Key Findings

**HALF OF THE** respondents considered liability concerns the top obstacle to bringing AVs to market.

**THE RESPONDENTS VIEWED** concern over consumers' perception of safety as the biggest impediment to the growth of driverless cars in the next five years.

**CONVERSELY, THEY VIEWED** reduced traffic accidents as the greatest benefit to consumers, ranking it first among 10 possible choices.

**NO CLEAR MAJORITY** of survey participants agreed on which regulatory authority should be responsible for oversight of liability issues. While regulators and technology executives foresaw state regulators taking this role, automotive executives expected federal regulators to take the lead in managing liability issues.

**REGULATORS OVERWHELMINGLY**—and unsurprisingly—viewed safety standards for experimental testing as crucial, with 81% saying such standards are at least somewhat necessary.

**TWO-THIRDS OF REGULATOR** respondents expected a patchwork of fragmented and sometimes conflicting rules to be harmonized at a federal level within five years.

**RESPONDENTS SAW SAFETY** and the price of investment as the principal obstacles to the growth of the AV industry; those in technology fields considered investment costs the most worrisome obstacle.

**MORE THAN HALF** of the respondents considered wireless connectivity among cars, parking meters, traffic lights and other smart infrastructure as the top data infrastructure requirement. They also said that urban and highway infrastructure need urgent attention to facilitate testing. Connectivity to towers and antennas ranked second, with data centers to manage and analyze large volumes of information collected from the vehicles also among the top choices.

**TECH AND AUTO** industry respondents considered 5G technology, vehicle-to-vehicle and vehicle-to-infrastructure communications, and advanced driverless assistance systems as the most attractive places in which to invest in the next five years.

*NOTE: The survey was completed by 264 respondents. In the charts that follow, some results do not add up to 100% due to rounding and some exceed 100% because respondents were invited to select more than one answer. For the full survey methodology and a breakdown of respondent demographics, see page 12.*

# Survey Results

## What do you believe would be the best means of establishing regulations of AVs?

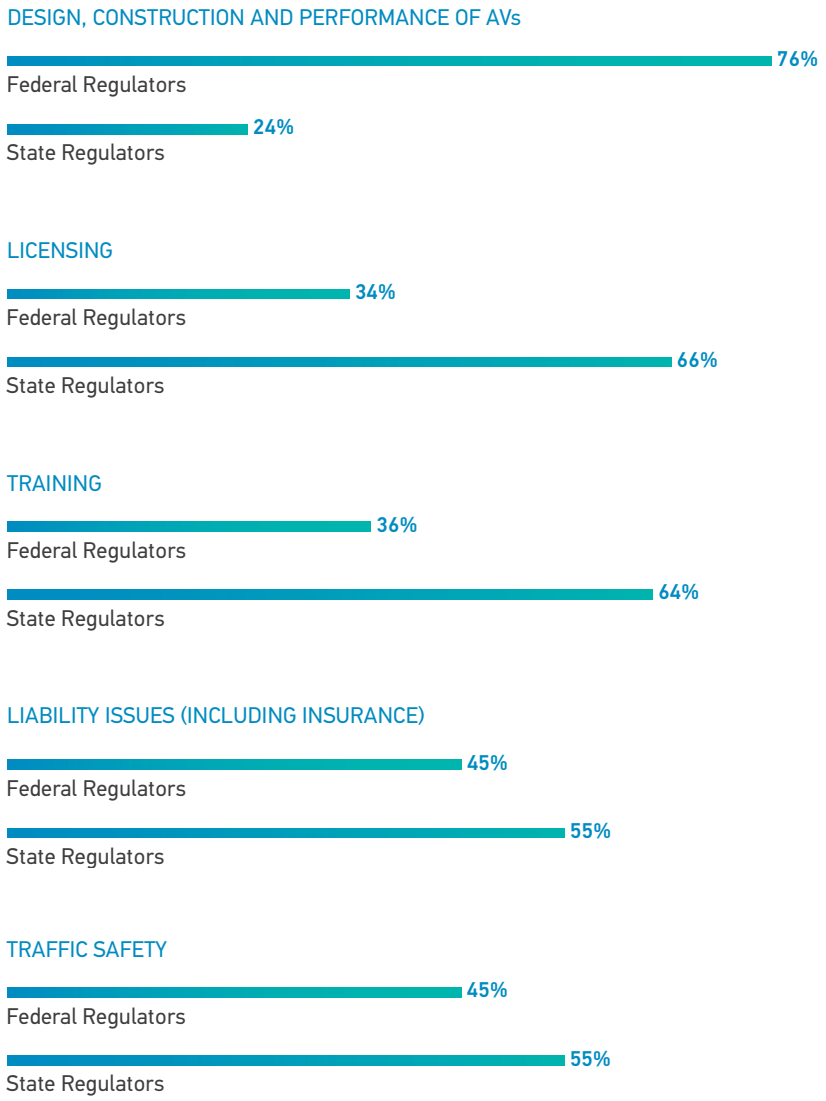
A majority of industry respondents said they would rather see regulation come from the federal level. This reflects not only participants' comfort with the status quo—safety and vehicle design has always been a federal responsibility—but also the difficulty automakers anticipate in achieving widespread adoption of AVs without a broad and coherent regulatory framework.

