L3Pilot Driving Automation

71 questions

3 waves in one survey

27,970 car drivers responded

75% have heard of automated cars

57% intend to use L3

L3 User Acceptance Survey

Results: Country Dashboards (Wave 1 & 2)

ejct VTT SNF UNIVERSITY OF LEEDS

Main 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

Main Objectives

Identify **cross-national differences** in knowledge, attitudes and expectations towards automated driving and L3 technology.

Explore user needs and preferences to design L3 technologies that promote acceptance and successful market implementations.

Predict acceptance by identifying **key factors of user acceptance** and expectations about L3 automation.

Contribute to societal discourse about automated driving by deriving strategic recommendations for decision-makers.

Facts & Figures: Online survey

- 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, 511
  - Wave 3 n= 9, 339

Survey in three waves – Dashboards based on wave 1 and wave 2

- Wave 1 and wave 2 are based on the same questionnaire but addressing different countries and with that different markets, societies, and cultures.
- Wave 3 is based on an adjusted questionnaire, focussing on a representative set of countries from wave 1 and wave 2 .

Information about L3 technology given to respondents

Respondents were first presented with instructions about L3 cars to ensure that they had sufficient understanding of how these worked. The instructions were written out as follows:

> *"There are different terms to define the capabilities of automated cars, such as self-driving, autonomous, automated, pilotless, driverless, and conditionally automated. With this questionnaire, we would like to get your opinion* ***on conditionally automated cars****.*
>
> *Conditionally automated cars can drive under limited conditions, such as* ***driving on motorways, on congested motorways, in urban traffic, and in parking situations****. They will not operate beyond these conditions.*
>
> *Conditionally automated cars do the steering, acceleration and braking. They will stay in the lane and maintain a safe distance to the vehicle in front. They will also overtake slower moving vehicles or change the lane. These cars still have gas and brake pedals and a steering wheel.*
>
> *You are not driving when the car is in conditionally automated mode – even if you are seated in the driver's seat. This will allow you to engage in other activities, such as emailing or watching videos. However, the car might ask you to resume vehicle control anytime, e.g., when approaching a construction site, which means you might have to stop what you are doing and resume control of the car."*

The sample

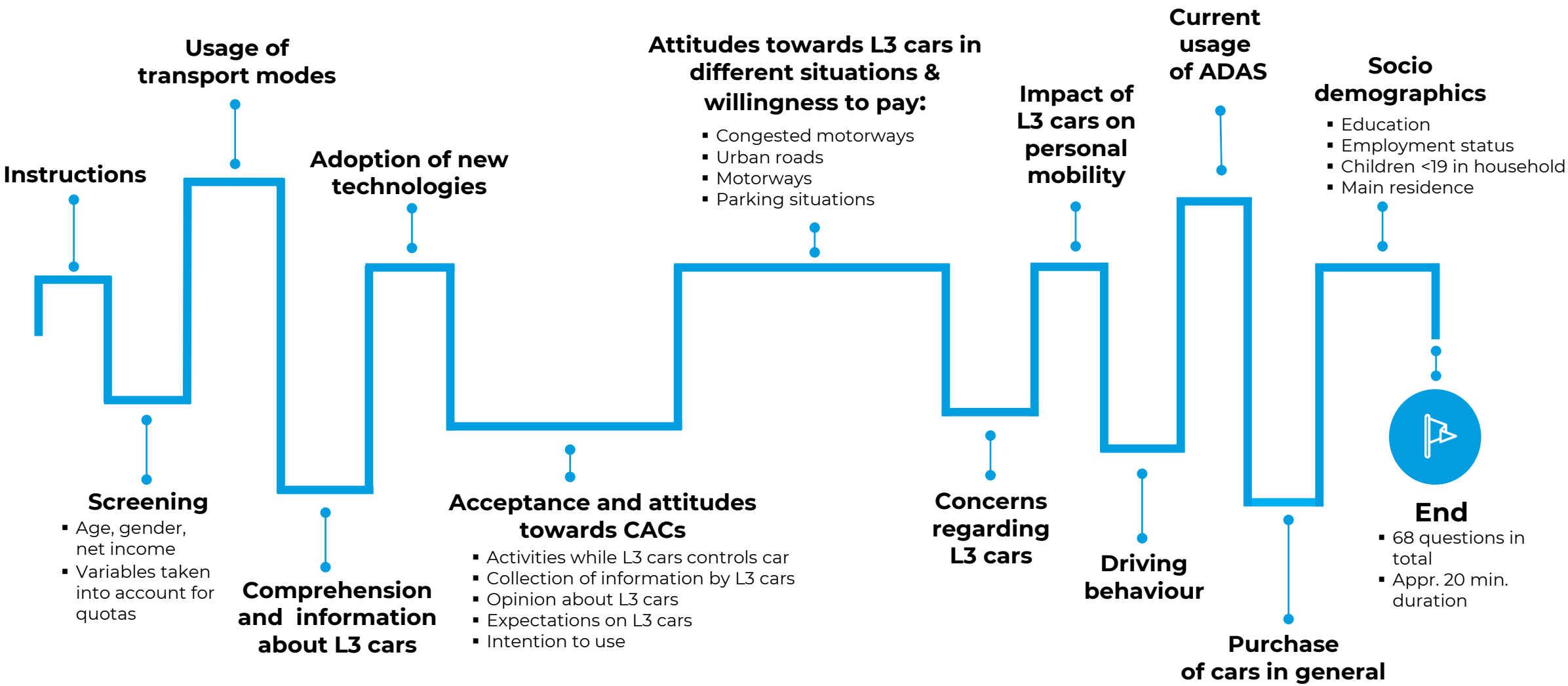
The target group of the survey was defined to be car drivers.

- We needed to get the insights, expectations and potential barriers from car users themselves. Surveying potential future users of conditionally automated cars, including the subgroup of divers who might already have experiences with ADAS, represent the ideal target group.

- Having in mind, that the differentiation between SAE Level 3 and Level 4 is even for experts challenging, it was essential to define the target group to be drivers for the success of the research goal.

Source: SAE Levels of Driving Automation J3016 (Copyright 2021 SAE International)

Questionnaire content wave 1 & wave 2



Dashboard: BRAZIL

Car usage

54% use their private car at least 4 times a week

Experience with ADAS

22% have and use Adaptive Cruise Control (**ACC**)

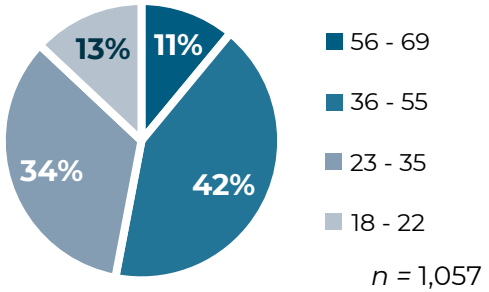
17% have and use Lane Keeping Assistant (**LKA**)

Favourite activity in CACs*

58% surfing the internet, watching videos

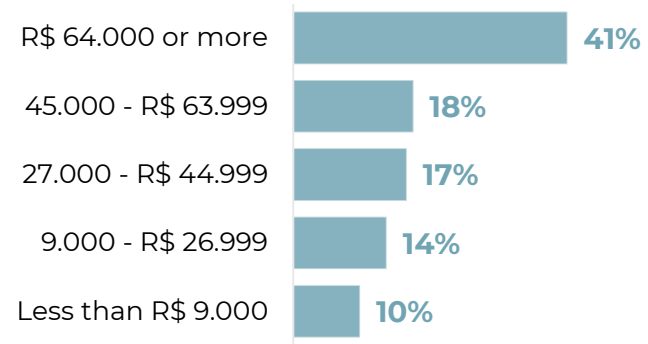
Gender and Age

50% Female
50% Male

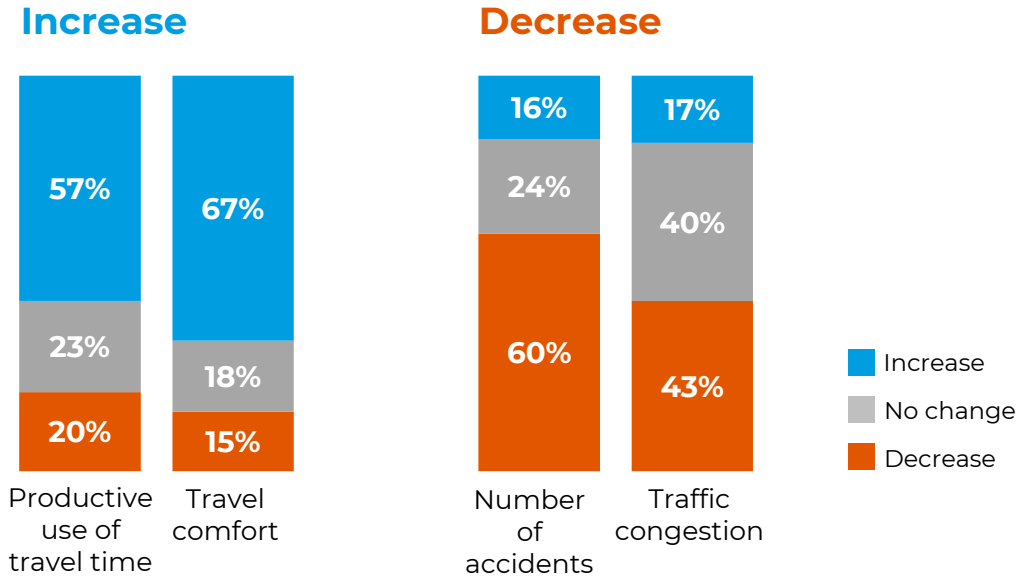


n = 1,057

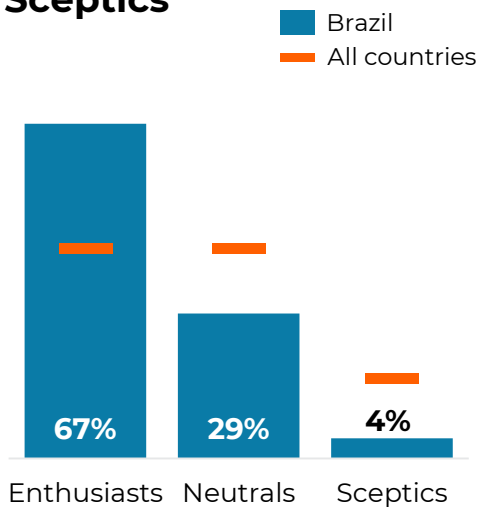
Monthly Gross Income



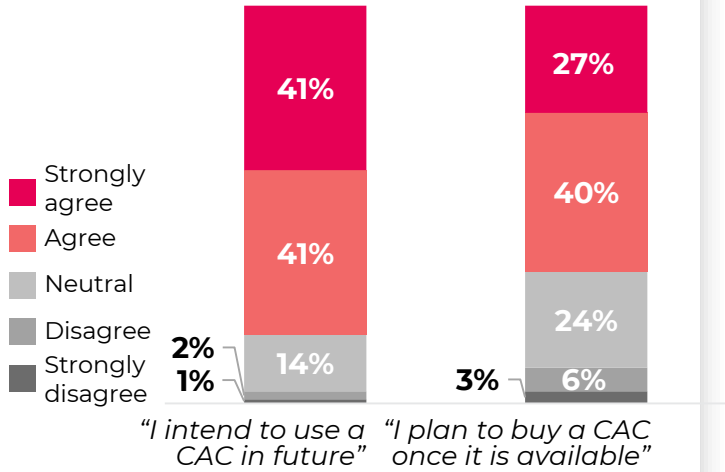
Expected impacts of using CACs



Enthusiasts, Neutrals, Sceptics



82% intend to use — 67% plan to buy



*Conditionally automated cars

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Dashboard: CHINA

Car usage

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

Experience with ADAS

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

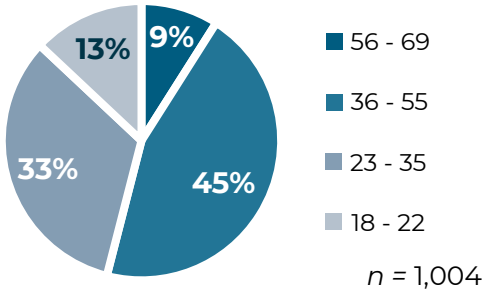
33% have and use Lane Keeping Assistant (**LKA**)

