

UMTRI-2014-30

OCTOBER 2014

**PUBLIC OPINION ABOUT SELF-DRIVING  
VEHICLES IN CHINA, INDIA, JAPAN,  
THE U.S., THE U.K., AND AUSTRALIA**

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PUBLIC OPINION ABOUT SELF-DRIVING  
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Report No. UMTRI-2014-30  
October 2014

1. Report No. UMTRI-2014-30		2. Government Accession No.		3. Recipient's Catalog No.	
4. Title and Subtitle Public Opinion about Self-Driving Vehicles in China, India, Japan, the U.S., the U.K., and Australia				5. Report Date October 2014	
				6. Performing Organization Code 383818	
7. Author(s) Brandon Schoettle and Michael Sivak				8. Performing Organization Report No. UMTRI-2014-30	
9. Performing Organization Name and Address The University of Michigan Transportation Research Institute 2901 Baxter Road Ann Arbor, Michigan 48109-2150 U.S.A.				10. Work Unit no. (TRAIS)	
				11. Contract or Grant No.	
12. Sponsoring Agency Name and Address The University of Michigan Sustainable Worldwide Transportation <a href="http://www.umich.edu/~umtriswt">http://www.umich.edu/~umtriswt</a>				13. Type of Report and Period Covered	
				14. Sponsoring Agency Code	
15. Supplementary Notes					
16. Abstract <p>This report documents a new study of public opinion about self-driving vehicles in China, India, and Japan. The survey yielded completed responses from 610 respondents in China, 527 respondents in India, and 585 respondents in Japan. For comparison, the report also includes recently released findings from the same survey in the U.S., the U.K., and Australia.</p> <p>The main findings (applicable to each of the six countries) are as follows:</p> <ul style="list-style-type: none"> <li>• The majority of respondents had previously heard of autonomous or self-driving vehicles, had a positive initial opinion of the technology (or neutral in the case of Japan), and had high expectations about the benefits of the technology.</li> <li>• However, the majority of respondents expressed high levels of concern about riding in self-driving vehicles, safety issues related to equipment or system failure, and self-driving vehicles not performing as well as human drivers.</li> <li>• Respondents also expressed high levels of concern about vehicles without driver controls; self-driving vehicles moving while unoccupied; and self-driving commercial vehicles, buses, and taxis.</li> <li>• The majority of respondents expressed a desire to have this technology in their vehicles. However, a majority was also unwilling to pay extra for the technology (except for respondents in China and India).</li> </ul> <p>In comparison to the respondents in the U.S., the U.K., and Australia, respondents in China and India had more positive initial opinions of self-driving vehicles, expressed greater interest in having such technology on their personal vehicles, and were willing to pay the most for it. Japanese respondents, on the other hand, generally had more neutral initial opinions about self-driving technology and were willing to pay the least for it.</p> <p>The main implications of these results are that the respondents in the six countries surveyed, while expressing high levels of concern about riding in vehicles equipped with this technology, mostly feel positive about self-driving vehicles, have optimistic expectations of the benefits, and generally desire self-driving-vehicle technology (though a majority in four out of the six countries surveyed are not willing to pay extra for such technology at this time).</p>					
17. Key Words autonomous vehicles, self-driving vehicles, driverless vehicles, survey, China, India, Japan, U.S., U.K., Australia, public opinion				18. Distribution Statement Unlimited	
19. Security Classification (of this report) None		20. Security Classification (of this page) None	21. No. of Pages 33	22. Price	

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## Introduction

Recent advances in autonomous-vehicle technology (e.g., Daimler, 2014; Google, 2014; Nissan, 2013) have helped bring self-driving vehicles to the forefront of public interest, making them a popular topic of discussion in the media (BBC, 2014; CNN, 2014; Forbes, 2014; Los Angeles Times, 2014). Self-driving vehicles are commonly envisioned to be the ultimate, full embodiment of connected-vehicle technology (Narla, 2013; NHTSA, 2013), an area that is currently the focus of several large research projects and government support in the U.S. (NHTSA, 2012; 2014).

In order to gain a better understanding of opinions, concerns, and general acceptance by average drivers around the world, we conducted a survey earlier this year of public opinion about autonomous and self-driving vehicles in the U.S., the U.K., and Australia (Schoettle and Sivak, 2014). That study examined several key topics, including gauging the general public's expectations, concerns, and overall willingness to own and pay for this type of technology.

The present study extends the geographic coverage of the survey by Schoettle and Sivak (2014) to three additional countries: China, India, and Japan. The questionnaire that was used in the present study is identical to the questionnaire used in Schoettle and Sivak (2014), except for the fact that translations were used in China and Japan. For completeness, the results will be presented for all six countries.

In this survey, the various levels of autonomous or self-driving technology were defined as follows (adapted from NHTSA, 2013):

- Level 0. No autonomous-vehicle technology.
- Level 1. The vehicle controls one or more safety-critical functions, but each function operates independently. The driver still maintains overall control.
- Level 2. This level combines two or more technologies from Level 1, and they operate in coordination with each other. The driver still maintains overall control.
- Level 3. This level provides limited self-driving technology. The driver will be able to hand control of all safety-critical functions to the vehicle, and only occasional control by the driver will be required.
- Level 4. Completely self-driving vehicle. The vehicle will control all safety-critical functions for the entire trip.

## **Method**

### **Survey instrument**

An online survey was conducted using SurveyMonkey ([www.surveymonkey.com](http://www.surveymonkey.com)), a web-based survey company. The same questionnaire developed in Schoettle and Sivak (2014) was used for the current study. The main topics addressed were as follows:

- Familiarity with and general opinion about autonomous and self-driving vehicles
- Familiarity with current autonomous-vehicle technology on their own vehicle(s)
- Expected benefits of self-driving vehicles
- Concerns about using self-driving vehicles
- Concerns about different possible implementations of self-driving vehicles
- Overall interest in owning and willingness to pay for self-driving-vehicle technology

The survey was translated for use in both China (Mandarin) and Japan (Japanese). For India, the survey was conducted in English, using the U.K. version for spelling and wording from Schoettle and Sivak (2014).

