



71 questions

3 waves in one survey

27,970 car drivers responded

75% have heard of automated cars

57% intend to use L3



L3 Pilot Global User Acceptance Survey

Tanja Kessel, Final Event, October 14, 2021

Facts & Figures: Global User Acceptance Survey

- Online survey on user acceptance of SAE Level 3: Conditionally automated cars
- long term perspective study // global
- 5 continents, 17 countries
- Data Collection in 3 waves:
05-06/2019 | 02-03/2020 | 01-02/2021
- 27,970 **car drivers** surveyed
 - Wave 1 n= 9, 118
 - Wave 2 n= 9, 513
 - Wave 3 n= 9, 339



Motivation

- **Provide a comprehensive picture** of user acceptance and major challenges
- Conduct the **1st long-term** and **global study on user acceptance**, attitudes, and expectations **towards automated driving** with **focus on L3 technology**
- **Link qualitative pre-competitive, pre-market research** on L3 technology **with quantitative insights** from potential users of the technology
- Develop an **adaptive study design** to respond to upcoming topics
- Derive research-driven and data-based **recommendations for decision-makers**

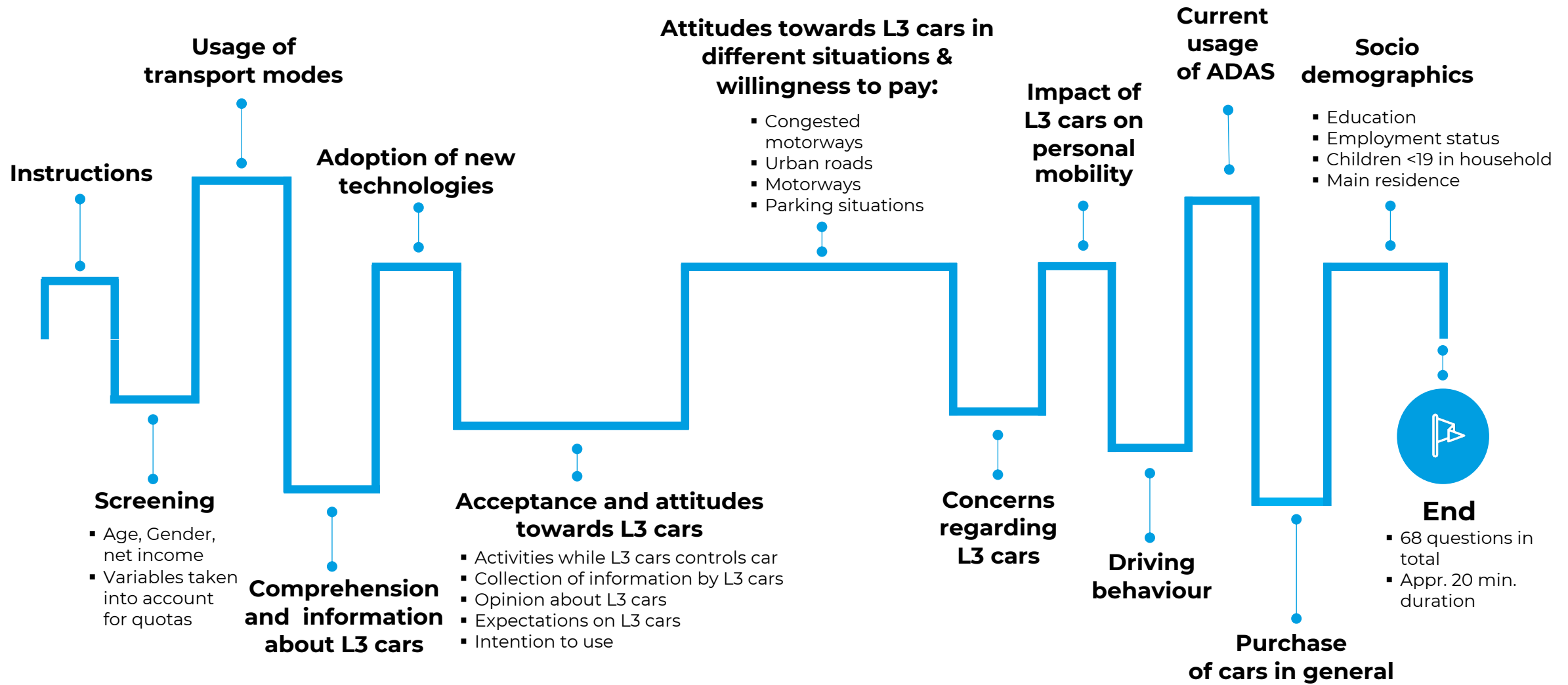
Address the following research gaps

Analysis of understanding, needs & expectations on L3 technology

Global scope, including different countries

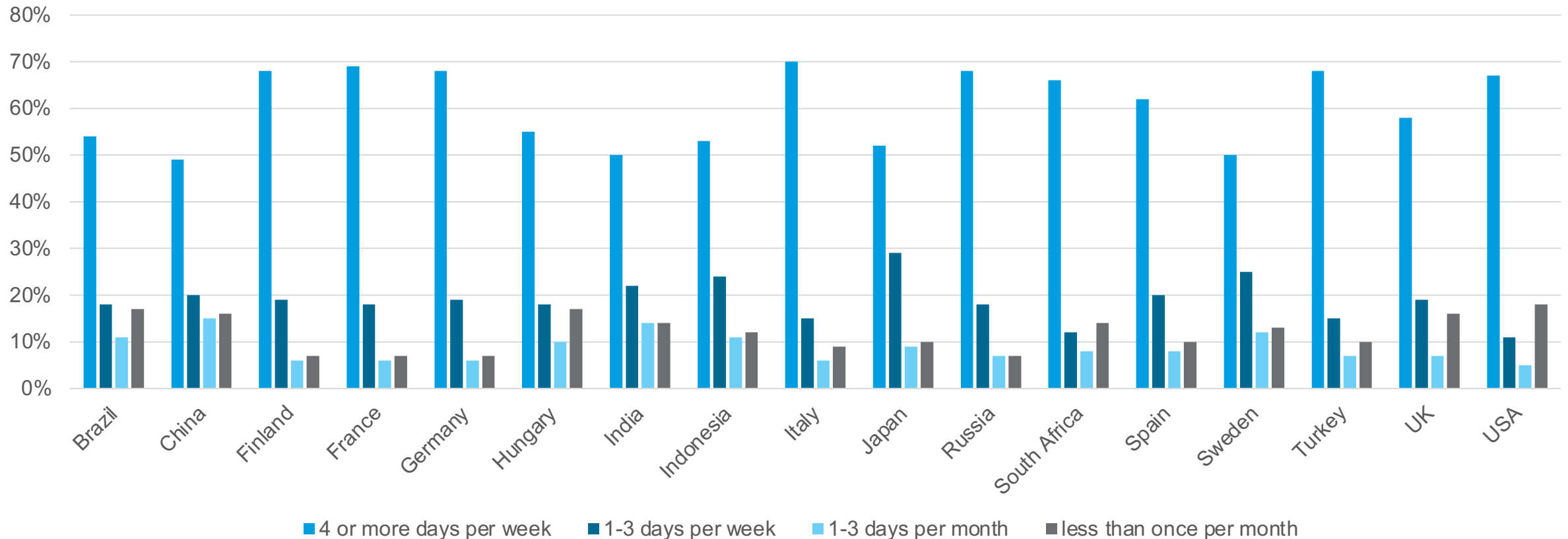
Long-term perspective

Questionnaire content wave 1 & 2



Private car usage frequencies among the sample

The majority of our respondents, which are drivers from different countries, represent people who drive very frequently:



49% use their private car at least 4 times a week

38% have and use Adaptive Cruise Control (**ACC**)

