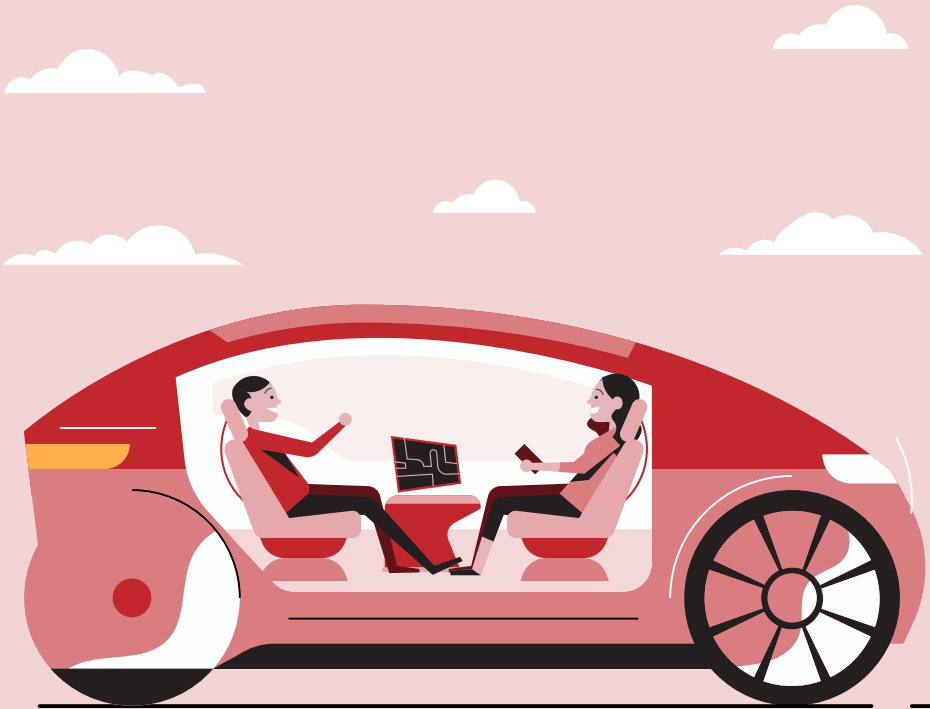


Being driven 2023

Reviewing attitudes on autonomous and shared mobility.





Introduction

Three-quarters of the UK public are not yet comfortable with vehicles at the highest levels of autonomy. Our research, conducted in August 2023 shows that this figure hasn't changed in four years and in fact has slightly increased. Efforts to educate and to communicate on the benefits of self-driving technology need to be stepped up in order for highly automated mobility to become a reality.

In 2019, Neckermann Strategic Advisors and 7th Sense Research conducted an extensive study on the adoption of autonomous and shared mobility across the UK, with additional research for Europe, and with interviews conducted for insights from across the world.

Among the most comprehensive studies of its kind, it has since been replicated by researchers and consultancies across Europe and the US; unsurprisingly the results have been similar. There is still a considerable apprehension in the adoption of autonomous mobility in society. The resistance varies – from a fear that autonomous vehicles might not be safe for all road users, to a loss of control. Concerns about liability, data privacy and hacking also haven't abated.

Our research explored various root causes of resistance:



Human nature



Education measures



Cultural backgrounds

One of the direct results of the study in 2019 was the founding of a European not-for-profit organisation to drive education and adoption in autonomous mobility. Initially called “Being Driven” (like the study), the organisation quickly joined forces with the Partners for Automated Vehicle Education, which had been formed in the US some months before. Hence, PAVE Europe was born, with Neckermann Strategic Advisors as the initiator, and Waymo, EasyMile, Mobileye, TÜV Rheinland, Swiss Re, and Achmea as founding partners. This organisation has since grown to over 20 members – a testament to the importance of education in our autonomous discussion.

In the Summer of 2023, we repeated our research with 7th Sense Research. Once again, well over 3,000 users across the UK were surveyed. This paper is a **preview summary** of the results, as they pertain to autonomous adoption.

To put it simply: any region that intends to deploy autonomous technology for passenger or goods transport should in any and all cases consider steps to ensure that a systematic program of education and communication of the public is provided. We are here to support these measures.

1. Being Driven 2023

This study is based on **proprietary research** (n=3,097, representative sample, UK) conducted by 7th Sense Research in collaboration with Neckermann Strategic Advisors in August 2023. For a more global perspective, we'll again compare this study with similar studies conducted by our peers across the world.

We are pleased to share this exclusive preview on these findings at the 2023 Dubai World Congress for Self-Driving Transport

Those of us who monitor the evolution

of smart cities, work in policy, or are proponents of autonomous and shared transportation may **still** not like the results of this study. The proportion of potential users of autonomous mobility that indicate feeling comfortable with the technology has not changed much over four years. What's more, the underlying evidence suggests that there is actually an **increase** in misinformation, in particular as it relates to the differences between driver assistance systems, and fully self-driving transport systems.

