Karlsruhe Institute of Technology

Institute for Technology Assessment and Systems Analysis

Social Acceptance of Automated Driving

Empirical Insights and First Lessons

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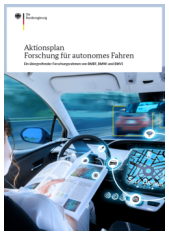
Recap: Why ‘Social Acceptance’ of CAD? (1)

- Technology projects are also social programs.
- CAD linked to “societal promises”. Usually four:
  - improve traffic safety
  - increase transportation efficiency (and contribute to the reduction of climate impact of transportation)
  - different (productive) time use while travelling
  - provide individual mobility options for currently excluded groups (elderly, people with impairments, …)
- Social Acceptance as a prerequisite for the adoption / diffusion of CAD technologies and services in order to fulfill these promises and have an impact.

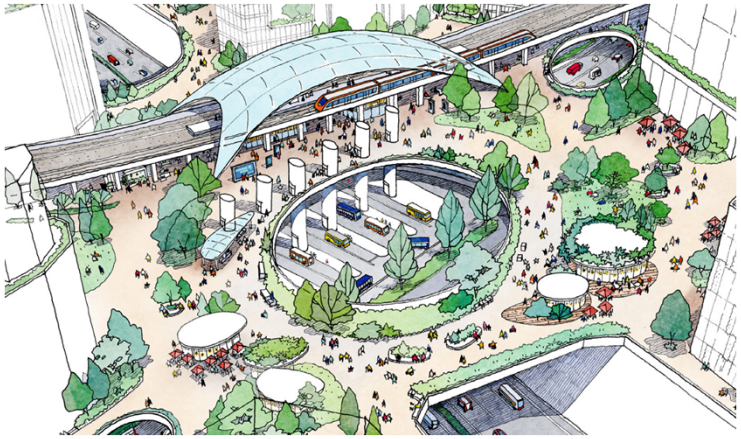


Recap: Why ‘Social Acceptance’ of CAD? (2)

- Public policy perspective: achieve related policy goals and avoid (potential, anticipated, …) societal conflicts
- Business perspective: achieve economic goals (new products and services, profits, avoid sunk cost, SLO/CSR,…)
- Ethics perspective: SA a metaphor for dealing with moral issues, value conflicts and acceptability
- Research perspective: Understanding all of the above (and more) and providing knowledge for orientation and action: structures and dynamics of sociotechnical change, conceptual and numerical models, empirical access,…

Innovation characteristics of CAD

- umbrella term for various automation concepts with different capabilities, ODD, performance and promises. Multidimensional
- aims at different concepts for mobility services (forms of ownership, business models, transport services)
- modifies an existing, highly regulated socio-technical system („conversion instead of construction")
- some incarnations aim at creating new institutions, or substantially reorganizing existing institutional arrangements → radical or transformative.
- adoption / diffusion require co-operation of multiple actors / actor networks
- different TRL, no widespread deployment (yet) → innovation actors negotiate expectations and imaginaries rather than actual everyday experiences



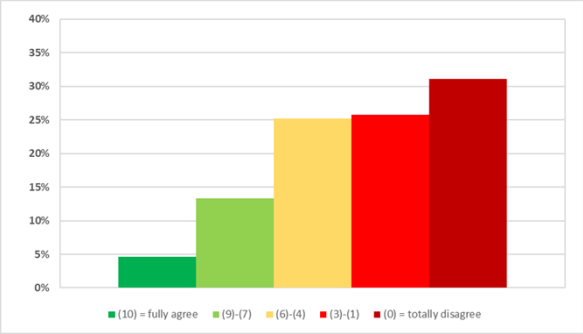
MLIT, 2040 Vision for Roads in Japan (2020)

Stuttgart 2035 (Daimler AG 2017)

