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User Experience of Elderly People in a Highly Automated Shuttle

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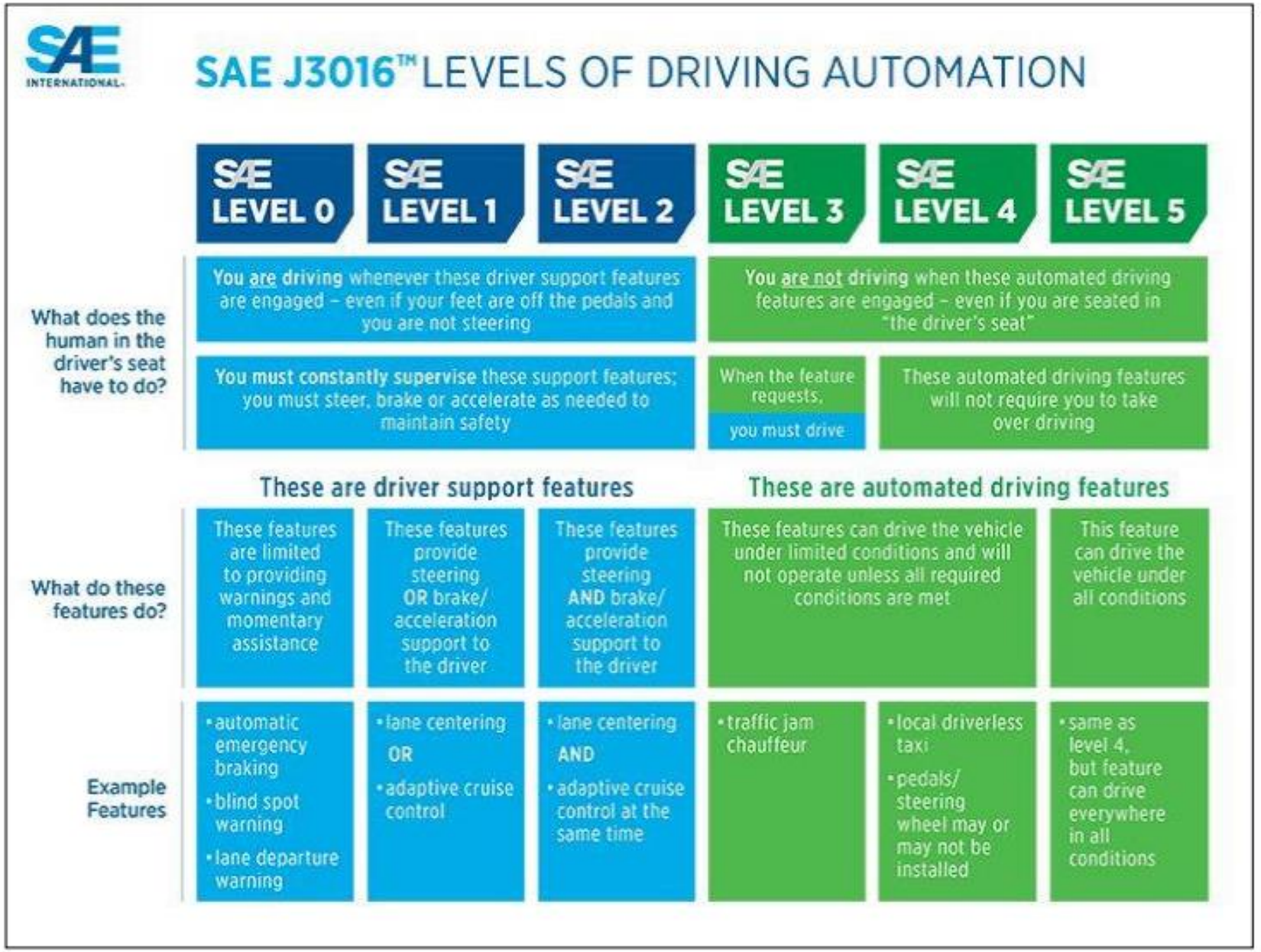
Introduction

- The increase in popularity of the concept of smart cities has promoted several efficient and clean modes of mobility such as cycling, public transport, electric vehicles and walking.
- Several cities are shifting their citizens dependence from private vehicles to public transport.
- Due to several advantages, Autonomous Vehicles (AV) as a means of public tranport is gaining popularity among city admnistration, transport providers and the automobil manufacturing industry.
- Autonomous Shuttles (AS) is a kind of AV which is currently being widely tested across the globe as a future means for public transport.

