



Public opinion research study: Consumer awareness of, and confidence in, automated vehicles (AVs) and advanced driver assistance systems (ADAS): Executive summary

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Ce rapport est aussi disponible en français

This public opinion research report presents the results of an online survey conducted by Ipsos on behalf of Transport Canada. The research study was conducted with n=2500 Canadians in December 2020. It also presents the qualitative results of questions posed on Ipsos Conversations - an omnibus online qualitative community designed to provide clients with qualitative insights. A total of 159 Ipsos Conversations community members shared their thoughts on topics related to advanced driver assistance systems (ADAS) as well as automated vehicle (AV) technologies between January 28th and January 30th, 2021.

Cette publication est aussi disponible en français sous le titre Connaissance et confiance des consommateurs en ce qui concerne les véhicules automatisés et les systèmes avancés d'assistance à la conduite.

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Executive summary

This report presents findings from qualitative and quantitative public opinion research conducted to gauge Canadians' confidence in and expectations of AVs (automated vehicles), including ADAS (advanced driver assistance system) features currently available on the market.

This research builds upon the 2019 AV POR (public opinion research) findings by: (i) using the 2019 data as a baseline for tracking changes in Canadian attitudes and knowledge toward AVs; (ii) exploring the sources of Canadians' concerns and misperceptions about AVs, and how they might be overcome; and (iii) seeking to understand ADAS user habits in greater detail in order to learn how drivers' knowledge affects their behaviour.

The findings from this research will allow Transport Canada to better understand Canadians' views on AVs which will help create relevant resources for Canadians that enhance their understanding and build appropriate trust in these technologies.

Noting that when used properly, AV technologies have the potential to reduce the severity and frequency of vehicle collisions, it will be important that Canadians feel confident in using these features while respecting their limitations. In turn, greater use of AV technologies has the potential to make Canadian roads safer for both vehicle occupants and other road users.

Background and objectives

Vehicle automation comprises a series of innovative and evolving technologies that are changing the Canadian motor vehicle landscape. As more and more AV technology enters the market, it is important that Canadians become more familiar with this evolving technology in order to increase safety and security on Canadian roads.

Although numerous studies have been conducted on AV technologies, including some that have touched on Canadian perspectives, there is limited information about what the general Canadian population knows about these technologies and whether or not they learn about them in a manner that promotes safe driving practices. Attention to the issues of consumer awareness and understanding of AVs have also been brought to the forefront in light of recent crashes in the United States, and incidents in Canada, involving vehicles with low-level automation technologies.

For the purpose of this study, automated vehicles are defined as vehicles that use sensors, onboard computers and software to make decisions. This technology allows the vehicle to take over control of some specific driving functions, under certain conditions – for example, steering, braking, acceleration, and checking and monitoring the driving environment. Fully automated vehicles are capable of doing all of the driving themselves, without the need of a human driver. (These types of vehicles are not currently available to the general public on the Canadian market.)

This study considers technologies that meet any of the six levels of automation as defined by SAE International (Level 0 to Level 5), but a particular emphasis will be placed on exploring consumer understanding of Level 0 to Level 2 advanced driver assistance systems (ADAS) features – technologies that are becoming increasingly present on the Canadian consumer market. ADAS features may serve as the building blocks for higher level AVs in the future. While AV technologies hold great potential to enhance the safety, mobility, and productivity of Canadians, building public confidence in these technologies will begin with the safe use of these assistance features.

The research findings will help:

1. Inform Transport Canada on Canadians’ current awareness of and confidence in AVs;
2. Transport Canada understand how drivers’ knowledge affects their behaviour;
3. Support Transport Canada to create tools/forums that enhance Canadians’ knowledge and understanding of AVs; and,
4. Transport Canada inform relevant stakeholders (e.g. provinces, territories, municipalities, industry, Transport Canada counterparts in other countries) of Canadians’ perceptions of AVs which will help guide the resources/tools they produce to educate the public.

The objectives of the research are summarized in the table below.

Methodology	Objectives
Quantitative survey	<ol style="list-style-type: none"> 1. To provide an accurate and up-to-date estimate of Canadians’ awareness and understanding of AVs (against the 2019 baseline), particularly the lower level automation technologies that are currently available to Canadian consumers; and, 2. To understand ADAS user habits in greater detail in order to learn how drivers’ knowledge affects their behaviour.
Qualitative online community	<ol style="list-style-type: none"> 1. To understand what knowledge promotes safe driving practice and any barriers that may limit comprehension of the benefits and applications or contribute to skepticism toward AVs; 2. To further deepen learning flowing from the quantitative research initiative by: <ul style="list-style-type: none"> ○ Gaining a better understanding of the perceived advantages and drawbacks of ADAS technologies ○ Attempting to determine the most effective messaging to promote and reassure the public with regards to ADAS technologies. For example, determining what information, if any, would be most effective in addressing outstanding questions and concerns related to ADAS.

