Automated vehicles

Community perceptions monitor

2018

Automated vehicles (also known as driverless or self-driving vehicles) are no longer the stuff of science-fiction. The technology is rapidly advancing and is the biggest disruption to transport and mobility since the invention of motor cars themselves. Understanding the community's attitudes and perceptions about these vehicles operating on Western Australia's (WA's) roads, and the potential opportunities and impacts of this, is crucial in preparing for a future with Automated Vehicles (AVs).

Many vehicles already have built-in AV technology and these features are becoming increasingly common, including autonomous emergency braking, lane keeping and supervised autonomous mode, where drivers rely on technology to steer, brake and/or accelerate.

Wider adoption of the technology has the potential to deliver many benefits, including significantly reduced crash risk and severity, enhanced mobility and independence for many and helping to manage traffic congestion for instance. Increasing automation does, however, also raise a number of considerations which need to be explored, including potential issues such as systems failures, hacking, liability in the event of a crash, etc. Likewise, until such a time when all vehicles on our roads are fully automated, drivers and other road users will also need to learn how to safely interact with these vehicles.

While there are still many unknowns about what a future with AVs will look like, these vehicles will no doubt have considerable implications for our transport networks, towns and cities and will change the way we move around. For this reason, AVs are a topic of public interest and as more information becomes available, communities all over the globe are beginning to make up their own minds about how the technology could impact their lives and this is important in planning and preparing for a sustainable driverless future.

To understand what Western Australians know, think and feel about AVs, RAC commissioned Painted Dog Research in March 2016 to undertake a community awareness and perceptions survey. This was then repeated in late 2016, and again in late 2017 to track changes in community sentiment. Age, gender and location sampling quotas were applied and data was weighted to be representative of the WA population, as well as RAC's membership composition. This paper focuses on Wave 3, but provides comparative data for the previous two survey waves.

Since 2015, RAC has been working to test and evaluate a fully driverless, electric shuttle bus and on 31 August 2016, with the support of the WA State Government and the City of South Perth, we launched our Automated Vehicle Trial on public roads with the RAC Intellibus®. This trial was among the first in the world and the Intellibus® continues to carry passengers while interacting with traffic, parked cars, cyclists and pedestrians along its 3.5km route in South Perth. It is enhancing local, national and international understanding around how AVs operate and the potential impacts and opportunities of the technology.

Wave 1 (baseline) » Apr/May 2016

Pre-launch of the public on-road trial
> 955 respondents
> 78% metro / 22% regional
> 65% RAC members / 35% non-members

Wave 2 » Nov/Dec 2016

Three months post-launch
> 827 respondents
> 78% metro / 22% regional
> 65% RAC members / 35% non-members

Wave 3 » Nov/Dec 2017

12 months on from the last wave
> 1059 respondents
> 78% metro / 22% regional
> 68% RAC members / 32% non-members

RAC
For the better

Awareness of automated vehicles

Awareness of the concept of AVs has increased since Wave 1 and a reasonable proportion of the community is familiar with some of the technology used by these vehicles.

Almost nine in ten Western Australians have heard of AVs (86 per cent in Wave 3, up from 64 per cent in Wave 1). As shown in Figure 1, awareness has increased amongst all demographic segments, with males, those residing in Metropolitan Perth and older generations (Gen X – born from 1965 to 1979, Baby Boomers – 1946 to 1964 and Builders – 1925 to 1945) consistently being amongst the most aware sub-groups.

In describing AVs, half specifically referred to them as being driverless or self-driving in Wave 3 and while this was a decrease from waves 1 and 2 (58 per cent and 62 per cent respectively), there appears to be a richer understanding of what these vehicles are, the technology used (e.g. software, sensors, GPS) and that they are being trialled and tested.

Fully automated vehicles (also known as driverless or self-driving vehicles) are vehicles that do not need any human intervention to operate, so basically, they can drive themselves. They can detect their surroundings using advanced control systems that interpret sensory information to identify appropriate navigation paths, avoid obstacles and obey signage and traffic signals. Automated features in vehicles still currently require human control.