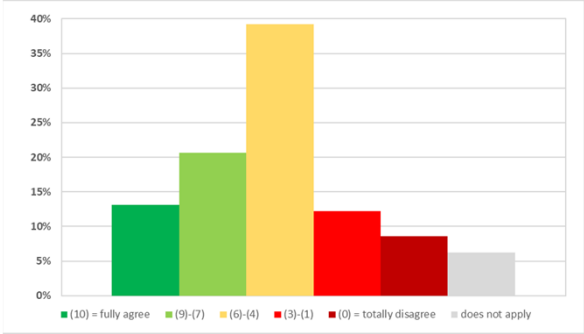
Cooper Hewitt, "The Road Ahead: Reimagining Mobility" © 2017 Bloomberg Philanthropies and NACTO

Technology Radar 2018 (field work Okt/Nov 2017)

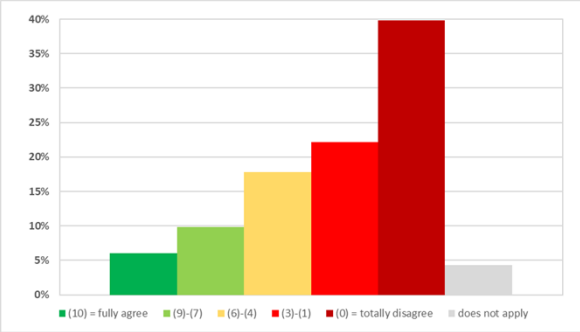
7.1.1 I have great confidence in the reliability of fully automated driving.
Ich habe großes Vertrauen in die Zuverlässigkeit des vollautomatischen Fahrens.



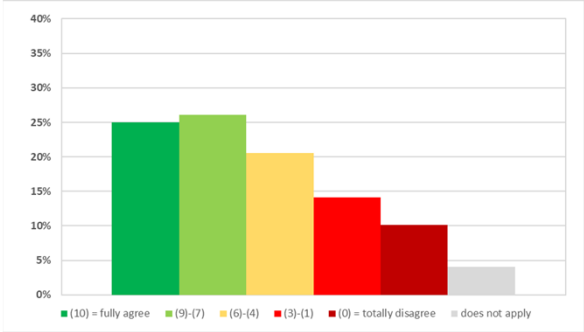
7.1.2 I can drive better than a computer-controlled car.
Ich kann besser fahren als ein computergesteuertes Auto.



7.1.8 In principle, I am ready to completely hand over my responsibility to a fully automated car.
Ich bin grundsätzlich bereit, meine Verantwortung vollständig an ein voll automatisch fahrendes Auto abzugeben.