More than a vastly expanded regulatory role, this result may show that federal regulation ensures a consistent national framework. And, beyond the oft-discussed impediment that a patchwork of state and local rules would create in any nationwide market, it is implicit in the nature of a motor vehicle to be mobile. Electric vehicles stumbled early in their commercial introduction because the distribution of charging stations limited their use; leaders in the AV industry fear that inconsistent laws could similarly restrict their adoption.

In addition, consistency may also help ease the challenges of deliberately making rules to govern technology that is changing and advancing at breakneck speeds.

"There's nothing you could do from a regulatory standpoint that would be relevant by the time the regulation came out," said a former administrator of the National Highway Traffic Safety Administration (NHTSA) who now works for an AV startup. "That's the issue now with technology moving so fast. If you regulate a technology or operating capability today, by the time the rule is finished, it would be obsolete."

## Please select whether federal or state regulatory authorities are more likely to have oversight responsibilities for each of the following tasks:




Respondents, including regulators and industry participants, preferred to see the responsibility for regulating design, construction and performance remain at the federal level while clearly hoping the states would take the lead in licensing and training, mirroring the way traditional vehicles have been regulated.

Survey participants narrowly preferred state-level regulation of liability issues and traffic safety, which may reveal the uncertainty implicit in the industry's maturity level. While safety is clearly a principal concern, there are many questions about how to define the term as it relates to the technology used in AVs.

"It's a work in progress," said an engineer who directs standards at an association promoting advancement in all types of vehicles. "Everybody thinks there are solid binary answers to this. But certain things have to happen to provide answers to those questions."

## What would be the greatest benefit to consumers in using autonomous vehicles (AVs)?

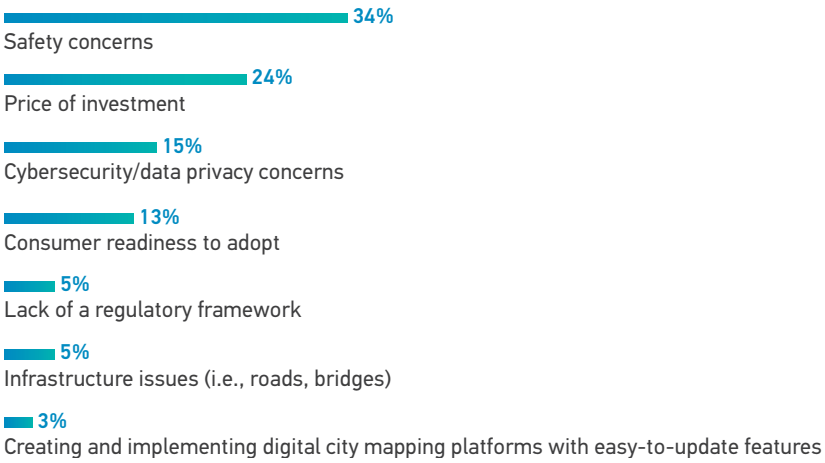
| | |
|---|---|
| 1 | Reduced traffic accidents |
| 2 | Decreased vehicle servicing costs |
| 3 | Decreased expenditure on fuel |
| 4 | Reduced energy consumption |
| 5 | Greater access to healthcare with improved patient mobility |
| 6 | Increased work productivity |
| 7 | Increased free time for family and entertainment |
| 8 | Reduced pollution (reduction of $CO_2$ emissions) |
| 9 | Higher vehicle flow rates on existing roads (increased lane capacity) |
| 10 | More efficient parking |

All survey respondents—technology and automotive executives as well as regulators—saw the possibility of reducing vehicle accidents, along with their staggering costs in life, health and treasure, as far and away the most important benefit of AVs. More survey respondents selected reduced traffic accidents as the greatest benefit to consumers than all other options combined—and no more than 10% of respondents selected any other answer.