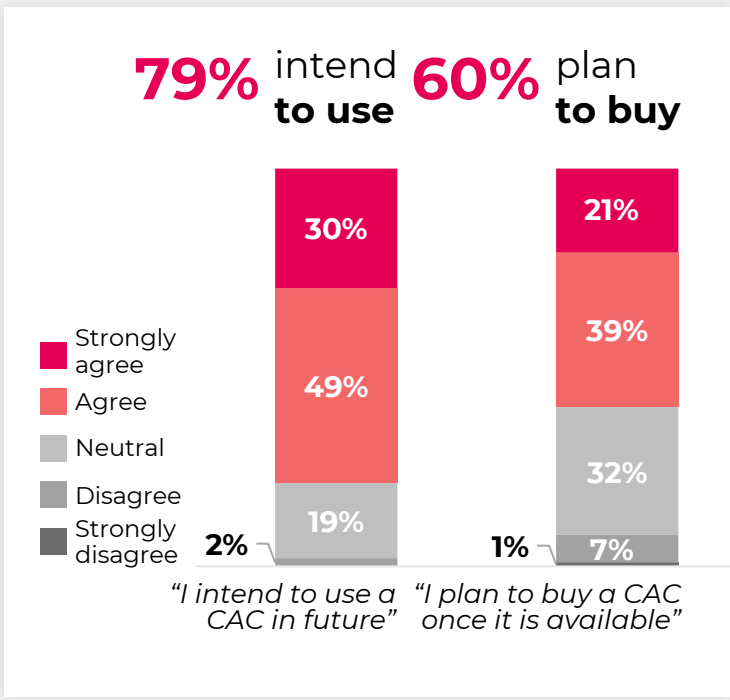
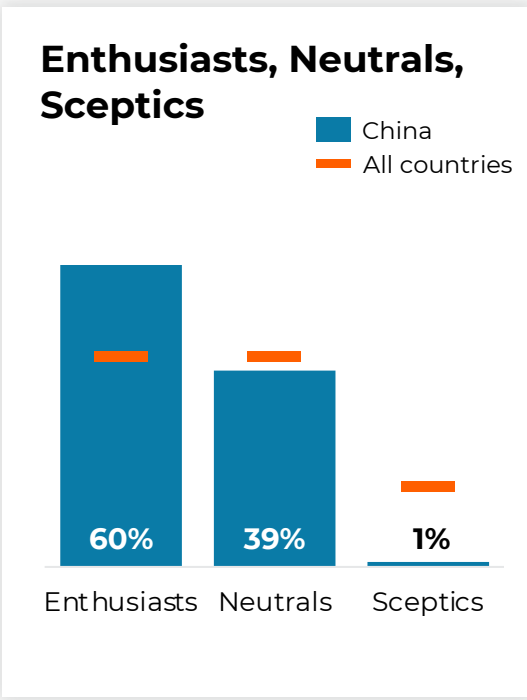
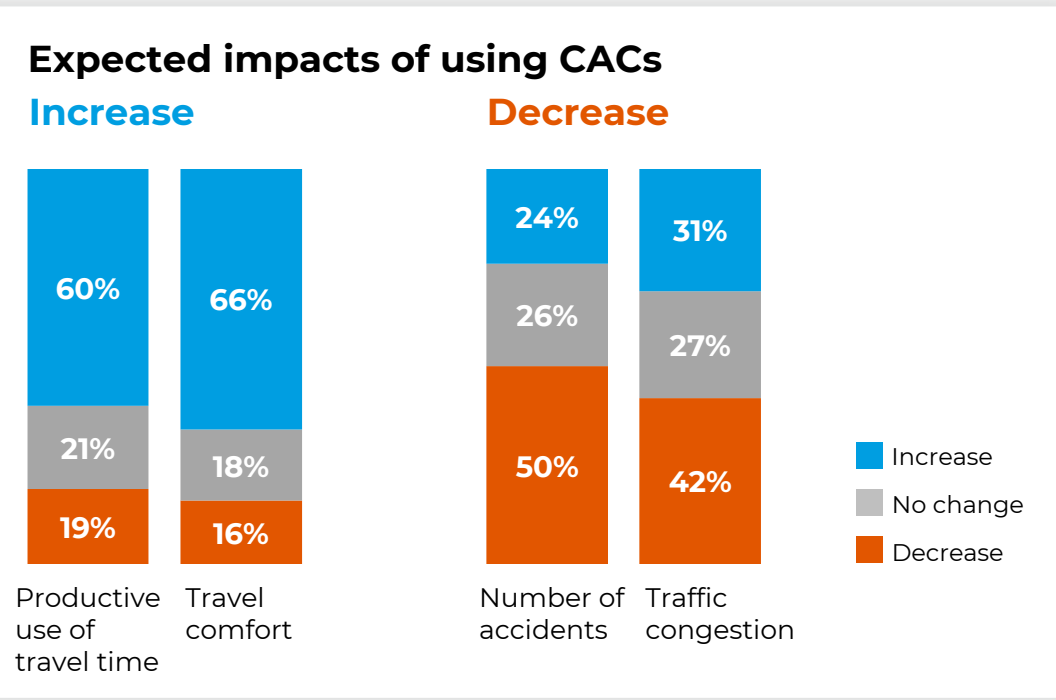
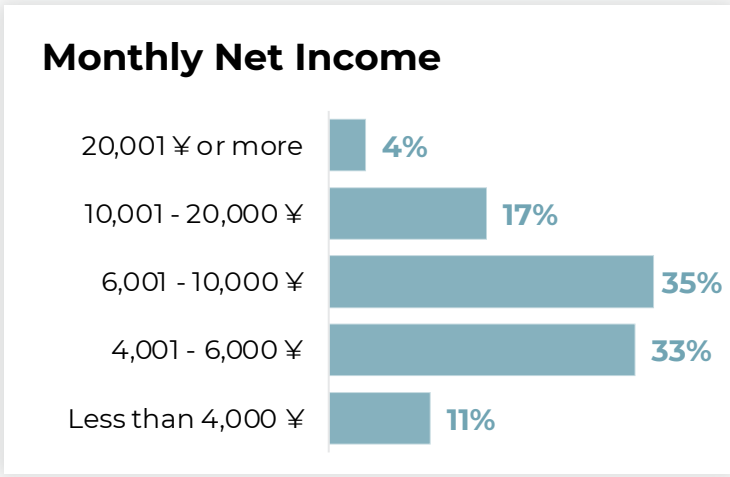
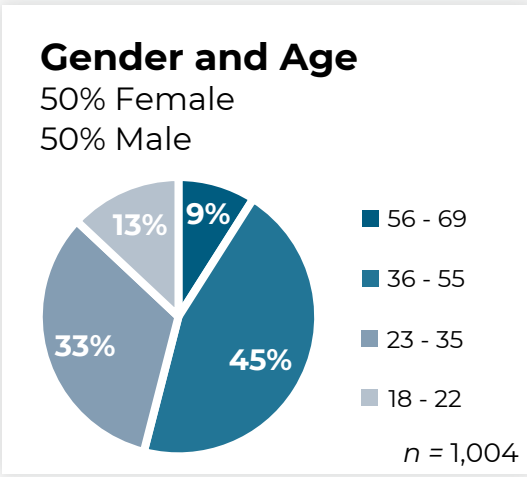
33% have and use Lane Keeping Assistant (**LKA**)