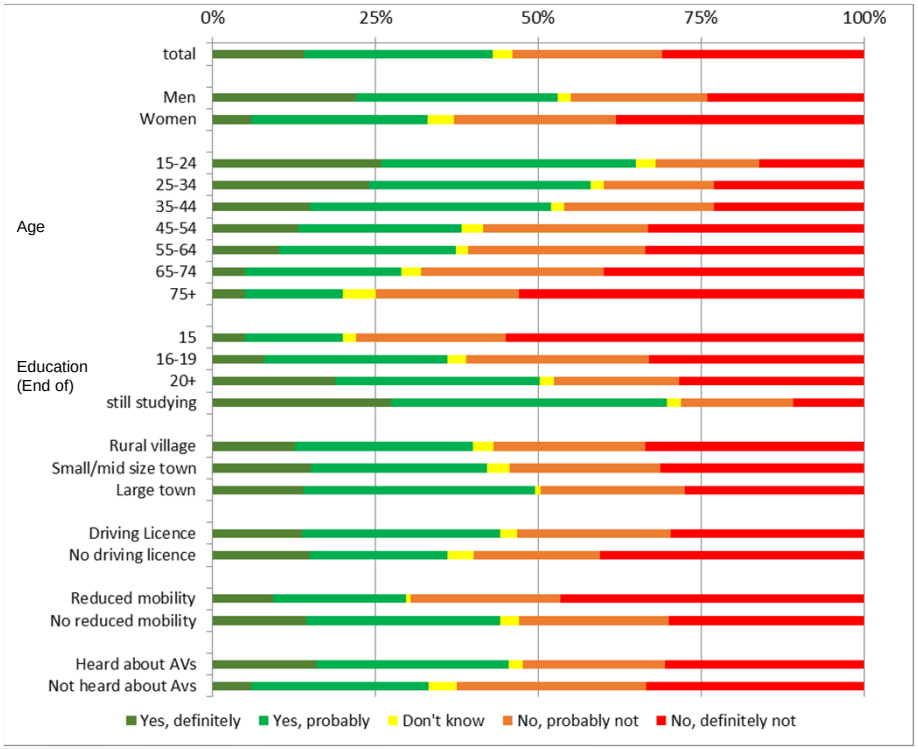


7.1.7 What will bother me about fully AVs is not being able to drive the way I want to.
An voll automatischen Fahrzeugen wird mich stören, nicht so fahren zu können, wie ich es gerne will.



Attitudes towards AV: Germany (field work Sept 2019)

QB17.1: If you had the opportunity, would you be ready to use the following vehicle types? A) Fully automated



Dataset: Eurobarometer 92.1

- Overall, the views are divided
  (Share of those who are skeptical did not change significantly over the last five years)
- More likely to say they would be ready to use:
  - Men compared to women
  - Younger respondents compared to older
  - Those who finished their education age 20 or older
  - Students compared to retired persons
  - Those without reduced mobility compared to respondents with reduced mobility

  (The first four points mirror well-known general patterns of attitudes towards new technologies)
- Only small (insignificant?) differences:
  - Subjective urbanization
  - Driving licence

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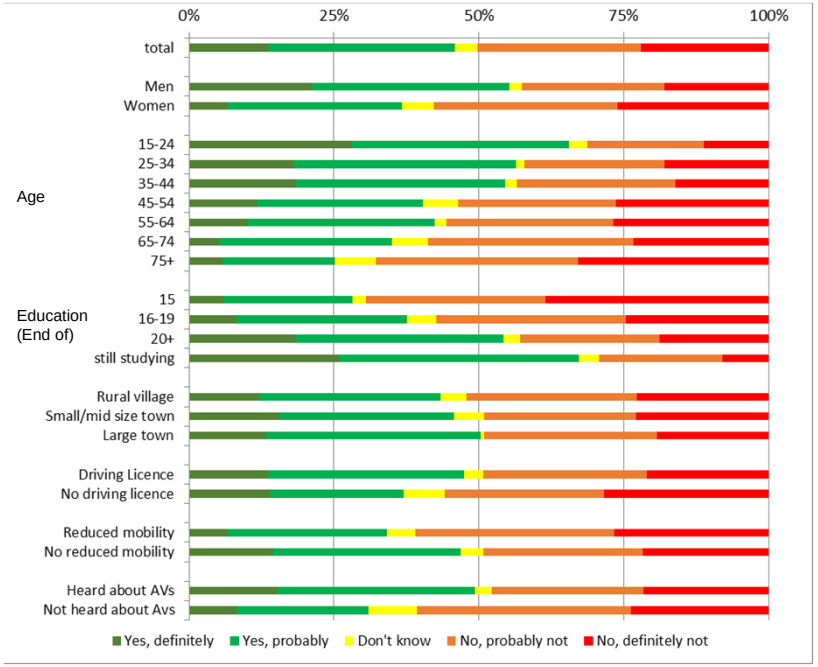
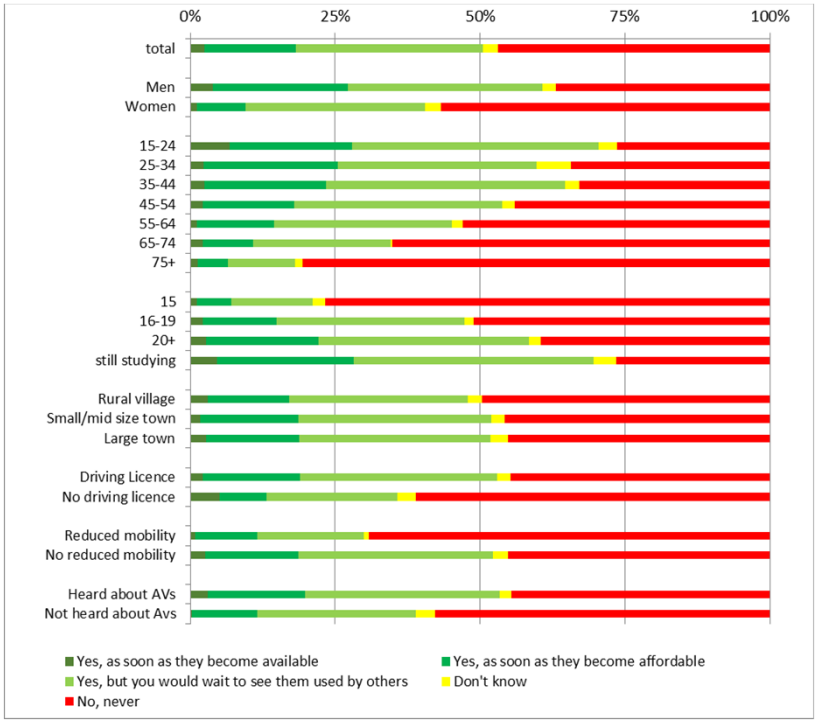
Patterns mirrored in similar questions