Favourite activity in CACs*

47% observing the landscape

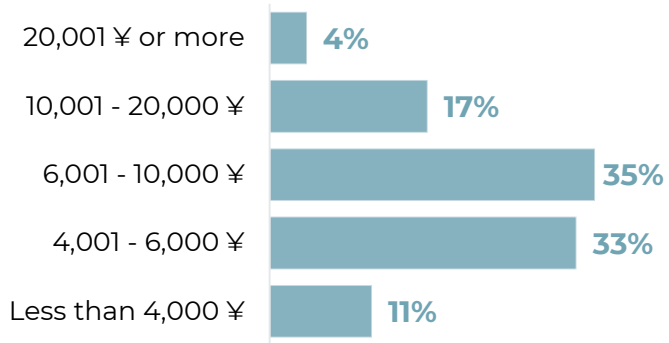
Gender and Age

50% Female
50% Male

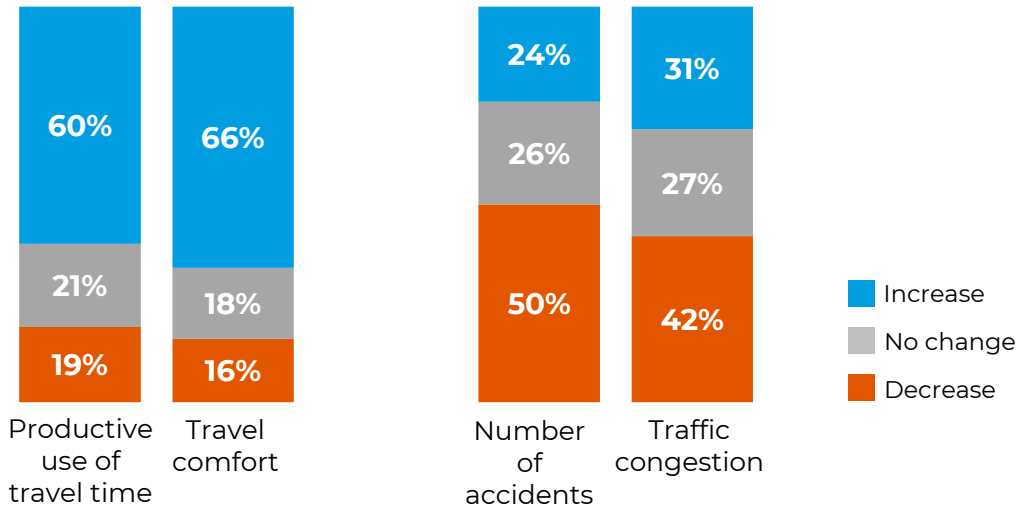


n = 1,004

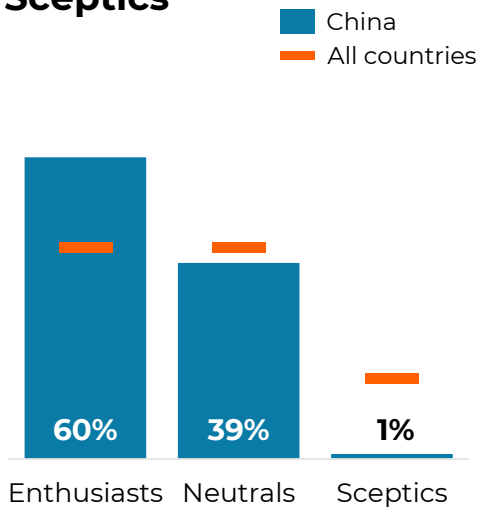
Monthly Net Income



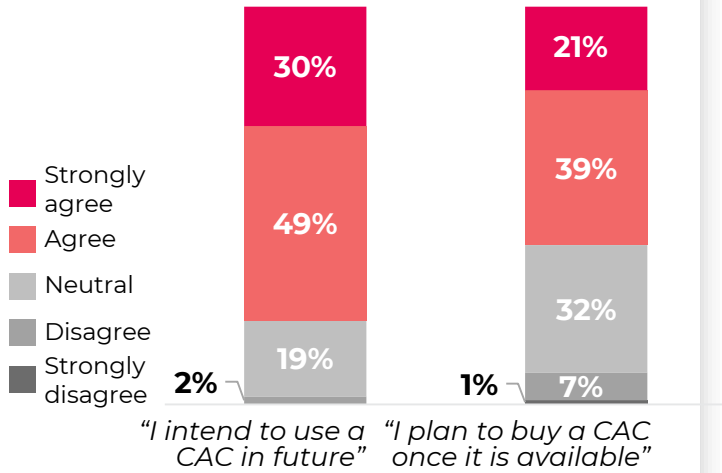
Expected impacts of using CACs



Enthusiasts, Neutrals, Sceptics



79% intend **to use** **60%** plan **to buy**



*Conditionally automated cars

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Dashboard: FINLAND

Car usage

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

Experience with ADAS

15% have and use Adaptive Cruise Control (**ACC**)

5% have and use Lane Keeping Assistant (**LKA**)

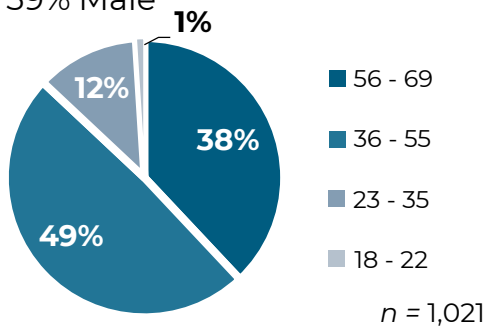
Favourite activity in CACs*

50% observing the landscape

Gender and Age

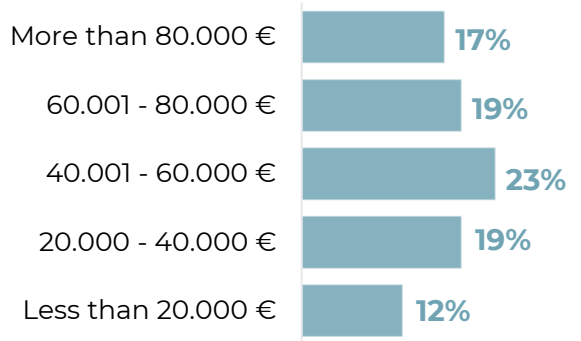
41% Female

59% Male

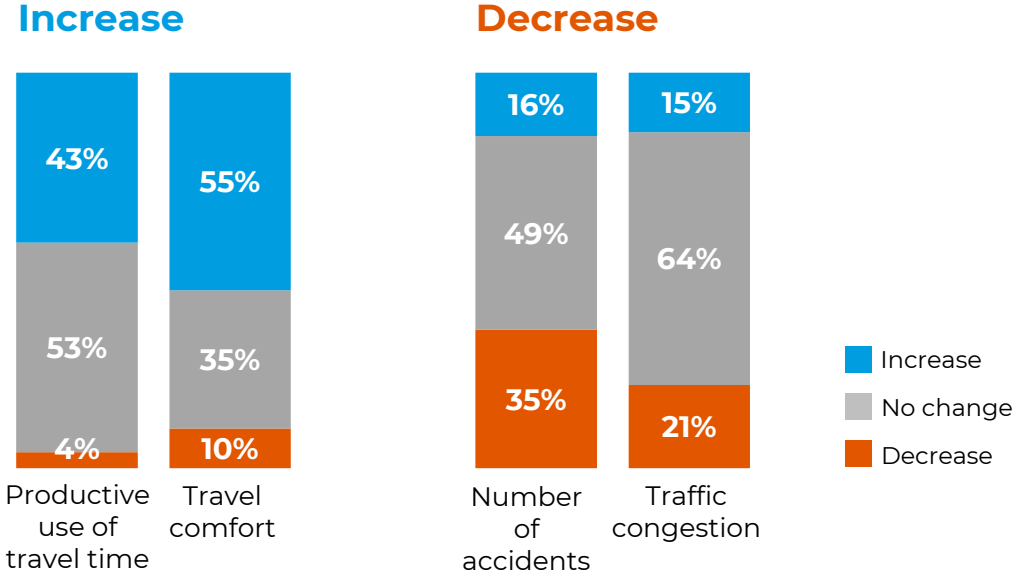


n = 1,021

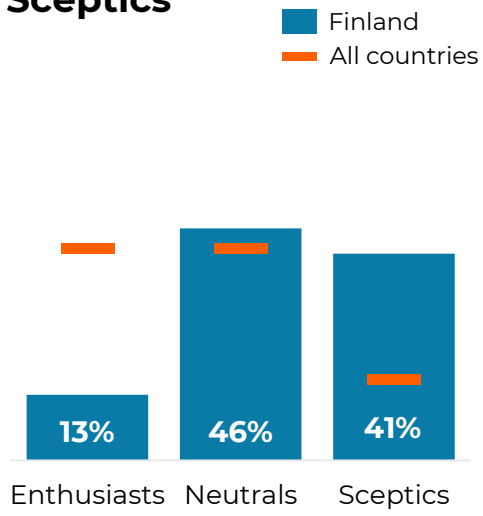
Yearly Gross Income



Expected impacts of using CACs

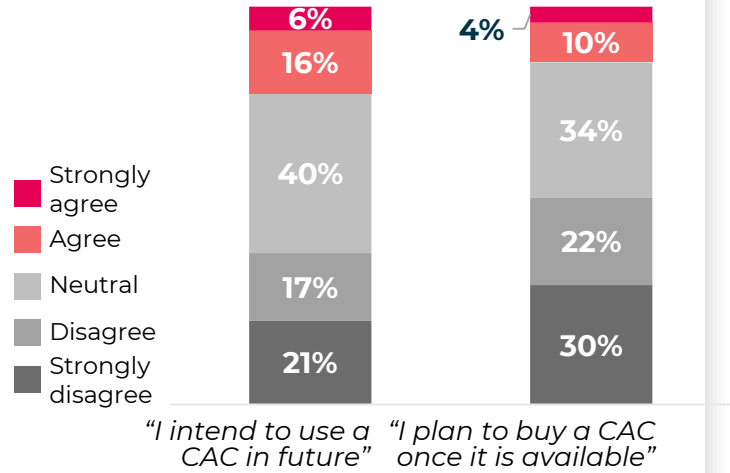


Enthusiasts, Neutrals, Sceptics



22% intend **to use**

14% plan **to buy**



*Conditionally automated cars

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Dashboard: FRANCE

Car usage

69% use their private car at least 4 times a week

Experience with ADAS

30% have and use Adaptive Cruise Control (**ACC**)

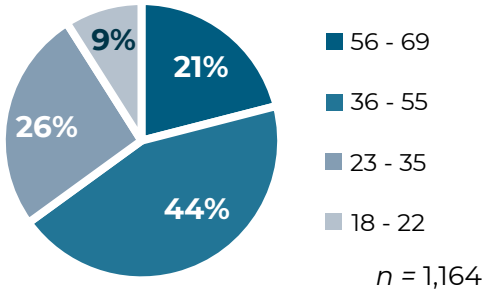
11% have and use Lane Keeping Assistant (**LKA**)