There's still a lot of work to be done

2. The journey toward shared, autonomous mobility

Among many other findings of our previous study, we were shocked by the discovery of a dual hurdle to adoption – which we dubbed the “**double leap**” – the need to educate and communicate not just the benefits of autonomous mobility, but also, of shared mobility – in some regions, more than others.

Autonomous and shared mobility – while linked – represent two distinct steps, which are unlikely to be taken

simultaneously by users. We had previously assumed that we are headed toward a world where vehicles will be autonomous and shared, and that these technological and social trends would be mutually reinforcing. The only question was, by when. But this is not the case. Trust needs to be built up in autonomous mobility, but also in shared mobility. The full report for 2023 will again delve into these findings.

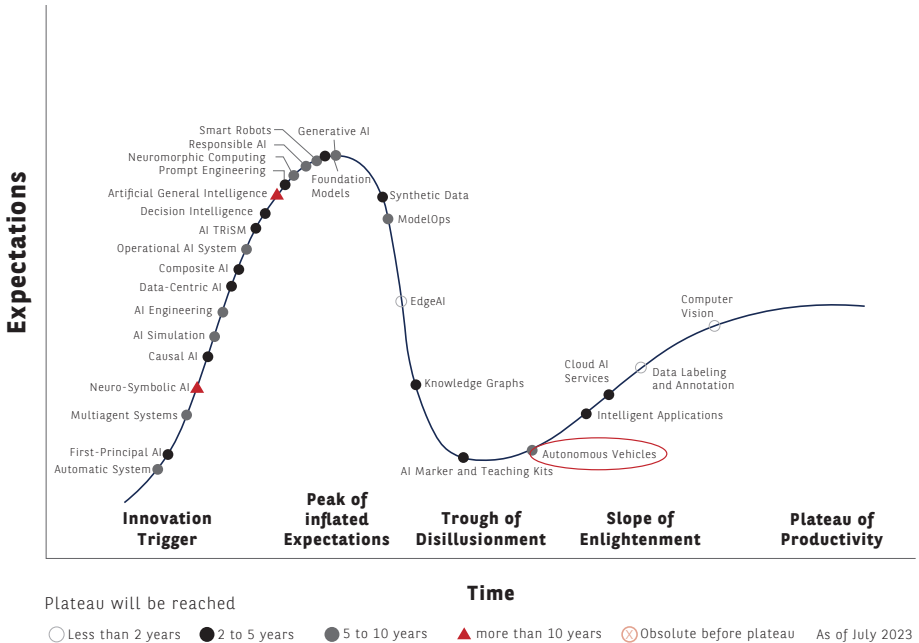


Figure 1: Gartner, Hype Cycle for Artificial Intelligence, 2023

When will autonomous vehicles become a viable commercial option for passengers?

In 2019, autonomous driving at level 4 had peaked in the famous Gartner Hype Cycle and was headed squarely into the “Trough of Disillusionment”. Come 2023, and countless company failures (and consolidation) across our industry, autonomous technology is now just past rock bottom. The hurdles – be they technological, economic, regulatory or legal – have been known for over a decade. So, in terms of managing expectations, let’s consider this a good thing: we are better in a position to deliver