Once prompted with a definition, awareness increased to 95 per cent (compared to 88 per cent in Wave 1 and 91 per cent in Wave 2). Further, 78 per cent of Western Australians are also aware that they currently drive vehicles which have some level of automation (Level 1 or 2), while 19 per cent believe they drive vehicles with no automation (Level 0).

When it comes to the Intellibus® specifically, awareness has doubled since Wave 1, increasing from 27 per cent of West Australians being aware of the trial to 61 per cent in Wave 3. Over three quarters agree that it is good to see this Australian-first taking place in WA.

Figure 1 » Awareness of AVs

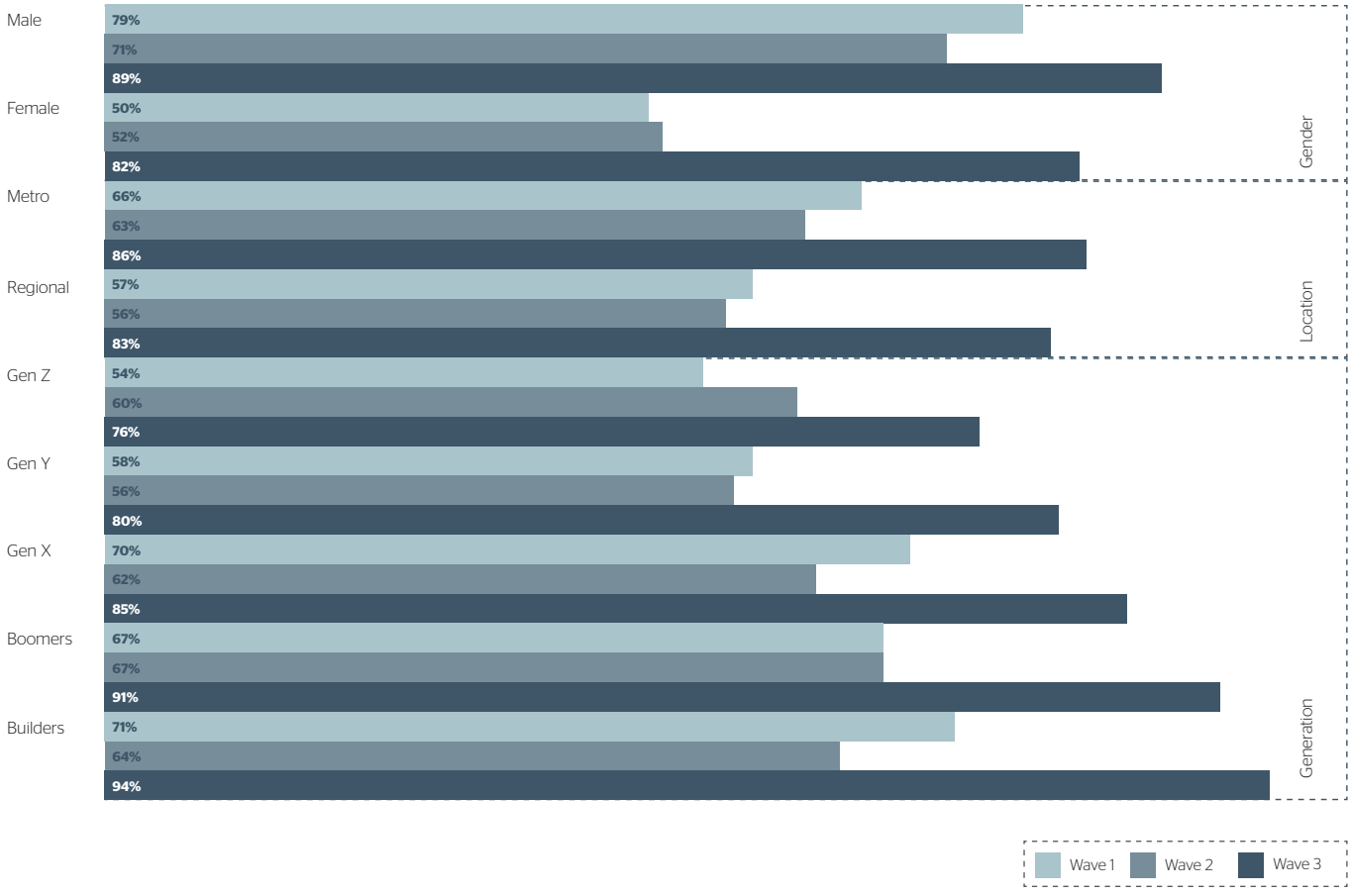


Figure 2 » Levels of vehicle automation[1]

0	No Automation	**The past –** Everything is done manually, there's not even power-assisted steering!
1	Driver Assistance	**The past –** You complete the majority of the driving task, with assistance for either steering, acceleration or braking.
2	Partial Automation	**Where we are now –** Some automated functions for steering, acceleration and braking – but your hands must still be on the wheel at all times.
3	Conditional Automation	**2017-2020 –** Hands off the wheel! All aspects of driving are automated – but you must be ready to take back control when prompted.