Favourite activity in CACs*

52% talking to fellow travellers

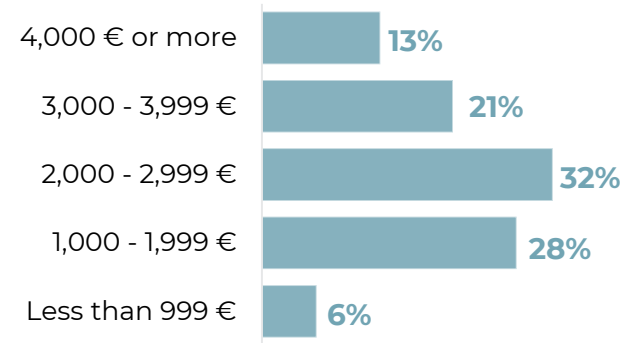
Gender and Age

52% Female
48% Male

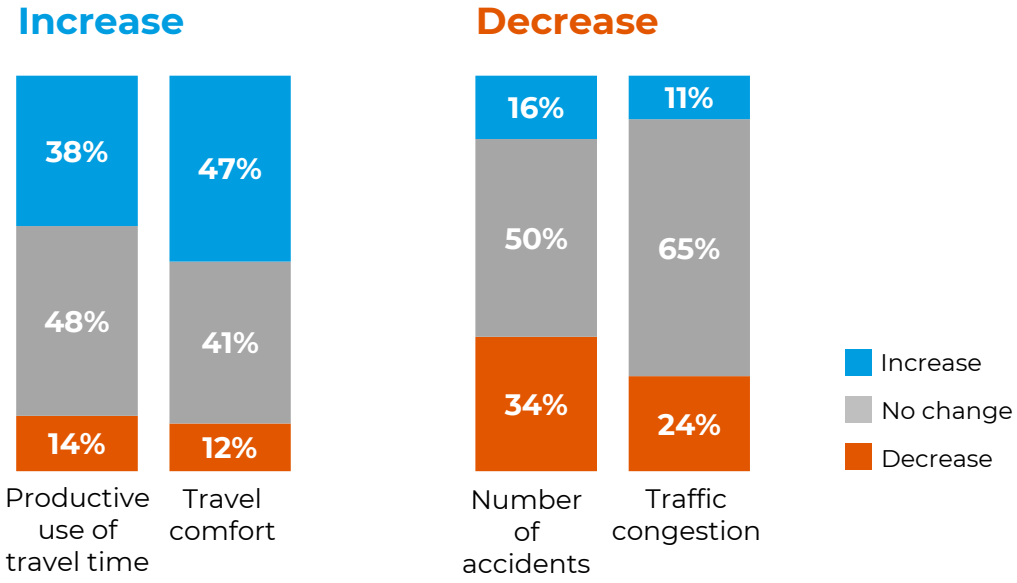


n = 1,164

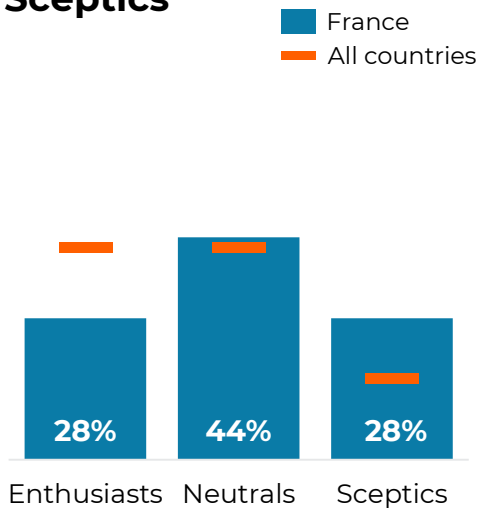
Monthly Net Income



Expected impacts of using CACs

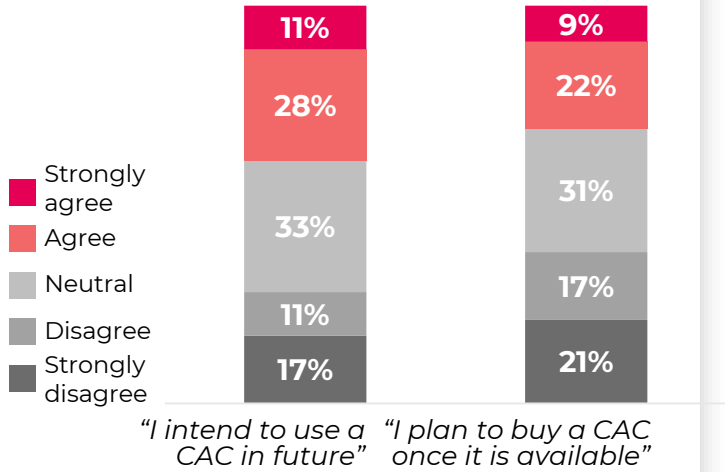


Enthusiasts, Neutrals, Sceptics



39% intend **to use**

31% plan **to buy**



*Conditionally automated cars

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Dashboard: GERMANY

Car usage

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

Experience with ADAS

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

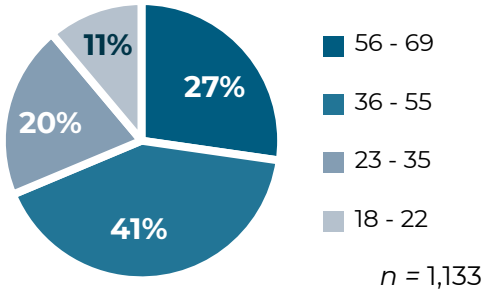
16% have and use Lane Keeping Assistant (**LKA**)

Favourite activity in CACs*

45% talking to fellow travellers

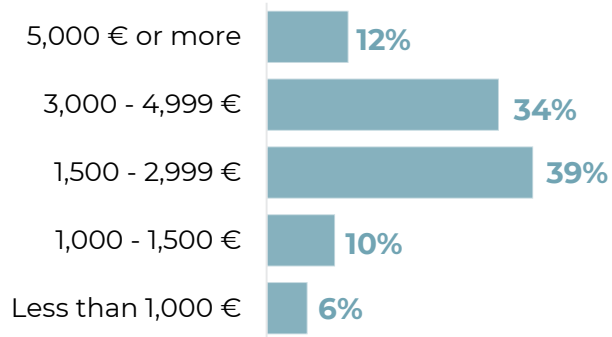
Gender and Age

50% Female
50% Male

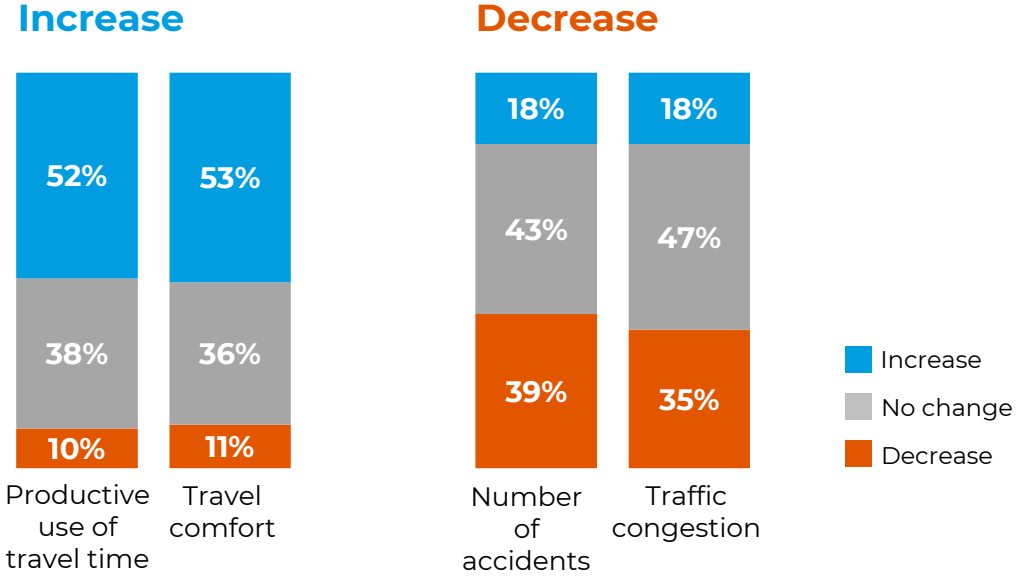


n = 1,133

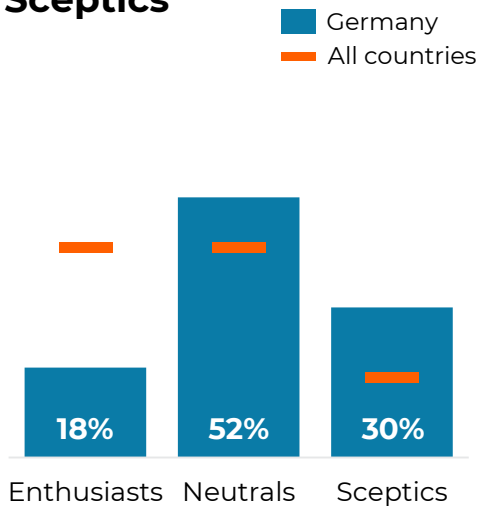
Monthly Net Income



Expected impacts of using CACs

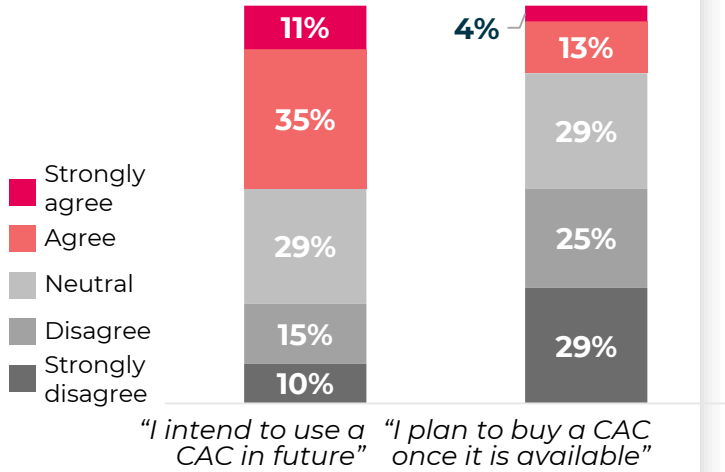


Enthusiasts, Neutrals, Sceptics



46% intend **to use**

17% plan **to buy**



*Conditionally automated cars

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Dashboard: HUNGARY

Car usage

55% use their private car at least 4 times a week

Experience with ADAS

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

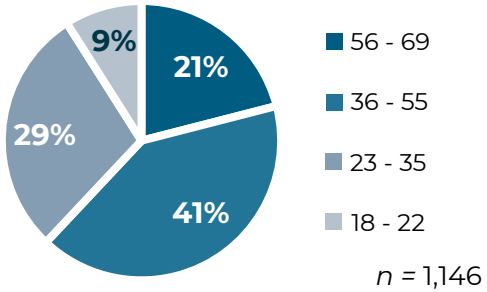
6% have and use Lane Keeping Assistant (**LKA**)

Favourite activity in CACs*

58% talking to fellow travellers

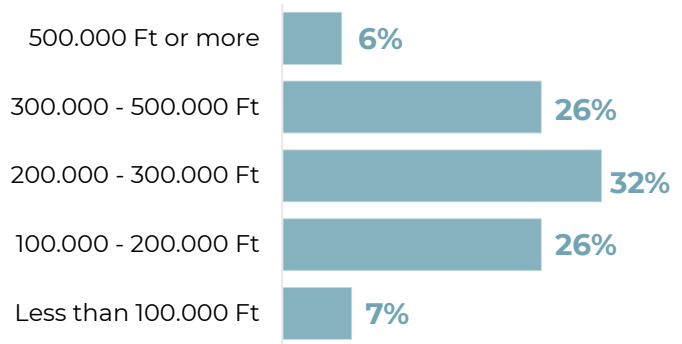
Gender and Age

51% Female
49% Male

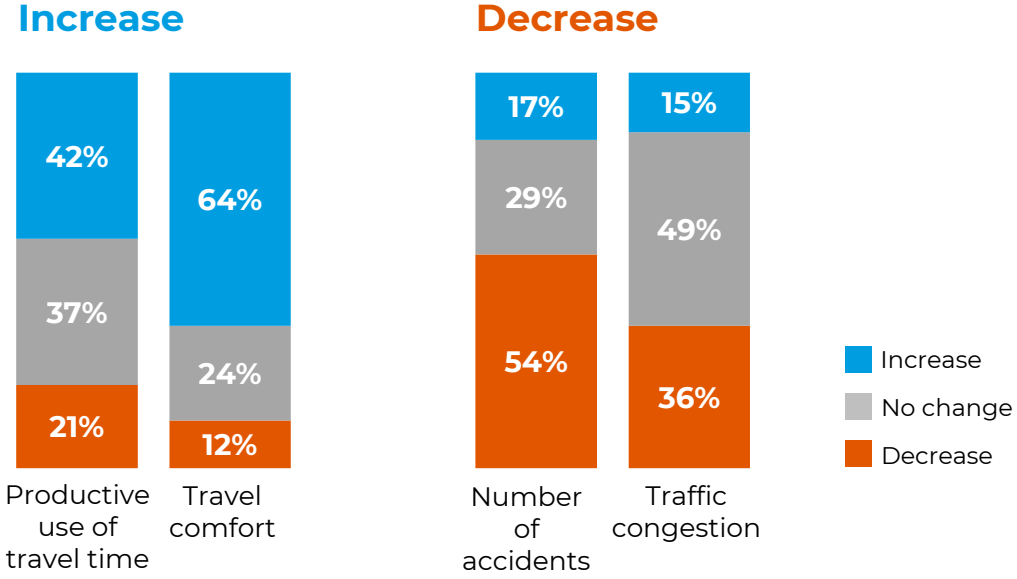


n = 1,146

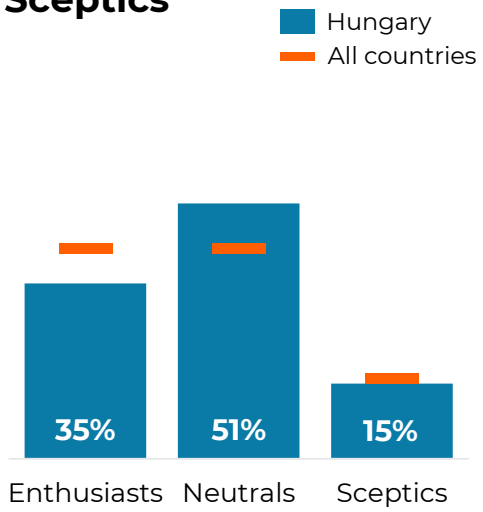
Yearly Net Income



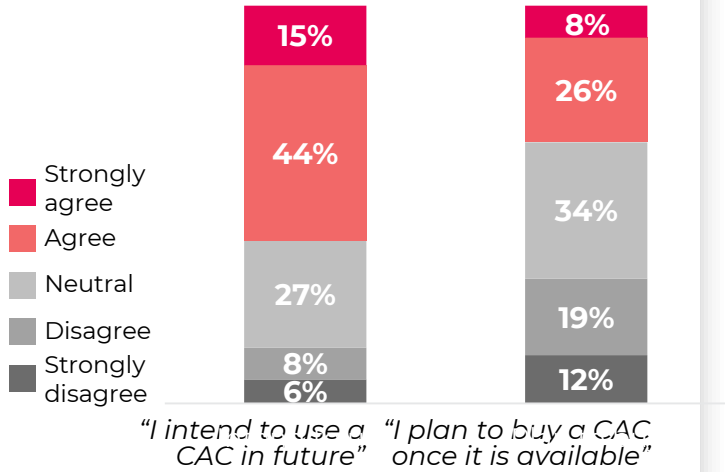
Expected impacts of using CACs



Enthusiasts, Neutrals, Sceptics



59% intend **to use** **34%** plan **to buy**



*Conditionally automated cars

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Dashboard: INDIA

Car usage

50% use their private car at least 4 times a week

Experience with ADAS

44% have and use Adaptive Cruise Control (**ACC**)

37% have and use Lane Keeping Assistant (**LKA**)