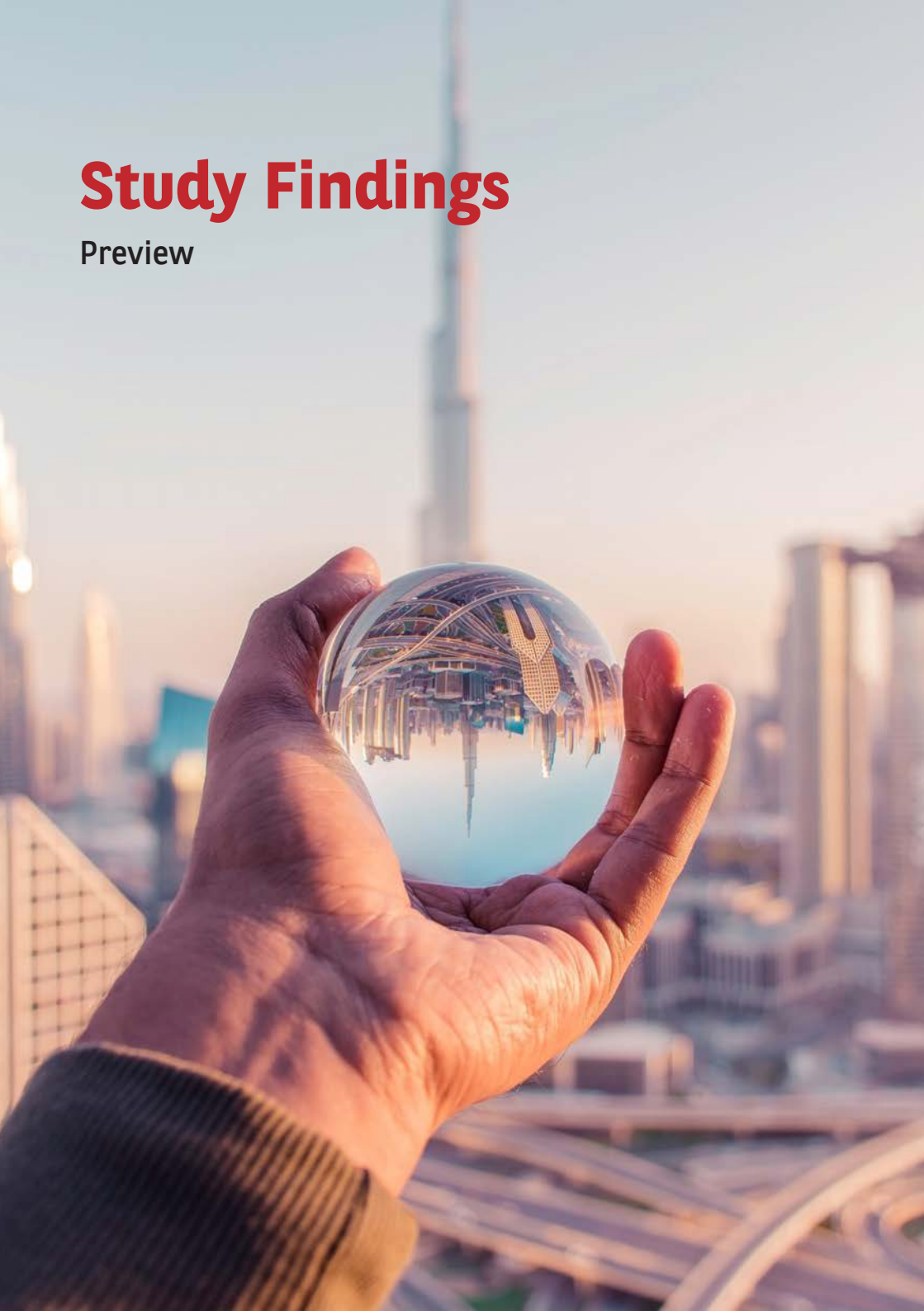
on the manifold promises that have been heaved upon our industry.

Our industry is recovering, reassessing, and refocusing its efforts toward those business models that will prove most effective in creating the economies that sit behind billions of investment funding over the last decade, alongside the safety, social, and environmental benefits inherent in the systems.

Nevertheless, the research suggests that it continues to be social acceptance of the technology that confounds us.

Study Findings

Preview



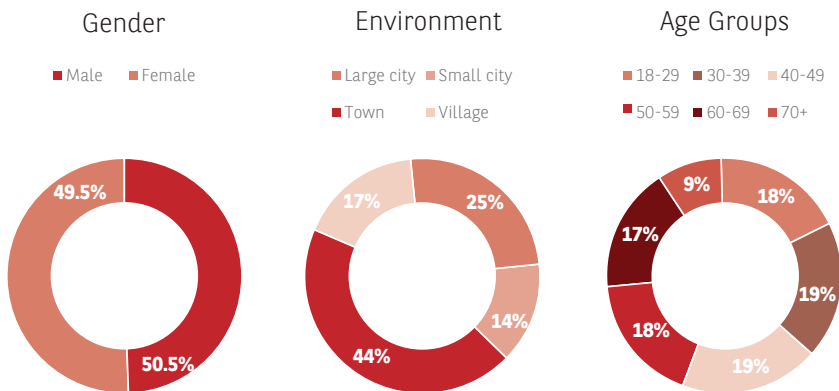
3. Building Trust: A view from over 3,000 Respondents

Our studies across the UK are consistent with similar studies performed around the world covering Asia, America and Europe, although it's worth noting that the questions asked varied slightly. The number of respondents in our 2023 study (just under 3,100) is significantly larger than some comparable studies, giving us considerable confidence in these numbers.

The study profile:

We asked 40 online questions in August 2023 to a UK-wide representative panel of people. Our study was balanced between male (1,559) and female (1,531) respondents, and sufficiently represented across all age groups (between 281 and 596 respondents). In order to represent them sufficiently, there was a considerable skew among respondents toward towns and villages; only 42 percent of respondents self-reported their environment to be a large or small city, compared to an urbanisation rate of over 80 percent in the UK.

Most of the questions include granular answers via a scale ranging from 1 to 10.



