

CREDS: Public Delphi #2

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Thank you for participating in the first round of this survey. We received 1,223 responses.

We have some more questions for you, based on what we have learnt so far.

We have to obtain your ethical consent again, and will then start with the questions.

As you may recall, this study uses a multi-stage approach to examine expectations of the future effects of automated vehicle (also called autonomous, driverless and self-driving vehicles) diffusion on energy demand and greenhouse gas emissions for passenger and road freight transport in the UK.

This is the second of three stages in which we build upon what we found in the first survey, and provide some details back to you.

No background knowledge about automated vehicles is required for this study.

The information collected will be collated and used to inform academic publications, policy briefs and presentations. Members of the research team will have access to the data, but not your name or other personal details. No third parties will be given access to any of the data. The anonymised data will be deposited in specific repositories as required by the research funders (UK Research Councils).

Please read through these terms before agreeing to participate by ticking the 'yes' box below. You may ask any questions before taking part by contacting Dr Debbie Hopkins: debbie.hopkins@ouce.ox.ac.uk.

Please note that your participation is voluntary. You may withdraw at any point during the questionnaire for any reason, before submitting your answers, by closing the browser.

Your answers will be completely anonymous, and we will use our best endeavours to keep them confidential. Your data will be stored in a password-protected file and may be used in academic publications. Research data will be stored for a minimum of three years after publication or public release.

Research is a task that we perform in the public interest. Further information about your rights with respect to your personal data is available from <http://www.admin.ox.ac.uk/councilsec/compliance/gdpr/individualrights/>

We will not be asking for your name or other identifiable information in the survey.

Toluna UK Limited, with whom you have signed up as a panel member, is the data controller with respect to your personal data and, as such, will determine how your personal data is used. Please see the privacy notice you accepted when you became a Toluna member [<https://uk.toluna.com/privacy>]. The 'Online Survey Provider' is Jisc Online Surveys who will only have access to survey responses and will share only fully anonymised data with the University of Oxford, for the purposes of research.

Any personal information that could identify you will be removed or changed before files are shared with other researchers or results are made public.

Responsible members of the University of Oxford and funders may be given access to data for monitoring and/or audit of the study to ensure we are complying with guidelines, or as otherwise required by law.

This project has been reviewed by, and received ethics clearance through, the University of Oxford Central University Research Ethics Committee Reference number: SOGE 1A 20-19.

If you have a concern about any aspect of this project, please speak to the researcher [Dr Debbie Hopkins, Debbie.hopkins@ouce.ox.ac.uk], who will do their best to answer your query. The researcher should acknowledge your concern within 10 working days and give you an indication of how they intend to deal with it. If you remain unhappy or wish to make a formal complaint, please contact the relevant Chair of the Research Ethics Committee at the University of Oxford: Chair, Social Sciences & Humanities Inter-Divisional Research Ethics Committee; Email: ethics@socsci.ox.ac.uk; Address: Research Services, University of Oxford, Wellington Square, Oxford OX1 2JD. The Chair will seek to resolve the matter in a reasonably expeditious manner.

1. You may only participate in this survey if you are 18 years of age or over.

☐ I certify that I am 18 years of age or over

2. If you have read the information above and agree to participate with the understanding that the data (including any personal data) you submit will be processed accordingly, please check the relevant box below to get started. Please note: you are required to answer all questions.

- ☐ Yes, I agree to take part
- ☐ No, I do not wish to take part

In the first survey, we found a high level of concern about the environmental impacts of transport such as its contributions to air pollution and carbon dioxide emissions (66% strongly agreed or agreed that the impacts worried them). At the same time, it was widely thought that a change towards a transport system with lower environmental impacts could happen.

More respondents agreed than disagreed (47% to 23%) that transport-related environmental impacts will be resolved by *technological* solutions.

3. How important do you think the following technological solutions will be to help resolve the environmental impacts of **passenger transport**?

	Not at all important	A little important	Somewhat important	Very important	I am not sure
Automated vehicles	☐	☐	☐	☐	☐
Electric vehicles	☐	☐	☐	☐	☐
Alternative fuels (i.e. Bio-diesels - produced from vegetable oil, animal oil/fats, or waste)	☐	☐	☐	☐	☐
Smart motorways (i.e. sections of motorways that use technologies to vary speed limits and access to the hard shoulder at busy times to manage traffic capacities)	☐	☐	☐	☐	☐
Smartphone Apps for route planning	☐	☐	☐	☐	☐
Digital platform transport services (e.g. Uber, 'car clubs')	☐	☐	☐	☐	☐
Electronic ticketing for buses and trains	☐	☐	☐	☐	☐
Real-time information for public transport	☐	☐	☐	☐	☐

3.a. Are there any additional technologies you think will help to resolve transport-related environmental problems?