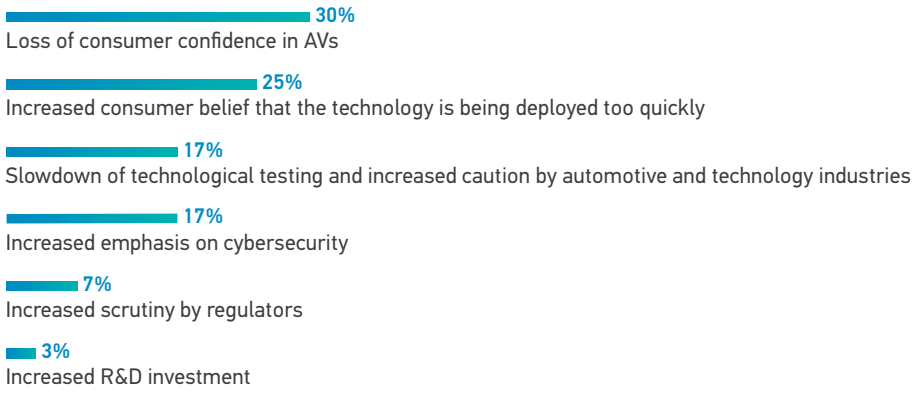
"This technology presents the most significant new tool to change road safety in 100 years," the former NHTSA administrator said, comparing U.S. highway fatalities to two jetliners crashing every week. "We know 94% of crashes are due to human choice or error. Just think of getting rid of that 94% so that nobody ever drives drunk, drugged, drowsy or distracted."

Meanwhile, more than one-third of participants from the auto and tech industries saw concerns about safety as the biggest obstacle to the growth of driverless cars in the next five years, surpassing the price of investment by 10% and far exceeding consumers' readiness to adopt the new technology.

## What do you see as the biggest obstacle to the growth of AVs in the next five years?



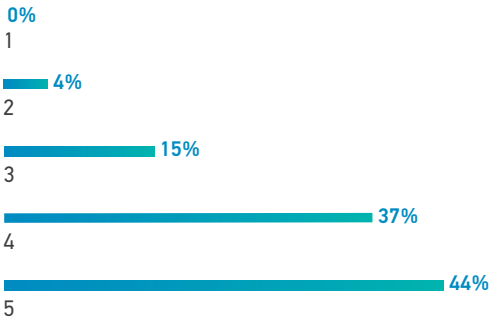
## In what ways has the industry been affected by recent high-profile problems involving autonomous vehicles (AVs)?



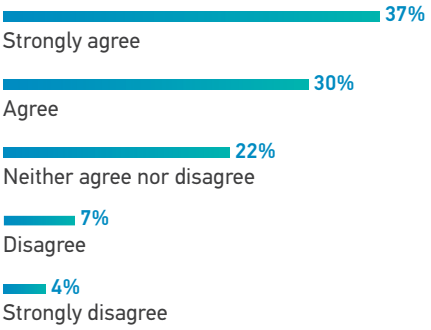

Consumer sentiment dominated our participants' view of the effect of recent crashes and other high-profile problems involving cars driving themselves. Of the respondents who said loss of consumer confidence was the most important consequence of such incidents, 52% came from the auto industry. Among the respondents who were most worried about consumers' concerns over the speed of technology deployment, 58% hailed from technology professions.

"Everybody does agree that safety and public trust are critical," the former NHTSA administrator said. Even as legacy car manufacturers view consumers' concerns principally through the lens of safety, "tech companies don't have to deal with a highly regulated industry where people die if your product doesn't work," he said. "It's not just about safety, it's about trust."