47% observing the landscape

Car usage

Experience with ADAS

Favourite activity in CACs*



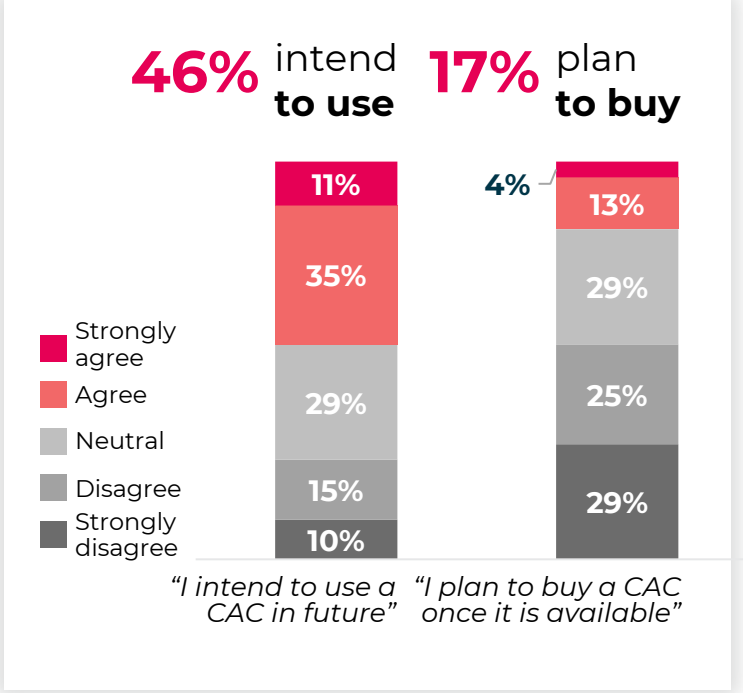
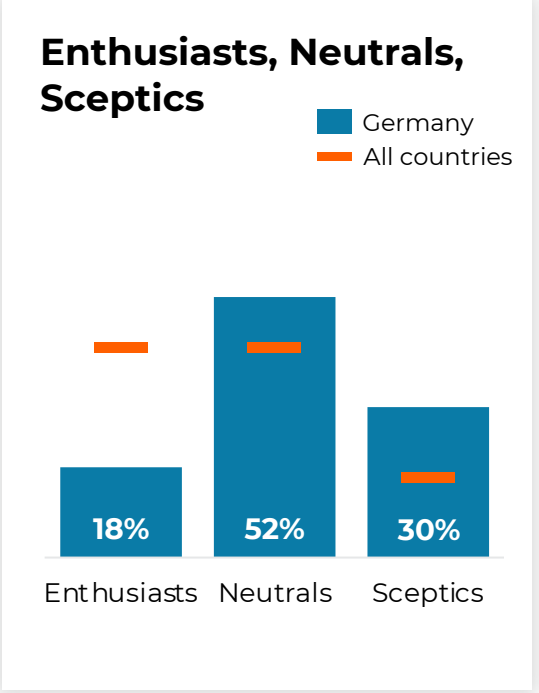
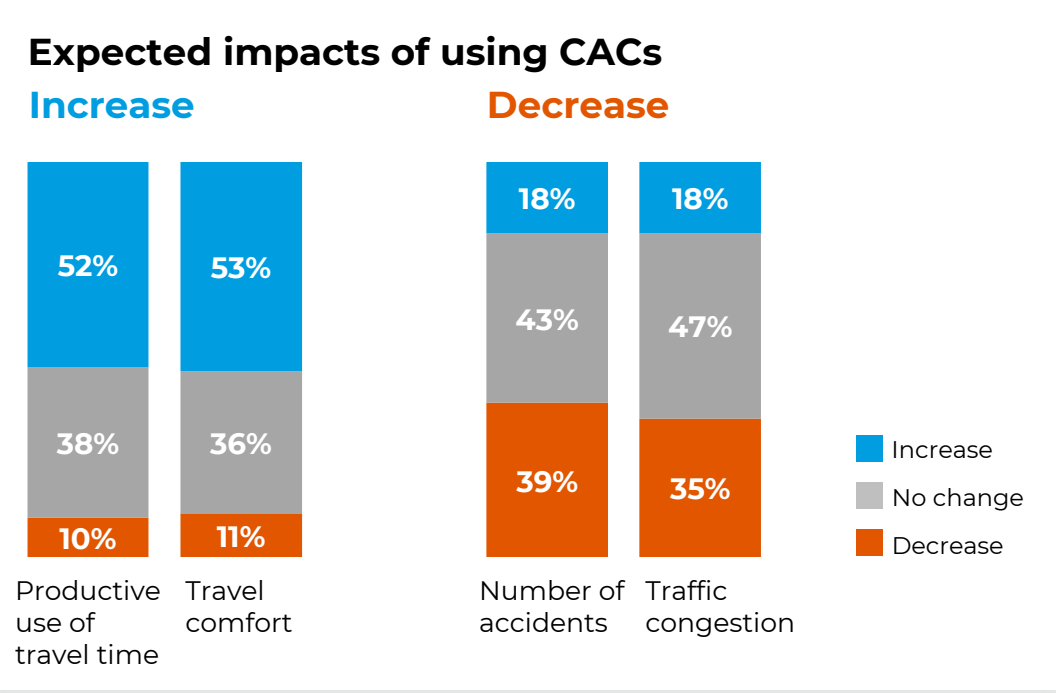
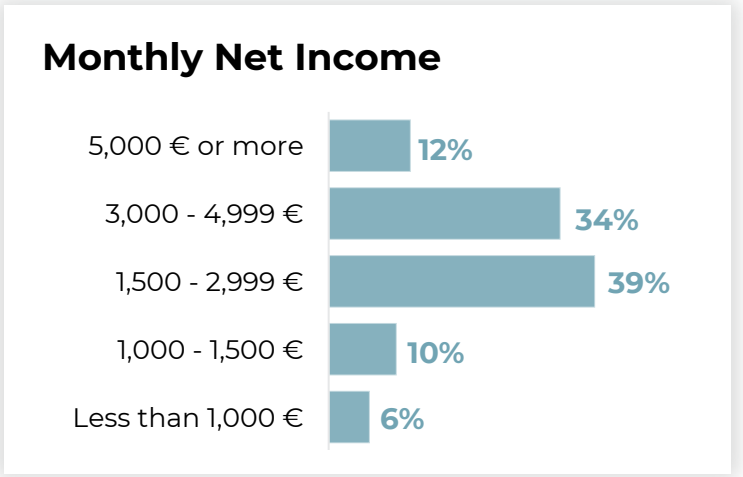
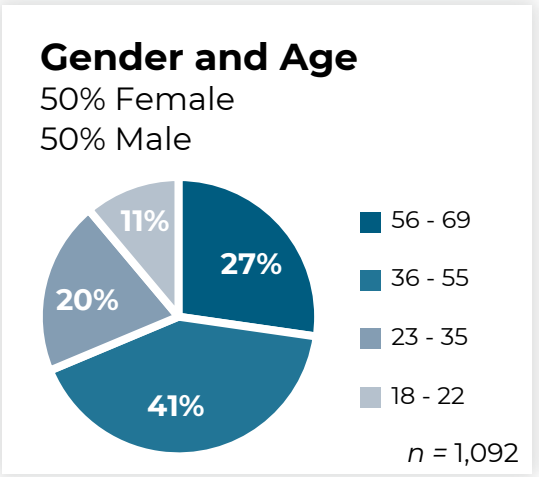
*Conditionally automated cars

68% use their private car at least 4 times a week

17% have and use Adaptive Cruise Control (**ACC**)

16% have and use Lane Keeping Assistant (**LKA**)

45% talking to fellow travellers



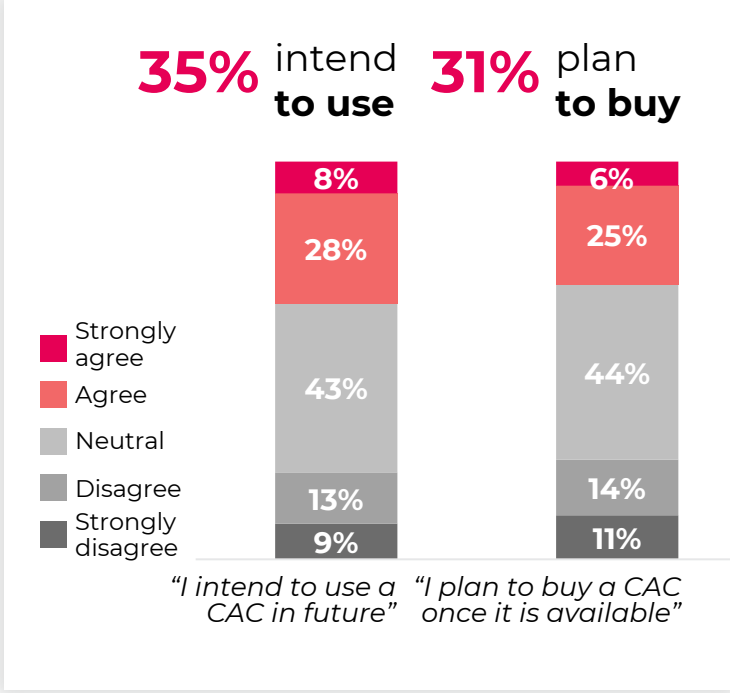
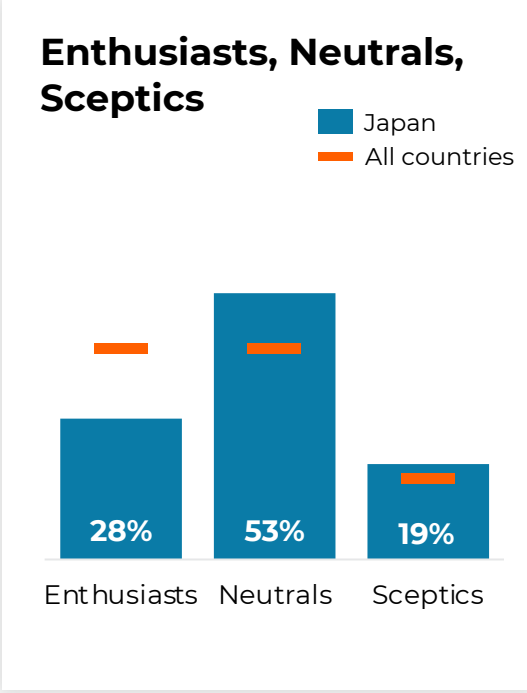
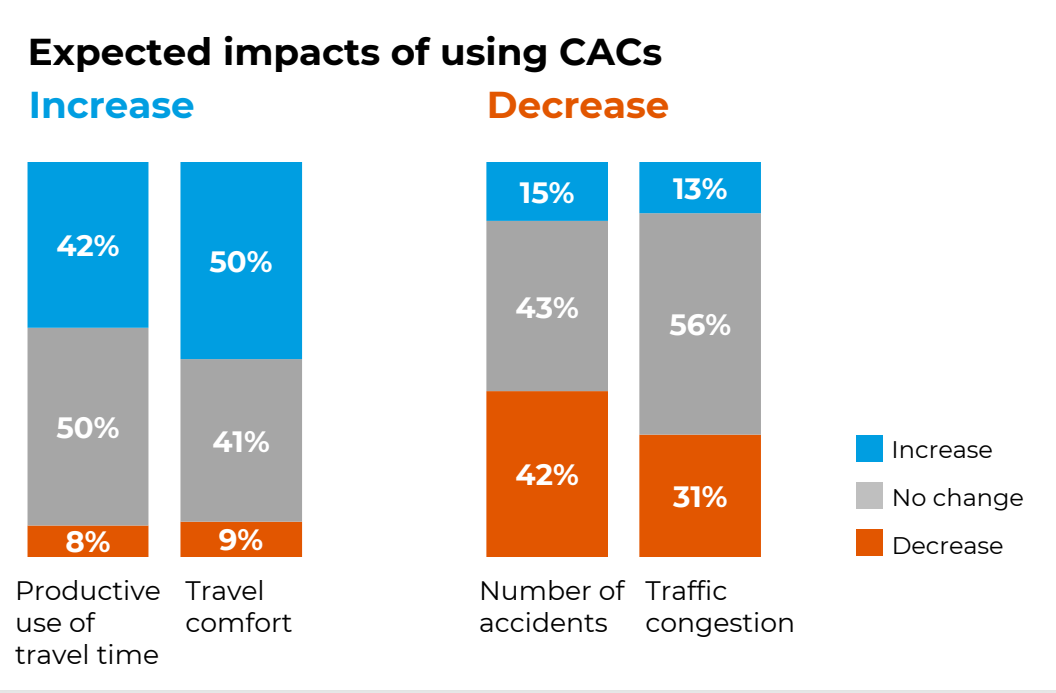
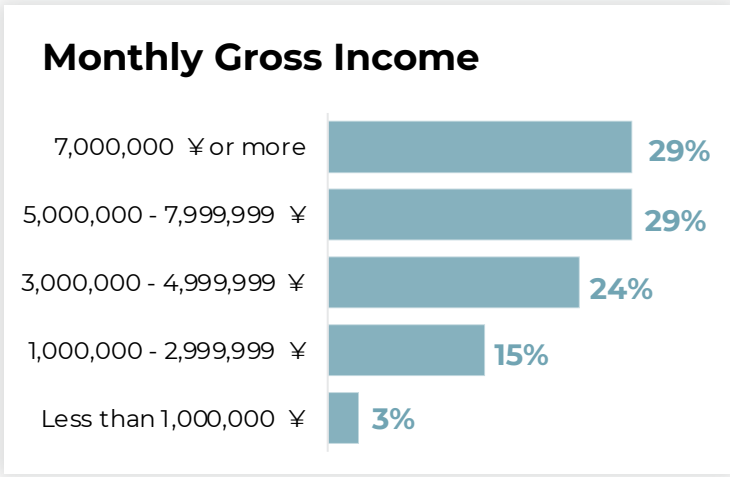
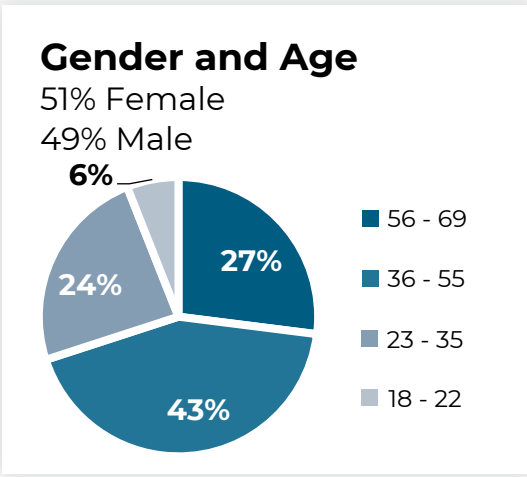
*Conditionally automated cars