Information related to each respondent's current vehicle type, including the level of autonomous technology on each respondent's vehicle, and additional demographic information was collected for inclusion in the analysis. (The appendix contains the full English version of the questionnaire.) The survey was conducted in September 2014.

### **Respondents**

SurveyMonkey's Audience tool was used to target and recruit individuals 18 years and older from SurveyMonkey's respondent databases in China, India, and Japan. The recruitment resulted in 1,812 replies from potential respondents. Fully completed surveys were received for 1,722 respondents. The total numbers of completed surveys by country were 610 for China, 527 for India, and 585 for Japan.

Respondents recruited to complete online surveys with SurveyMonkey are generally representative of each country's population (SurveyMonkey, 2014); however, online surveys, by their nature, result in the exclusion of individuals without Internet access. Furthermore, as the markets for SurveyMonkey's Audience recruiting tool are still being developed in China and India, those respondents were less representative of

each country's population than the samples for the other countries in these two studies. For example, at the time the surveys were conducted, both countries had around 400,000 potential respondents in their respective Audience databases (corresponding to only 0.03% and 0.04% of the adult populations in China and India, respectively).

Demographic breakdowns for the respondents are presented in Table 1. The samples for each country contained several demographic differences, especially regarding the age, education, and employment distributions. While the age distributions of respondents vary across the countries, those differences generally correspond to the actual age distributions for each country (Census, 2014). Due to the nature of the sampling described above, it is likely that the respondents in China and India are more educated and have higher income than the general population in those countries. However, though the respondents in these two countries may not be representative of the overall population, they are likely to be representative of those individuals who would comprise the initial market for autonomous and self-driving vehicles in these countries.

Table 1  
Demographic breakdown for the final 3,255 respondents.

Demographic aspect		Percent					
		China (N=610)	India (N=527)	Japan (N=585)	U.S. (N=501)	U.K. (N=527)	Australia (N=505)
Age group	18 to 29	22.0	46.3	12.1	29.2	23.7	26.6
	30 to 39	35.9	33.0	7.4	21.6	24.5	22.8
	40 to 49	19.8	12.3	33.5	19.2	21.0	21.6
	50 to 59	14.1	5.5	21.7	23.2	21.4	22.6
	60 to 69	7.5	2.3	15.0	7.0	8.7	6.5
	70 or older	0.7	0.6	10.3	0.0	0.6	0.0
Gender	Female	47.7	48.8	48.0	52.1	52.9	51.7
	Male	52.3	51.2	52.0	47.9	47.1	48.3
Education	Less than bachelor	28.7	7.4	52.0	56.3	59.0	51.3
	Bachelor degree	64.3	47.2	43.2	29.5	23.5	32.1
	Graduate degree	7.0	45.4	4.8	14.2	17.5	16.6
Employment	Full-time	81.3	56.9	35.6	46.5	42.7	43.6
	Part-time	2.0	17.8	17.6	17.0	19.4	19.6
	Not employed	0.8	16.7	31.3	20.6	20.1	17.4
	Retired	10.7	1.9	12.0	9.0	8.5	9.5
	Full-time student	4.4	4.6	3.6	6.0	8.9	8.3
	Part-time student	0.8	2.1	0.0	1.0	0.4	1.6
Vehicle type driven most often	Passenger car	54.3	41.7	56.2	55.3	66.4	74.1
	Minivan/van/MPV	5.4	1.7	11.5	7.0	6.3	2.4
	Pickup truck	0.5	0.4	0.0	8.0	0.6	2.8
	SUV	19.0	10.8	2.2	16.8	4.0	11.1
	Motorcycle/scooter	4.4	29.0	1.2	0.4	1.1	0.8
	Do not drive	15.9	15.2	28.9	12.0	21.2	8.7
	Other	0.5	1.1	0.0	0.6	0.4	0.2
Autonomous-vehicle technology installed on vehicle(s)	Level 0	32.0	34.2	50.6	47.7	49.7	45.3
	Level 1	29.5	26.2	8.2	25.5	16.7	29.7
	Level 2	18.9	10.8	3.6	4.6	3.6	4.4
	Do not know	4.1	4.4	10.8	6.4	5.5	4.6
	Do not own vehicle	15.6	24.5	26.8	15.8	24.5	16.0



## Results

For completeness, the results from the three new countries (China, India, and Japan) are presented along with those for the U.S., the U.K., and Australia from Schoettle and Sivak (2014).

### **Familiarity with and general opinion about autonomous and self-driving vehicles**

The majority of respondents in each of the six countries had heard of autonomous or self-driving vehicles before the survey (Table 2). China had the highest percentage responding that they had previously heard of autonomous or self-driving vehicles (87.0%); Japan had the lowest percentage (57.4%).

Table 2  
Percentage of responses, by country, to Q1: “*Had you ever heard of autonomous or self-driving vehicles before participating in this survey?*”

Response	China	India	Japan	U.S.	U.K.	Australia
Yes	87.0	73.8	57.4	70.9	66.0	61.0
No	13.0	26.2	42.6	29.1	34.0	39.0

Respondents were asked: “*What is your general opinion regarding autonomous and self-driving vehicles?*” Table 3 presents a complete summary of responses by country. Most respondents had a “very positive” or “somewhat positive” impression of the technology, with the most positive responses coming from China (87.2%); Japanese respondents had the least positive impressions, with only a minority (42.9%) feeling positively about such vehicles. Chinese respondents were 4.9 times as likely to report a “very positive” opinion about the technology (49.8%) than were Japanese respondents (10.1%). Only a modest percentage of respondents had any negative impressions, with the highest incidence in the U.S. (16.4%), and the lowest incidence in China (3.0%). The percentage of respondents in each country having a neutral opinion ranged widely from 50.3% in Japan (the most frequent response for that country) to 9.8% in China.