Methodology

The research consisted of a mixed-methodology approach through an online/telephone survey and a qualitative online community.

Quantitative survey

A mixed-methodology survey was conducted with a total of n=2500 Canadians age 16-80 where 90% of the sample have a valid driver’s licence and 10% do not. A total of n=2000 sample was conducted online to replicate the methodology used in 2019. The online sample was drawn from Ipsos’ online and partner panels (non-probability sample, no margin of sampling error is reported). A total of n=500 random-digit-dial (RDD) sample was conducted by telephone using a dual frame landline and cell phone households (70% cell phone primary and 30% landline). This is a probability-based sample. The addition of the probability-based telephone sample was a valuable addition as it provides greater coverage and inclusion of the perspectives of those Canadians not part of an online panel. This allows us to have the ability to make

projections about the opinions and behaviours of the Canadian population as well as explore different styles of questions (e.g. open-ended vs. prompted lists) and understand mode effects on a survey of this topic.

Quotas were set by age, gender, and region on each sample separately, to make each sample closely reflect the composition of the actual population. The samples were statistically weighted independently to ensure each sample matches this population according to the most recently available Census information (region, age, gender). Where tracking to 2019 data, the online sample of n=2,000 will be reported in order to match the methodology of the 2019 survey (n=3,113 online sample of Canadians age 16-80), otherwise the data reported reflects the combined n=2500 sample.

The survey was conducted between December 9 and 21, 2020. The telephone version averaged 11 minutes in length and the online survey average about 9 minutes in length.

Qualitative online community

Qualitative results are based on questions posed on Ipsos Conversations - an omnibus online qualitative community designed to provide clients with qualitative insights. Findings flowing from the qualitative component of the research are not drawn from a representative sample of the Canadian population. They should be considered directional and thematic in nature; they should not and cannot be extrapolated to the wider research audience

A total of 159 Ipsos Conversations community members shared their thoughts on topics related to advanced driver assistance systems (ADAS) as well as automated vehicle (AV) technologies between January 28th and January 30th, 2021. The table below provides additional context related to the volume and nature of interactions within the Ipsos Conversations Community environment.

Total number of participants	159
Total number of Posts	1775
Total number of Likes	540
Average number of contributions per participant	11.16

Community members took part in online bulletin board style activities – they were invited to answer a series of open-ended questions individually *before* being exposed to the answers of other community members and were encouraged to interact with each other.

Cost of research

The cost of this research was \$98,157.99 (HST included).

Key findings

Awareness and impressions of advanced driver assistance systems (ADAS)

According to study results, Half of Canadians are familiar with ADAS.¹ Within this half, 14% describe themselves as very familiar, with men declaring more familiarity than women, and little difference by age. The declared familiarity increases with education level and household income, meaning those with higher levels of education and household income are more familiar than those with lower levels of education and income. One-quarter of Canadians without a driver's license are familiar with ADAS technologies.

Overall, 70% of Canadians agree ADAS technologies make roads safer.² Agreement is higher among those Canadians who are familiar with ADAS technologies at 84%. Comparatively, only 55% of those unfamiliar with ADAS technologies agree they make roads safer (after being informed by a description of these technologies).³ Therefore, familiarity is positively correlated with perceptions that ADAS technologies make roads safer. In other words, the more familiar you are, the more you agree these technologies improve the safety of our roads.

Notably, very few Canadians outright disagree that ADAS technologies help make roads safer (5%). And similarly, a small percentage disagree that these technologies assist the driver with unexpected events (4%). A much larger percentage (24%) either have a neutral opinion (middle score on the scale) or don't know. Therefore, it can be concluded that the issue is not that significant proportions of Canadians disbelieve the value proposition that these technologies make roads safer. The challenge is to educate those unfamiliar with the technologies.

The strongest driver of opinions that these technologies make our roads safer is that these technologies assist the driver with unexpected events. That correlation is reasonably strong (0.60). Therefore, demonstrating ways ADAS manage unexpected events better than drivers do could increase public perceptions of the value these technologies hold for improved road safety.