(Data for Germany, field work Sept 2019)

QB18.1: Please tell me to what extent are you in favour of or opposed to each of the following: The deployment of fully automated vehicles on our roads



QB13: Would you ever consider purchasing an automated vehicle?



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Specific to Germany? Rather not. (field work Sept 2019)

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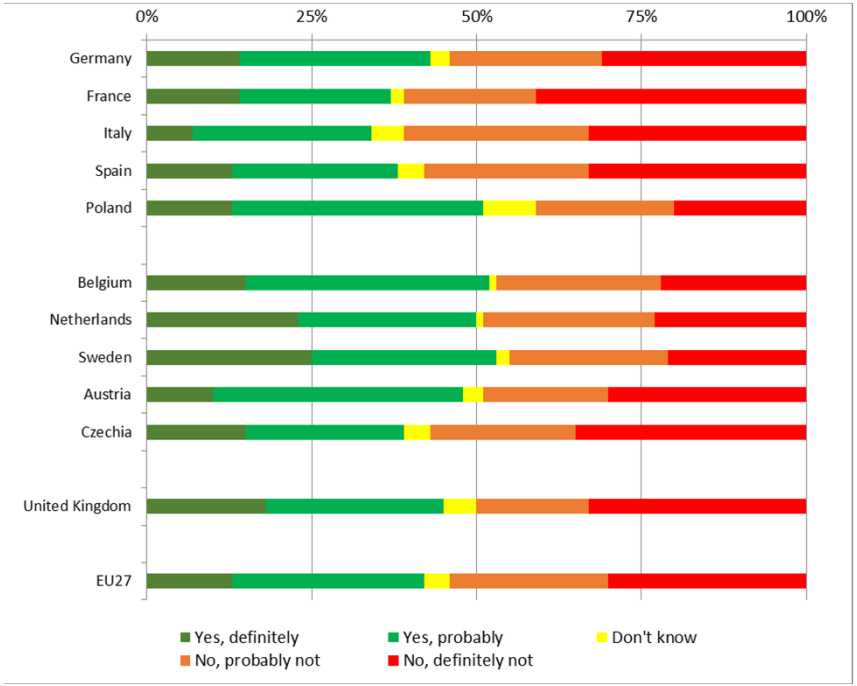