Table 3  
 Percentage of responses, by country, to Q2: “*What is your general opinion regarding autonomous and self-driving vehicles?*”

Response	China	India	Japan	U.S.	U.K.	Australia
Very positive	49.8	45.9	10.1	22.0	13.9	16.2
Somewhat positive	37.4	38.3	32.8	34.3	38.3	45.7
Neutral	9.8	12.5	50.3	27.3	34.2	26.7
Somewhat negative	2.3	3.0	6.2	12.4	11.2	8.3
Very negative	0.7	0.2	0.7	4.0	2.5	3.0

**Expected benefits of self-driving vehicles**

Respondents were asked: “*How likely do you think it is that the following benefits will occur when using completely self-driving vehicles (Level 4)?*” (Respondents were provided with a detailed definition of Level 4 technology prior to the question.) They were asked to select “very likely,” “somewhat likely,” “somewhat unlikely,” or “very unlikely” for each item in a list of expected benefits for completely self-driving vehicles (Level 4). Table 4 presents a complete summary of responses by country. “Somewhat likely” was generally the most frequent response for each item in all six countries. For all questions, the “very likely” category was chosen most frequently by Indian or Chinese respondents, and least frequently by Japanese respondents.

Table 4

Percentage of responses, by country, to Q6: “How likely do you think it is that the following benefits will occur when using completely self-driving vehicles (Level 4)?”

Expected benefit	Response	China	India	Japan	U.S.	U.K.	Australia
Fewer crashes	Very likely	33.6	36.6	17.3	26.1	23.5	24.2
	Somewhat likely	52.1	45.0	63.8	41.7	47.6	48.1
	Somewhat unlikely	13.1	12.7	15.4	22.2	21.6	21.4
	Very unlikely	1.1	5.7	3.6	10.0	7.2	6.3
Reduced severity of crashes	Very likely	37.4	36.8	17.4	25.0	21.8	23.6
	Somewhat likely	47.7	46.1	63.1	43.9	50.9	49.9
	Somewhat unlikely	13.8	13.1	16.2	20.8	20.9	20.2
	Very unlikely	1.1	4.0	3.2	10.4	6.5	6.3
Improved emergency response to crashes	Very likely	43.6	49.7	11.8	32.5	18.8	23.0
	Somewhat likely	45.2	37.4	54.4	39.1	41.4	45.7
	Somewhat unlikely	10.5	10.2	28.4	21.2	29.6	24.4
	Very unlikely	0.7	2.7	5.5	7.2	10.2	6.9
Less traffic congestion	Very likely	30.0	35.5	10.8	19.2	15.2	15.2
	Somewhat likely	42.0	36.8	45.1	30.5	32.1	32.3
	Somewhat unlikely	24.9	22.0	37.9	32.9	37.4	36.2
	Very unlikely	3.1	5.7	6.2	17.4	15.4	16.2
Shorter travel time	Very likely	31.3	36.8	5.8	16.8	11.0	13.3
	Somewhat likely	47.0	37.0	36.6	29.1	28.3	31.5
	Somewhat unlikely	20.0	19.7	48.7	36.9	44.2	40.2
	Very unlikely	1.6	6.5	8.9	17.2	16.5	15.0
Lower vehicle emissions	Very likely	27.4	39.3	8.5	21.2	23.0	16.8
	Somewhat likely	44.8	43.5	48.7	42.3	44.2	45.5
	Somewhat unlikely	25.9	12.7	36.1	26.1	26.4	27.5
	Very unlikely	2.0	4.6	6.7	10.4	6.5	10.1
Better fuel economy	Very likely	34.8	47.4	10.8	25.3	27.5	21.0
	Somewhat likely	49.3	38.5	52.1	44.7	48.4	49.1
	Somewhat unlikely	13.6	10.8	31.8	21.2	19.7	22.6
	Very unlikely	2.3	3.2	5.3	8.8	4.4	7.3
Lower insurance rates	Very likely	25.2	33.2	9.1	22.6	18.0	16.6
	Somewhat likely	53.3	36.1	50.9	30.9	40.2	38.0
	Somewhat unlikely	19.2	22.4	33.7	27.9	27.7	28.9
	Very unlikely	2.3	8.3	6.3	18.6	14.0	16.4

The majority of respondents felt that each of the expected benefits was likely to occur with self-driving vehicles, with the exception of less traffic congestion and shorter travel times (a majority in several countries felt that these two benefits were unlikely to occur). A collapsed breakdown (likely responses versus unlikely responses) showing the countries most likely and least likely to expect each benefit is as follows (with the collapsed percentage saying “very/somewhat likely” in parentheses):

- Fewer crashes: China (85.7%), U.S. (67.8%)
- Reduced severity of crashes: China (85.1%), U.S. (68.9%)
- Improved emergency response to crashes: China (88.8%), U.K. (60.2%)
- Less traffic congestion: India (72.3%), U.K. (47.3%)
- Shorter travel time: China (78.3%), U.K. (39.3%)
- Lower vehicle emissions: India (82.8%), Japan (57.2%)
- Better fuel economy: India (85.9%), Japan (62.9%)
- Lower insurance rates: China (78.5%), U.S. (53.5%)

A collapsed breakdown (likely responses versus unlikely responses) showing the most likely and least likely expected benefits by country is as follows (with the collapsed percentage saying “very/somewhat likely” in parentheses):

- China: Improved emergency response to crashes (88.8%)  
Less traffic congestion (72.0%)
- India: Better fuel economy (85.9%)  
Lower insurance rates (69.3%)
- Japan: Fewer crashes (81.1%)  
Shorter travel time (42.4%)
- U.S.: Improved emergency response to crashes (71.6%)  
Shorter travel time (45.9%)
- U.K.: Better fuel economy (75.9%)  
Shorter travel time (39.3%)
- Australia: Reduced severity of crashes (73.5%)  
Shorter travel time (44.8%)

### Concerns about using self-driving vehicles

Respondents were asked: “*How concerned would you be about driving or riding in a vehicle with [Level 3] self-driving technology?*” (Respondents were provided with a detailed definition of Level 3 technology immediately preceding the question.) Table 5 presents a complete summary of responses by country. The most frequent response varied by country, with “very concerned” being most frequent in India, “moderately concerned” in the U.S. and Australia, and “slightly concerned” in China, Japan, and the U.K. The “very concerned” response was selected 4.5 times as often in India (41.6%) than in China (9.2%).