Figures 2, 3, 4: Gender, Location, and Age Groups of respondents of the survey, 7th Sense / Neckermann Strategic Advisors 2023

3.1 Three-quarters of respondents still not yet comfortable

The UK public is currently not yet comfortable with the idea of driverless vehicles (for this study, we define AV, or driverless vehicle, as a vehicle equipped with level 4 or 5 autonomous technology; participants were fully briefed on the differences between the levels).

The figure on the following page (Figure 5) shows the aggregate result of the comfort level regarding level 4 and 5 from our scale – for responses of “7” (Comfortable) or above, with “10” being “Very Comfortable” by age group. Notably, across almost every age group, comfort levels slightly decreased over the four year timespan in spite of considerable communication, trials across multiple regions of the UK, and exposure to various kinds of autonomous vehicle technology (even by way of pizza deliveries) the public continues to have reservations about automation at the highest levels. We’ll look in greater detail at differences between genders and age groupings in the full study, but initial insights are already evident.



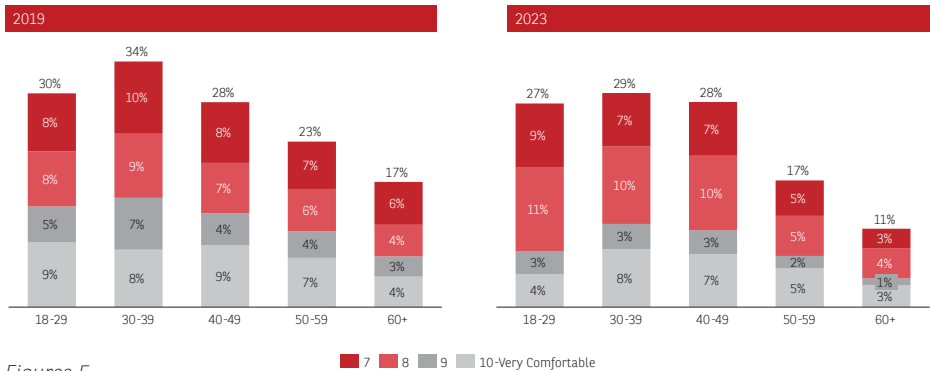
Image: Starship delivery robots in Milton Keynes and Manchester (Source: Starship press photo)

3.2 Millennials and Gen Z more comfortable

Those aged 70+ were most uncomfortable with autonomous technology at all levels. This became most pronounced at higher levels of autonomy. 60 percent of the Silent Generation were “very uncomfortable” with L4 or L5 automation (a “1” or a “2” comfort level in our study), closely followed by the 51 percent of those aged 60 to 69 who felt very uncomfortable.

On the other hand, notably, the age group between 30-39 is most comfortable with autonomous mobility at the highest levels (L4 and L5). Once again this is consistent with our findings from 2019. This is an age group (roughly equivalent to today’s Millennials) often characterised by families with young children; we may be led to believe that having little time, but an overall attention to the safety of young children might be conducive to believing in a future of crash-free, time-saving mobility.

How comfortable are you with vehicles operating at L4 or L5 right now?



Figures 5

3.3 Uncertainty about system failures and human interactions dominate

Beyond the questions around acceptance of specific levels of self-driving technology, we focused our study primarily on highly automated vehicles – in other words, fully driverless technology.

When asked about primary reservations about such autonomous vehicle technology, **system failure** and **loss of control in complex driving environments** were each noted by over half of all respondents; in particular, female respondents ranked these highest as concern factors (Figure 6). A whopping 82 percent of respondents over 70 similarly have reservations about system failures – double the percentage of respondents aged under 40 (Figure 7).

The interaction between self-driving vehicles and both pedestrians and cyclists was also noted by approximately half or respondents. Here, we can suspect the impact of adverse reporting or activism; throughout the period of the survey there were reports of vehicles in San Francisco that had been “coned” (traffic cones placed on them) by activists to raise awareness on the interaction between the technology and other vulnerable road users. It can also be noted that incessant reporting in the mass media on the so-called “trolley problem” may contribute to these concerns.

Although also receiving ample media attention through recent reports, **hacking, data privacy and security** were all last among the list of concerns expressed by our respondents – least of all by digital natives (those aged 18-29).



Image: Aurrigo autonomous shuttle (Source: Aurrigo)



What factors contribute to your reservations regarding self driving vehicles?