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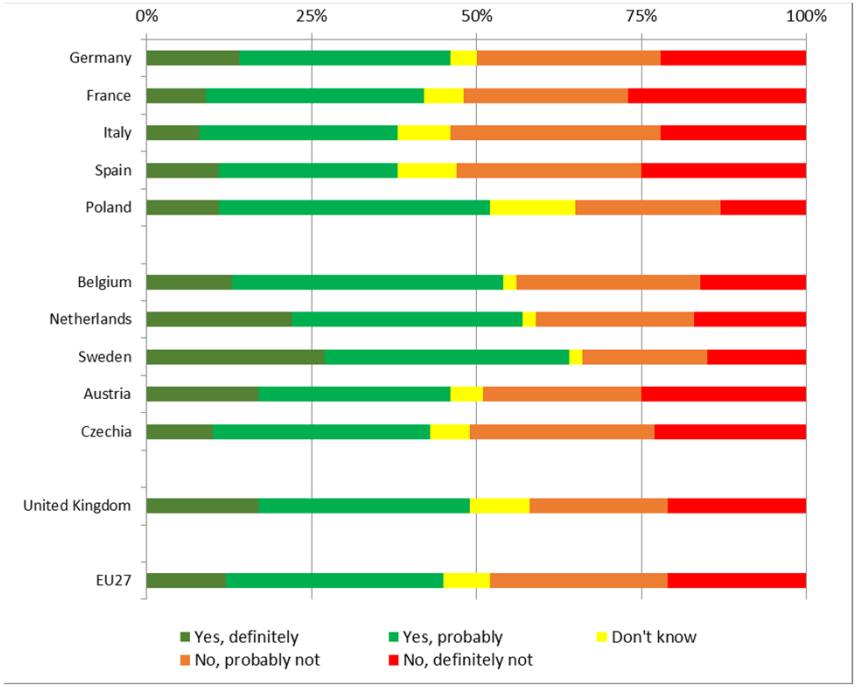

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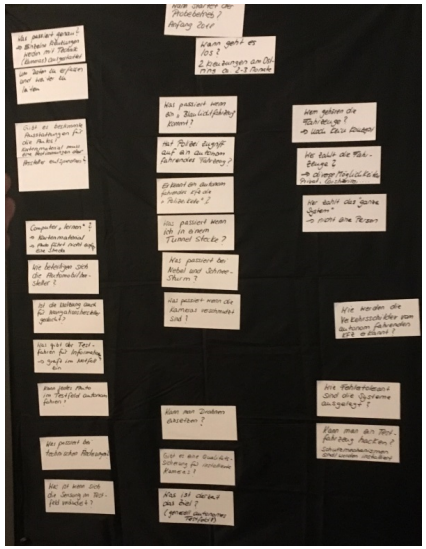
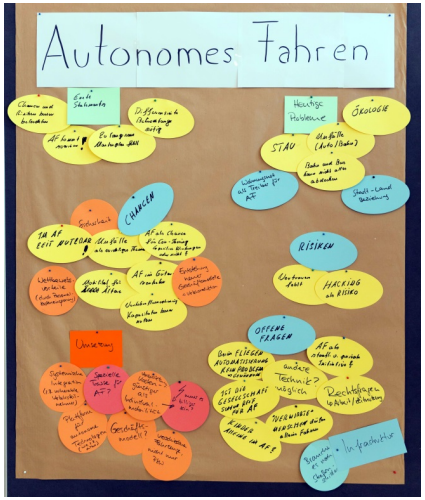
Complementary: Dialogue Events with Citizens