Table 5  
Percentage of responses, by country, to Q4: “*How concerned would you be about driving or riding in a vehicle with [Level 3] self-driving technology?*”

Response	China	India	Japan	U.S.	U.K.	Australia
Very concerned	9.2	41.6	14.9	26.1	14.8	16.0
Moderately concerned	34.1	39.7	35.6	35.5	33.8	37.2
Slightly concerned	46.6	14.8	39.3	27.1	36.8	34.5
Not at all concerned	10.2	4.0	10.3	11.2	14.6	12.3

Respondents were asked: “*How concerned would you be about driving or riding in a vehicle with [Level 4] self-driving technology?*” (Again, respondents were provided with a detailed definition of Level 4 technology immediately preceding the question.) Table 6 presents a complete summary of responses by country. The most frequent response varied by country, with “very concerned” being most frequent in India and the U.S., “moderately concerned” in the U.K., and “slightly concerned” in China, Japan, and Australia. The “very concerned” response was selected 3.3 times as often in India (40.4%) than in China (12.3%).

Table 6  
 Percentage of responses, by country, to Q5: “How concerned would you be about driving or riding in a vehicle with [Level 4] self-driving technology?”

Response	China	India	Japan	U.S.	U.K.	Australia
Very concerned	12.3	40.4	19.8	35.9	26.0	27.9
Moderately concerned	36.7	38.5	32.5	30.9	31.1	29.5
Slightly concerned	38.2	15.9	38.5	21.8	29.6	31.1
Not at all concerned	12.8	5.1	9.2	11.4	13.3	11.5

Respondents were asked: “How concerned are you about the following issues related to completely self-driving vehicles (Level 4)?” (Respondents were provided with a detailed definition of Level 4 technology prior to the question.) They were asked to select “very concerned,” “moderately concerned,” “slightly concerned,” or “not at all concerned” for each item in a list of possible concerns regarding self-driving vehicles. Table 7 presents a complete summary of responses by country. The most frequent response was either “very concerned” or “moderately concerned,” depending on the issue in question. The “very concerned” response tended to be selected most often by Chinese and Indian respondents, and least likely by Japanese respondents.

Table 7  
Percentage of responses, by country, to Q7: “How concerned are you about the following issues related to completely self-driving vehicles (Level 4)?”

Possible concern	Response	China	India	Japan	U.S.	U.K.	Australia
Safety consequences of equipment/system failure	Very concerned	68.0	59.0	31.1	51.1	44.8	44.4
	Moderately concerned	27.7	27.5	45.8	30.7	36.8	34.3
	Slightly concerned	3.8	10.8	19.5	14.6	14.6	17.4
	Not at all concerned	0.5	2.7	3.6	3.6	3.8	4.0
Legal liability for drivers/owners	Very concerned	55.1	46.7	21.2	41.1	30.0	33.1
	Moderately concerned	37.0	36.6	49.2	36.1	42.5	39.6
	Slightly concerned	7.5	13.9	23.6	15.4	20.1	20.4
	Not at all concerned	0.3	2.8	6.0	7.4	7.4	6.9
System security (from hackers)	Very concerned	53.9	54.6	22.1	40.1	30.7	34.9
	Moderately concerned	35.6	28.7	46.5	30.7	36.4	33.3
	Slightly concerned	9.3	13.3	25.8	19.8	23.5	23.4
	Not at all concerned	1.1	3.4	5.6	9.4	9.3	8.5
Vehicle security (from hackers)	Very concerned	55.4	57.3	18.6	39.9	29.2	33.7
	Moderately concerned	32.0	25.0	50.1	30.7	37.2	32.7
	Slightly concerned	11.6	13.3	26.0	20.6	23.1	23.2
	Not at all concerned	1.0	4.4	5.3	8.8	10.4	10.5
Data privacy (location and destination tracking)	Very concerned	49.8	50.9	13.0	38.7	23.9	28.1
	Moderately concerned	35.6	31.3	49.6	30.7	37.8	32.1
	Slightly concerned	13.3	13.1	25.8	20.0	23.3	26.5
	Not at all concerned	1.3	4.7	11.6	10.6	15.0	13.3
Interacting with non-self-driving vehicles	Very concerned	38.9	35.5	22.2	40.1	29.6	30.7
	Moderately concerned	43.1	40.0	46.0	35.5	37.4	35.8
	Slightly concerned	16.1	19.4	24.8	16.8	25.6	24.0
	Not at all concerned	2.0	5.1	7.0	7.6	7.4	9.5
Interacting with pedestrians and bicyclists	Very concerned	42.6	40.4	22.2	42.1	33.4	35.6
	Moderately concerned	41.0	37.4	48.5	32.9	35.5	29.9
	Slightly concerned	13.9	16.1	22.7	18.0	23.1	25.1
	Not at all concerned	2.5	6.1	6.5	7.0	8.0	9.3
Learning to use self-driving vehicles	Very concerned	41.8	43.6	9.6	29.1	15.4	20.8
	Moderately concerned	43.6	32.6	42.1	30.3	33.0	31.9
	Slightly concerned	12.6	16.9	32.1	25.7	30.2	26.9
	Not at all concerned	2.0	6.8	16.2	14.8	21.4	20.4
System performance in poor weather	Very concerned	59.5	50.5	15.4	39.7	18.4	25.9
	Moderately concerned	33.4	28.8	46.8	33.7	37.0	33.7
	Slightly concerned	6.1	15.6	30.3	19.2	30.2	28.9
	Not at all concerned	1.0	5.1	7.5	7.4	14.4	11.5
Self-driving vehicles confused by unexpected situations	Very concerned	56.1	50.7	32.3	53.1	38.1	43.4
	Moderately concerned	35.1	29.6	43.1	29.1	34.2	29.1
	Slightly concerned	7.9	15.2	20.9	13.4	22.0	21.6
	Not at all concerned	1.0	4.6	3.8	4.4	5.7	5.9
Self-driving vehicles not driving as well as human drivers	Very concerned	35.1	38.9	19.0	39.7	27.5	30.1
	Moderately concerned	46.7	38.3	46.2	33.5	34.0	35.6
	Slightly concerned	15.4	15.9	29.1	19.6	25.6	24.6
	Not at all concerned	2.8	6.8	5.8	7.2	12.9	9.7