4	High Automation	**2020-2025 –** Driver is no longer needed in limited environments. RAC's Intellibus is a level 4 driverless vehicle!
5	Full Automation	**2026-2030 –** You won't need a steering wheel, just tell the vehicle where to go!

Source: Australian Driverless Vehicle Initiative

[1]SAE International (2014), "Automated Driving", http://www.sae.org/misc/pdfs/automated_driving.pdf

Attitudes towards automated vehicles

Attitudes towards AVs remain mixed and safety continues to be a major consideration, with Western Australians being uncertain whether we will be safer with or without them. Many believe there will be road safety benefits but a similar proportion has concerns about entrusting the technology.

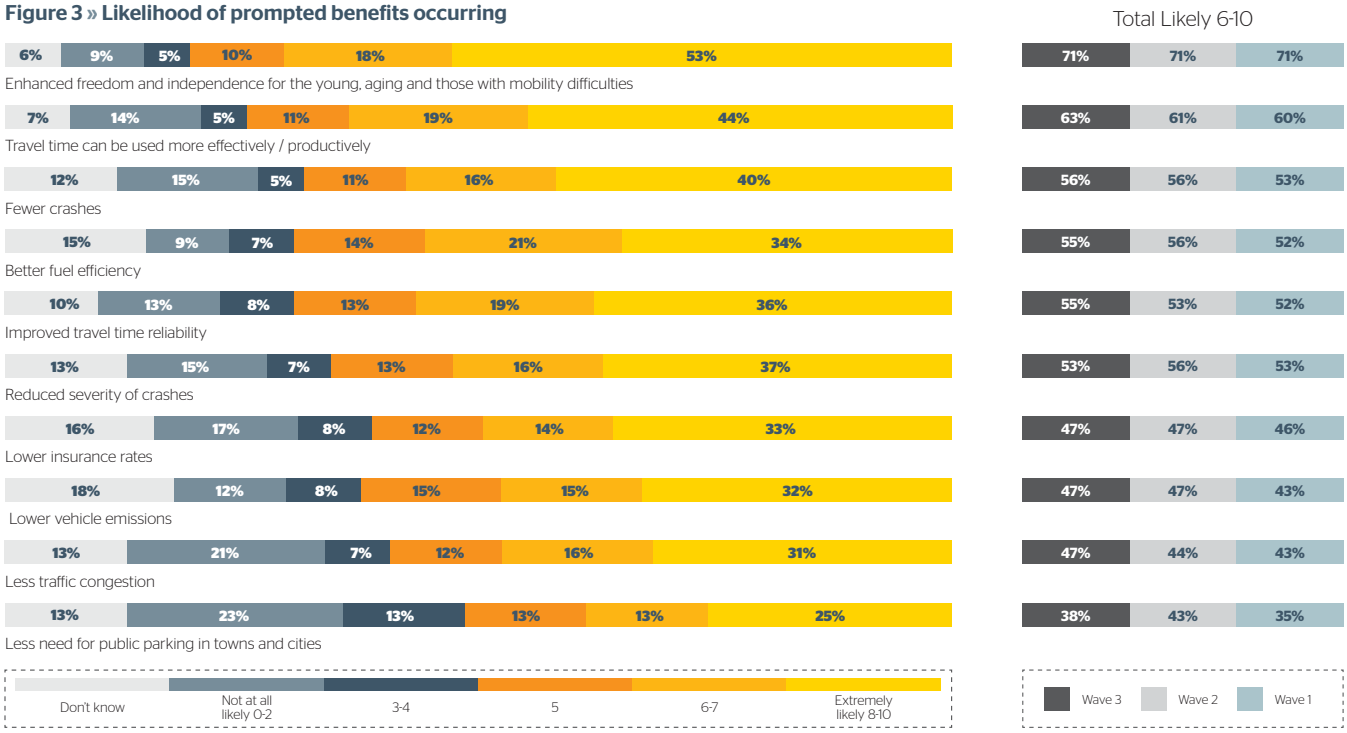
Despite AVs still being in the early stages of development, 50 per cent of Western Australians feel positive towards them, with 30 per cent being extremely so (slight increases from 46 per cent and 28 per cent respectively in Wave 1). However, 28 per cent still have some negative feelings towards them. Those who are aware of the Intellibus® feel significantly more positive towards AVs than those who are unaware though (56 per cent compared to 41 per cent). Crash history[2], attitudes towards driving and driving frequency do not have a significant impact on attitudes towards AVs.