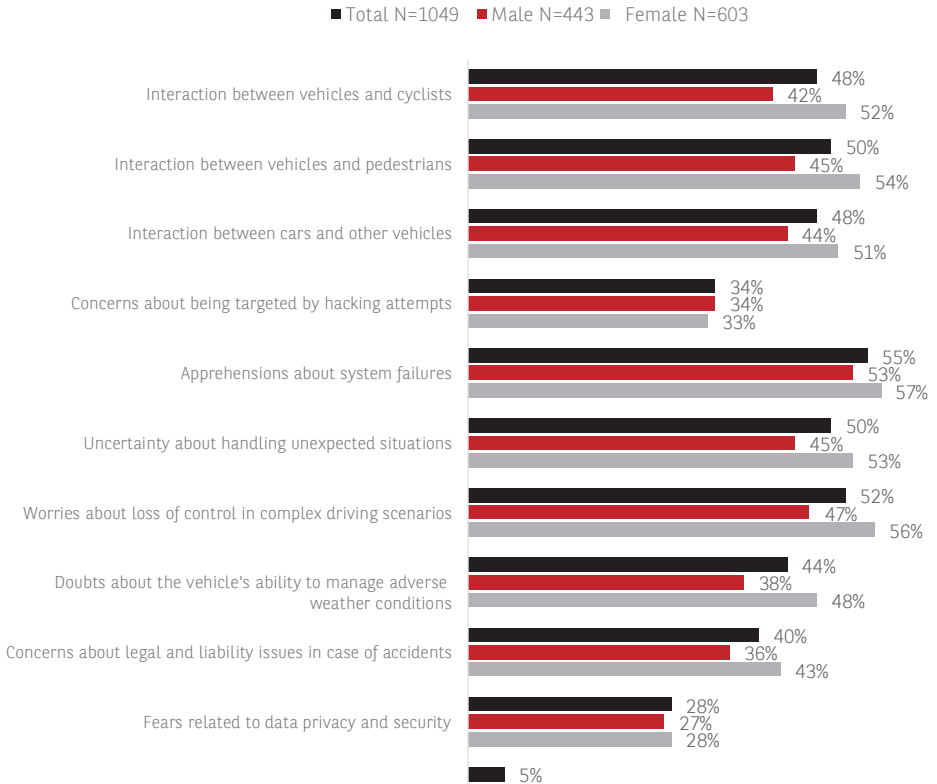


Figure 6

Differences between age groups were quite pronounced across each of the scenarios posed in this question (Figure 7). Yet, quite notably, 30 - 39 year old respondents generally expressed the fewest concerns.

What factors contribute to your reservations regarding self driving vehicles?

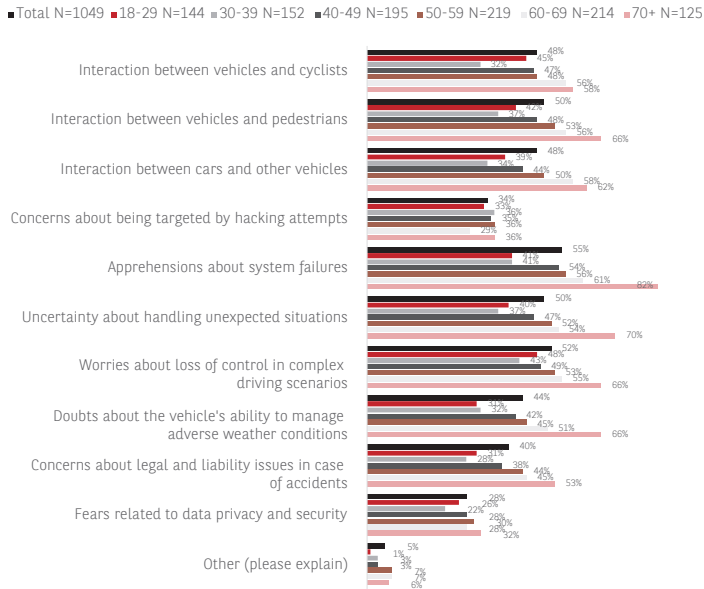


Figure 7

3.4 Emotions and low expectations dominate understanding

For 2023, we expanded our study to reflect on the emotions and the perceived potential of autonomous mobility. We asked respondents how they feel about the prospect of driverless vehicles (Figures 8 and 9).

46 percent have **safety** concerns around vehicles driving themselves. This is of particular note, given that safety is one of the “selling points” of the technology – especially over human drivers. One can be led to assume that – at least among close to half of our respondents – the safety benefits of autonomous vehicle technology have not yet been understood by a wider audience.

The respondents who simply find the technology a **bad idea** equalled the number who found it a **good idea** – with a considerable gap evident once again between male and female respondents. One out of five found it’s **not needed**.

Similarly, the economic case for autonomous mobility has clearly not yet been sufficiently made: only 6 percent indicated that self-driving vehicles would **help the economy** – the same low number as were **excited** about the prospect. In our more detailed analysis, we’ll show differences between the environments of the respondents. Those large cities reported being the most excited.

What do you think/feel about vehicles being able to drive themselves in the near future?