52% **Car usage**
use their private car at least 4 times a week

13% **Experience with ADAS**
have and use Adaptive Cruise Control (**ACC**)

16% have and use Lane Keeping Assistant (**LKA**)

55% **Favourite activity in CACs***
surfing the internet, watching videos



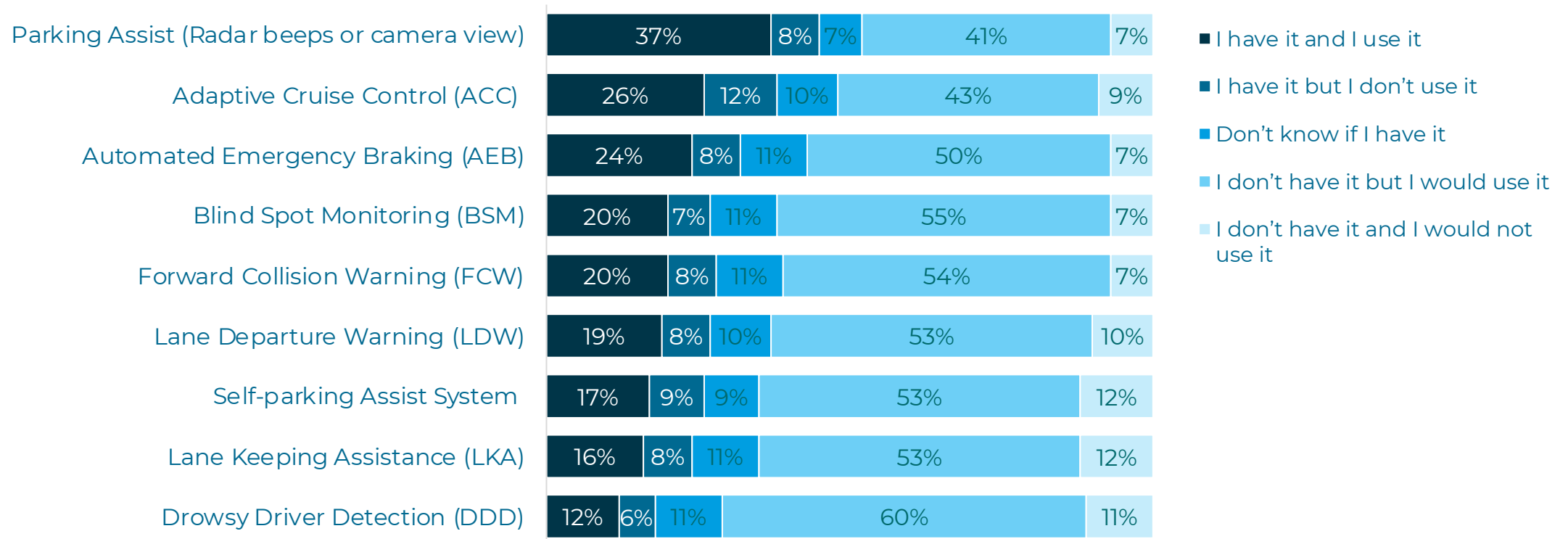
*Conditionally automated cars



Current usage of ADAS

Overview: Current usage of ADAS

The currently most often used advanced driver assistance system is the parking assistant followed by the adaptive cruise control and the automated emergency braking.



Today's cars offer lots of technical equipment - known as driver assistance systems - intended to support the driver. Overview of the current usage of ADAS, overall values, not grouped by countries. n = 18, 631

Interpretation

37%

are using the parking assistant

26%

are using adaptive cruise control while driving

24%

of those who have ADAS are using the automated emergency braking



The current usage of advanced driver assistance systems shows a high potential.

- The large majority of those who do not have the systems shows a positive attitude towards using them.
- Usage of the system reflects the differences in market introduction and market penetration.
- With regard to the related safety benefits of assistant systems the percentage of respondents that do not use them is surprisingly high (6-12%).
- One out of ten respondents is not sure about having the system.



Current ADAS systems need careful promotion.

- There is a high potential for current and future ADAS on the market, but they are no self-selling items. Further research is needed to get insights about those who do not use available systems and those who do not know, if they have them.

The customer relationship should be modified to increase use of ADAS.