As shown in Figure 3, when prompted with a list of potential benefits, those that Western Australians agree would most likely occur if all vehicles were fully automated are enhanced freedom and independence for the young, ageing and people with mobility difficulties (71 per cent agreeing this would occur), more productive and efficient use of travel time (63 per cent) and fewer crashes (56 per cent). The proportion agreeing with all of the prompted benefits has increased slightly since Wave 1. More detailed analysis considering the relationship between attitudes towards AVs and opinions about the likelihood of these benefits occurring revealed fewer crashes, reduced crash severity and enhanced freedom are the main benefits driving positive feelings. This is followed by improved travel time reliability and more efficient use of travel time.

Western Australians remain equally as concerned about being an occupant in an fully automated vehicle as they do interacting with one as a driver of another vehicle (six in ten are concerned with each scenario). Interestingly though, there is less concern about travelling in or interacting with a Level 3 AV (around four in ten) despite this potentially being the most risky level - these vehicles will be able to drive themselves in some situations but the human driver must always be ready to take control.

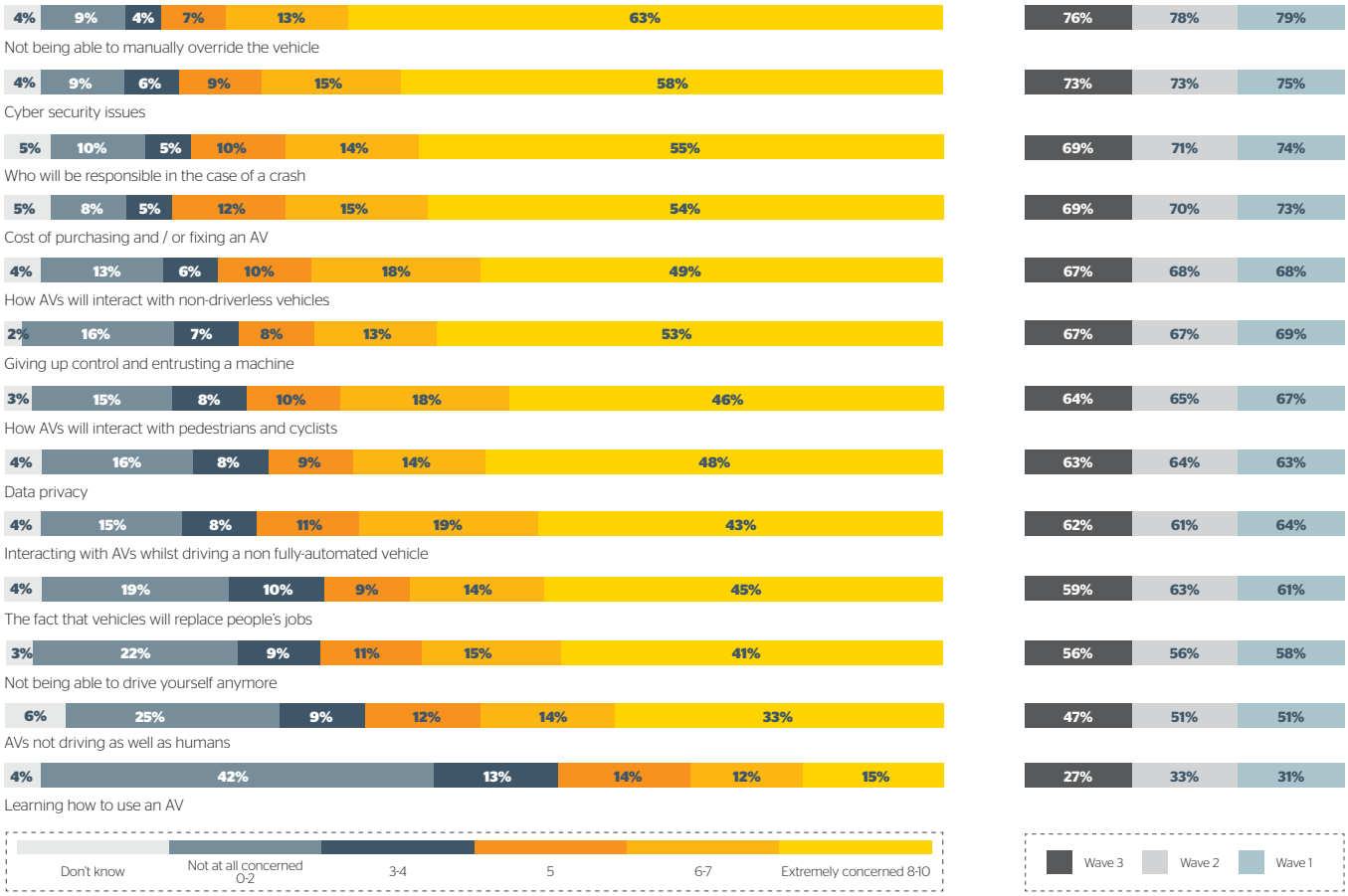
As shown in Figure 4, when prompted with a list of potential concerns relating to fully automated vehicles, not being able to manually override the vehicle is the top concern (76 per cent). Cyber security issues (73 per cent), responsibility in the event of a crash (69 per cent) and cost (69 per cent) also rank highly in the list. This is broadly consistent with waves 1 and 2 but there has been a slight decline over time in the proportion of Western Australians that have these concerns. More detailed analysis identified the prospect of giving up control and entrusting a machine, AVs not driving as well as humans and interacting with AVs while still driving non-automated cars as being the most influential prompted concerns on negative feelings. Interestingly, in Wave 1, not being able to drive anymore was most influential but this moved down to fifth in Wave 3.

Figure 3 » Likelihood of prompted benefits occurring



[2]Respondents were asked how many crashes they had been involved in over the past five years, as a driver and a passenger.

Figure 4 » Level of concern



Perceived benefits

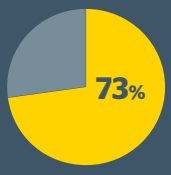
Agree they will provide enhanced freedom and independence for the young, the aged and people with mobility difficulties.