Level of Autonomy

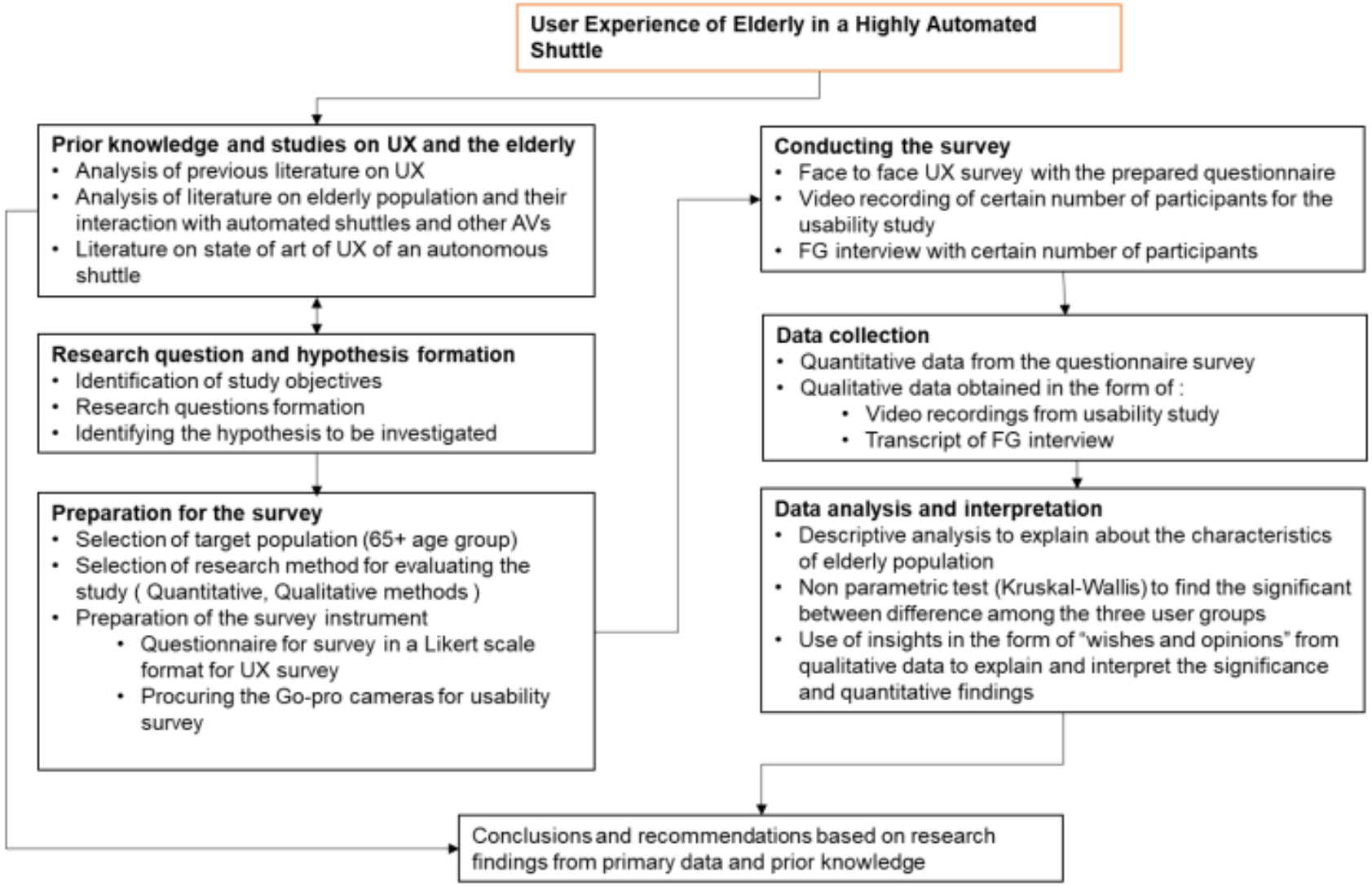


Ref: SAE J3016

Study Area

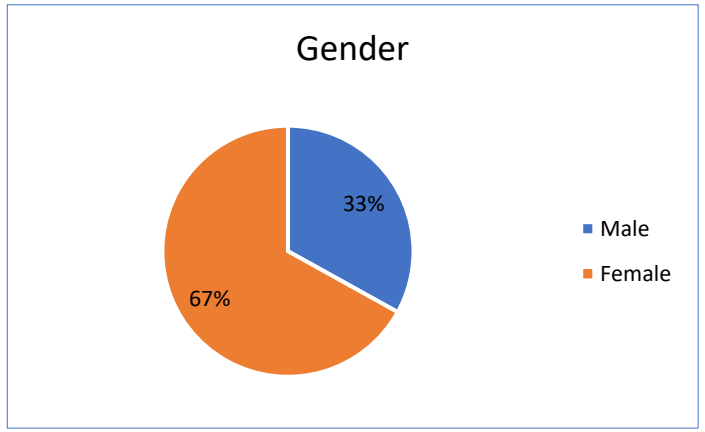
- Alt-Tegel lies in the Reinickendorf district of Berlin
- Area : 33.7 Km2
- Population : 36,986