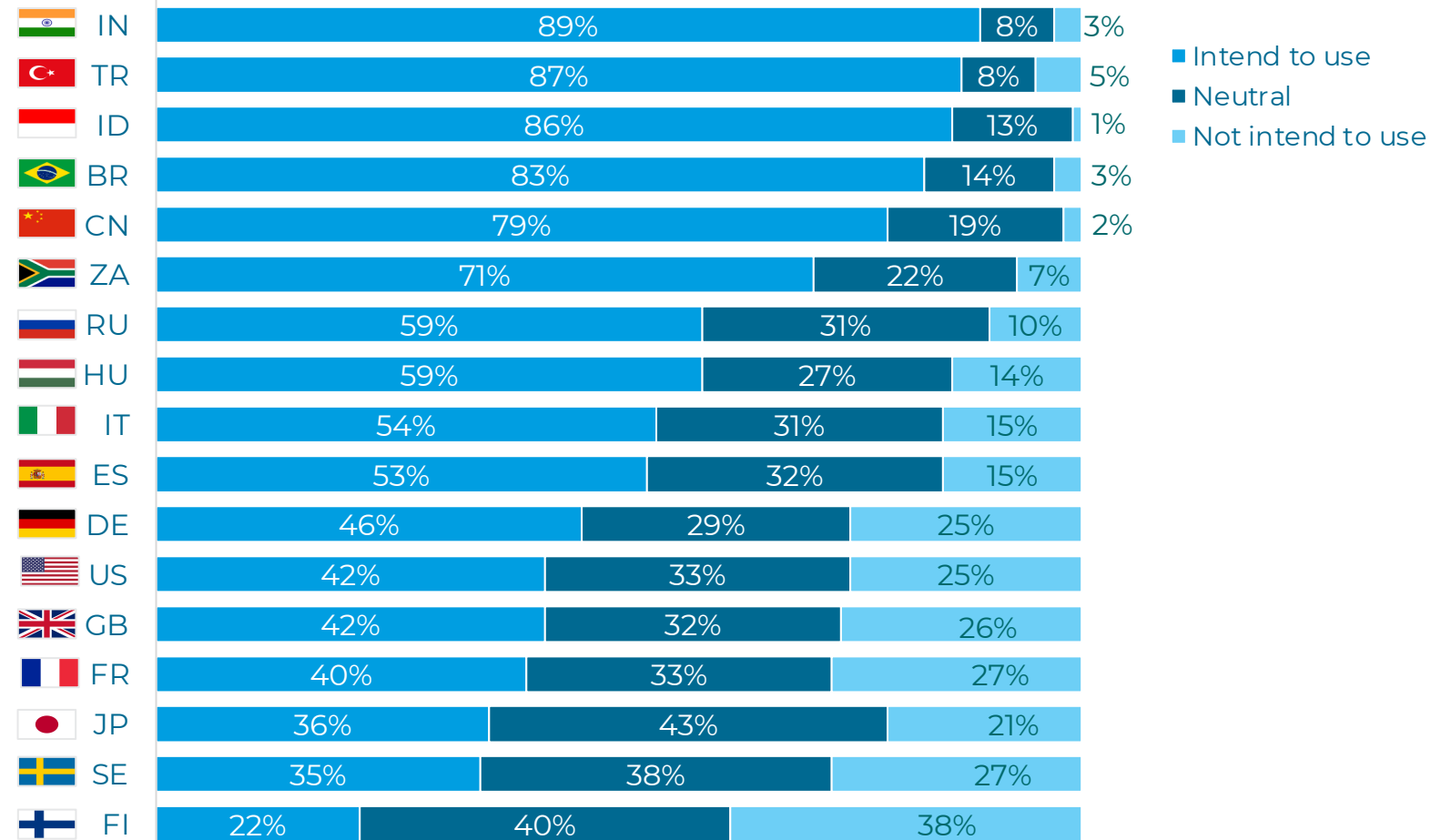
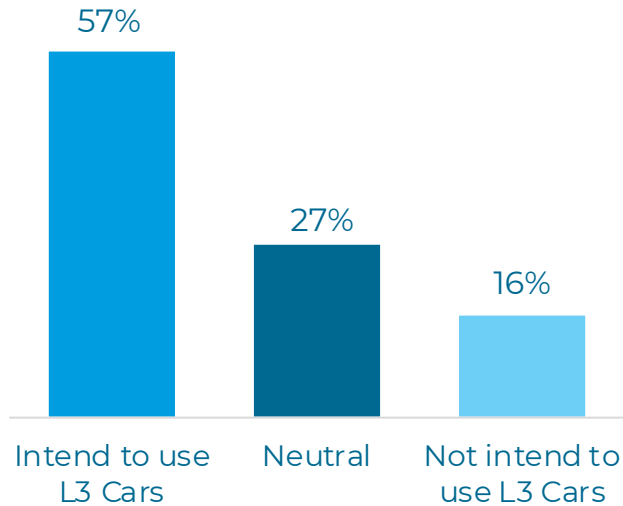
- Besides marketing and service contacts, explaining and training of system functions and capabilities should be targeted in customer interactions.
- Usage of ADAS could benefit from repeated communication about individual experiences with the systems.
- Beyond newly sold vehicles, the second-hand car market should be addressed as well.



**What is the acceptance
of L3 cars?**

Intention to use

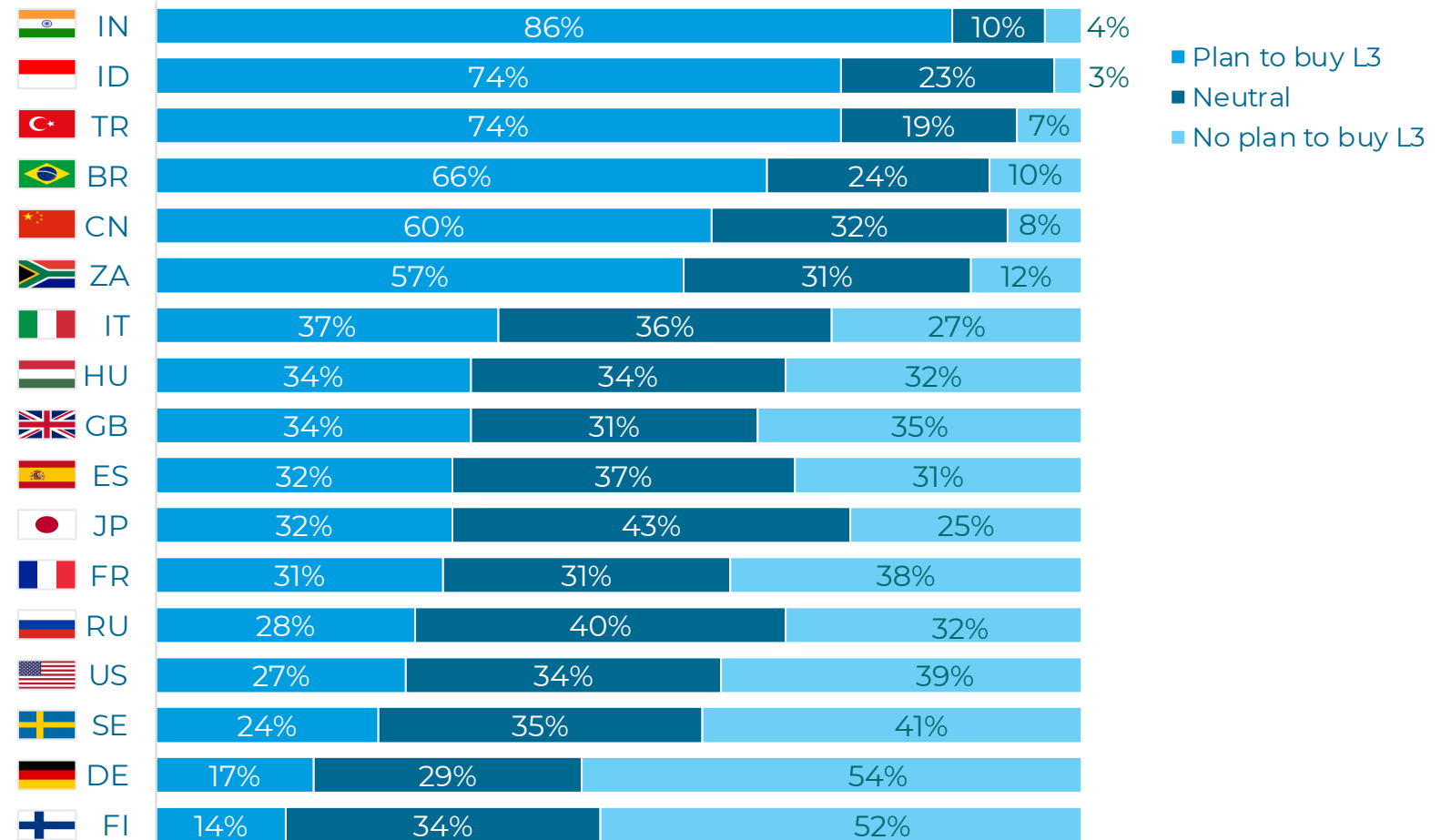
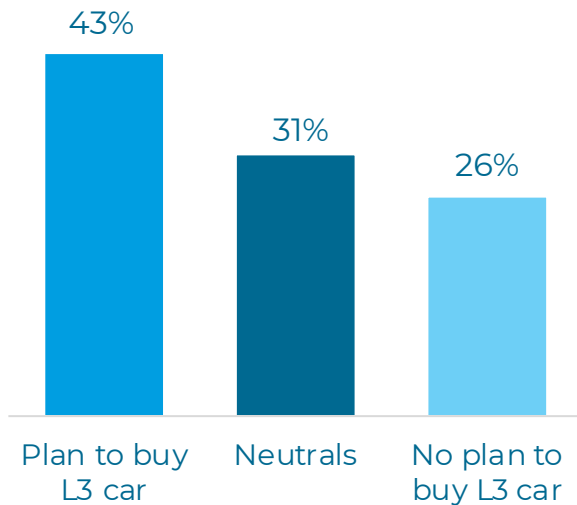
Overall:



Q16_10. Now, we kindly ask you to give your opinion on conditionally automated cars. Please indicate to what extent you agree with the following statements: "I intend to use a conditionally automated car in the future." n = 18, 631

Plan to buy

Overall:



Q16_23. Now, we kindly ask you to give your opinion on conditionally automated cars. Please indicate to what extent you agree with the following statements: "I plan to buy a conditionally automated car once it is available." n = 18, 631

Interpretation

57%

Intend to use
L3 cars

43%

Plan to buy
L3 cars

Car drivers show great potential of using Level 3 automated cars and a relevant share of respondents would consider to buy.



Overall, more than half of the surveyed drivers consider the use of L3 functions. This corresponds to the amount of drivers, that do not have ADAS but would like to use them.