A summary of the highest and lowest levels of concern for each item is shown below. The first country listed after each item expressed the highest concern (with the highest percentage saying “very concerned” in parentheses), while the second country listed (always Japan for these items) expressed the lowest concern (with the lowest percentage saying “very concerned” in parentheses):

- Safety consequences of equipment/system failure: China (68.0%), Japan (31.1%)
- Legal liability for drivers/owners: China (55.1%), Japan (21.2%)
- System security (from hackers): India (54.6%), Japan (22.1%)
- Vehicle security (from hackers): India (57.3%), Japan (18.6%)
- Data privacy (location and destination tracking): India (50.9%), Japan (13.0%)
- Interacting with non-self-driving vehicles: U.S. (40.1%), Japan (22.2%)
- Interacting with pedestrians and bicyclists: China (42.6%), Japan (22.2%)
- Learning to use self-driving vehicles: India (43.6%), Japan (9.6%)
- System performance in poor weather: China (59.6%), Japan (15.4%)
- Self-driving vehicles confused by unexpected situations: China (56.1%), Japan (32.3%)
- Self-driving vehicles not driving as well as human drivers: U.S. (39.7%), Japan (19.0%)

A summary of the highest and lowest concerns for each individual country is listed below. The first item listed after each country corresponds to the highest concern (with the highest percentage saying “very concerned” in parentheses), while the second item listed corresponds to the lowest concern (with the lowest percentage saying “very concerned” in parentheses):

- China: Safety consequences of equipment/system failure (68.0%)  
Self-driving vehicles not driving as well as human drivers (35.1%)
- India: Safety consequences of equipment/system failure (59.0%)  
Interacting with non-self-driving vehicles (35.5%)
- Japan: Self-driving vehicles confused by unexpected situations (32.3%)  
Learning to use self-driving vehicles (9.6%)
- U.S.: Self-driving vehicles confused by unexpected situations (53.1%)  
Learning to use self-driving vehicles (29.1%)



- U.K.: Safety consequences of equipment/system failure (44.8%)  
Learning to use self-driving vehicles (15.4%)
- Australia: Safety consequences of equipment/system failure (44.4%)  
Learning to use self-driving vehicles (20.8%)

Respondents were asked: “*How concerned are you about the following possible scenarios with completely self-driving vehicles (Level 4)?*” They were asked to select “very concerned,” “moderately concerned,” “slightly concerned,” or “not at all concerned” for each item in a list of possible scenarios involving different methods of using or deploying self-driving vehicles. Table 8 presents a complete summary of responses by country. “Very concerned” was the most frequent response for all items in each country except for Japan, where this level of concern was only expressed for riding in a vehicle with no driver controls available (the most frequent response for all other scenarios in Japan was “moderately concerned”).

Table 8  
 Percentage of responses, by country, to Q8: “How concerned are you about the following possible scenarios with completely self-driving vehicles (Level 4)?”

Possible concern	Response	China	India	Japan	U.S.	U.K.	Australia
Riding in a vehicle with no driver controls available	Very concerned	58.9	49.5	41.0	60.1	51.8	51.0
	Moderately concerned	33.3	32.1	40.0	25.7	26.2	27.4
	Slightly concerned	6.6	13.1	14.7	10.4	14.6	14.5
	Not at all concerned	1.3	5.3	4.3	3.8	7.4	7.1
Self-driving vehicles moving from one location to another while unoccupied	Very concerned	45.7	40.0	29.2	41.5	36.6	39.4
	Moderately concerned	43.3	38.3	44.8	31.3	29.5	31.9
	Slightly concerned	9.7	15.7	19.3	16.6	20.0	17.7
	Not at all concerned	1.3	5.9	6.7	10.6	13.9	11.0
Self-driving commercial vehicles such as heavy trucks or semi-trailer trucks	Very concerned	40.3	48.8	34.2	58.2	51.7	53.0
	Moderately concerned	39.5	28.5	42.6	24.4	25.7	23.6
	Slightly concerned	16.9	16.3	16.4	12.2	15.0	16.1
	Not at all concerned	3.3	6.5	6.8	5.2	7.6	7.3
Public transportation such as buses that are completely self-driving	Very concerned	51.8	44.2	31.1	49.7	44.0	44.1
	Moderately concerned	35.6	32.6	43.8	28.1	28.5	26.6
	Slightly concerned	10.3	15.2	17.3	15.4	16.3	19.5
	Not at all concerned	2.3	8.0	7.9	6.8	11.3	9.7
Taxis that are completely self-driving	Very concerned	46.4	41.2	32.1	45.7	41.3	41.7
	Moderately concerned	40.0	35.5	40.9	31.4	28.8	29.4
	Slightly concerned	10.8	15.4	20.5	15.9	19.2	19.4
	Not at all concerned	2.8	4.7	6.5	7.0	10.7	9.5

A summary of the highest and lowest levels of concern for each scenario is shown below. The first country listed after each scenario expressed the highest concern (with the highest percentage saying “very concerned” in parentheses), while the second country listed (always Japan for these scenarios) expressed the lowest concern (with the lowest percentage saying “very concerned” in parentheses):

- Riding in a vehicle with no driver controls available: U.S. (60.1%), Japan (41.0%)
- Self-driving vehicles moving from one location to another while unoccupied: China (45.7%), Japan (29.2%)
- Self-driving commercial vehicles such as heavy trucks or semi-trailer trucks: U.S. (58.2%), Japan (34.2%)

- Public transportation such as buses that are completely self-driving: China (51.8%), Japan (31.1%)
- Taxis that are completely self-driving: China (46.4%), Japan (32.1%)

A summary of the highest and lowest concerns for each individual country is listed below. The first scenario listed after each country corresponds to the highest concern (with the highest percentage saying “very concerned” in parentheses), while the second scenario listed corresponds to the lowest concern (with the lowest percentage saying “very concerned” in parentheses):