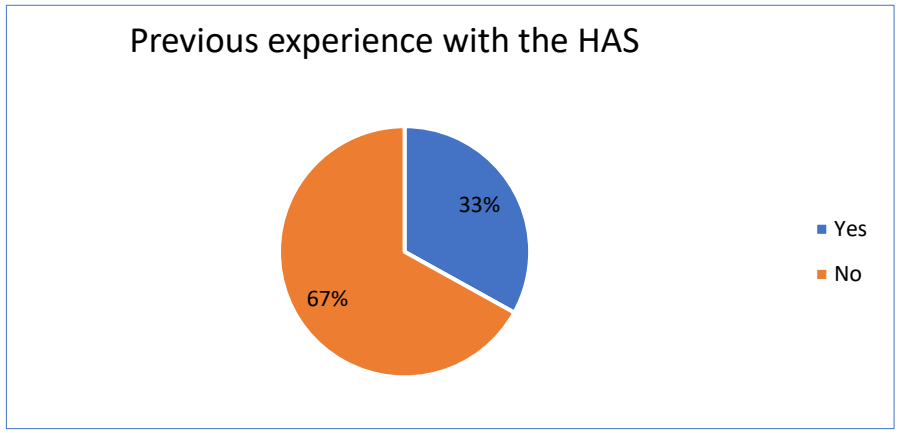
Research Design

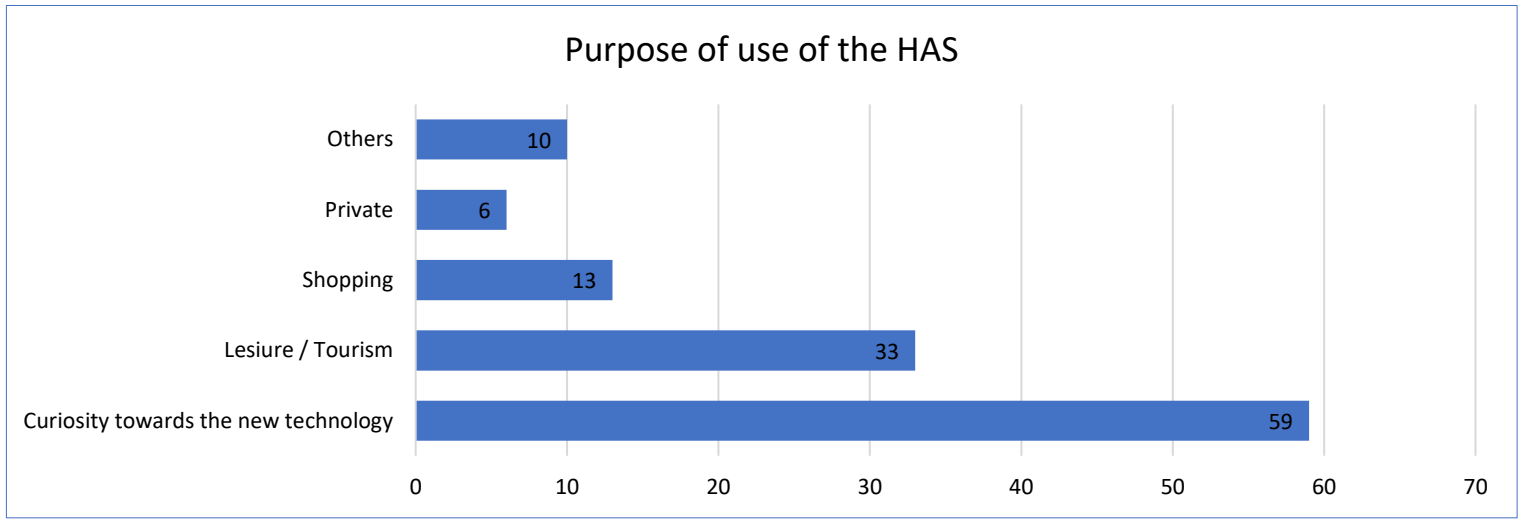