- Only a rather small group of respondents reject currently (16%) the option of using L3 functions.
- A smaller value considering the plan to buy a L3 car was to be expected and can be found in the majority of countries. The intention to use conditionally automated cars being higher than the purchase intention can possibly be explained by respondents' lack of physical exposure to L3 cars.



The public could be “warmed up” for conditionally automated cars promoting currently available partially automated cars.

- Automated cars could be subsidised, motivated by proven safety benefits (e.g., tax exemption, reimbursement, discount on registration), particularly in lower GDP-countries.
- Intention to buy can also be encouraged by exposing public to conditionally automated cars when the technology is available, e.g., by opening up living labs or giving people the option to test the technology in the context of test rides on a longer-term basis (e.g., subscription basis).

Car dealers could be better trained about system capabilities and limitations, offering consumers the possibility to test conditionally automated driving functions.

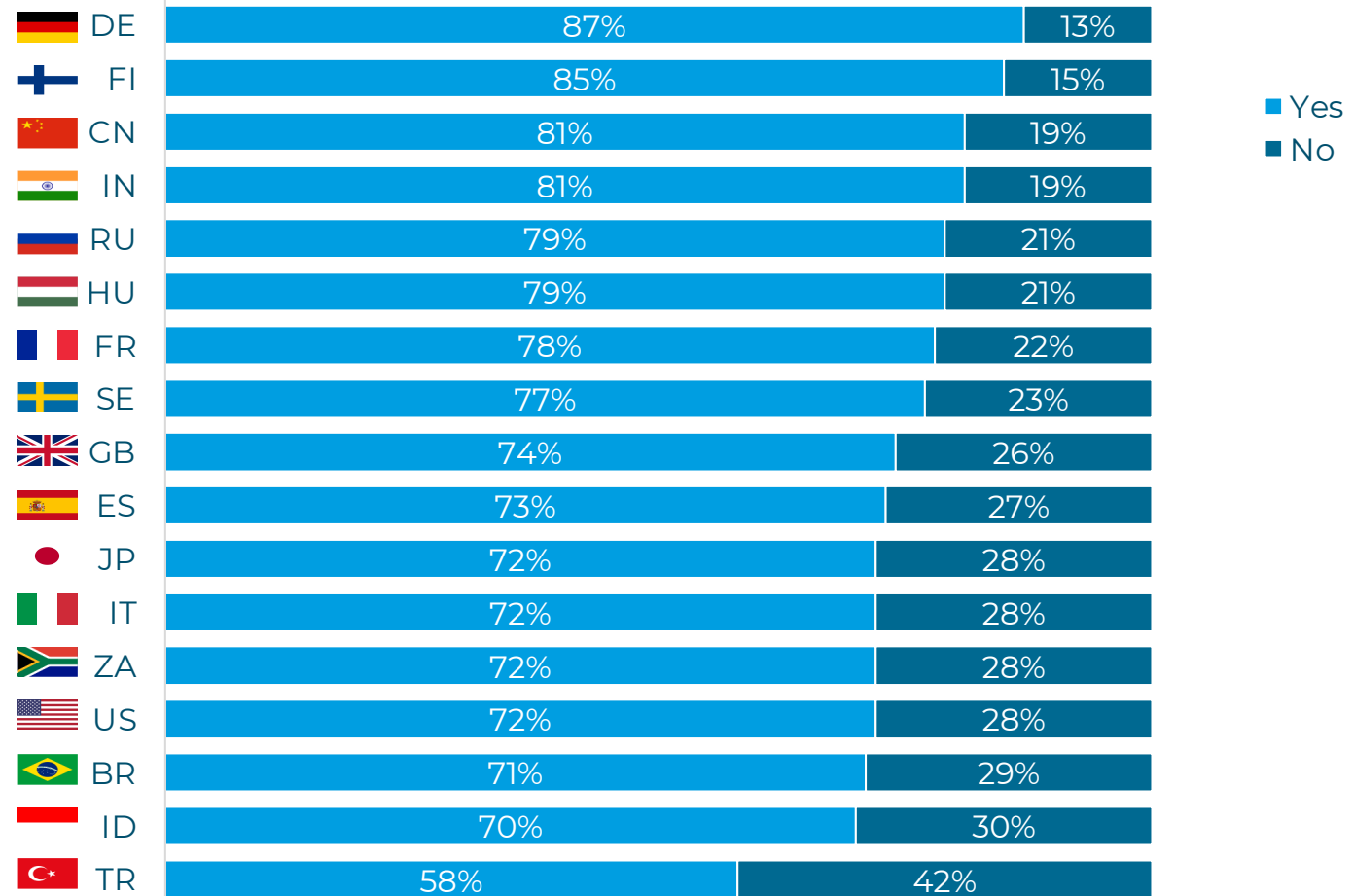
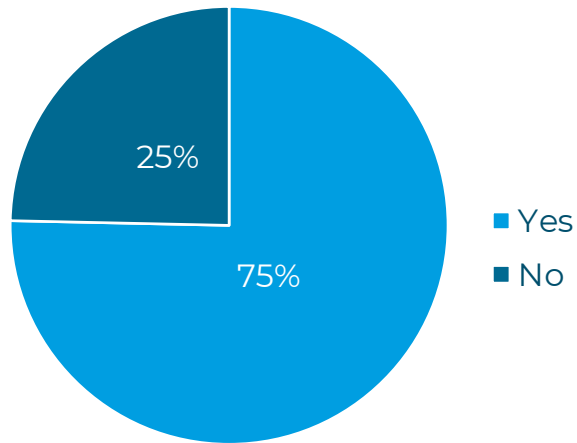


**How aware are the respondents
of automated driving?**

What is the awareness of automated driving?

The topic of automated driving is very present among the respondents.

Overall:



Q11. Have you ever heard of automated cars before taking part in the present questionnaire survey? n = 18,631

Interpretation

75%

Had heard of automated cars before survey.

The hype is real. Widespread awareness of automated cars across countries and cultures. Automated cars have become a topic of the global public discourse.

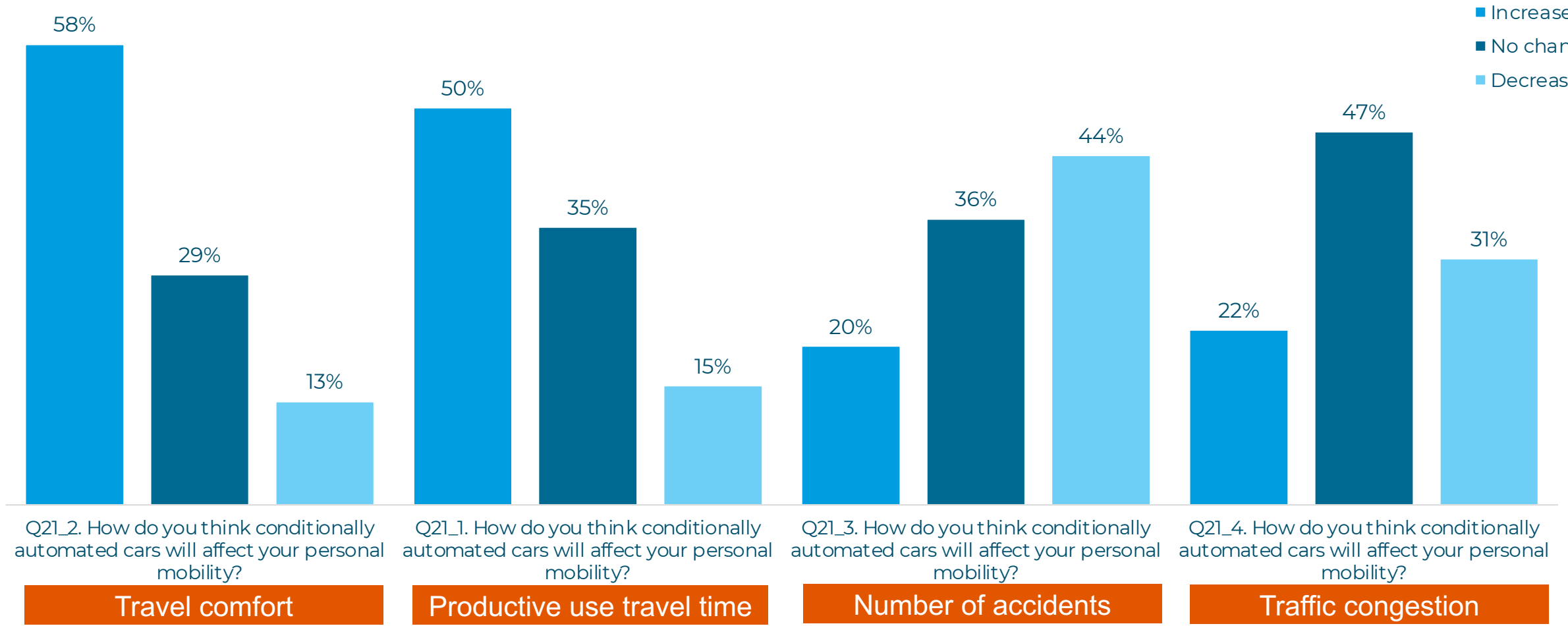
?! **Observation of an reversal: “Leaders” in acceptance are the last in line regarding awareness and vice versa.**

- Leading countries in awareness (DE, FI) are among the least accepting nations of L3 cars.
- Enthusiasm for new technologies especially in emerging economies with lower GDP might be an expression of the need for new mobility solutions to improve transport safety, efficiency, and comfort.
- China and India as exceptions with high awareness (among top 5) and simultaneously high acceptance rate (top 5).