- China: Riding in a vehicle with no driver controls available (58.9%)  
Self-driving commercial vehicles such as heavy trucks or semi-trailer trucks (40.3%)
- India: Riding in a vehicle with no driver controls available (49.5%)  
Self-driving vehicles moving from one location to another while unoccupied (40.0%)
- Japan: Riding in a vehicle with no driver controls available (41.0%)  
Self-driving vehicles moving from one location to another while unoccupied (29.2%)
- U.S.: Riding in a vehicle with no driver controls available (60.1%)  
Self-driving vehicles moving from one location to another while unoccupied (41.5%)
- U.K.: Riding in a vehicle with no driver controls available (51.8%)  
Self-driving vehicles moving from one location to another while unoccupied (36.6%)
- Australia: Self-driving commercial vehicles such as heavy trucks or semi-trailer trucks (53.0%)  
Self-driving vehicles moving from one location to another while unoccupied (39.4%)

### Overall interest in owning and willingness to pay for self-driving technology

Most respondents expressed some level of interest in having completely self-driving vehicles (Level 4) (see Table 9). Respondents in China were most likely to say they were interested in having this technology (96.4% said “very/moderately/slightly interested”), with the lowest interest shown in the U.K. (63.4%). The most frequent response in both China and India was “very interested”, while in Japan it was “slightly interested”, and in the U.S., the U.K., and Australia it was “not at all interested” (even though a majority expressed some level of interest in having this technology in these three countries).

Table 9  
Percentage of responses, by country, to Q9: “How interested would you be in having a completely self-driving vehicle (Level 4) as the vehicle you own or lease?”

Response	China	India	Japan	U.S.	U.K.	Australia
Very interested	40.2	46.9	8.5	21.4	18.0	13.9
Moderately interested	36.2	33.0	32.1	22.6	22.6	27.3
Slightly interested	20.0	15.4	36.6	22.4	22.8	26.5
Not at all interested	3.6	4.7	22.7	33.7	36.6	32.3

Results showing how much extra individuals would be willing to pay to have completely self-driving-vehicle technology (Level 4) are presented in Table 10. (Respondents were asked to input an amount in their local currency—Chinese yuan, Indian rupee, Japanese yen, U.S. dollar, British pound, or Australian dollar; these amounts were recalculated to U.S. dollars using currency-conversion rates on the final day of each survey.)

Respondents in China were the most willing to pay extra for this technology, with 25% (75<sup>th</sup> percentile) willing to pay at least \$8,000 for this technology. Conversely, respondents in Japan were the least willing to pay extra, with 25% willing to pay at least \$465 for the technology. The majority of respondents in China and India said they *would* be willing to pay something extra for this technology (a response of \$0 was given by only 21.6% and 29.8%, respectively). On the other hand, the majority of respondents in Japan, the U.S., the U.K., and Australia said they *would not* be willing to pay extra for this

technology, with 54.5% of U.S. respondents (lowest) to 67.5% of Japanese respondents (highest) saying \$0.

Table 10

Summary, by country, for Q10: “How much EXTRA would you be willing to pay to have completely self-driving technology (Level 4) on a vehicle you own or lease in the future?” (Responses were given in the local currency; amounts in this table were recalculated to U.S. dollars using current currency conversion rates.)

Measure	China	India	Japan	U.S.	U.K.	Australia
25 <sup>th</sup> percentile	\$0	\$0	\$0	\$0	\$0	\$0
50 <sup>th</sup> percentile (median)	\$1,600	\$160	\$0	\$0	\$0	\$0
75 <sup>th</sup> percentile	\$8,000	\$1,600	\$465	\$2,000	\$1,710	\$2,350
Percent responding \$0	21.6%	29.8%	67.5%	54.5%	59.8%	55.2%

### How extra time would be spent when riding in self-driving vehicles

Respondents were asked: “If you were to ride in a completely self-driving vehicle (Level 4), what do you think you would use the extra time doing instead of driving?” Table 11 presents a complete summary of responses by country. On one extreme, 33% of Japanese respondents indicated that they would not ride in a self-driving vehicle. On the other extreme, only 3.1% of Chinese respondents indicated the same.

In every country, respondents most frequently said, “watch the road even though I would not be driving,” ranging from 30.7% in India to 44.0% in the U.K. Of those who would participate in a specific activity while riding in self-driving vehicles (other than watching the road), the most common response varied by country, with the top three choices for each country as follows (with the rank within each country in parentheses):

- Text or talk with friends/family (#1 in China and Australia; #2 in India, Japan, and the U.S.; #3 in the U.K.)
- Work (#1 in India).
- Sleep (#1 in Japan; #2 in the U.K. and Australia; #3 in China and the U.S.)
- Read (#1 in U.S. and U.K.; #3 in Australia)
- Watch TV/movies (#2 in China; #3 in India and Japan)

Table 11

Summary of responses, by country, to Q11: *“If you were to ride in a completely self-driving vehicle (Level 4), what do you think you would use the extra time doing instead of driving?”*

Response	China	India	Japan	U.S.	U.K.	Australia
Watch the road even though I would not be driving	36.1	30.7	33.2	35.5	44.0	43.4
I would not ride in a self-driving vehicle	3.1	7.8	33.0	23.0	23.0	21.2
Read	10.5	10.2	5.6	10.8	7.6	6.5
Text or talk with friends/family	20.8	15.0	7.4	9.8	5.5	7.9
Sleep	10.8	4.7	12.6	6.8	7.2	7.1
Watch movies/TV	11.3	12.3	6.2	6.0	4.2	5.7
Work	5.4	16.3	0.7	4.8	4.9	5.1
Play games	1.3	2.1	1.2	2.0	1.9	2.0
Other	0.7	0.8	0.2	1.4	1.7	1.0

## Discussion

### Differences among countries

Table 12 summarizes the main findings by country by listing the countries with the most extreme responses for each topic. Note that the U.K. and Australia do not appear in Table 12 at all, suggesting more moderate responses to all questions in the U.K. and Australia than in China, India, Japan, and the U.S.

Table 12  
Countries with the most extreme responses for each topic.