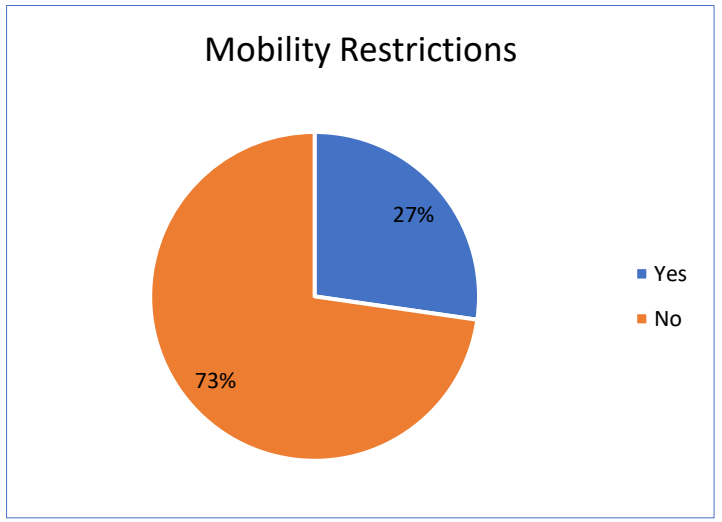
Sample Size Description

Elderly population (65+), n = 121