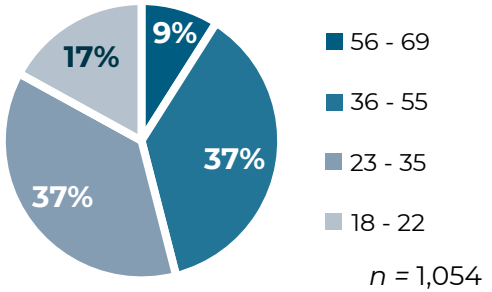
Favourite activity in CACs*

54% surfing the internet, watching videos

Gender and Age

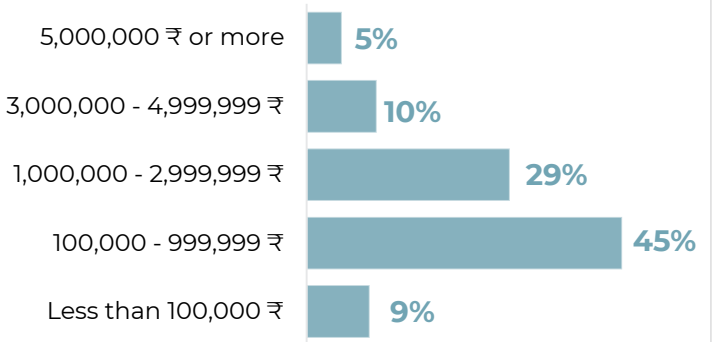
49% Female

51% Male

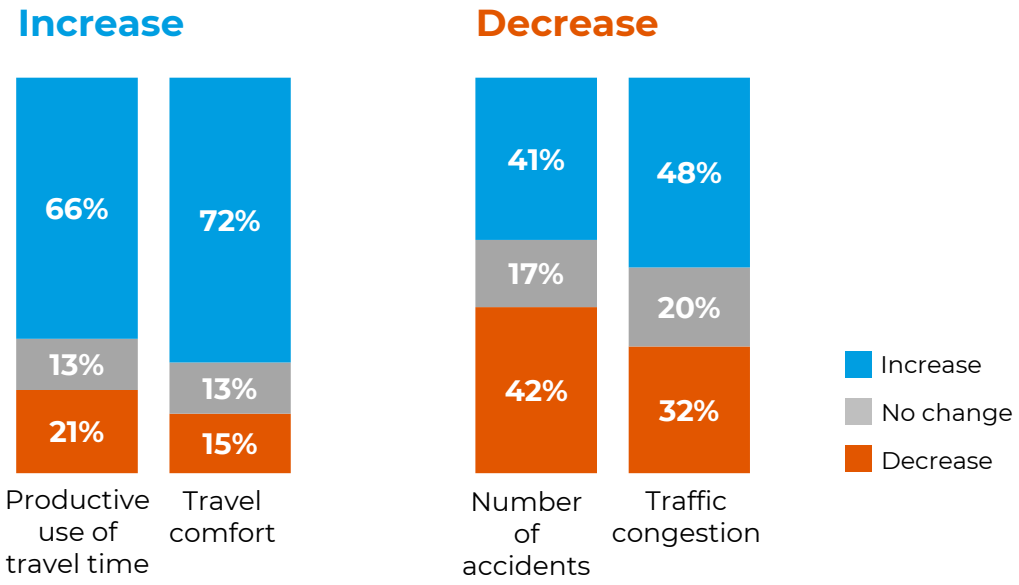


n = 1,054

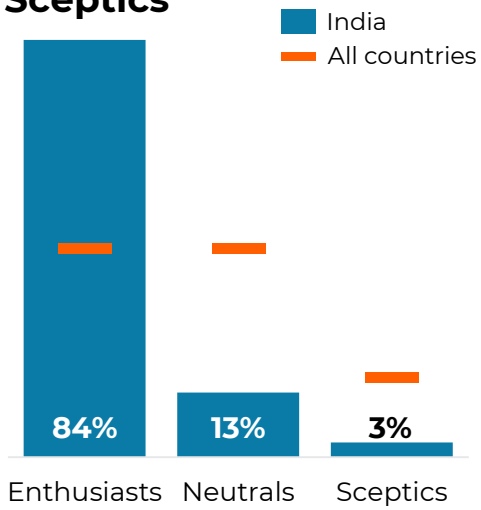
Monthly Gross Income



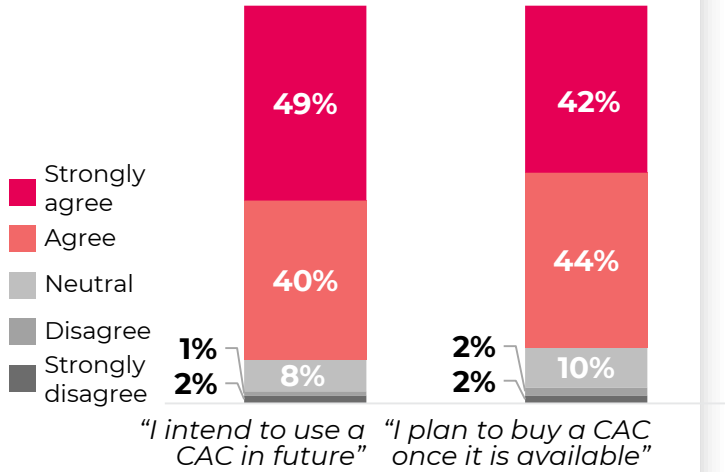
Expected impacts of using CACs



Enthusiasts, Neutrals, Sceptics



89% intend **to use** **86%** plan **to buy**



*Conditionally automated cars

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Dashboard: INDONESIA

Car usage

53% use their private car at least 4 times a week

Experience with ADAS

34% have and use Adaptive Cruise Control (**ACC**)

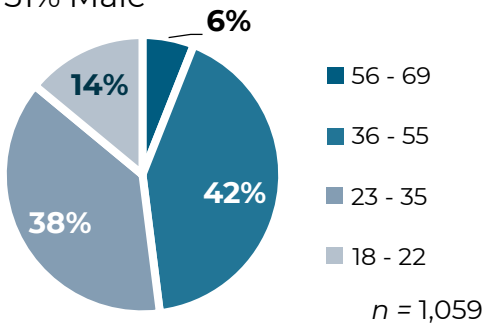
29% have and use Lane Keeping Assistant (**LKA**)

Favourite activity in CACs*

60% surfing the internet, watching videos

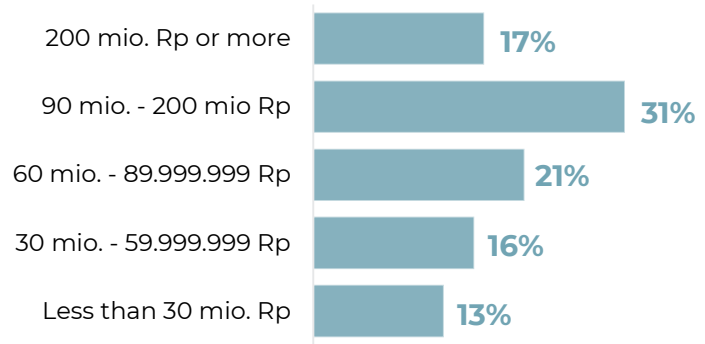
Gender and Age

49% Female
51% Male

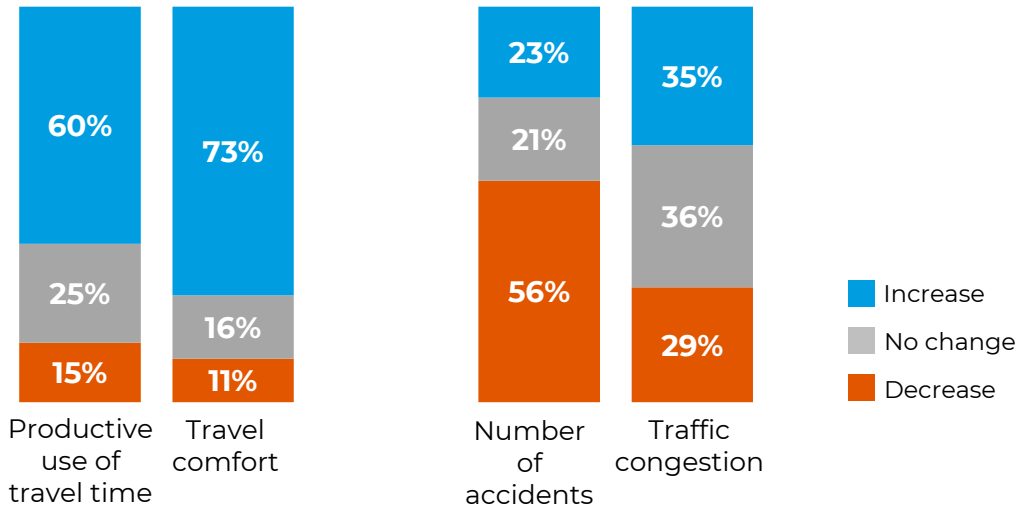


n = 1,059

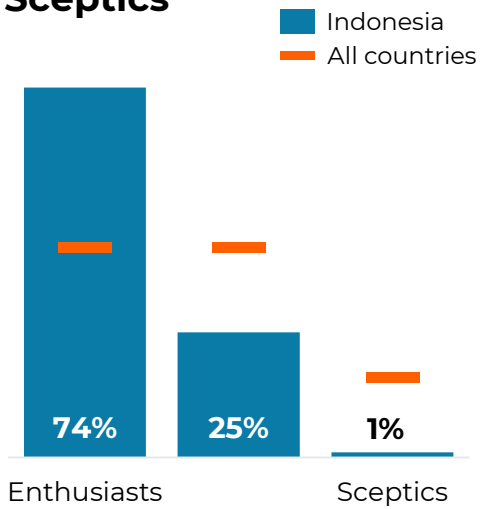
Yearly Gross Income



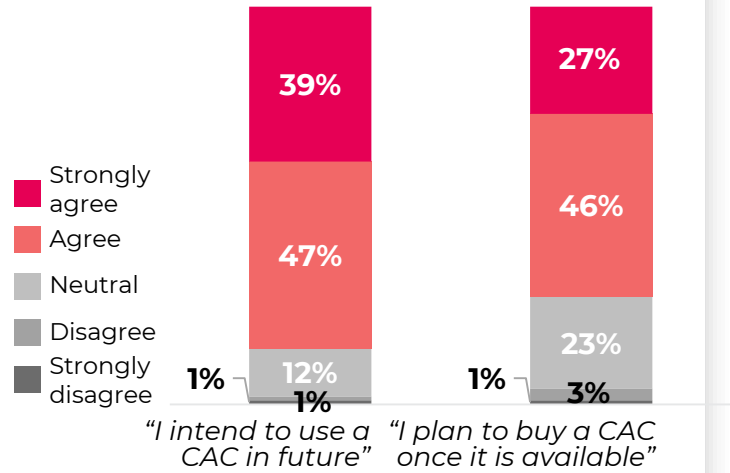
Expected impacts of using CACs



Enthusiasts, Neutrals, Sceptics



86% intend **to use** **73%** plan **to buy**



*Conditionally automated cars

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Dashboard: ITALY

Car usage

70% use their private car at least 4 times a week

Experience with ADAS

15% have and use Adaptive Cruise Control (**ACC**)

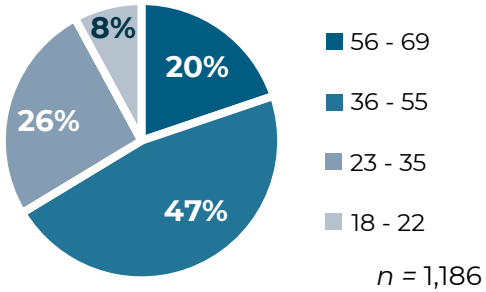
6% have and use Lane Keeping Assistant (**LKA**)