Topic	Highest percentage	Lowest percentage
Familiarity with self-driving vehicles	China	Japan
“Very positive” opinion regarding self-driving vehicles	China	Japan
“Very likely” rating of eight possible benefits of self-driving vehicles	India (7) China (1)	Japan (all)
“Very concerned” about Level 3 self-driving vehicles	India	China
“Very concerned” about Level 4 self-driving vehicles	India	China
“Very concerned” about eleven issues related to using self-driving vehicles	China (5) India (4) U.S. (2)	Japan (all)
“Very concerned” about five possible implementations of self-driving vehicles	China (3) U.S. (2)	Japan (all)
Willingness to pay for self-driving vehicles	China	Japan
Unwilling to ride in a self-driving vehicle	Japan	China

### Level 3 and Level 4 self-driving vehicles

Concern about riding in Level 3 and Level 4 self-driving vehicles varied by country. Despite the fact that an additional safety risk exists during the transition if it becomes necessary to hand control back to the human driver with Level 3 vehicles (limited self-driving), overall concern was *higher* for riding in Level 4 vehicles (completely self-driving) in each country, with the exception of India. This higher level of concern with Level 4 vehicles is also evident in the responses to the question about how extra time would be spent, as a majority of respondents in Japan, the U.S., the U.K.,

and Australia said they would either watch the road or would prefer not to ride in a Level 4 vehicle; both of these findings indicate an unwillingness to completely rely on self-driving vehicles. While watching the road was also the most common response in China and India, a relatively small percentage of respondents in these two countries said they would prefer not to ride in a self-driving vehicle (only 3.1% in China and 7.8% in India), as compared to 21.2% in Australia, 23.0% in both the U.S. and the U.K., and 33.0% in Japan.

### **Human drivers versus self-driving vehicles**

In each country, a majority of respondents expressed a substantial level of concern that self-driving vehicles would not drive as well as human drivers. Respondents in China expressed the greatest concern about this issue (81.8% were “very/moderately concerned”), while those in the U.K. expressed the lowest levels of concern (61.5%). Concern was even higher regarding the possibility that self-driving vehicles will get confused by unexpected situations, with the frequency of those saying they were “very/moderately concerned” being highest in China (91.2%) and lowest in the U.K. (72.3%).



## Conclusions

This report documents a new study of public opinion about self-driving vehicles in China, India, and Japan. The survey yielded completed responses from 610 respondents in China, 527 respondents in India, and 585 respondents in Japan. For comparison, the report also includes the recently released findings from the same survey in the U.S., the U.K., and Australia. The main findings (applicable to each of the six countries) are as follows:

- The majority of respondents had previously heard of autonomous or self-driving vehicles, had a positive initial opinion of the technology (or neutral in the case of Japan), and had high expectations about the benefits of the technology.
- However, the majority of respondents expressed high levels of concern about riding in self-driving vehicles, safety issues related to equipment or system failure, and self-driving vehicle not performing as well as human drivers.
- Respondents also expressed high levels of concern about vehicles without driver controls; self-driving vehicles moving while unoccupied; and self-driving commercial vehicles, buses, and taxis.
- The majority of respondents expressed a desire to have this technology in their vehicles. However, a majority was also unwilling to pay extra for the technology (except for respondents in China and India).

In comparison to the respondents in the U.S., the U.K., and Australia, respondents in China and India had more positive initial opinions of self-driving vehicles, generally expressed greater interest in having such technology on their personal vehicles, and were willing to pay the most for it. Japanese respondents, on the other hand, generally had more neutral initial opinions about self-driving technology and were willing to pay the least for it.

The main implications of these results are that the respondents in the six countries surveyed, while expressing high levels of concern about riding in vehicles equipped with this technology, mostly feel positive about self-driving vehicles, have optimistic expectations of the benefits, and generally desire self-driving-vehicle technology (though

a majority in four out of the six countries surveyed are not willing to pay extra for such technology at this time).

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## Appendix: Questionnaire

### Opinions Concerning Autonomous and Self-Driving Vehicles (via SurveyMonkey)

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We are conducting a survey of opinions about autonomous and self-driving vehicles.

A general explanation of what is meant by autonomous and self-driving vehicles will be shown on the next page. Please take a moment to read that description carefully before continuing with the survey.

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Autonomous vehicles are those in which at least some aspects of a safety-critical control (such as steering, throttle, or braking) operate without direct driver input. Vehicles that provide safety warnings to drivers (for example, a forward-crash warning) but do not take control of the vehicle are not considered autonomous.

Autonomous vehicles may use on-board sensors, cameras, GPS, and telecommunications to obtain information in order to make decisions regarding safety-critical situations and act appropriately by taking control of the vehicle at some level. Examples of autonomous-vehicle technologies range from those that take care of basic functions such as cruise control, to completely self-driving vehicles with no human driver required.

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Q1) Had you ever heard of autonomous and/or self-driving vehicles before participating in this survey?

Yes

No

Q2) What is your general opinion regarding autonomous and self-driving vehicles?

*Even if you had never heard of autonomous or self-driving vehicles before participating in this survey, please give us your opinion based on the description you just read.*

Very positive

Somewhat positive

Neutral

Somewhat negative

Very negative

There are several different levels of autonomous-vehicle technology. Some of these technologies already exist now, while others are expected to become available in the future. Descriptions of each level of autonomous vehicle technology are shown below. Please take a moment to read each description carefully before continuing with the survey.

**Current technology:**

Level 0. No autonomous-vehicle technology.

Level 1. The vehicle controls one or more safety-critical functions, but they operate independently. The driver still maintains overall control.

Level 2. This level combines two or more technologies from Level 1, but they operate in coordination with each other. The driver still maintains overall control.

**Future technology:**

Level 3. This level provides limited self-driving technology. The driver will be able to hand control of all safety-critical functions to the vehicle, and only occasional control by the driver will be required.

Level 4. Completely self-driving vehicle. The vehicle will control all safety-critical functions for the entire trip.

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Q3) Which of the following autonomous-vehicle technologies, if any, do you have on the vehicle(s) that you own or lease?

*Please select one response only. If you have more than one vehicle with this technology, please select the most advanced level installed on your vehicles.*

- I do not currently own or lease a vehicle
- Level 0: No automation. The driver is in complete and sole control of the primary vehicle controls (brake, steering, and throttle) at all times, and is solely responsible for monitoring the roadway and for safe operation of the vehicle. Vehicles that have certain driver support or convenience systems but do not have control over steering, braking, or throttle would still be considered Level 0 vehicles. Examples include systems that provide only warnings (forward collision warning, lane departure warning, blind spot monitoring), as well as systems providing automated secondary controls such as wipers, headlights, (*U.S.: turn signals, U.K./Australia: indicators*), hazard lights, etc.
- Level 1: Automation at this level involves one or more primary vehicle controls (brake, steering, or throttle); if multiple controls are automated, they operate independently from each other. The driver has overall control, and is solely responsible for safe operation, but can choose to hand over limited control to the vehicle (such as cruise control); or the vehicle can automatically control a function (such as electronic stability control); or the vehicle can provide added control to aid the driver in certain situations (such as dynamic brake support in emergencies). The vehicle may assist the driver in operating one of the controls—steering, braking, or throttle—but each function is controlled independently from the others. Other examples of Level 1 systems include automatic braking and automatic lane keeping.