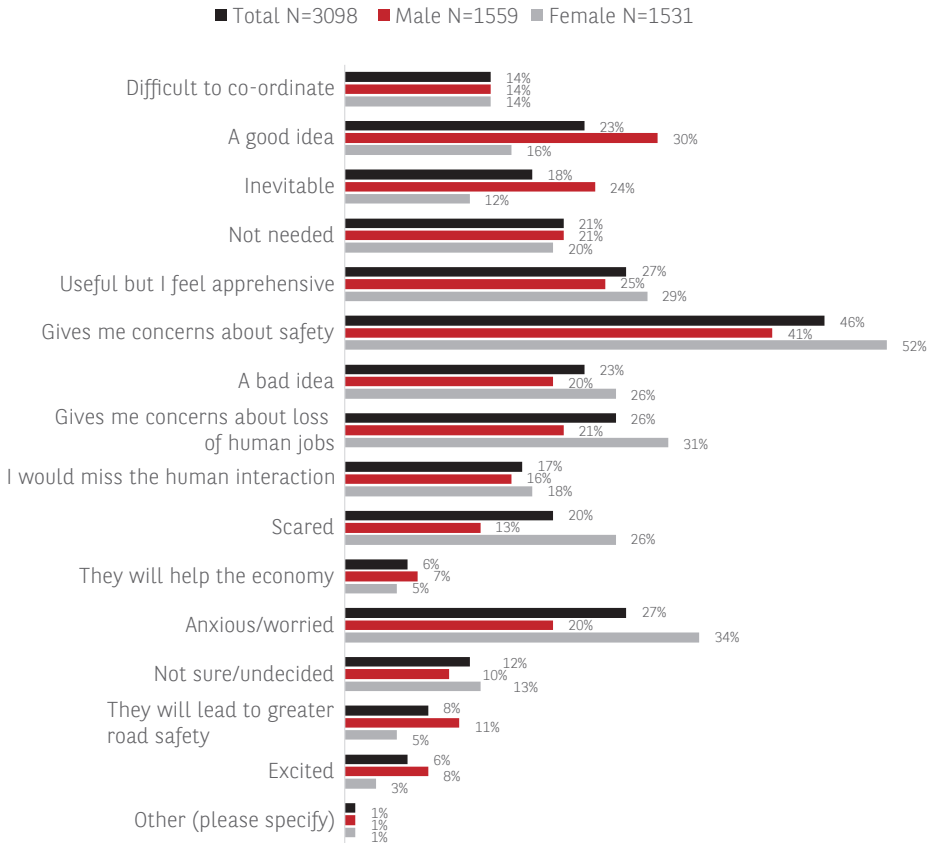


Figure 8

What do you think/feel about vehicles being able to drive themselves in the near future?

■ Total N=3098 ■ 18-29 N=550 ■ 30-39 N=577 ■ 40-49 N=596 ■ 50-59 N=567 ■ 60-69 N=527 ■ 70+ N=281