Favourite activity in CACs*

51% observing the landscape

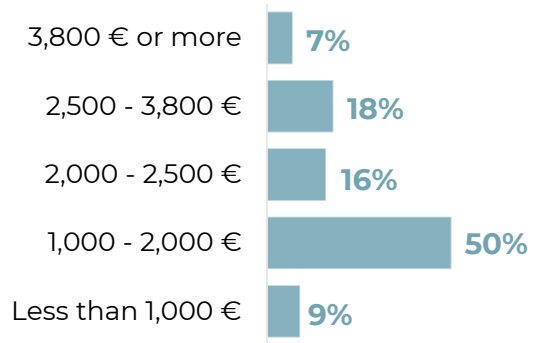
Gender and Age

50% Female
50% Male

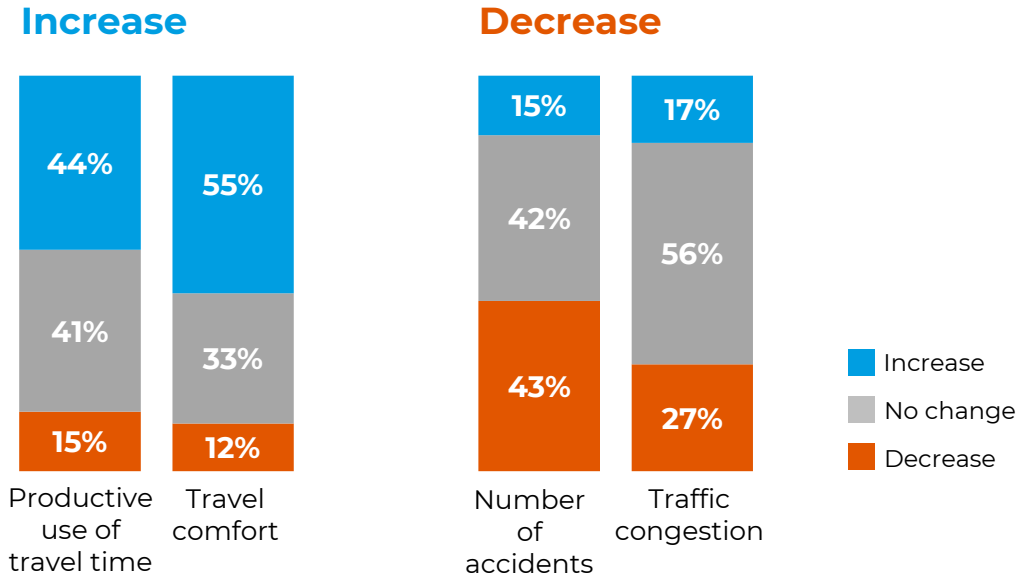


n = 1,186

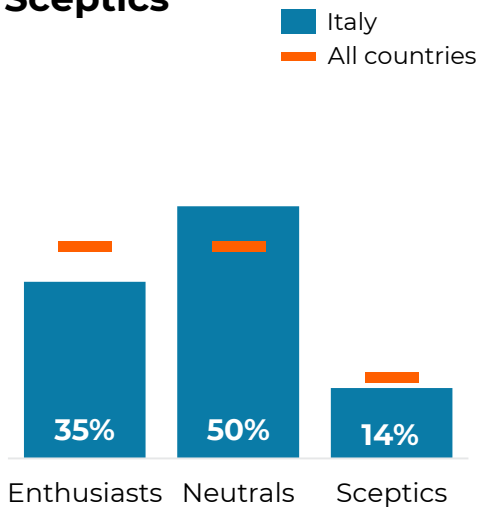
Monthly Net Income



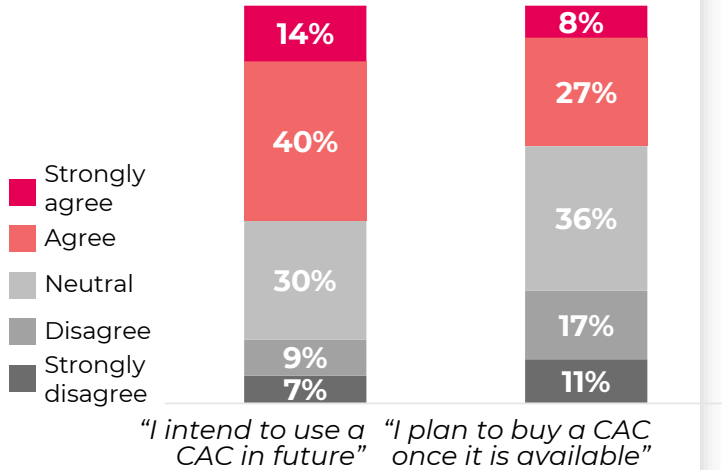
Expected impacts of using CACs



Enthusiasts, Neutrals, Sceptics



54% intend **to use** **37%** plan **to buy**



*Conditionally automated cars

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Dashboard: JAPAN

Car usage

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

Experience with ADAS

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

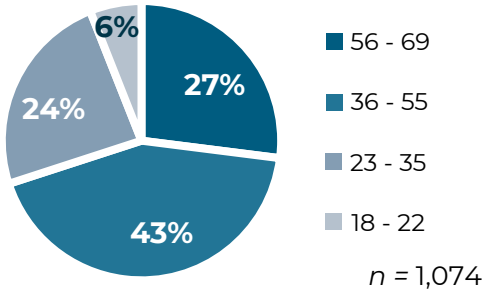
16% have and use Lane Keeping Assistant (**LKA**)

Favourite activity in CACs*

55% surfing the internet, watching videos

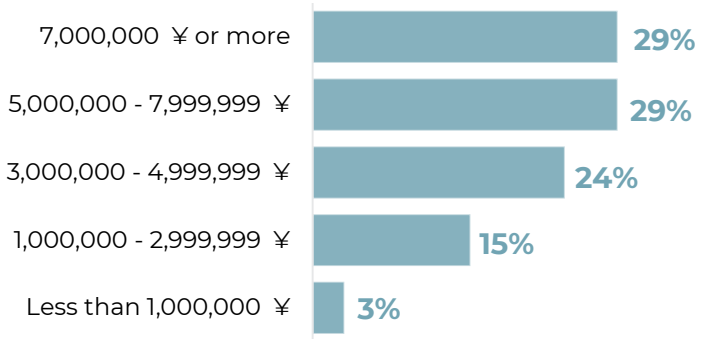
Gender and Age

51% Female
49% Male

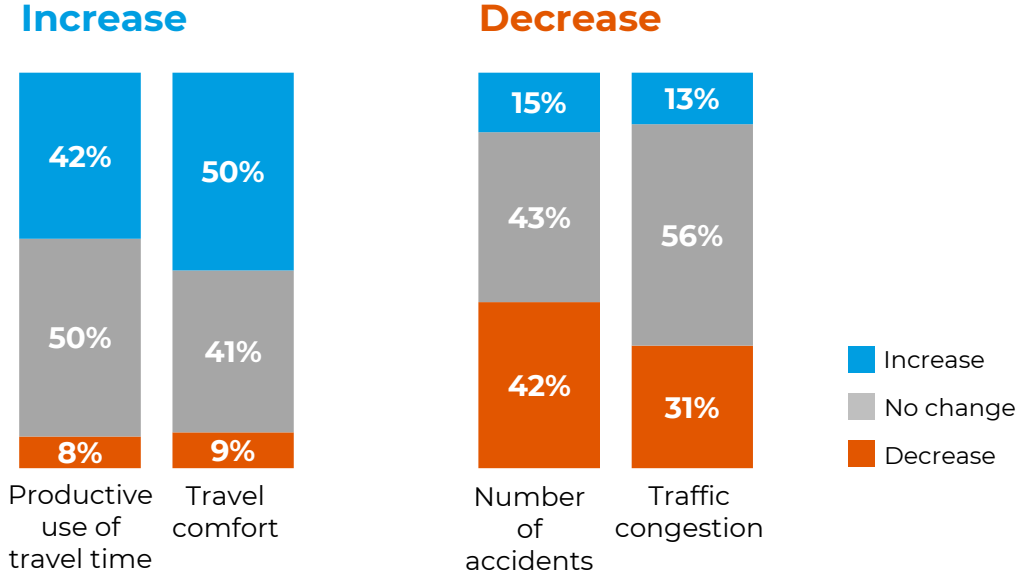


n = 1,074

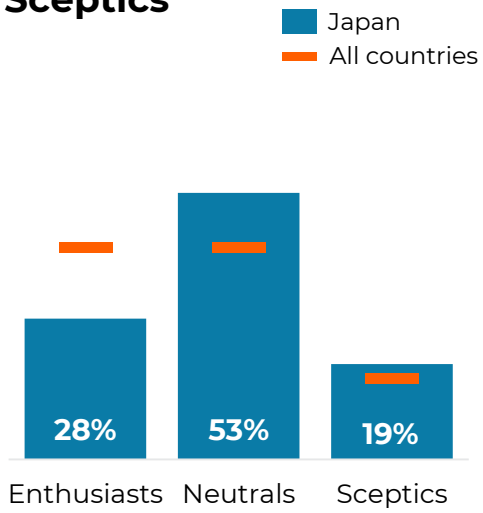
Monthly Gross Income



Expected impacts of using CACs

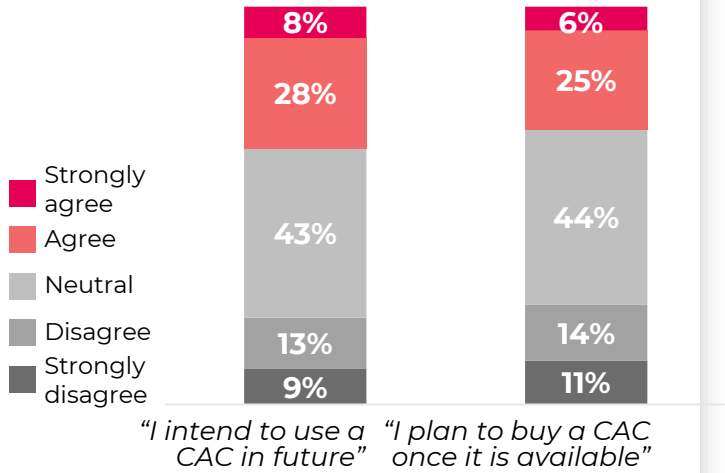


Enthusiasts, Neutrals, Sceptics



35% intend **to use**

31% plan **to buy**



*Conditionally automated cars

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Dashboard: RUSSIA

Car usage

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

Experience with ADAS

27% have and use Adaptive Cruise Control (**ACC**)

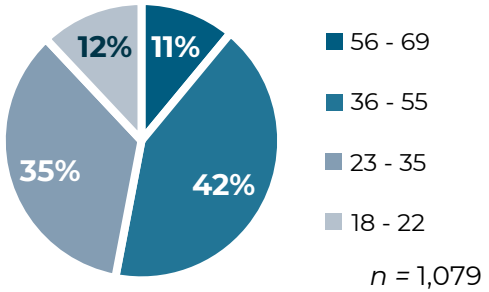
6% have and use Lane Keeping Assistant (**LKA**)

Favourite activity in CACs*

51% talking to fellow travellers

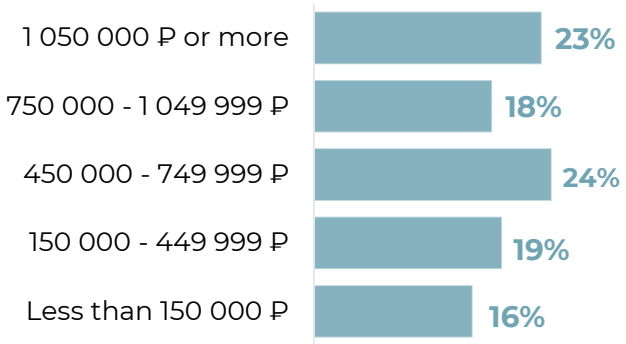
Gender and Age

54% Female
46% Male

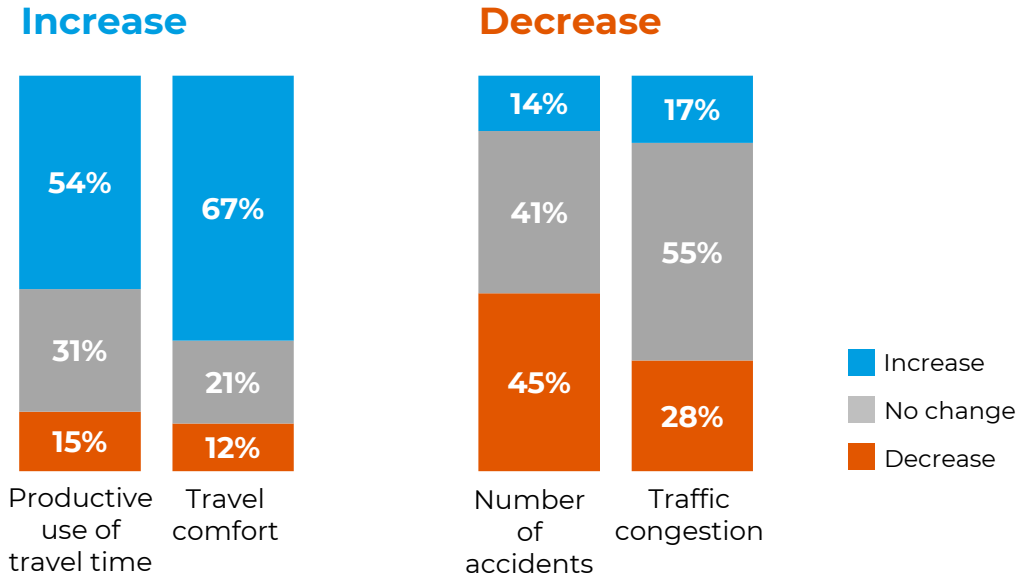


n = 1,079

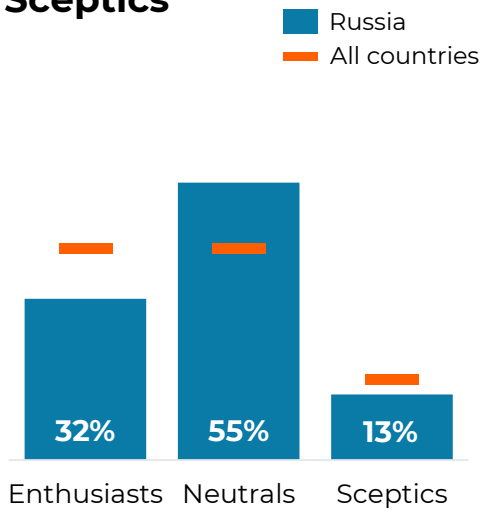
Monthly Gross Income



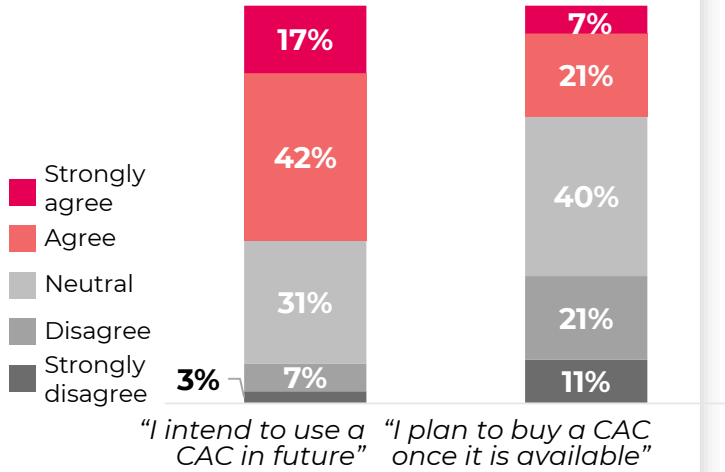
Expected impacts of using CACs



Enthusiasts, Neutrals, Sceptics



59% intend **to use** **28%** plan **to buy**



*Conditionally automated cars

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Dashboard: SOUTH AFRICA

66% use their private car at least 4 times a week

Car usage

30% have and use Adaptive Cruise Control (**ACC**)