*(Q3 continued on next page)*

- Level 2: This level involves automation of at least two primary vehicle controls (brake, steering, and/or throttle) designed to work together to relieve the driver of control of those functions. Vehicles at this level of automation can share control with the driver in certain limited driving situations. The driver is still responsible for monitoring the roadway and safe operation, and is expected to be available for control at all times and on short notice. The system can relinquish control with no advance warning and the driver must be ready to control the vehicle safely. An example of a Level 2 system is adaptive cruise control in combination with automatic lane keeping. Automatic parking systems are also considered Level 2.
- I do not know if my vehicle has any of these technologies

Q4) Level 3 vehicles are expected to provide limited self-driving automation. Vehicles at this level enable the driver to hand over control of all safety-critical functions under certain traffic conditions, and to rely on the vehicle to monitor for changes that require switching back to driver control. The driver will be expected to be available for occasional control, but with sufficiently comfortable transition time. An example would be a self-driving car that can determine when the system is no longer able to support automation, such as in a construction area, and then signals the driver to take control of the vehicle with an appropriate amount of time to safely react. The major difference between Level 2 and Level 3 is that at Level 3, the vehicle is designed so that the driver is not expected to constantly monitor the roadway while driving.

How concerned would you be about driving or riding in a vehicle with this level of self-driving technology?

- Very concerned
- Moderately concerned
- Slightly concerned
- Not at all concerned

Q5) Level 4 vehicles are expected to provide complete self-driving automation. The vehicle will be designed to perform all safety-critical driving functions and monitor roadway conditions for an entire trip. The “driver” will provide destination or navigation input, but will not be expected to be available for control at any time during the trip. This includes both occupied and unoccupied vehicles. By design, safe operation rests solely with the automated vehicle system.

How concerned would you be about riding in a vehicle with this level of self-driving technology?

- Very concerned
- Moderately concerned
- Slightly concerned
- Not at all concerned

Q6) How likely do you think it is that the following benefits will occur when using **completely self-driving vehicles (Level 4)**?

*Please select one response per row.*

	Very likely	Somewhat likely	Somewhat unlikely	Very unlikely
a. Fewer crashes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Reduced severity of crashes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Improved emergency response to crashes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Less traffic congestion	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Shorter travel time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Lower vehicle emissions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. Better fuel economy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. Lower insurance rates	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Q7) How concerned are you about the following issues related to **completely self-driving vehicles (Level 4)**?

*Please select one response per row.*

	Very concerned	Moderately concerned	Slightly concerned	Not at all concerned
a. Safety consequences of equipment failure or system failure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Legal liability for “drivers”/owners	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. System security (from hackers)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Vehicle security (from hackers)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Data privacy (location and destination tracking)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Interacting with non-self-driving vehicles	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. Interacting with pedestrians and bicyclists	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. Learning to use self-driving vehicles	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i. System performance in poor weather	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
j. Self-driving vehicles getting confused by unexpected situations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
k. Self-driving vehicles not driving as well as human drivers in general	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Q8) How concerned are you about the following possible scenarios with **completely self-driving vehicles (Level 4)**?

*Please select one response per row.*

	Very concerned	Moderately concerned	Slightly concerned	Not at all concerned
a. Riding in a vehicle with no driver controls available (no steering wheel, no brake pedal, and no gas pedal/accelerator)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Self-driving vehicles moving by themselves from one location to another while unoccupied	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Commercial vehicles such as heavy trucks or semi-trailer trucks ( <i>U.K.: lorries or heavy goods vehicles</i> ) that are completely self-driving	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Public transportation such as buses that are completely self-driving	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Taxis that are completely self-driving	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Q9) How interested would you be in having a **completely self-driving vehicle (Level 4)** as the vehicle you own or lease?

- Very interested
- Moderately interested
- Slightly interested
- Not at all interested

Q10) How much EXTRA would you be willing to pay to have **completely self-driving technology (Level 4)** on a vehicle you own or lease in the future?

*(Please enter 0 if you would not be willing to pay extra for this technology.)*

[Respondents were asked to input an amount in their local currency—Chinese yuan, Indian rupee, Japanese yen, U.S. dollar, British pound, or Australian dollar; these amounts were recalculated to U.S. dollars using currency-conversion rates on the final day of each survey.]

Q11) If you were to ride in a **completely self-driving vehicle (Level 4)**, what do you think you would use the extra time doing instead of driving?

*Please select one response only.*

Text or talk with friends/family

Read

Sleep

Watch movies/TV

Play games

Work

Watch the road even though I would not be driving

I would not ride in a completely self-driving vehicle

Other (please specify): \_\_\_\_\_

Q12) Now we would like to know some basic background information about you.

What is your gender?

Female

Male

Q13) What is your age?

18 to 24

25 to 29

30 to 34

35 to 39

40 to 44

45 to 49

50 to 54

55 to 59

60 to 64

65 to 69

70 or older

Q14) What is the highest level of education you have completed?

Less than bachelor degree

Bachelor degree

Graduate degree

Q15) What is your current level of employment?

*Please select only ONE option that best describes you.*

- Employed full-time
- Employed part-time
- Not currently employed
- Retired
- Full-time student
- Part-time student

Q16) What kind of vehicle do you use most often?

*Please select one response only.*

- Passenger car (any type or size)
- Minivan / van / MPV (multipurpose vehicle)
- Pickup truck
- SUV (sport utility vehicle)
- Motorcycle / scooter
- I do not drive
- Other (please specify): \_\_\_\_\_

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Thank you for completing this survey about autonomous and self-driving vehicles!