**What are the expectations
towards L3 cars?**

What are the expectations towards L3 cars?



Interpretation

58%

L3 cars will increase personal travel comfort

50%

productive use of travel time will increase

The surveyed car drivers value the productive use of time while travelling in a L3 car.



This is in line with a positive attitude towards L3 automation and perceived benefit of using travel time for non-driving-related activities.

- Congested transport systems might reinforce the preference for productive use of travel time
- Commuters might value the possibility to work in the car office and thus using travel time more efficiently while others rather consider it as pleasure or a contribution to increasing well-being
- China and India affinity to innovation and trend towards heavily increased urbanization with 60% by far endorses the productive value of travel time

Interpretation

44%

No change of number of accidents

20%

Increase of number of accidents

The primary benefit of partly automated transport systems to improve safety for all road users is seen with some doubts.



Reservations about automated driving safety improvements may result in

- Mass media coverage of accidents with automated vehicle and its frequency of reporting. (USA where the first tragic reminders of the remaining challenges took place is among the countries with the lowest trust in safety improvements.)
- Lack of long-term safety records / detailed safety impact assessment reassuring the users and thus building confidence.
- AD systems as part of a safer system: AD vehicles in transport system not yet ready for it in terms of street design, traffic conditions, signs and signals.



Build up confidence and trust through verified safety.

- Continue the good practice of „safety first“ and emphasize safety by design. Reach out to the general public with written in plain language safety principles.
- Reassure the driver: prove safety through extensive Field Operational Test (FOT) campaigns on public roads.
- Information from trustable sources can build confidence and help the public to learn the new vocabulary.

Provide a comfortable driving experience in L3 cars while focusing on the design of clear and smooth driver-vehicle interactions.

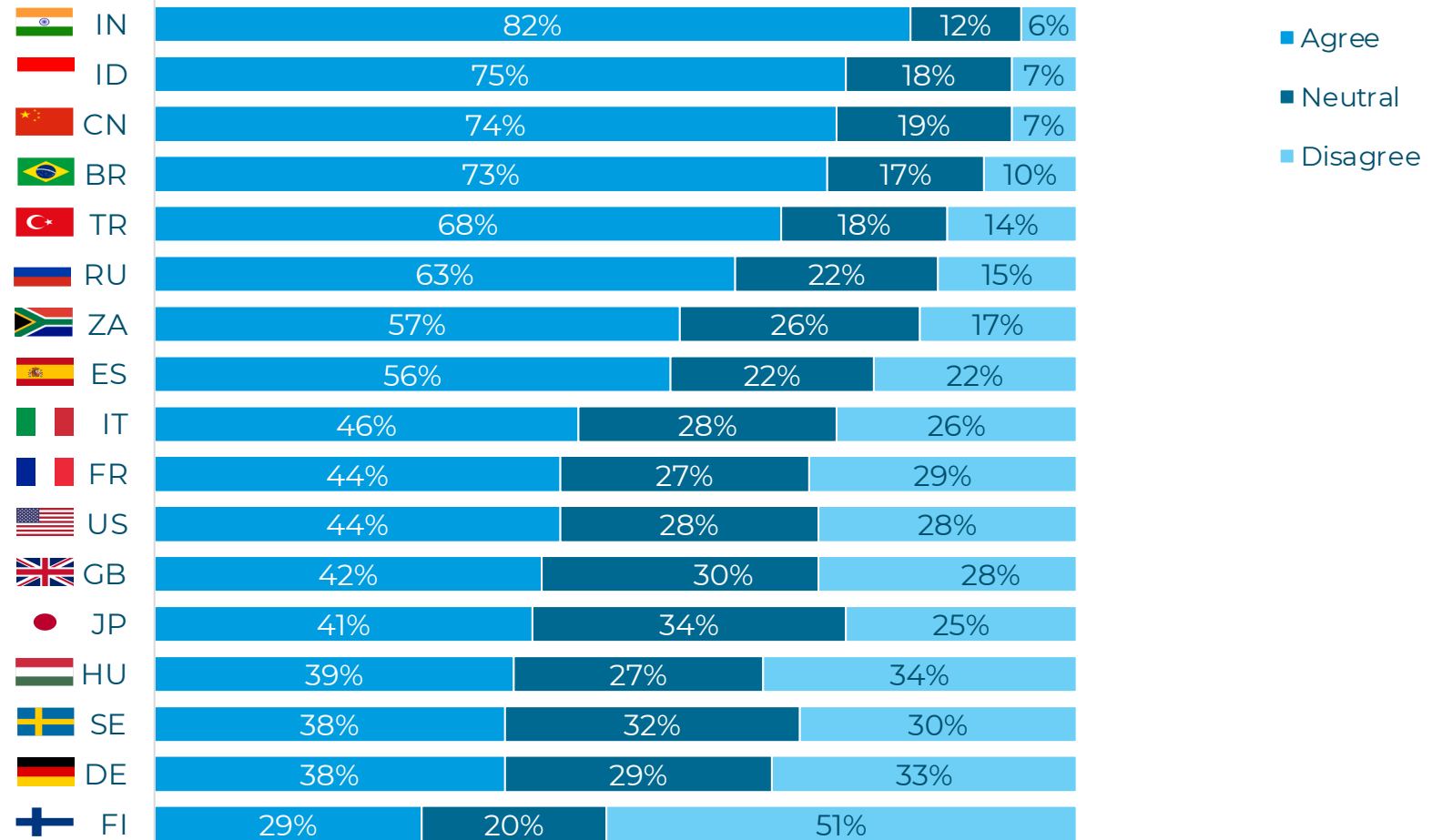
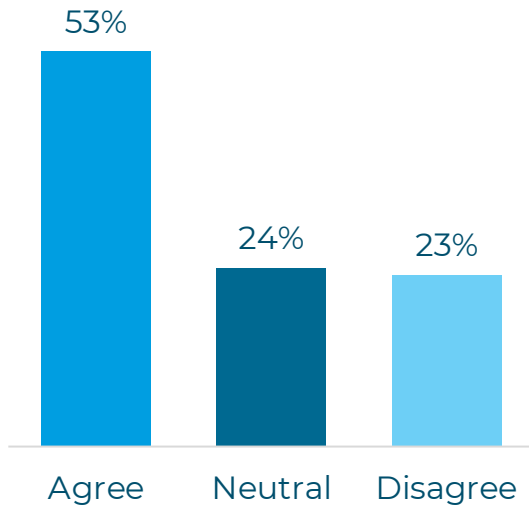
Investigate the value of travel time.



Which activities are the most attractive?