Incidence of awareness, and users of vehicles, with specific ADAS technologies

The survey found that 85%⁴ of Canadians have heard of at least one of the ADAS features measured in the survey – unchanged from 2019 (84%). Over the past year, instead of making more (new) people aware of ADAS technologies, those who were already aware of at least one feature learned about other features. While the total percentage of Canadians aware of at least one of the 7 technologies measured in the survey did not statistically increase year over year (85% in 2020 vs. 84% in 2019), awareness of some individual technologies did increase, specifically, automatic emergency braking from 49% of Canadians to 54%, adaptive cruise control from 39% to 46%, and lane departure warning from 55% to 60%. In other words, over the past year there has been greater market penetration in awareness of these technologies (making those already aware of at least one ADAS technology, aware of more of them), but little market growth (new people becoming aware of any or at least one ADAS technology). The most commonly known

¹ Notably, 62% of the phone respondents are familiar versus 47% of online respondents. While there are as many respondents under age 35 by phone or online, there is a skew toward more younger respondents within the 16-24 age category by phone. However, even when controlling for age, the phone sample familiarity is higher over the phone. This may suggest a bias between online respondents and phone respondents when it comes to either their actual level of familiarity or their impulse to characterize their familiarity. It could be that online respondents are less inclined to say familiar and more inclined to say not very familiar if they are doubting the amount they know about these technologies.

² – this higher among phone respondents at 76% than online respondents at 69%. The higher agreement among phone respondents is likely correlated with their higher degree of familiarity.

³ There are driver assistance technologies on many new vehicles today. These are called Advanced Driver Assistance Systems (ADAS). Some driver assistance technologies like blind spot warning, are designed to warn you if you are at risk of an accident, while others, like automatic emergency braking, are designed to take action to help avoid a crash. Note that manufacturers may use different names for these technologies.

⁴ Based on online data only to be directly comparable with the 2019 incidence figures.

features continue to be normal back-up camera (84%) and blind spot warning (69%). The least known are lane keeping assistance (50%) and adaptive cruise control (46%).

The incidence of Canadians who have used at least one of the ADAS technologies (defined as being a driver or passenger in a vehicle with ADAS) has remained fairly constant between 2019 and 2020, and ranges from 22% for automated emergency braking to 41% for blind spot warning.

Attitudes and experiences of users of ADAS

Half of ADAS users (drivers/passengers) say they feel safer when using it. This is a key factor that needs to resonate more strongly in order to increase support for these technologies. Correlation analysis confirms that feeling safe using the technology contributes greatly to opinions that they make our roads safer -- and represents the strongest correlation of the options tested in the survey. The second strongest relationship with confidence the technologies make our roads safer is feeling that the technology in fact works well. Therefore, not only do Canadians need to feel safe using ADAS, they need to have confidence they work well – meaning the technology does what it is intended to do and will not fail.

At present, two out of three Canadians who are aware of at least one type of technology believe it works well and know how to use it properly and comfortably, and half believe they feel safer when using it. As noted, as the strong driver of the main value proposition of ADAS, safety is a key factor in increasing support for these technologies among Canadians.

Improving perceptions of safety

The qualitative community sessions confirmed that improved safety for vehicle drivers in the form of preventing accidents and reducing the severity of accidents, as well as safety for other road users are top advantages of ADAS. At the same time, the potential for driver complacency, questions related to the reliability of the systems, creating distractions for the driver, lack of familiarity with the ADAS and the learning curve in using these technologies were revealed to be impediments to building the confidence of both users and non-users of the technologies.

Furthermore, the qualitative community sessions found that many believe that ADAS technologies are, first and foremost, intended to be assistive devices; they do not absolve drivers of these vehicles from adopting defensive driving habits. If used as intended, ADAS technology can indeed prove helpful and assist in making one's driving experience safer. Community members also acknowledge the potential for driver complacency and, consequently, potential dire outcomes are very real and that this is largely due to an over-reliance on or a lack of understanding of how ADAS should be used.

Community members tend to agree that ADAS technology can be an annoyance and a source of distraction. There does not appear to be any one ADAS that stands out in particular; members reference a range of systems. For several community members, these ADAS technologies can, at times, fuel a perceived loss of control and, more precisely, the ability to make snap decisions on their own. These feelings tend to be driven by a relative mistrust in the underlying technology that powers these systems.

Importance of ADAS in purchasing/leasing decisions

Seven in ten (69%) of those aware of blind spot warning say it is an important factor in their decision to purchase or lease a vehicle in the future, while six in ten consider forward collision warning important to their decision-making. All other technologies are hovering around five in ten.

Sources of information about ADAS technologies

Canadians who want to learn about an ADAS feature, for example, about what they do or how they work, are most likely to go to the internet first and look for related online forums for information. A basic google search is also common, as is information from the car manual (particularly older Canadians age 65+), the manufacturer's website or car dealerships.