4. How important do you think the following technological solutions will be to help resolve the environmental impacts of **freight transport**?

	Not at all important	A little important	Somewhat important	Very important	I am not sure
Automated vehicles	☐	☐	☐	☐	☐
Aerial drones	☐	☐	☐	☐	☐
Electric vehicles	☐	☐	☐	☐	☐
Alternative fuels (i.e. Bio-diesels - produced from vegetable oil, animal oil/fats, or waste)	☐	☐	☐	☐	☐
Smart motorways (i.e. sections of motorways that use technologies to vary speed limits and access to the hard shoulder at busy times to manage traffic capacities)	☐	☐	☐	☐	☐

Smartphone Apps for route planning	☐	☐	☐	☐	☐
3d printing	☐	☐	☐	☐	☐

4.a. Are there any additional technologies you think will help to resolve transport-related environmental problems?

In the first survey, we found that most people prefer the term 'driverless vehicle' (35%), followed by 'self-driving vehicle' (17%), 'autonomous vehicle' (15%) and 'automated vehicle' (13%).

We are interested to know what these different terms mean to you.

5. In the table below, we would like you to indicate what you think these different terms ('driverless', 'self-driving', 'autonomous' and 'automated') mean for how the vehicle operates. We ask you to think about what the human driver does, what the vehicle can do (without the driver) and the types of roads the vehicles can use. Please provide one answer for the 'driver', one for the vehicle, and one for where the vehicle should be allowed, for each of the named technologies (three answers for each row!).

	Does the 'driver':			Can the vehicle:			Should these vehicles be used:			
	Always have control of the vehicle	Sometimes regain control from the vehicle	Never have control of the vehicle	Drive itself all the time	Drive itself some of the time	Offer some assistance to the driver	Only on private roads and off-road sites (e.g. factories)	In some designated lanes on public roads	On all main roads (e.g. motorways, dual-carriageways, A-roads)	On all roads
Driverless vehicles	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Self-driving vehicles	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Autonomous vehicles	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Automated vehicles	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

6. In a similar survey that we conducted in 2019 with transport and automated vehicle professionals, we found that many thought freight vehicles would be automated earlier than passenger vehicles. The first round of this survey indicated that more of you thought that fully automated passenger vehicles will be seen on some of the UK's roads by 2030 than freight vehicles (40% versus 25%) So, there seems to be a difference of views between the professionals and the participants in this survey. What do you think may be the reasons(s) for this difference? Please write your answer in the box below. *Optional*

The transport and automated vehicle professionals also thought that shifting towards electric vehicles and the adoption of new ownership models (i.e. from individual ownership to shared) would be important to achieve environmental benefits of automated vehicles.

Sharing can take place in terms of the public using vehicles when they're needed but not owning them (so someone else such as a private company, charity or the council would own them), and/or by sharing the journey with other people.

In the first survey, we questioned how automated vehicles might be owned and used.

There was strong support for retaining private ownership of automated vehicles, as we have with cars today. 58% of respondents agreed that "it is important that people are able to own their own car".

Just 1/4 of respondents agreed that 'it would be best if automated vehicles were in shared ownership rather than privately owned'. And more people agreed than disagreed (38% to 24%) that they would only use an automated vehicle if they owned it.

We also found that more than 2 out of 3 respondents (69%) did not want to share vehicles with people they don't know.

In addition, we found that just 5% of respondents regularly use 'car clubs' (e.g. Zipcar, Co-Wheels), 8% occasionally use car clubs, and 87% have not used one. Car clubs are a bit like a hire car, except you become a member of the club, and hire a car for a specified time when you need it, and pick it up from a designated parking bay or at a location indicated by the scheme's website or app. Others can also book the car and use it for a specified duration when they need it. The scheme can be run by a commercial for-profit firm, a social enterprise or a charity.