Agree it will be a more productive and efficient use of travel time.

Believe there will be fewer crashes.

Potential concerns

Are concerned about not being able to manually override the vehicle.



Are concerned about cyber security issues.

Are concerned about where responsibility lies in the event of a crash.

Future considerations

Western Australians are interested in travelling in AVs once commercially available but promisingly, this may not necessarily result in more private vehicle trips. The community is realistic about when these vehicles may be operating on WA roads but there remains uncertainty over readiness.

As shown in Figure 5, once commercially available, one in two Western Australians would be very or extremely likely to make trips in a privately owned AV (31 per cent being extremely likely to). Those who are aware of the Intellibus® are significantly more likely to than those who are unaware (52 per cent compared to 41 per cent). Perhaps surprising though, those classed as Gen Y (born from 1980 to 1994) are significantly more likely to use private AVs than those in other age groups (55 per cent).

An unrelated survey of 1,260 people living in Australia's major cities found that Perth commuters were the most receptive to switching to a driverless commute to avoid congestion (19.7 per cent, followed by Melbourne at 16.8 per cent and Brisbane at 10.7 per cent)[3].

While there remains less of a willingness to travel in an AV which is a public or shared service, as well as a private use on-demand service, this could be as much to do with feelings towards these types of transport services as it is about the use of AVs for such services.

However, it is nevertheless promising to see more than one third of Western Australians are receptive to sharing their journeys with others and, as seen with privately owned AVs, awareness of the Intellibus® has a positive influence on views about sharing (43 per cent of those who are aware would use a public or shared service compared to 33 per cent of those unaware).

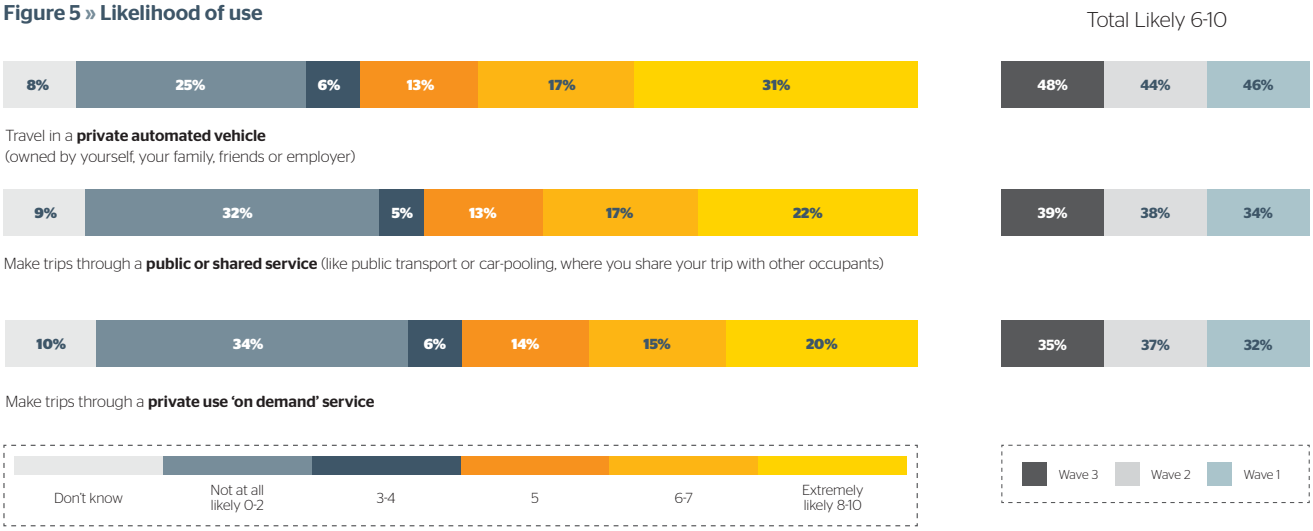
Four in ten Western Australians disagree that owning or having access to an AV would result in them making more vehicle trips and more than half said they would not be happy to travel longer distances just because they are able to make better use of the travel time (Figure 6).