14% have and use Lane Keeping Assistant (**LKA**)

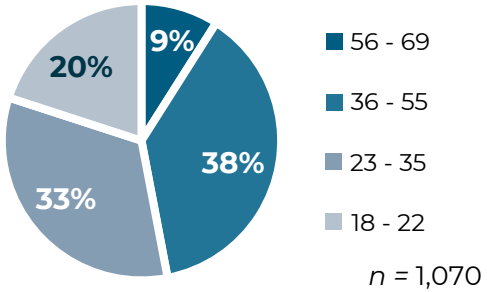
Experience with ADAS

46% surfing the internet, watching videos

Favourite activity in CACs*

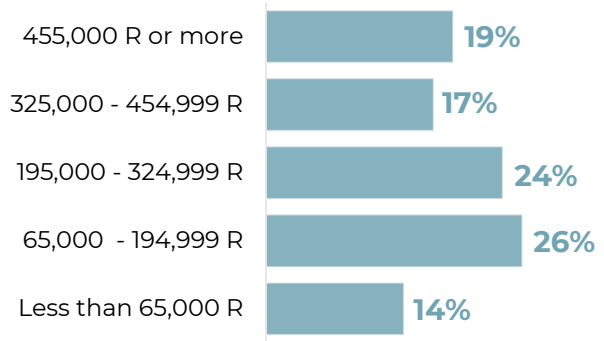
Gender and Age

52% Female
48% Male

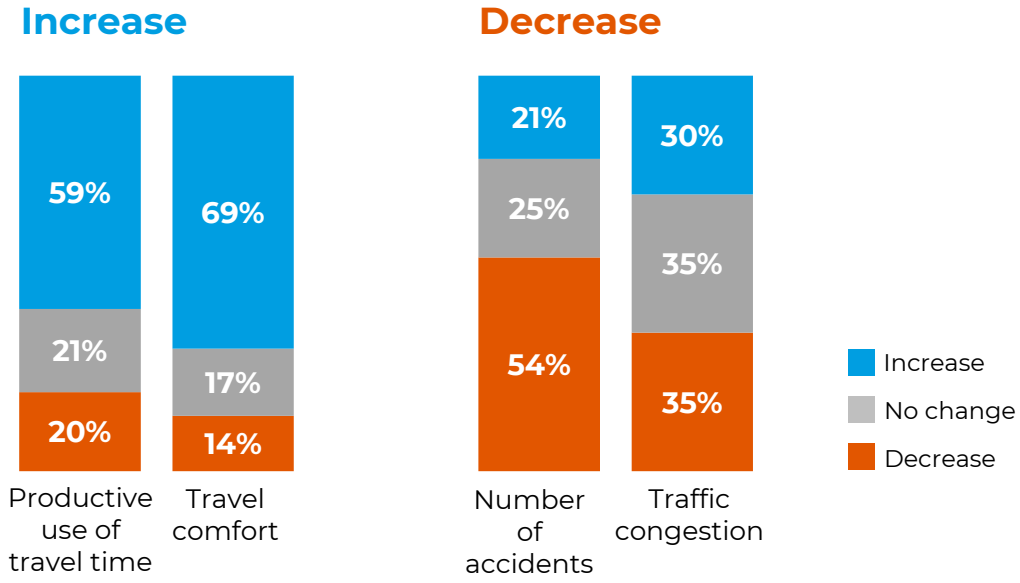


n = 1,070

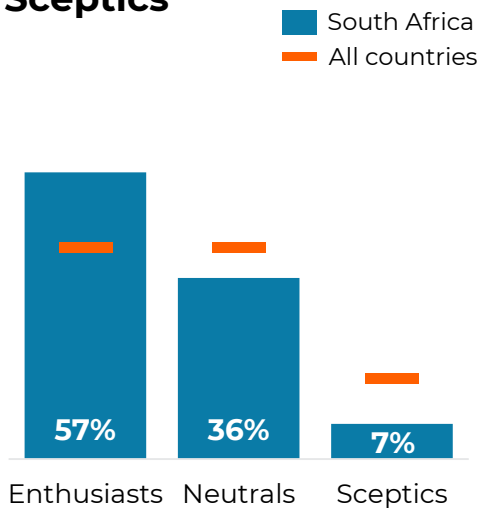
Yearly Gross Income



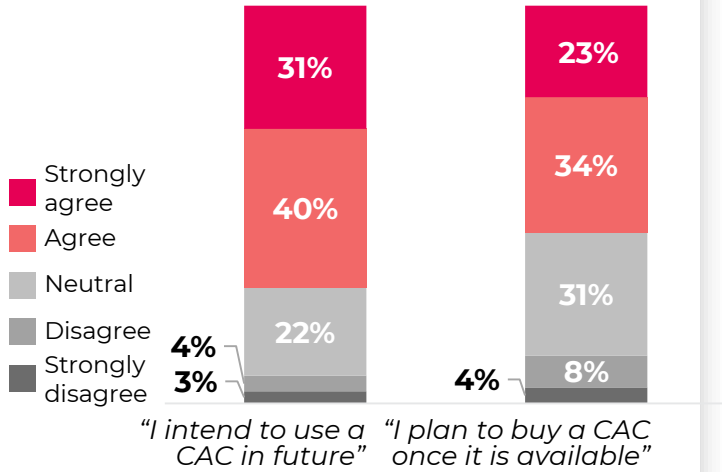
Expected impacts of using CACs



Enthusiasts, Neutrals, Sceptics



71% intend **to use** **57%** plan **to buy**



*Conditionally automated cars

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Dashboard: SPAIN

Car usage

62% use their private car at least 4 times a week

Experience with ADAS

32% have and use Adaptive Cruise Control (**ACC**)

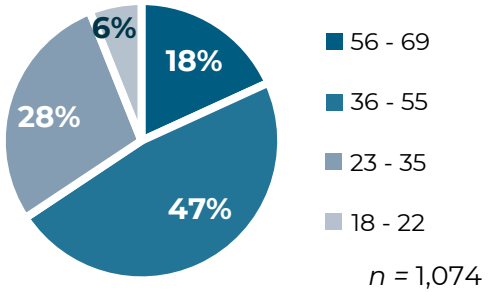
16% have and use Lane Keeping Assistant (**LKA**)

Favourite activity in CACs*

51% surfing the internet, watching videos

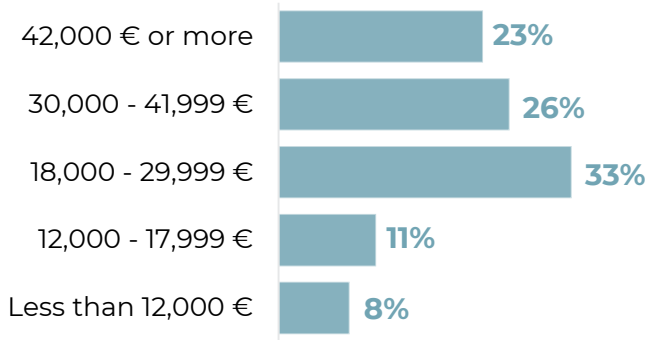
Gender and Age

49% Female
51% Male

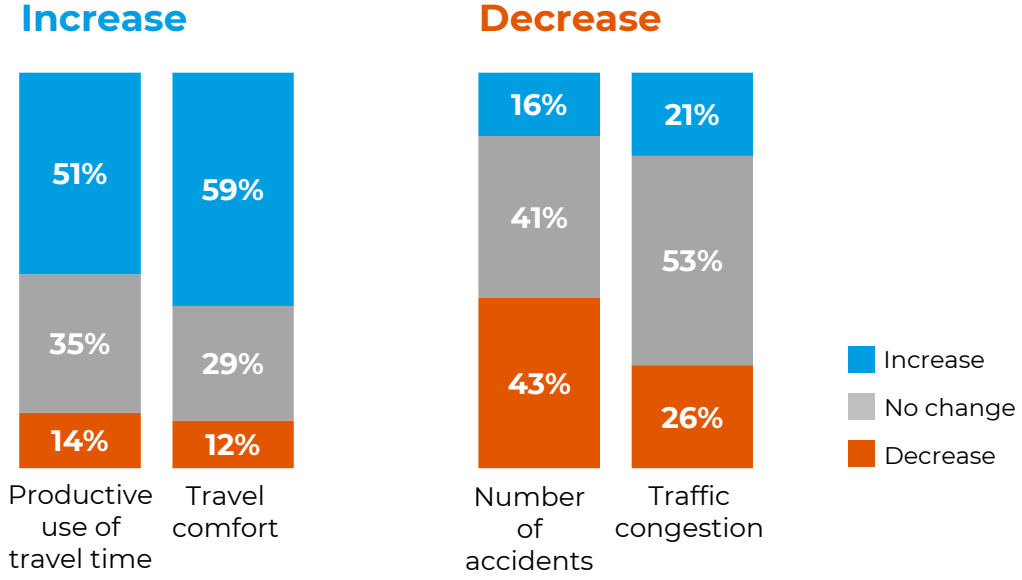


n = 1,074

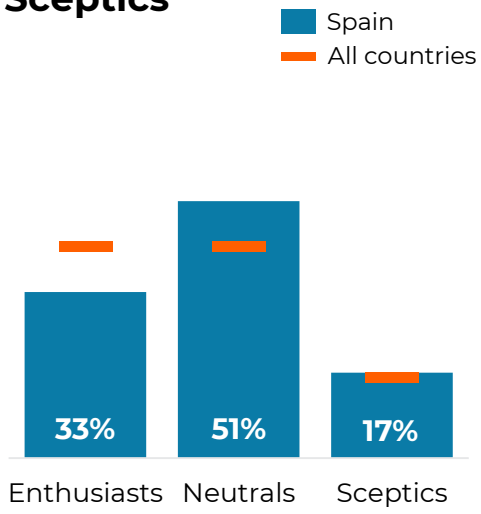
Yearly Gross Income



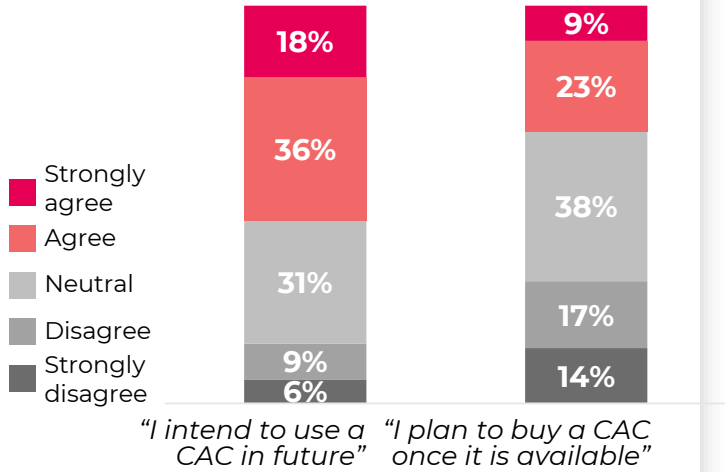
Expected impacts of using CACs



Enthusiasts, Neutrals, Sceptics



54% intend **to use** **32%** plan **to buy**



*Conditionally automated cars

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Dashboard: SWEDEN

Car usage

50% use their private car at least 4 times a week

Experience with ADAS

21% have and use Adaptive Cruise Control (**ACC**)

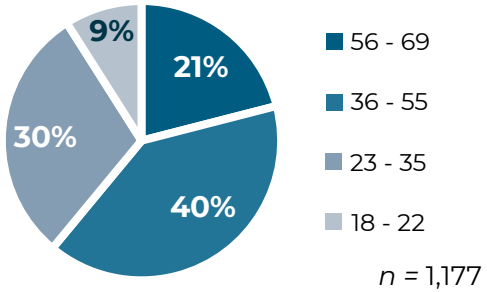
13% have and use Lane Keeping Assistant (**LKA**)