7. Please indicate whether you agree or disagree with the following statements

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
For my household accessing a car through a car club is more attractive than owning a second vehicle	☐	☐	☐	☐	☐
I worry that the vehicle may not be available when I need it	☐	☐	☐	☐	☐
It would be a pain to not be able to keep personal belongings in the vehicle	☐	☐	☐	☐	☐
I do not want to use a vehicle previously occupied by strangers	☐	☐	☐	☐	☐
I worry about whether I would be adequately insured when using a car club vehicle	☐	☐	☐	☐	☐
Using a car club is better for the environment than owning a vehicle	☐	☐	☐	☐	☐
It would be more economical to use a car club than to own my own car	☐	☐	☐	☐	☐
I would drive the club car less than if I owned a car	☐	☐	☐	☐	☐
The inside of a shared car might be unhygienic	☐	☐	☐	☐	☐
I don't want to have to use an App or the web to book a vehicle	☐	☐	☐	☐	☐
Using a car club car means I do not have to worry about parking	☐	☐	☐	☐	☐

7.a. Thinking about this same model of sharing using a 'car club', what would make you more likely to use it?

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
If the 'club' had a wide range of vehicles (i.e. mini cars, SUVs and vans)	☐	☐	☐	☐	☐
If the 'club' had very low emission vehicles (e.g. electric or hybrid)	☐	☐	☐	☐	☐
If membership and use of the vehicles was cheaper than owning a car	☐	☐	☐	☐	☐
If the car was parked close (less than 500m) to my home	☐	☐	☐	☐	☐
If the cars of the 'club' were the most efficient in petrol/diesel use within their vehicle class (e.g. small-vehicle, SUV, van, etc.)	☐	☐	☐	☐	☐
If the 'club' had vehicles with automated features (e.g. adaptive cruise control, lane assist, automatic parking)	☐	☐	☐	☐	☐
If the car was always cleaned between users	☐	☐	☐	☐	☐
If the car remembered my driving settings (e.g. preferred radio stations, seat position)	☐	☐	☐	☐	☐

7.b. Thinking about this same model of sharing using a 'shared taxi', what would make you more likely to use it?

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
If I knew for sure there would be enough space for me to be comfortable	☐	☐	☐	☐	☐
If the cost was significantly lower than travelling alone	☐	☐	☐	☐	☐
If I knew for sure that it was better for the environment	☐	☐	☐	☐	☐
If the vehicle was fully automated (i.e. with no human driver)	☐	☐	☐	☐	☐
If I could vet who can get into a vehicle with me	☐	☐	☐	☐	☐
If there was a wide range of vehicles from which I could choose (i.e. mini cars, SUVs)	☐	☐	☐	☐	☐
If it was a very low emission vehicles (e.g. electric or hybrid)	☐	☐	☐	☐	☐
If the vehicle was the most efficient in petrol/diesel use within their vehicle class (e.g. small-vehicle, SUV, van, etc.)	☐	☐	☐	☐	☐
If the 'club' had vehicles with automated features (e.g. adaptive cruise control, lane assist, automatic parking)	☐	☐	☐	☐	☐
If I knew it reduced congestion	☐	☐	☐	☐	☐

If I knew it would arrive sooner than an individual taxi	☐	☐	☐	☐	☐
If the interior of the vehicle was monitored by CCTV	☐	☐	☐	☐	☐

8. Thinking about sharing in terms of getting into a vehicle at the same time as another person (e.g. a shared taxi, UberPool), please indicate whether you agree or disagree with the following statements:

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
It is better for the environment to use shared taxis than to use individual taxis	☐	☐	☐	☐	☐
Using a shared taxi will mean the car will arrive sooner (less wait time)	☐	☐	☐	☐	☐
I don't want to have to talk to people I don't know	☐	☐	☐	☐	☐
The inside of a shared car might be unhygienic	☐	☐	☐	☐	☐
I would want to travel in a vehicle only with people of my own gender	☐	☐	☐	☐	☐
A human driver is important for the safety of all passengers	☐	☐	☐	☐	☐
It is a good way to meet new people	☐	☐	☐	☐	☐
I don't want to have to use an App or the web to book a ride	☐	☐	☐	☐	☐
I don't want other passengers to see where I live or where I go to	☐	☐	☐	☐	☐
I would only want to travel in a vehicle with people of a similar age as mine	☐	☐	☐	☐	☐

In the first survey, we found that most people (55%) are uncomfortable with the idea of sharing the road with vehicles where machines do all of the driving task, and humans are unable to intervene.

In contrast, many people (44%) are more comfortable with sharing the road with vehicles where machines do most of the task but human drivers are able to take over, and almost two-thirds (64%) are comfortable with vehicles with assistance for steering, breaking or accelerating tasks.

We are now going to ask some questions about the road types you think automated vehicles should be used on, what might make you more comfortable about sharing the road, and your travel behaviours.

9. How suitable are the following road types for vehicles that do all of the driving tasks, and a human passenger would never be allowed to take over or drive the vehicle? Please provide one answer for 'passenger vehicles', and one for 'freight vehicles' for each of the road types (two answers for each row!).