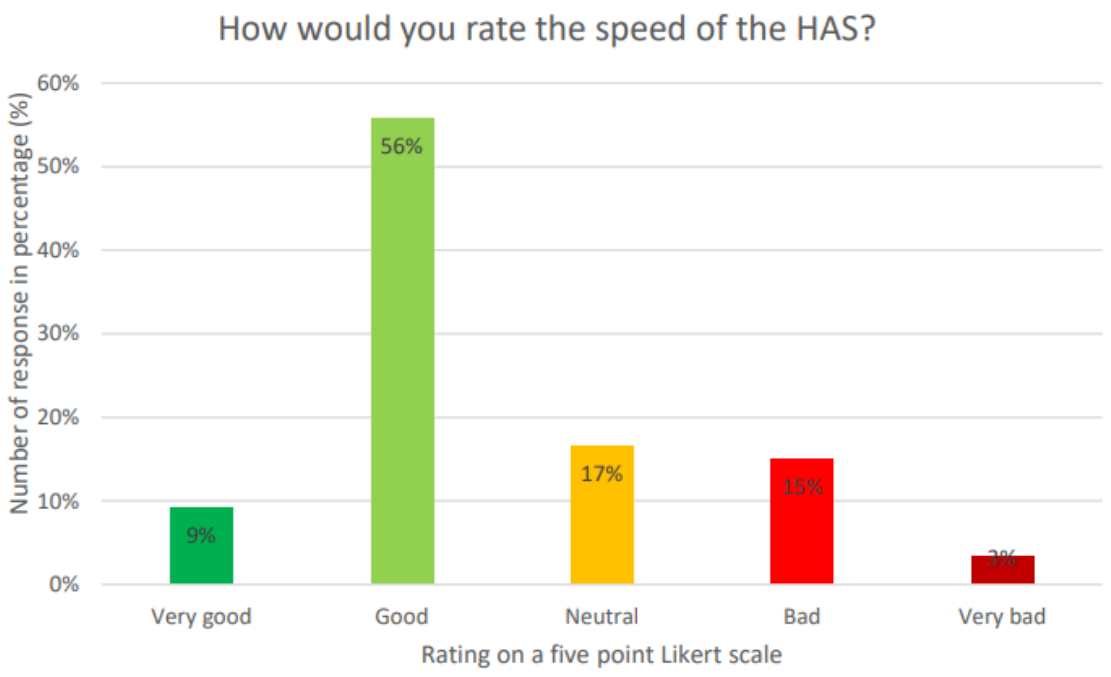


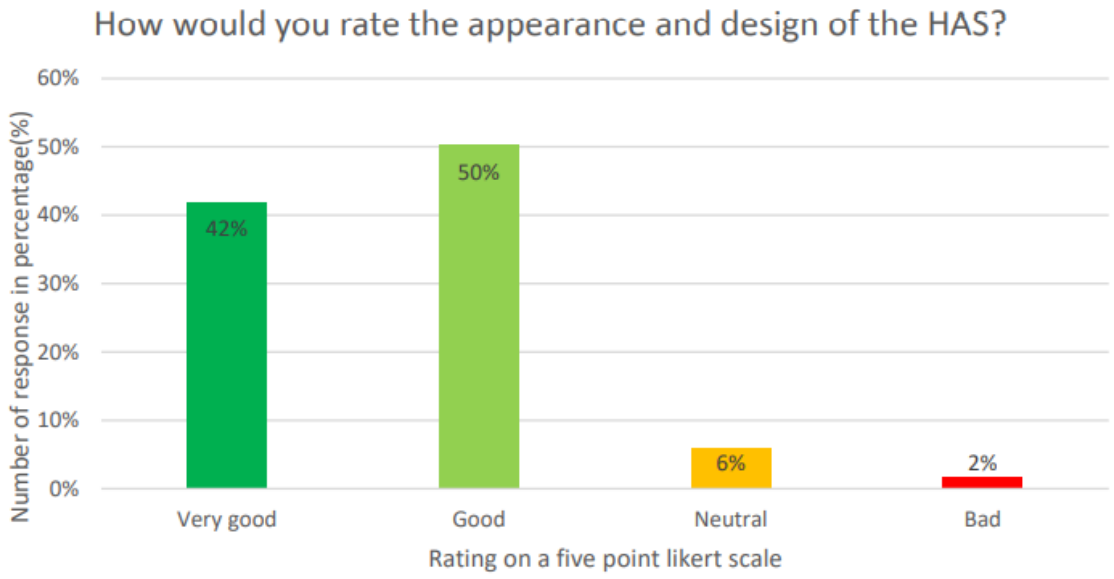




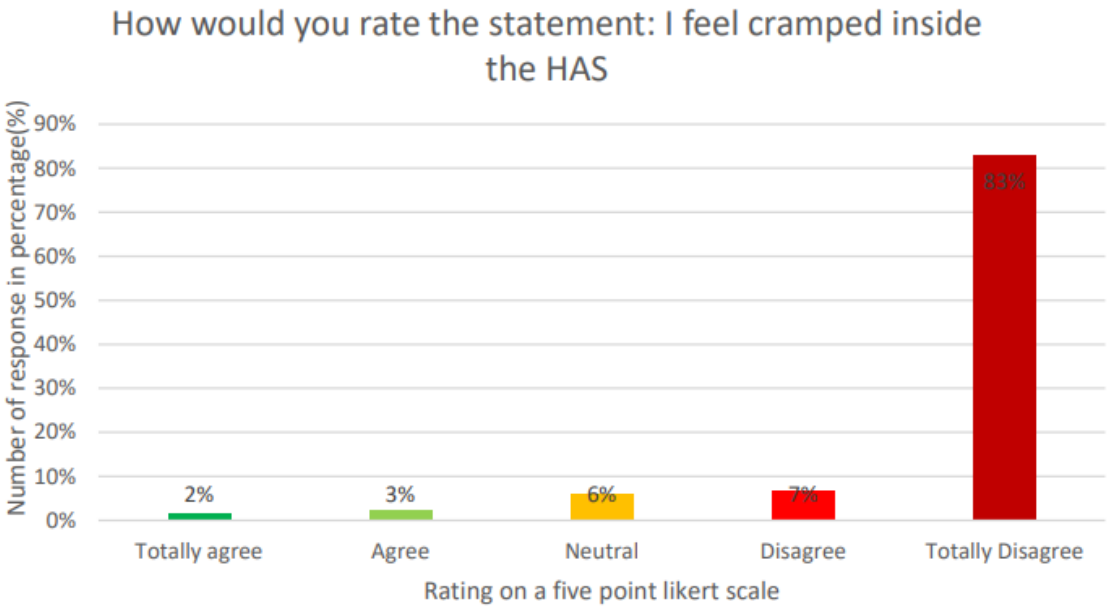