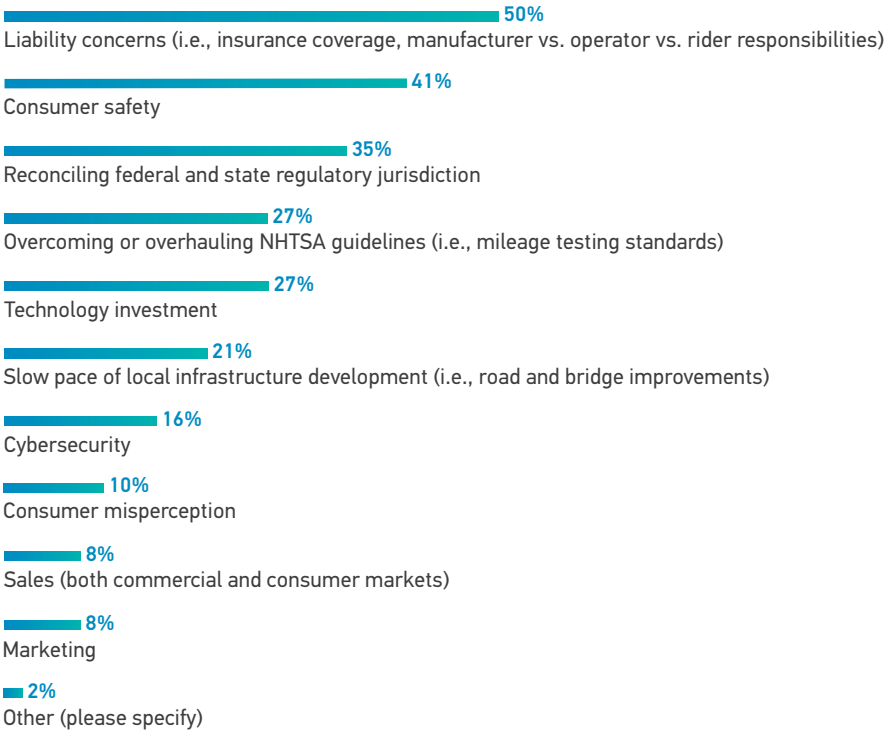
## On a scale of 1 – 5, how necessary are continued efforts to plan and develop new safety standards for experimental testing? (Regulator responses only.)



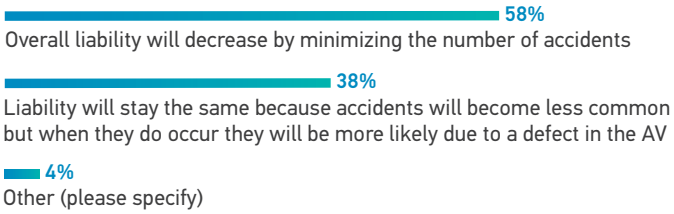
## In the absence of federal regulations for AVs, state regulatory bodies have developed fragmented and sometimes conflicting regulations addressing the testing and licensing of autonomous vehicles. Please indicate your level of agreement with the following statement: *There will be a federal regulatory framework for autonomous vehicles within the next five years.* (Regulator responses only.)




## What are the top challenges in bringing AVs to market?



## How do you think the adoption of AV technology will affect product liability risks for manufacturers of AVs and their components?




Liability topped participants' concerns about bringing AVs to market, followed by consumer safety and then reconciling federal and state regulations. Absent a robust regulatory framework, these are two facets of the same issue, indicative of industry participants of all types contending with the extra complexity arising when innovation speeds ahead of rulemaking in a heavily regulated environment.

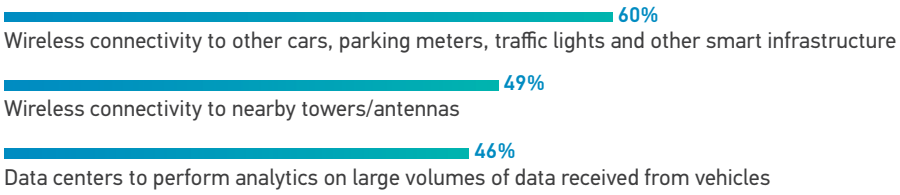
"There's a cap on how far you can go with existing vehicle safety standards," said an expert in the legal aspects of the AV industry. "Some vehicles—the ones without a steering wheel or brake pedal, for example—can't be tested or sold today."

AV designers have some latitude to take advantage of regulatory irregularity by selecting the jurisdictions with rules lenient enough to allow testing. To create a mass market, however, carmakers will need a single coherent standard.