Favourite activity in CACs*

49% surfing the internet, watching videos

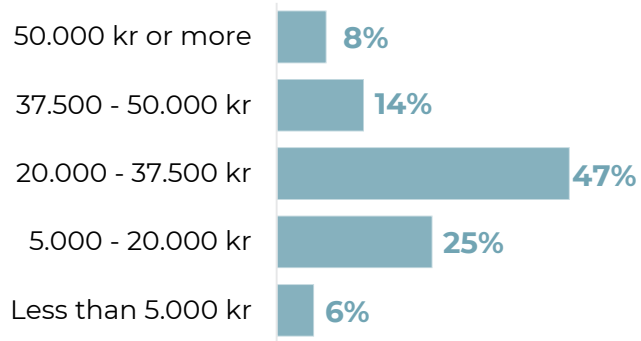
Gender and Age

48% Female
52% Male

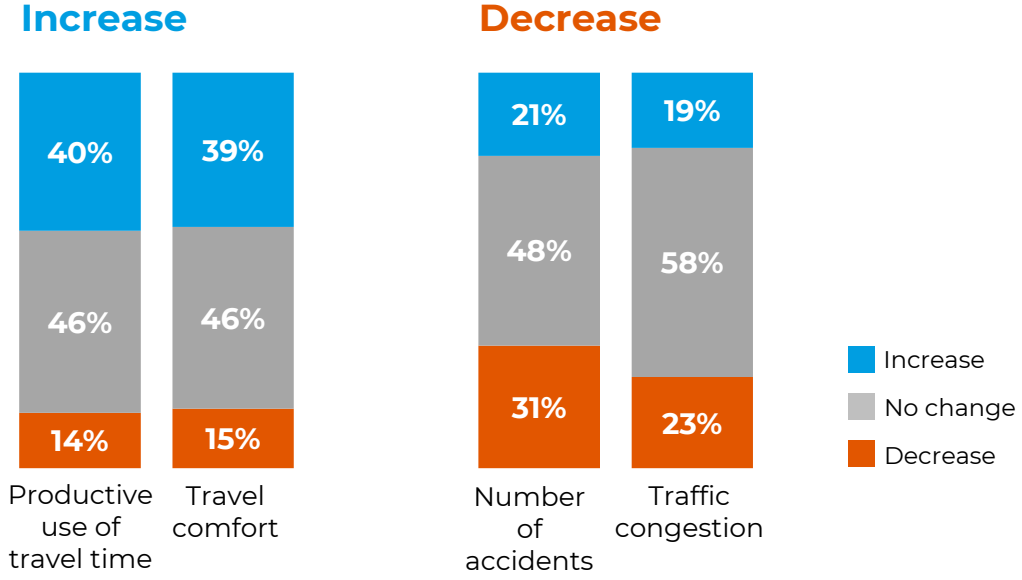


n = 1,177

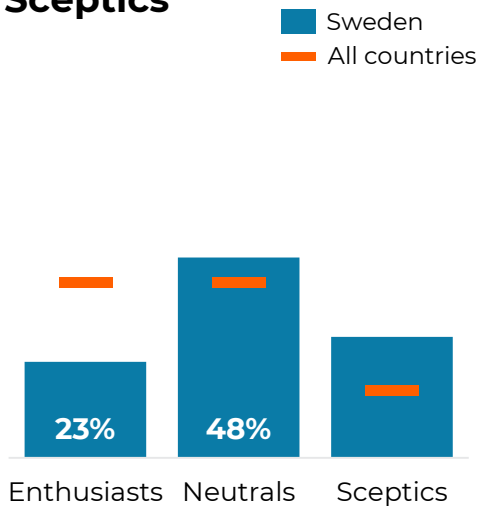
Monthly Gross Income



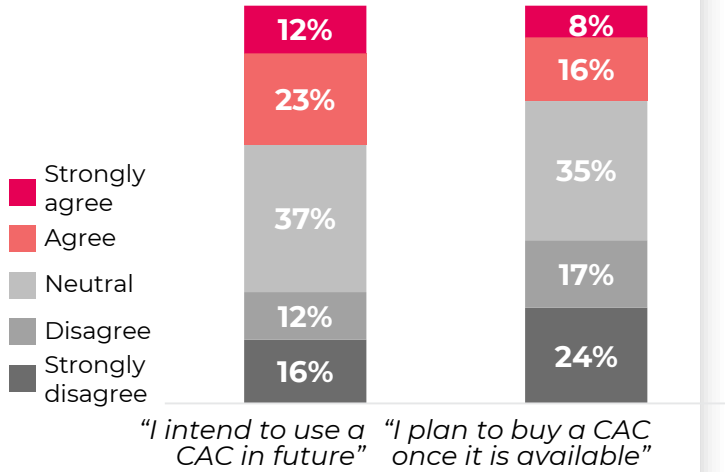
Expected impacts of using CACs



Enthusiasts, Neutrals, Sceptics



35% intend **to use** **24%** plan **to buy**



*Conditionally automated cars

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Dashboard: TURKEY

Car usage

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

Experience with ADAS

46% have and use Adaptive Cruise Control (**ACC**)

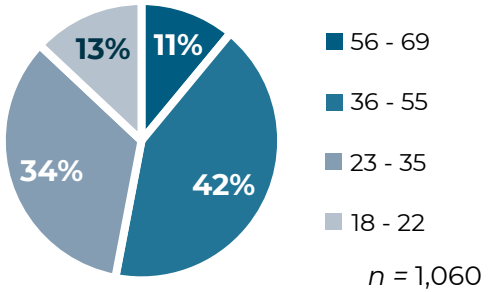
34% have and use Lane Keeping Assistant (**LKA**)

Favourite activity in CACs*

49% observing the landscape

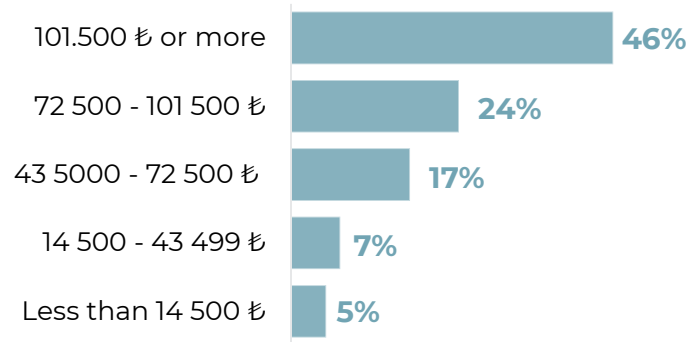
Gender and Age

50% Female
50% Male

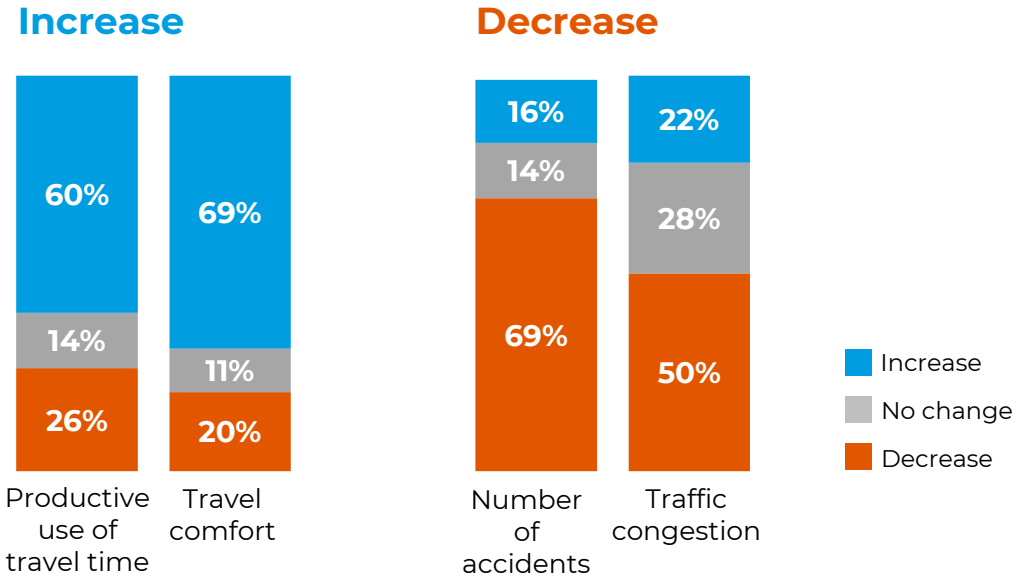


n = 1,060

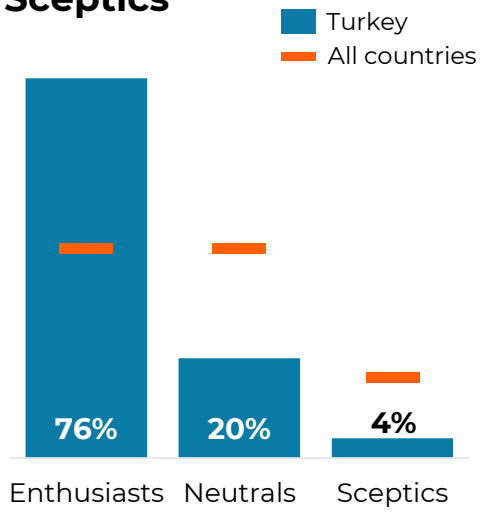
Monthly Gross Income



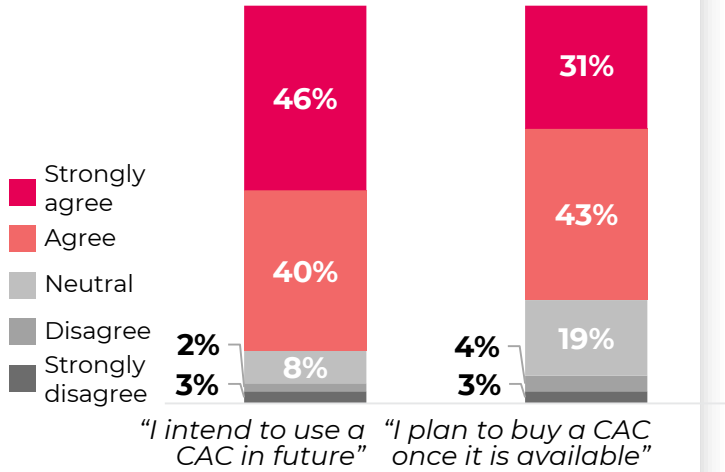
Expected impacts of using CACs



Enthusiasts, Neutrals, Sceptics



86% intend **to use** **74%** plan **to buy**



*Conditionally automated cars

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Dashboard: UK

Car usage

58% use their private car at least 4 times a week

Experience with ADAS

19% have and use Adaptive Cruise Control (**ACC**)

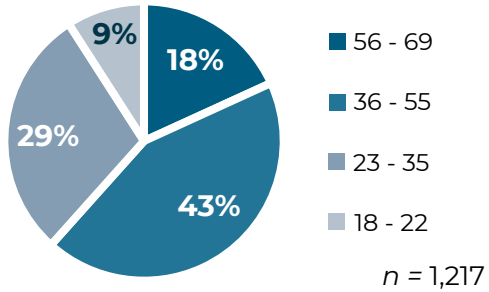
10% have and use Lane Keeping Assistant (**LKA**)