Citizens‘ Forum Testfeld AF, Karlsruhe 06.10.2017



Citizens‘ Dialogue Autonomous Technologies, Karlsruhe 20.10.2018

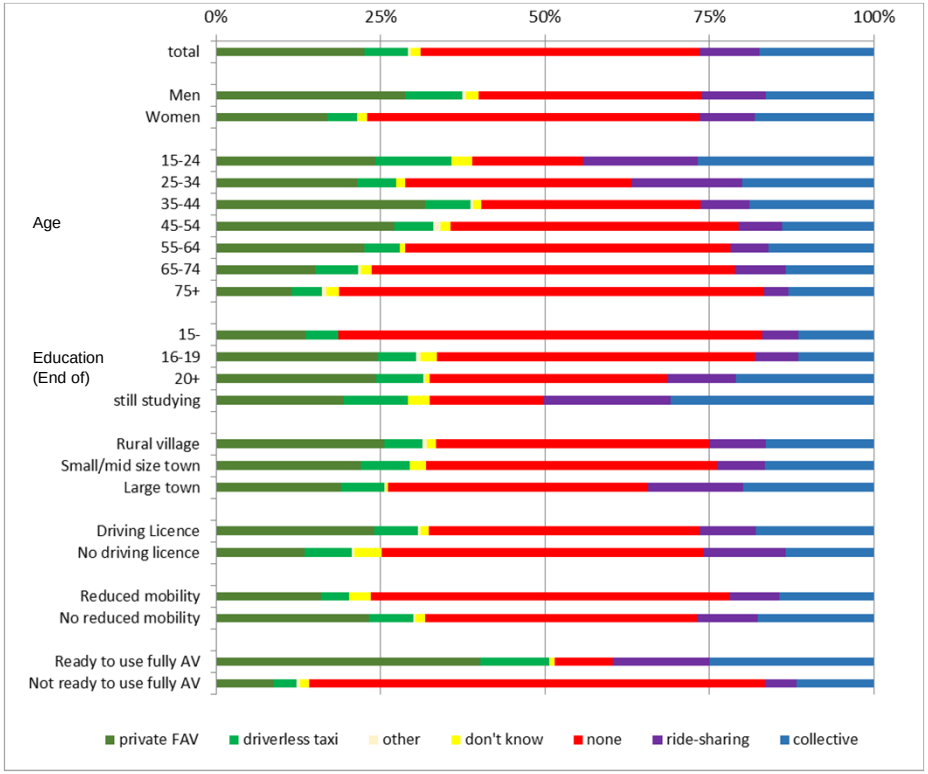


Citizens‘ Dialogue KIT Science Week, Karlsruhe 09.10.2021

Varietes of adoption reluctance and non-use

- Temporality? Short-term, long-term, permanent?
- Technology-related factors: safety/risk perceptions, trust, usability, privacy,…
- ambivalent expectations on situational behavior of mobile robots (a.k.a. AVs), including ‘ethical problems’ & moral emotions
- Service-related factors: design, cost, quality, integration into everyday mobility needs and habits, constrained user flexibility

AV Mobility Services Options: Germany (field work Sept 2019)



QB10: Thinking about fully automated vehicles, which of the following options would you consider will be *best* suited for your personal mobility needs?

Full wording of possible responses:

private FAV: privately owned fully-automated vehicle

driverless taxi: fully-automated vehicle that you can hire for your individual needs (e.g. driverless taxi)

ride-sharing: fully-automated vehicle shared with other people and used as a ride-sharing service (i.e. with a limited number of users)

collective: fully automated vehicle shared with other people and used as a collective transport service (e.g. automated public transport, mini bus service)