Awareness and impressions of automated vehicles (AVs)

Between 2019-2020 there has been a small increase in Canadians' familiarity with automated vehicles. In 2019, 34% of Canadians indicated they are at least somewhat familiar with automated vehicles – without seeing a definition of automated vehicles. (6% indicated being very familiar). In 2020, 37% report being familiar, including 7% very familiar. Notably, phone respondents (probability sample) report much higher levels of familiarity at 56% including 19% very familiar.

There continues to be a relatively high level of concern and pessimism about automated vehicles and how they will function on the nation's roads. 30% agree they would be comfortable riding in a fully automated car, while 47% disagree, and 23% have a neutral opinion or don't know. Compared with rebalanced data from 2019 (when no neutral option was offered), this represents a 10 point increase in respondents who would feel comfortable riding in a fully automated vehicle. Comfort is strongly correlated with perceived safety⁵, and at present 41% of Canadians agree that fully automated vehicles make our roads safer. Until more Canadians are convinced that fully automated vehicles make our roads safer, it is unlikely that comfort with riding in such a vehicle will increase.

Also contributing to Canadians' lack of comfort riding in a fully automated vehicle are concerns about cyber security⁶. Based on the survey results, two in ten Canadians (17%) agree that automated vehicles are cyber secure (e.g. secure from hackers, terrorists, fraud or unwanted access), while a substantial minority (42%) disagree. Therefore, efforts to demonstrate the safety benefits of automated vehicles should also consider cyber security concerns.

Safety/reduction in driver error and easier vehicle operation for elderly and/or persons with a disability (prompted) continue to be the top advantages Canadians believe AVs will provide for the future. The percentage of Canadians that identify easier operation for the elderly and persons with a disability as an advantage of fully automated vehicles increased over the past year. The only other advantage that increased in frequency from 2019 is lower insurance premiums.

The top disadvantages of AVs identified by Canadians in 2019 were again cited by many respondents. These are equipment/system failure (59%) and vehicles failing to react to unexpected situations (53%). However, an increasing number of Canadians point to the following disadvantages:

1. Drivers will become lazy/pay less attention (60%)
2. Drivers will become less skillful (51%)
3. Loss of driver control (42%)
4. Legal liability/knowing who is at fault (42%)
5. Concerns about cyber security threats (e.g. hackers, terrorists, fraud) (48%)
6. Data privacy (e.g., location tracking) (34%)
7. Concerns about operation in winter/Canadian weather (48%)

⁵ Pearson correlation coefficient 0.731, where 0 reflects no correlation and 1 reflects a perfect correlation.

⁶ Pearson correlation coefficient 0.604, where 0 reflects no correlation and 1 reflects a perfect correlation.

The qualitative community revealed that the skepticism is fueled by a lack of knowledge and general understanding of how automated vehicles operate as well as a perceived loss of control.

Conclusions

Analysis of the survey responses indicate that there is a large opportunity to increase the public's familiarity with ADAS technologies noting that greater familiarity breeds greater support. The survey found that many Canadians remain unfamiliar with advanced driver assistance systems. Half of Canadians report being familiar and of that half, 84% agree that these technologies make our roads safer. Educating Canadians about how ADAS assist the driver with unexpected events is an effective way to increase support for these technologies. The survey found that the strongest driver of opinions that ADAS make our roads safer is the belief that these technologies assist the driver with unexpected events. The survey also found that Canadians could be more informed about the potential benefits of the technology. Future education efforts may be more effective if they target women, younger and less affluent Canadians, as they are least familiar and less supportive in general.

ADAS technologies are important to future vehicle purchase decisions among those who have used them, but the pool of Canadians who have used them is similar in size to last year. Building greater support for the value proposition of ADAS and growing uptake will depend on understanding how to make users feel safer when using the technology. At present 52% of ADAS users feel this way.

When it comes to fully automated vehicles, many Canadians are skeptical, largely due to a lack of knowledge about these vehicles. They are not convinced they make roads safer and many believe that these vehicles are not cyber secure. These factors can impact willingness/comfort to consider riding in a fully automated vehicle. More research could provide additional understanding of how Canadians form their opinions about the impact on road safety and cyber security of automated vehicles.

Political neutrality statement and contact information

I hereby certify as Senior Officer of Ipsos that the deliverables fully comply with the Government of Canada political neutrality requirements outlined in the Communications Policy of the Government of Canada and Procedures for Planning and Contracting Public Opinion Research. Specifically, the deliverables do not include information on electoral voting intentions, political party preferences, standings with the electorate, or ratings of the performance of a political party or its leaders.

A handwritten signature in black ink, appearing to read "M. Colledge". The signature is stylized and written in a cursive-like font.

Mike Colledge
President
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