Favourite activity in CACs*

45% surfing the internet, watching videos

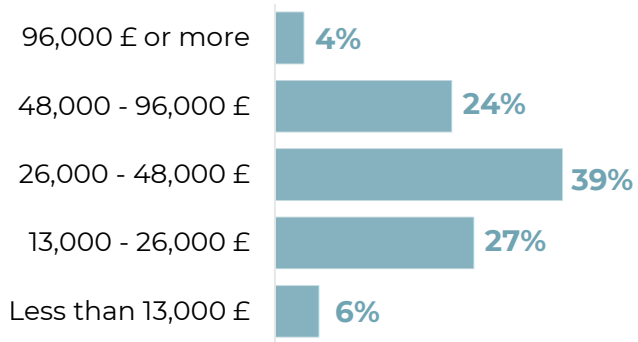
Gender and Age

51% Female
49% Male

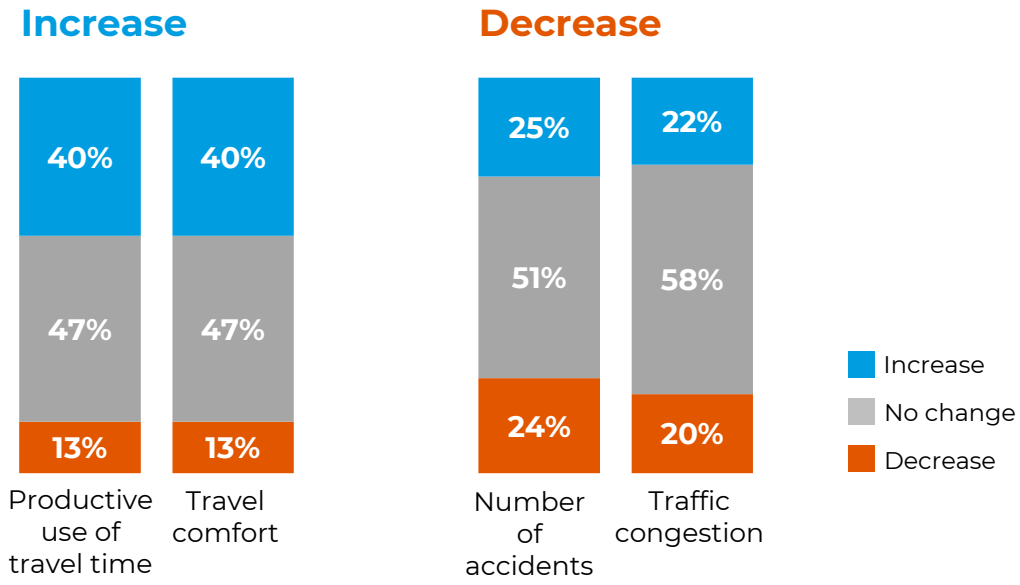


n = 1,217

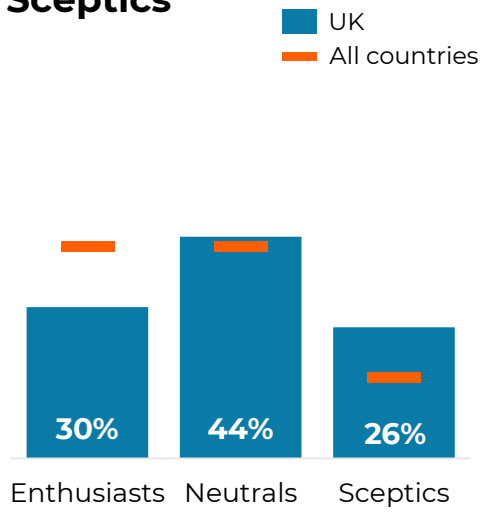
Yearly Gross Income



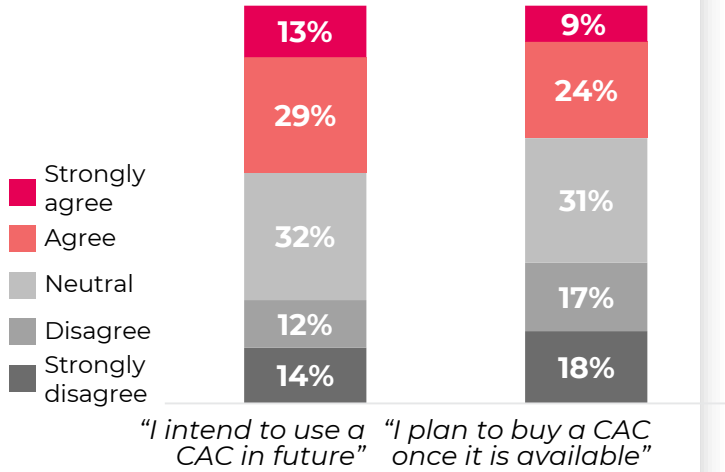
Expected impacts of using CACs



Enthusiasts, Neutrals, Sceptics



42% intend **to use** **33%** plan **to buy**



*Conditionally automated cars

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Dashboard: USA

Car usage

67% use their private car at least 4 times a week

Experience with ADAS

26% have and use Adaptive Cruise Control (**ACC**)

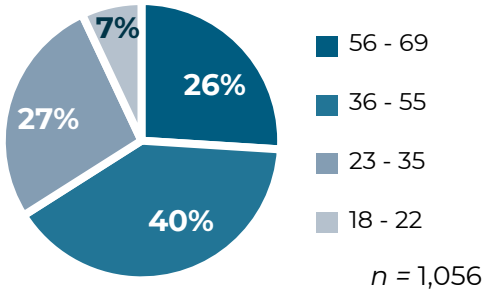
12% have and use Lane Keeping Assistant (**LKA**)

Favourite activity in CACs*

56% surfing the internet, watching videos

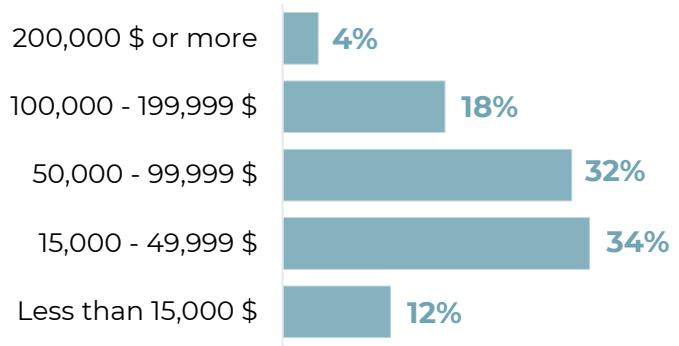
Gender and Age

52% Female
48% Male

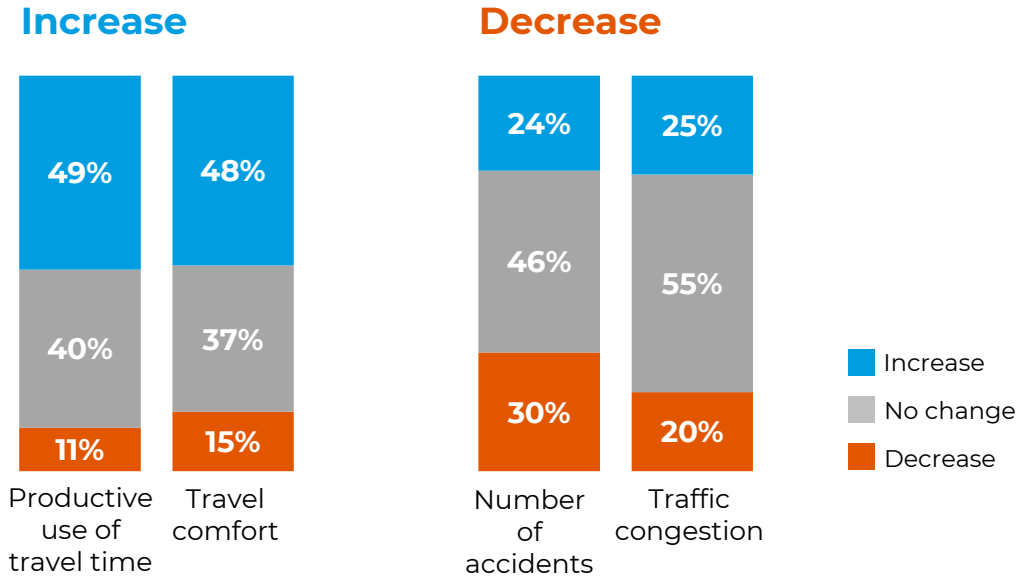


n = 1,056

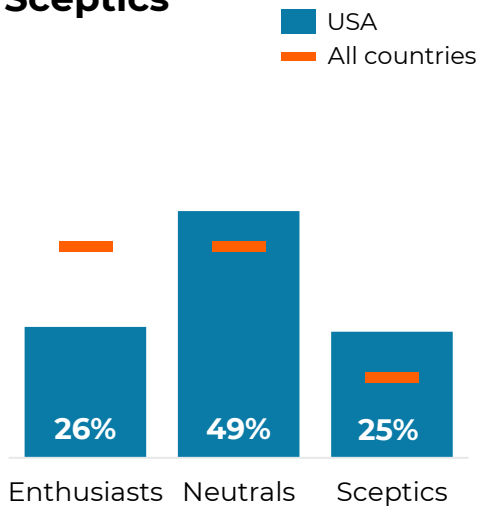
Yearly Gross Income



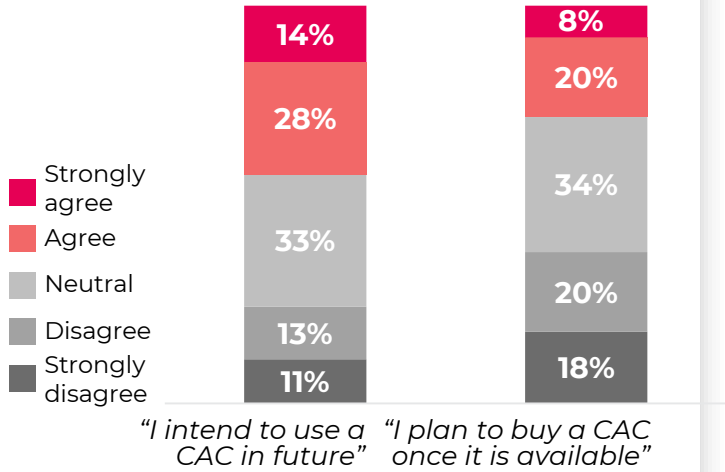
Expected impacts of using CACs



Enthusiasts, Neutrals, Sceptics



42% intend **to use** **28%** plan **to buy**



*Conditionally automated cars

© L3Pilot Consortium 2021. L3 User Acceptance Survey: Country Dashboard 17/17 "USA". www.L3pilot.eu. user-survey@eict.de

Summary of results

- **Frequent car usage ranging from 50% to 70% in all countries.**
  - High rate of car usage does not comply with high rate of ADAS experience.
  - Usage rate of Adaptive Cruise Control (ACC) and Lane Keeping Assist (LKA) is higher in emerging economies than in European markets.
- **General reservation towards buying L3 car. Intention to use L3 cars is higher than purchase intention.**
  - Purchase intention in emerging economies is twice as large as in European countries.
  - Emerging economies have larger proportion of enthusiasts. European countries have larger share of people being neutral and sceptical towards CAC.
- **Eyes-off road activities are welcome.**
  - Infotainment activities with highest attractiveness overall, but high rankings also for familiar and less attention intensive activities .

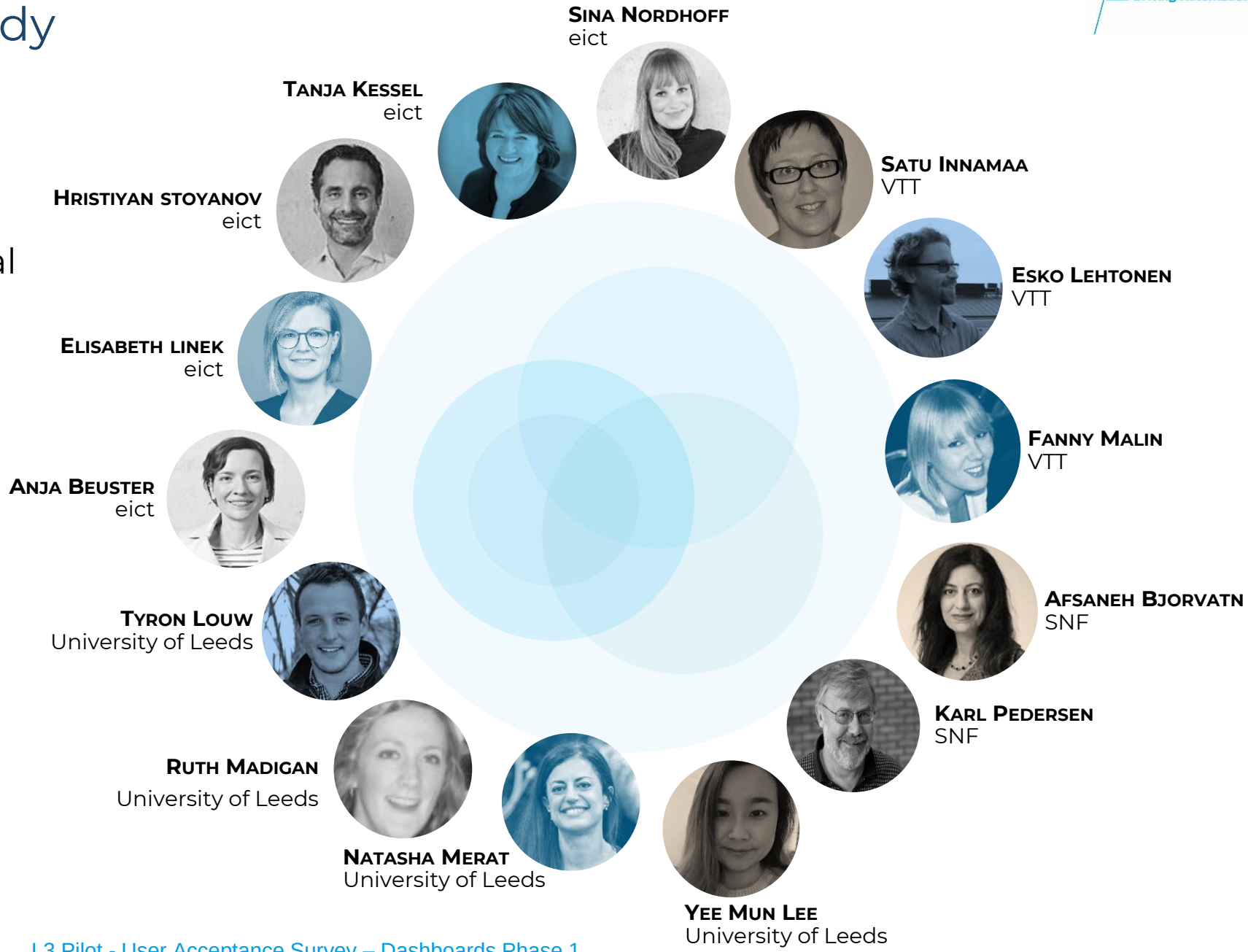
Summary of results

- **Relevant impacts of using CACs expected.**
  - High expectations about increases in the productive use of travel time and travel comfort. Moderate expectations regarding decreases in traffic congestion and number of accidents.
  - Emerging economies with higher expections regarding the impacts of CACs on people‘s personal mobility compared to European countries.

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.

Publications, further descriptive analyses and shared datasets can be found on the following websites:

https://l3pilot.eu/data
https://l3pilot.eu/downloads

Contact: user-survey@eict.de

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