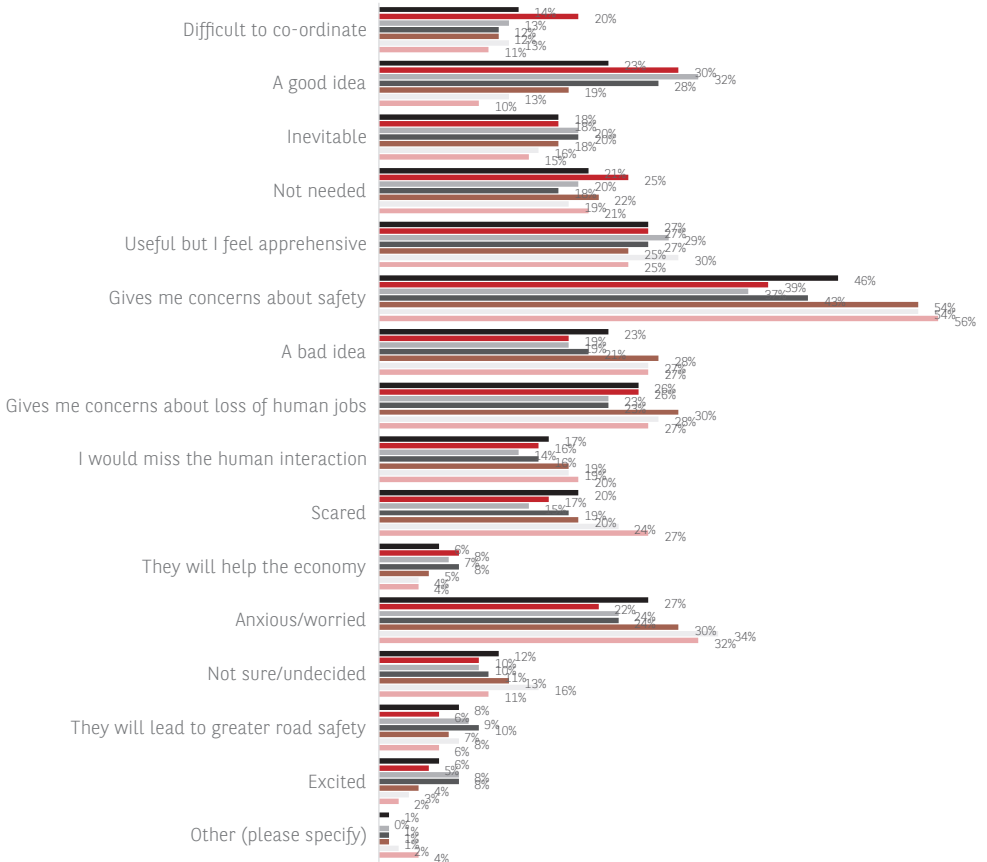


Figure 9

4. Addressing the hurdles



Image: ZF Autonomous shuttle in collaboration with Beep (in the US)

To plot a path forward in enabling adoption of highly automated mobility, we asked respondents **which factors – or activities – would enhance their confidence** in the introduction of self-driving vehicles in local areas. Our findings should not come as a surprise to any and all developers who are currently deploying either pilot or commercial applications of the technology.

The most noted – perhaps most effective – factor to give confidence in the deployment of the technology is **enabling users to experience** the safety

benefits – noted by 40 percent respondents (Figure 10). It almost goes without saying (and is dictated by economics) that the technology should be gradually rolled out. This was particularly true among Generations X, Y, and Z. It appears that younger generations may be more interested in understanding the technology's safety measures upfront.

Particularly notable – and conducive to the practice of deploying autonomous shuttles within public transport – is the endorsement (by 20 percent of all respondents, 24 percent of males, and 15 percent of females) of **integrating autonomous mobility seamlessly with current transport systems**.

Aside from this, one third of respondents called for **education and awareness campaigns**. We are happy to see this response, as we believe this to be essential at all levels and age groups.

In this context, we decided to ask our sample about which benefits of self-driving technology should be the focus when teaching about connected and automated vehicles to younger audiences. Fully 83 percent said that the **safety benefits of self-driving technology should be taught in schools** – by far the benefit most noted, followed by showing how **self-driving technology helps the environment**, and also, the technology basics of the technology (Figure 11).

Which of the following factors would enhance your confidence in the introduction of self driving vehicles in local areas?

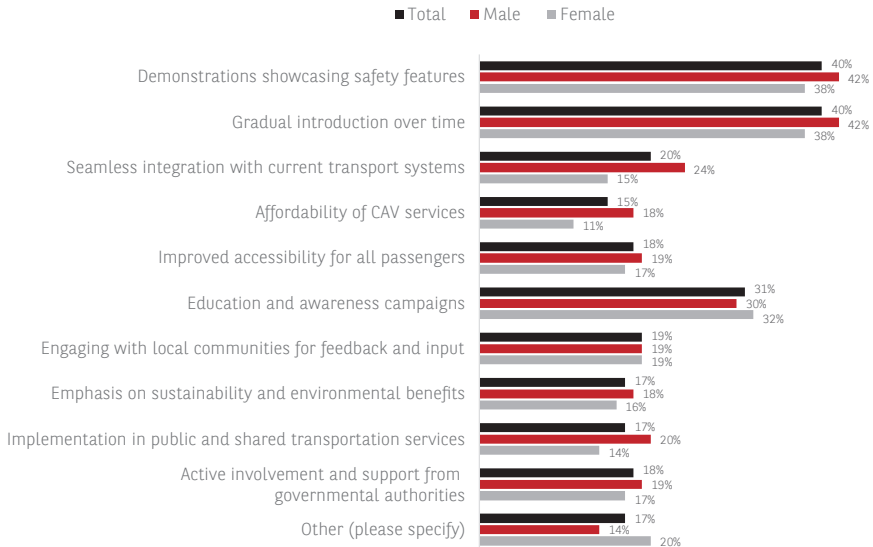


Figure 10

These insights – first enquired via our study – give indication of a path forward. Educating schoolchildren on automated vehicle technology may well prove a fruitful path forward. Fittingly, PAVE (Partners for Automated Vehicle Education) in 2022 launched an essay contest and scholarship program for high school juniors and seniors.



What do you believe should be the primary focus when delivering education about self-driving and connected vehicles in schools?