In terms of influencing where they choose to live, six in ten disagree they would consider living further from their place of work/study.

Unprompted, consistent with the previous survey waves, 80 per cent believe fully automated vehicles will be commercially available sometime between 2020 and 2030, which broadly aligns with the views of industry[4] (Figure 7). However, as time has moved on we have seen a decline in the proportion that believe it will be before 2025.

A majority (62 per cent, up from 59 per cent in Wave 1) continue to agree it is important for the State Government to ensure WA is ready for AVs by 2025 and 57 per cent (up from 52 per cent in Wave 1) believe vehicle manufacturers and industry should be leading the way. Fewer than one in five (18 per cent) have confidence that the Government will be ready in this timeframe (down from 20 per cent in Wave 1).

Figure 5 » Likelihood of use



[3]HERE (2018), "Where to from HERE: Mapping multi-modal movement in Australia", https://360.here.com/hubfs/Blog/Mapping%20multi-modal%20movement%20in%20Australia.pdf?t=1513841986117
[4]The Australian Driverless Vehicle Initiative (ADVI) estimates Level 4 (High Automation) vehicles could be available between 2020 and 2025 and Level 5 (Full Automation) vehicles between 2026 and 2030.

Figure 6 » Anticipated impacts of owning or having access to an AV

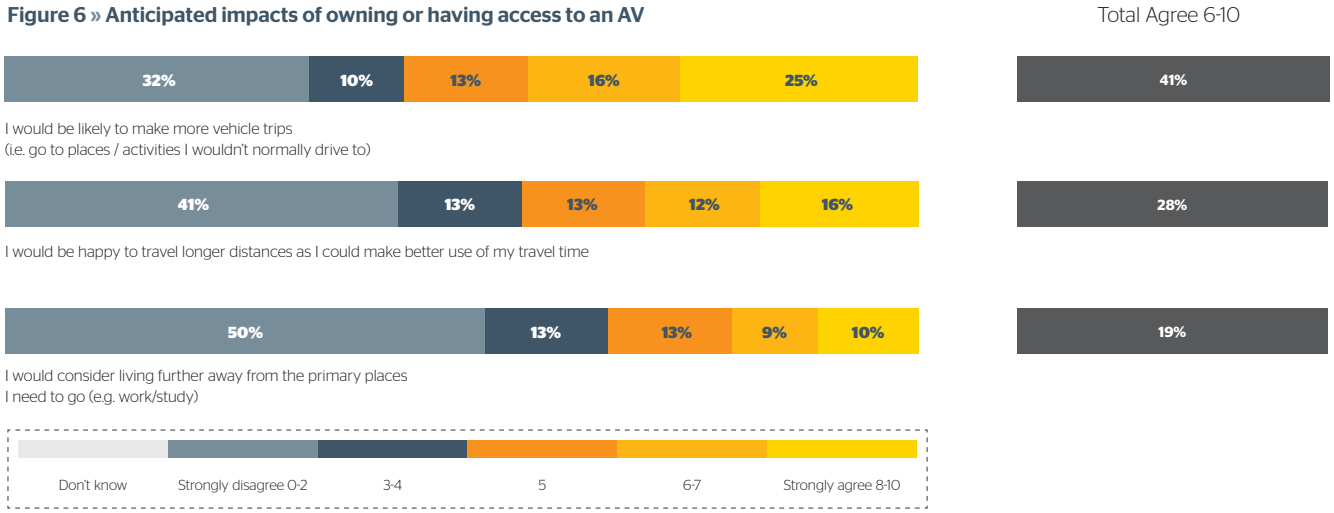
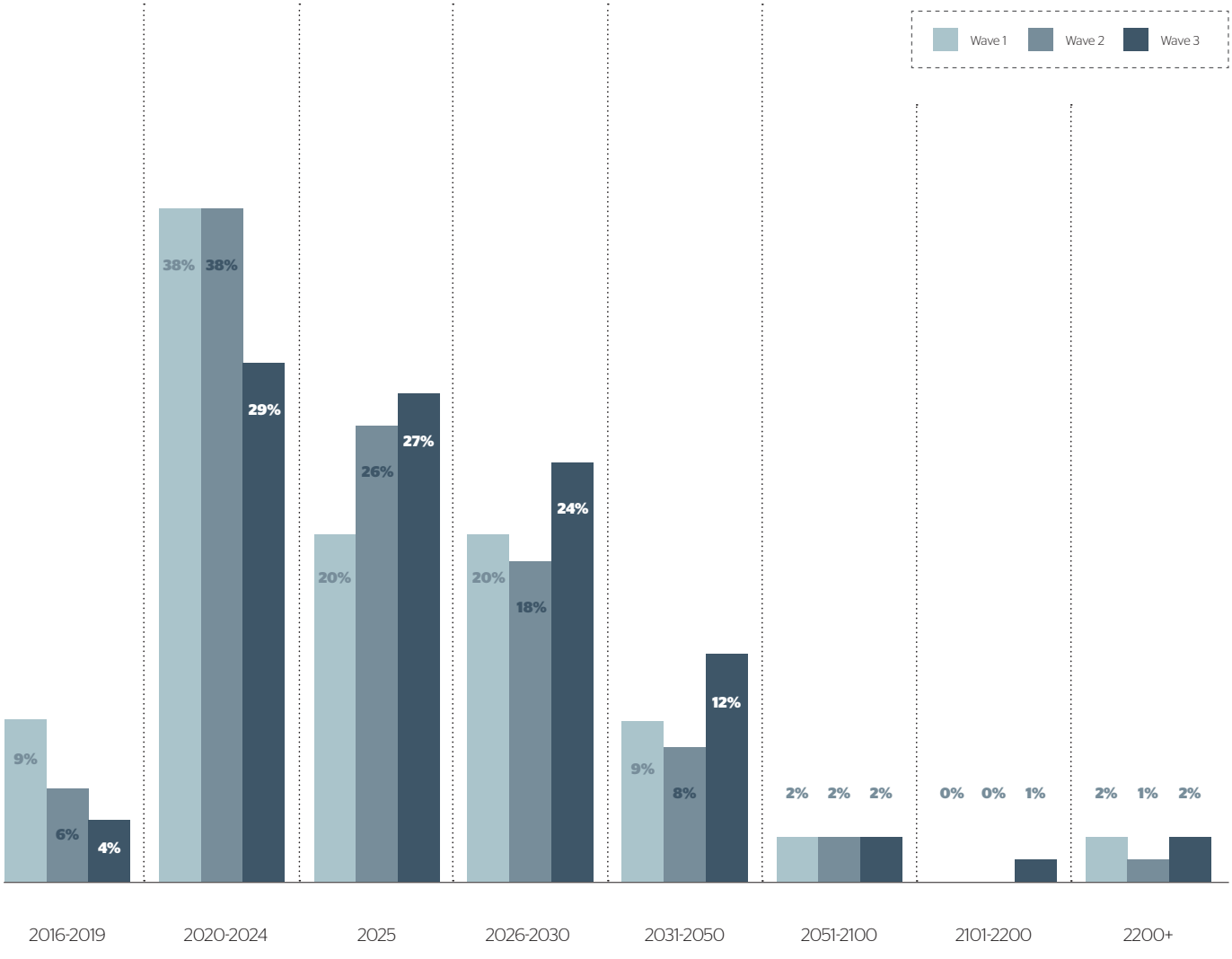


Figure 7 » Estimated timeframe for automated vehicles to become commercially available



R16358

RAC

For the better