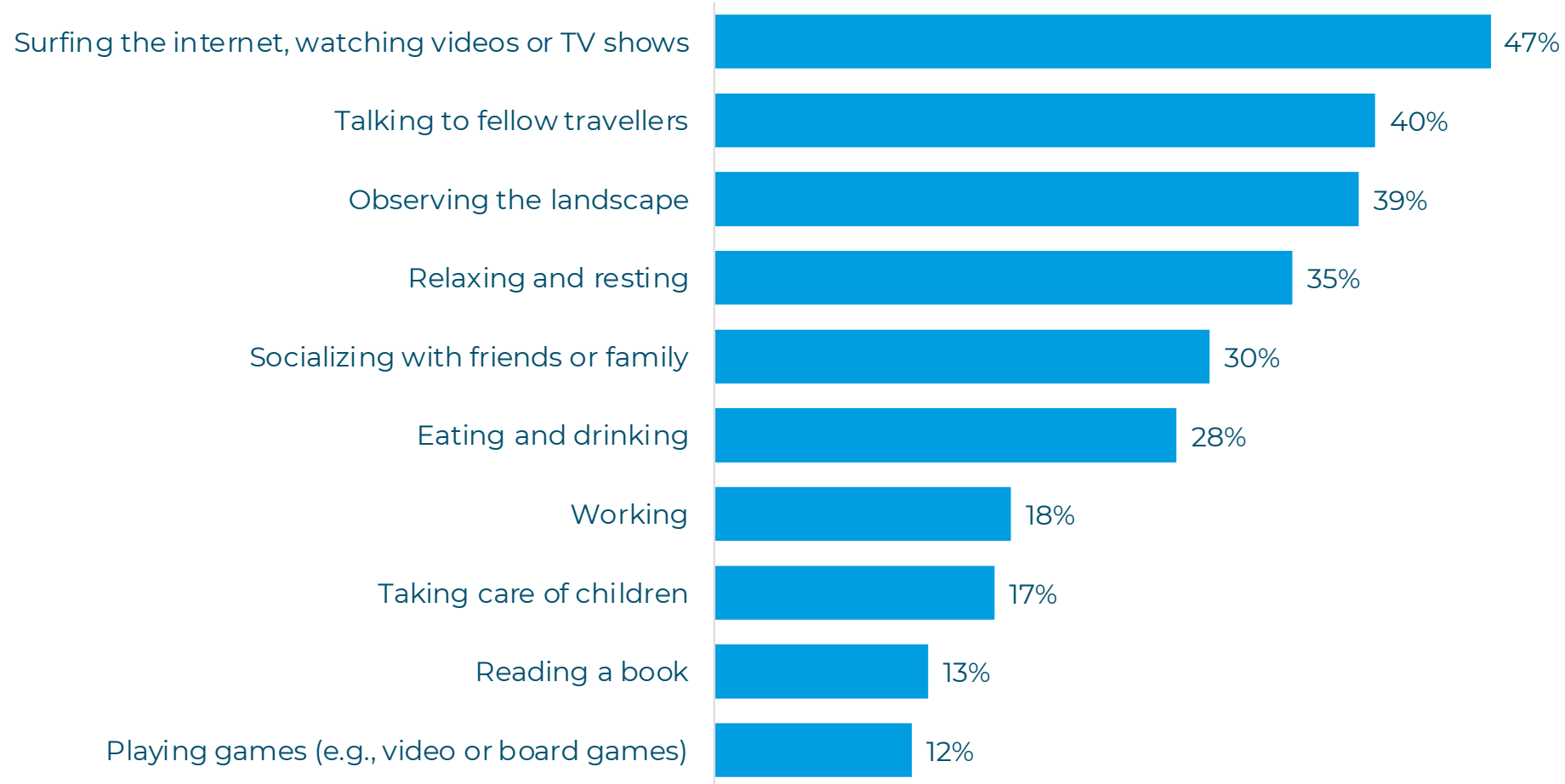
Task engagement: Willingness to engage in other activities

Overall:



Q14. I would use the time during which the conditionally automated car is driving for other activities; n = 18,631

Which activities are the most attractive?



Q14b_1-Q14b_10. Which activities would you like to perform in a conditionally automated car? Please select a maximum of three activities;
n = 10,052

Interpretation

53% Would like to use time in L3 cars for other activities.

One of the main benefits of automated cars – engagement in secondary, eyes-off road activities – not seen by 47% of respondents.



Large variation among countries about willingness to engage in other activities.

- Drivers may not feel fully at ease engaging in non-driving related tasks while automation is engaged due to a lack of confidence about the reliability of the system. It could also be indicative for a curiosity to look at how the system behaves.
- Respondents could not fully envision their interaction with L3 cars due to their lack of actual physical experience with L3 cars, which may have made it difficult to accurately understand the function and the benefits offered by this technology.
- Higher willingness to use car for other activities might also reflect higher level of trust and general excitement and enthusiasm for this topic.



Respondents value engagement in familiar and traditional activities they perform in cars & public transport that demand less attentional resources.

- Low preference to engage in secondary eyes-off activities might be concerns about discomfort, due to the emergence of motion sickness, by having the eyes off the road.
- Respondents might not fully trust L3 cars to operate safely and reliably.
- Surveyed car drivers might still have image of classical automobile in mind steered by human drivers.
- Low willingness to take eyes off the road might reflect nature of L3 automation, which places considerable demands on the sensory, motoric and cognitive state of the human driver.



Accommodate car interior to enable comfortable engagement in people's most favorite activities and promote popularity of engaging in eyes-off road activities.

- Design the car interior to allow for relaxation activities, e.g., equipping the car with comfy couch and providing fast access to the internet.
- Alternatively, promote trust in L3 cars to motivate people to engage in activities that demand many attentional resources to fully reap the benefits of L3 cars.
- Demonstrate that L3 cars are safe and reliable.
- More effectively market the idea of L3 automation among the public and its association with taking eyes off the road safely and comfortably.
- Demonstrate that automation driving styles and interiors result in high comfort levels even when taking the eyes off the road.
- Effectively communicate benefits of eyes-off road activity engagement to users.

Summary



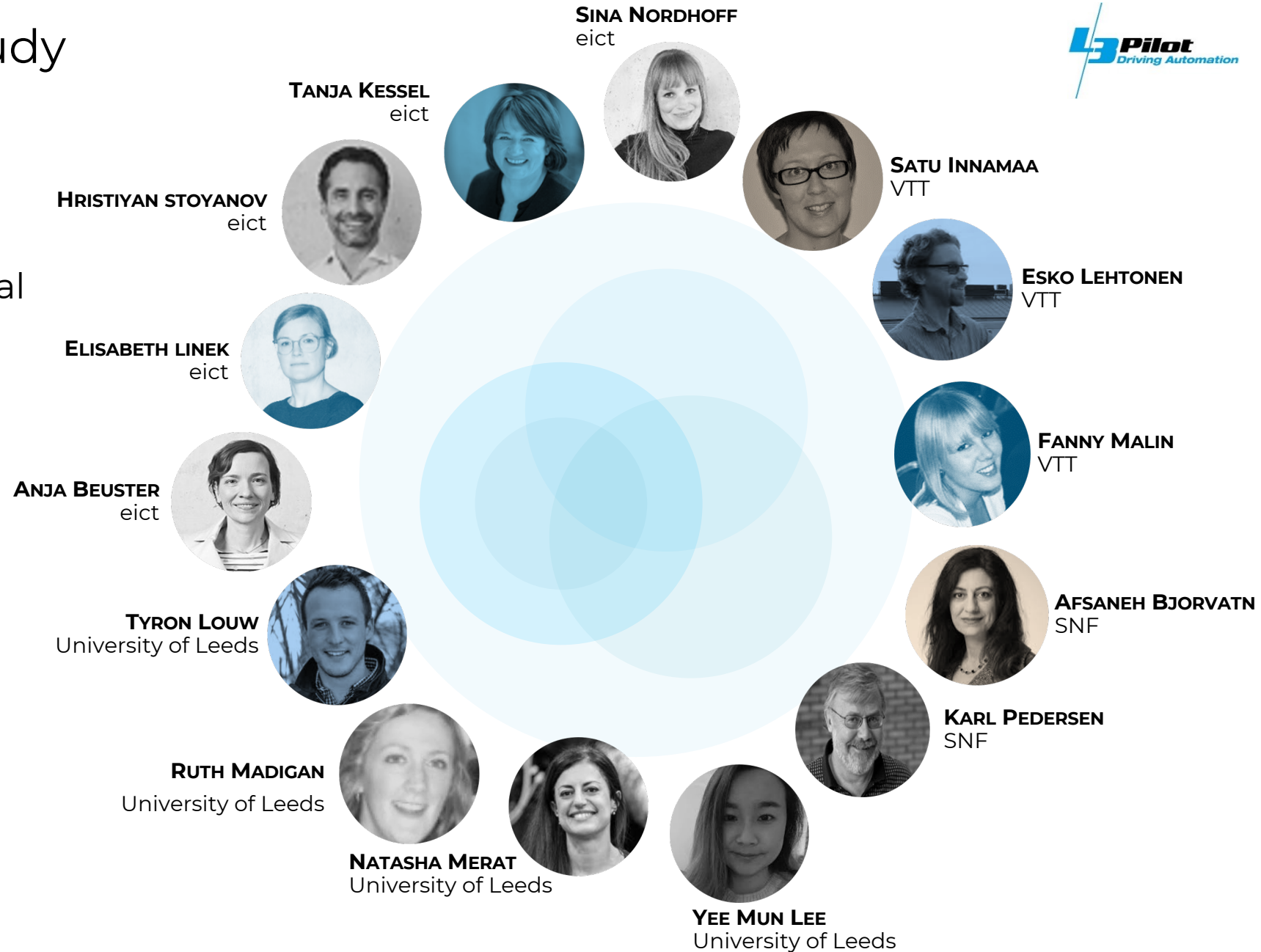
- What has become clear: The respondents out of the group of drivers were **open towards ADAS** and there is already a **group of enthusiasts** with a high intention to use L3 cars. Consequently, there is a good opportunity to reach this group and to promote the intention to buy L3 cars.
- What needs to be analyzed in more detail: How to explain the **difference between comfort and safety impact expectations** – a lack of information and knowledge? – and the **popularity of familiar activities** – a persistent need or lack of imagination?
- What remains open: **How to encourage the use of ADAS** once available in the vehicle. Here, we may need more creativity – besides the marketing perspective – to get in touch with the user. And to stay in touch.

And this was only the group of current drivers...

Experts behind the study

Interdisciplinary, cross-national expert group to

- Develop survey concept, methodological approach, and questionnaire
- Share data, check quality and discuss insights
- Derive target-group specific presentation of results





Thank you for your kind attention.

Contact: user-survey@eict.de



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