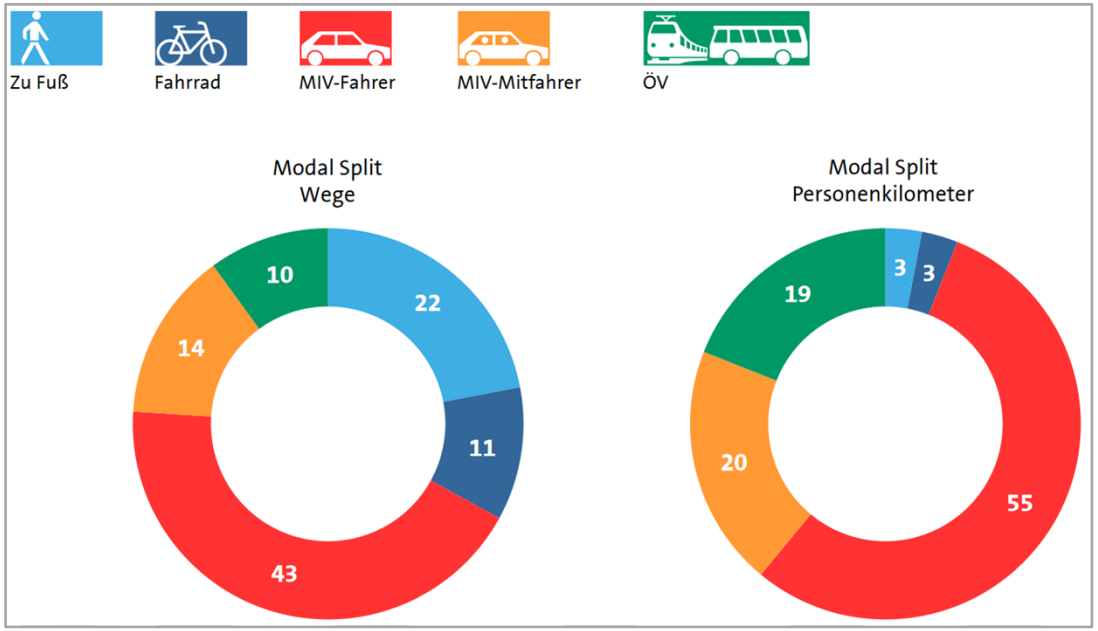
red: none of these

other: other options (spontaneous)

Dataset: Eurobarometer 92.1

Crosstab: Primary MoT vs. FAV best suited

	all	car with DL	urban public trans with DL	urban public trans w/o DL	private bike / scooter with DL	private bike / scooter w/o DL	walking with DL	walking w/o DL	other	all with DL	all w/o DL
Typically most often used mode of transport	100	57	7	5	12	2	6	4	5	86	14
FAV best suited for needs										49 57%	7 47%
privately owned FAV										21 42%	2 29%
hire for individual needs (e.g. driverless taxi)										6 12%	1 15%
FAV ride sharing (limited number of pax)										7 15%	2 27%
FAV collective (automated public transport)										15 31%	2 28%
None / other / DK										37 43%	8 53%



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Varietes of adoption reluctance and non-use

- Temporality? Short-term, long-term, permanent?
- Technology-related factors: safety/risk perceptions, trust, usability, privacy,…
- ambivalent expectations on situational behavior of mobile robots (a.k.a. AVs), including ‘ethical problems’ & moral emotions
- Service-related factors: design, cost, quality, integration into everyday mobility needs and habits, constrained user flexibility
- Lack of individual and collective experience with both new artefacts and new services based on them
- diverse mobility futures – AV imaginaries as representatives of alternative visions of “good life” in societies of tomorrow

First lessons for innovation strategies and research

- The introduction of CAD is a social program. SA needs to be better captured conceptually. More than user acceptance
- CAD will change socio-technical arrangements, either deliberately, as a consequence of its diffusion/adoption, or both. This will affect multiple actors.
- Actors are embedded on order structures in the social world. AD-induced changes in these structures should be anticipated, systematically mapped and analyzed.
- CAD technologies and services should be tested in real-world labs: inclusive, long-term, transparent, mission-oriented.
- Communities and society need time to familiarize, learn and build trust.
- CAD diffusion is embedded in broader policy contexts: climate change, livable cities, ageing populations, mobility-inducing structures. CAD needs to offer persuasive solutions.

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