	...for passenger vehicles:					...for freight vehicles:				
	Very suitable	Suitable	Neither suitable nor unsuitable	Unsuitable	Very unsuitable	Very suitable	Suitable	Neither suitable nor unsuitable	Unsuitable	Very unsuitable
Motorway	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Dual-carriageway	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
A-road	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Suburbs	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Town/city centre	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Rural road	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Unpaved road	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Private road	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Off-road	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

It is also important to think about how pedestrians and cyclists might be affected by the introduction of automated vehicles, so we are now going to ask you some questions about this.

10. How far do you walk on an average week day?

- ☐ less than 1 mile
- ☐ 1-3 miles
- ☐ 4-7 miles
- ☐ 8+ miles

11. Do you think you would be more or less likely to walk if there were 'fully' automated vehicles (vehicles where machines do all of the driving task, and humans are unable to intervene) on the roads?

- ☐ More likely
- ☐ Less likely
- ☐ About the same

12. How far do you cycle on an average week day?

- ☐ Less than 1 mile
- ☐ 1-5 miles
- ☐ 6-10 miles
- ☐ 10-19 miles
- ☐ 20- 29 miles
- ☐ 30+ miles
- ☐ I don't cycle

13. Do you think you would be more or less likely to cycle **on the road** if there were 'fully' automated vehicles (vehicles where machines do all of the driving task, and humans are unable to intervene) **on the roads**?

- ☐ More likely
- ☐ Less likely
- ☐ About the same

14. What do you think might **increase your comfort with sharing the road with a vehicle which does all the driving task without human interference**? Please provide one answer for 'driver/ passenger in a vehicle', one for 'cyclist' and one for 'pedestrian' for each of the items. There should be three answers for each row!

	As a driver/ passenger in a vehicle			As a cyclist			As a pedestrian		
	Yes	No	Maybe	Yes	No	Maybe	Yes	No	Maybe
Physical barriers which separate the automated vehicle from other motorised vehicles	☐	☐	☐	☐	☐	☐	☐	☐	☐
Physical barriers which separate the automated vehicle from all other road users, including cyclists and pedestrians	☐	☐	☐	☐	☐	☐	☐	☐	☐
Greater awareness of what automated vehicles can and cannot do	☐	☐	☐	☐	☐	☐	☐	☐	☐
A fail-safe stop mechanism in the vehicle to ensure emergency stops	☐	☐	☐	☐	☐	☐	☐	☐	☐
Clear indications of the vehicles' intended movements (i.e. signals for turning, slowing, accelerating etc.)	☐	☐	☐	☐	☐	☐	☐	☐	☐

Automated vehicles may mean that people in the vehicles can do different activities - particularly for the person who was once the 'driver', as they no longer have to do all of the driving task.

We are now going to ask some questions about the activities you do when you are in a car as a driver or passenger.

15. We are interested to know the purpose of your trips by car (as the driver or passenger).

	How much of your time do you spend travelling for the following purposes. Over the five categories, your answers should add up to 100. (e.g.: 60% commuting, 15% shopping and errands, 10% Chauffeur others, 5% leisure, and 10% other).	
Commuting		
Shopping and errands		
Chauffeur others (e.g. children)		
Leisure		
Other		

16. For the final question, we would like you to tell us about the activities you do in a vehicle at the moment, and what you think you would do in an automated vehicle. Please provide one answer in each column for each of the activities. There should be three answers for each row!

	When you travel as a passenger in a vehicle today, please indicate how often you do the following activities:					As a passenger in a vehicle which does all driving tasks, and in which you are never allowed to take over or drive the vehicle, please indicate how often you think you would engage in the following activities:					As the driver in a vehicle which does most driving tasks, but in some circumstances a to take over driving, please indicate how often you think you would engage in the following activities:			
	Always	Often	Sometimes	Rarely	Never	Always	Often	Sometimes	Rarely	Never	Always	Often	Sometimes	Rarely
Watching scenery and/or people outside the vehicle	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Daydreaming	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Sleeping/resting	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Watching video	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Talking to people on the phone	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Talking to other people in the vehicle	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Reading/Gaming	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Eating/drinking	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Grooming (e.g. putting on make-up)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Work-related tasks	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

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Thank you for completing the second survey about automated vehicles! We will now be looking at all the responses we receive, and designing a third and final survey, which you will be invited to complete - we do hope you will!

Thank you again.

Please click [here](#) to end the survey.