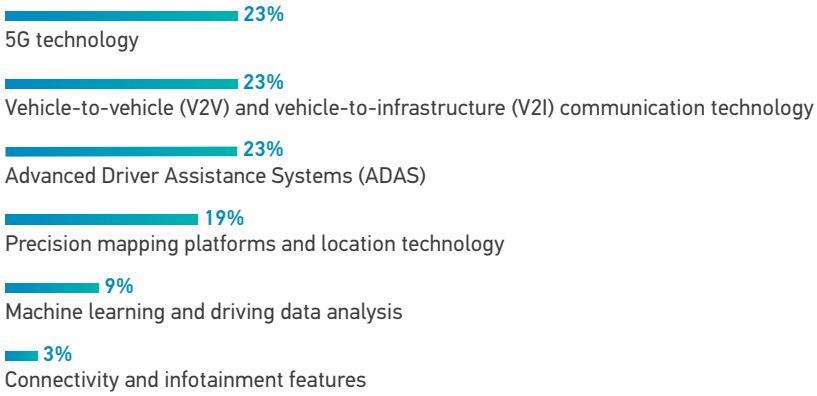
In addition, in the meantime, there is no clarity on who will be held responsible when things go wrong.

"There's a lot of mixed messages that are hard to reconcile," continued the AV legal expert source. "You don't have a liability issue until you've failed on safety. Liability is typically determined through the courts, not by regulators."

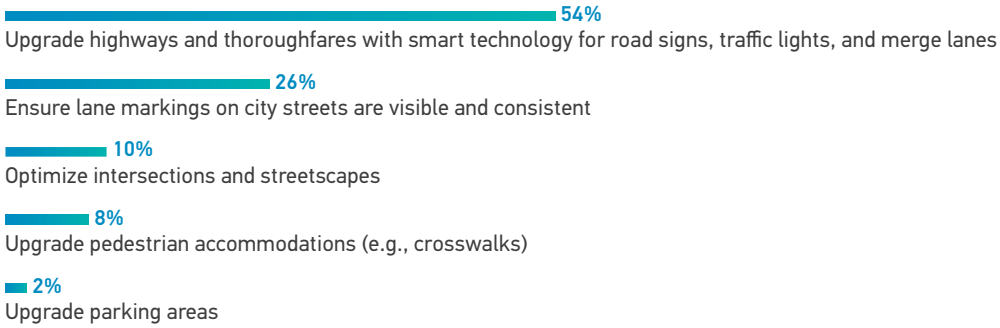
## In your opinion, what are the top data infrastructure requirements in smart cities to facilitate AV testing in 2019? Please select all that apply.



## Which of the following technologies for autonomous vehicles do you consider most attractive for investment over the next five years?




## Which city infrastructure requirements need immediate attention so that AV technology testing/implementation can be facilitated further, starting in towns and cities?



# Methodology and Demographics

In Q4 2018, 264 respondents completed Perkins Coie and The Association for Unmanned Vehicle Systems International's 2018 Autonomous Vehicles Survey, via an online survey tool. Respondents represented three areas of employment: automotive industry (dealerships, manufacturers and suppliers); technology sector (hardware and software); and regulatory bodies (federal and state). The results were tabulated, analyzed and released on January 14, 2019.

As stated previously in the report, due to rounding, the percentage breakdown may not add up to 100% for some questions, while others may exceed 100% because respondents were invited to select more than one answer.

# About the Study Authors

PERKINS COIE

With more than 1,000 lawyers in 19 offices across the United States and in Beijing, Shanghai and Taipei, Perkins Coie represents great companies across a wide range of industries and stages of growth. Using our deep knowledge of technology and transportation markets, we represent companies operating in the connected and autonomous vehicle space, including companies focused on non-traditional transportation solutions, electric vehicles, self-driving cars and the sharing economy. We also partner with and strategically advise industry players, including those in IoT automation, on a wide spectrum of legal issues. Our clients include established technology companies, original equipment manufacturers and Tier 1 and Tier 2 suppliers, as well as emerging growth and startup companies in the autonomous vehicle industry.

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The Association for Unmanned Vehicle Systems International (AUVSI), the world's largest nonprofit organization dedicated to the advancement of unmanned systems and robotics, represents corporations and professionals from more than 60 countries involved in industry, government and academia. AUVSI members work in the defense, civil and commercial markets.

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