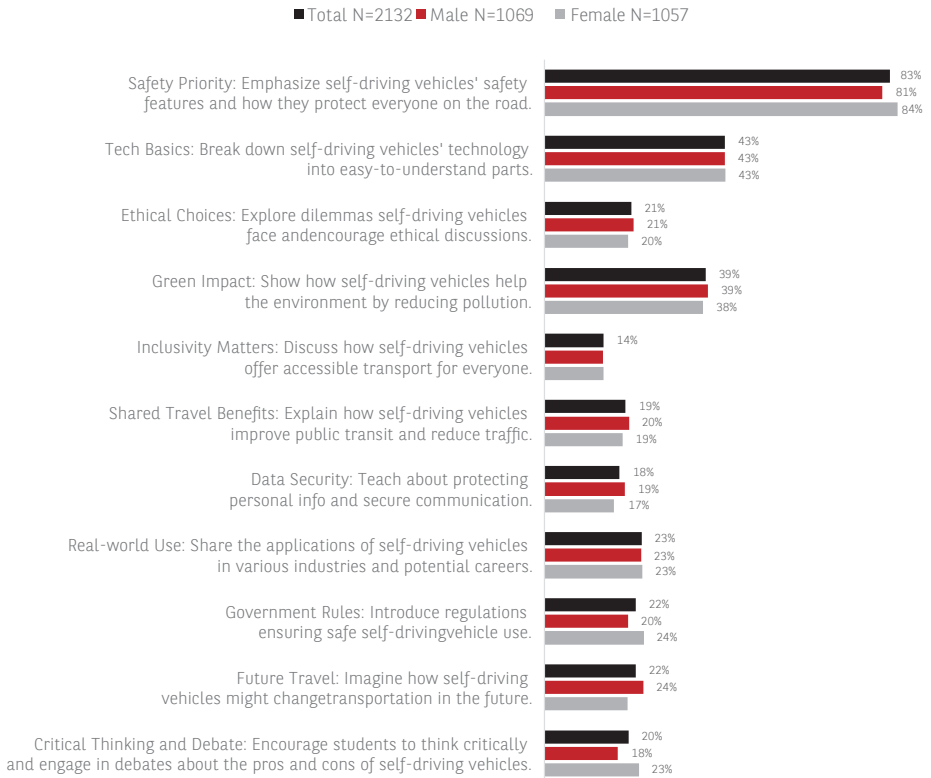


Figure 11

5 Conclusion: Building trust is a multi-faceted approach

Although the results are still fresh, we can already begin to draw lessons from these preview findings.

Our comparison of these results with similar studies across the world will show similarities, but also differences. Regions of the world with either (or both) younger and technologically open societies

have shown greater openness toward autonomous mobility, as have those regions where its benefits – to road safety, to economy, and to the efficiency of the road network – will be most felt.

Most crucially, autonomous mobility is – and will continue to be – successful only when trust is established with the public.



image: Freepik



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Lukas is an advisor to scale-up organizations and investors with a focus on smart cities and smart mobility. His insights are valued in boardrooms and research labs alike.

After defining “The Mobility Revolution” with his 2014 book, Lukas followed up with three more: “Corporate Mobility Breakthrough 2020”, “Smart Cities, Smart Mobility”, and “Being Driven”. He has addressed hundreds of thousands in over 200 keynote speeches and panels on five continents, with topics including electrification, autonomous vehicles, infrastructure, energy, shared mobility, the future of work, and investing into a carbon-neutral future.

In 2019, following the results of “Being Driven”, he co-initiated and launched PAVE Europe, a not-for-profit organization to educate on the benefits of automated vehicle technology; he is now a Board Observer.

Lukas is also an Advisor to NEXT Modular Vehicles, MSCI, SNRG and other companies, as well as a GLG Council Member. He regularly lectures at TU Berlin, the University of St. Gallen, as well as corporate universities across Europe. He is part of multiple startup event juries, and a member of the Advisory Boards of Camden Clean Air, and AutoTech Europe. Lukas was COO at mobility scale-up Splyt, helping to grow the company to over 100 staff post-Series B investment, and has also co-founded companies in the UK, US, and Romania. He holds degrees from Cornell University and the New York University Stern School of Business.

About Neckermann Strategic Advisors

We are a strategic consultancy based in London with a focus on emerging new mobility trends and their strategic impact. We conduct research and advise on the "Three Zeroes" of The Mobility Revolution: Zero Emissions, Zero Accidents, Zero Ownership.

We've supported scale-ups with their strategic plan, and investors with their sourcing. We've guided OEMs through product plans, real-estate companies through their mobility strategy, not-for-profits in their go-to-market approach, and leasing companies in communicating the benefits of mobility with their clients. Our research is read by senior leaders across the globe. Our experience isn't just on paper – it's lived. We pride ourselves on flexibility, creativity and a relentless focus on the big-picture, fundamental and strategic challenges of our clients.

We work via an extensive network of partners and associate consultants across Europe, Asia, and North America. We also partner, share offices and resources with select boutique consultancies in New York and Munich.

We are pleased to share our research with a wider audience in order to advance the mobility revolution. For more information: www.neckermann.net

About 7th Sense Research

We are experts in customer experience optimisation, product development and customer engagement across passenger, motorcycle and commercial vehicles.

Our reach stretches beyond automotive to the broader landscape of mobility and transport, and we advise manufacturers and network providers on future-proofing relevance as they design for the behaviours of the future.