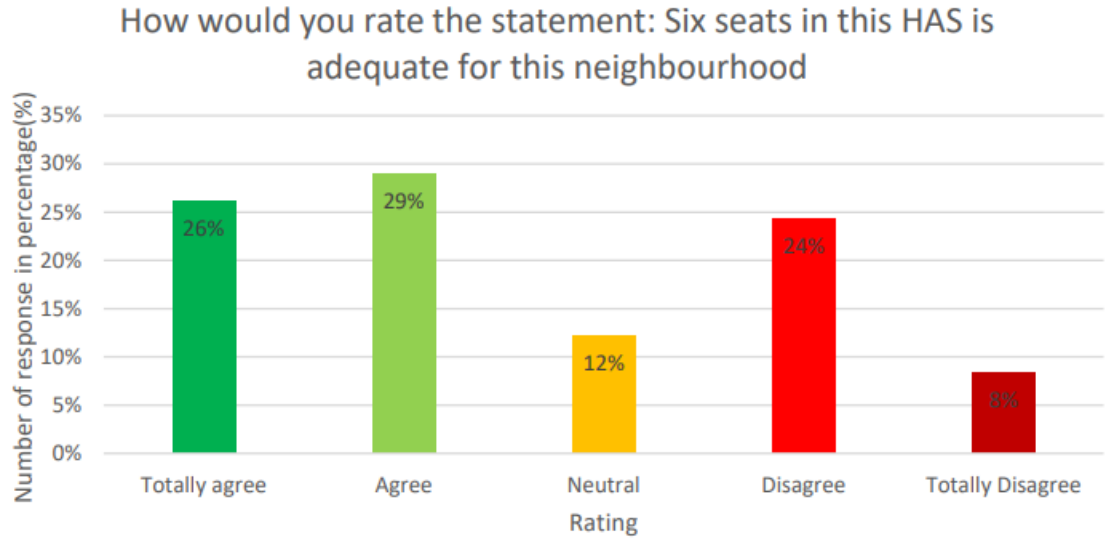
Attractiveness & Comfort



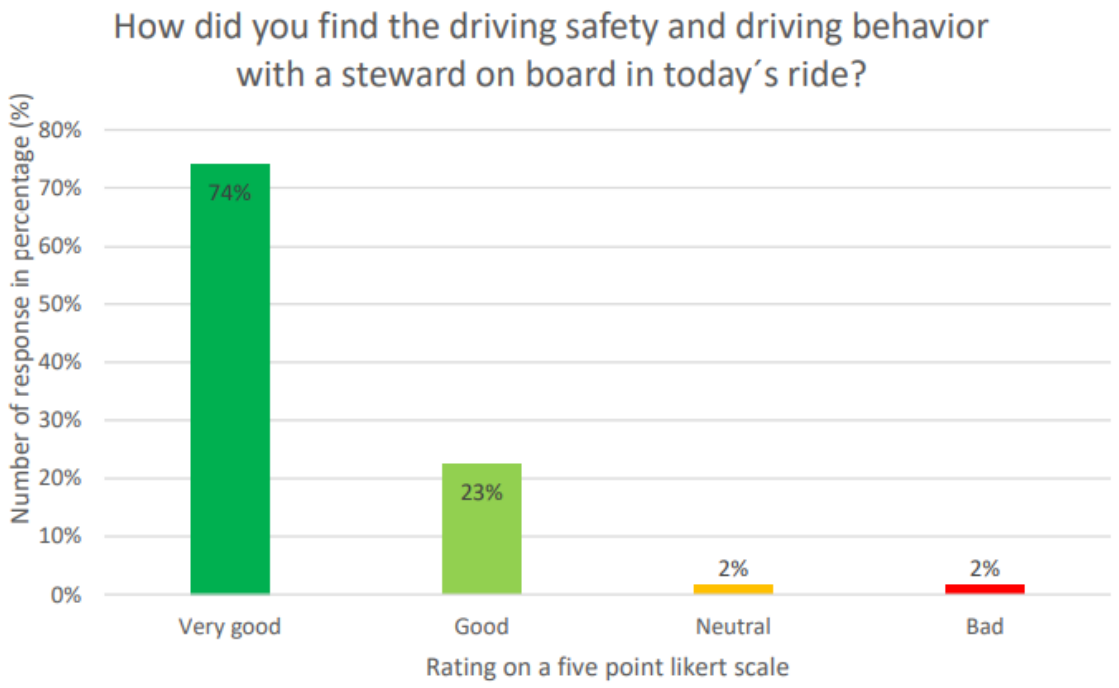


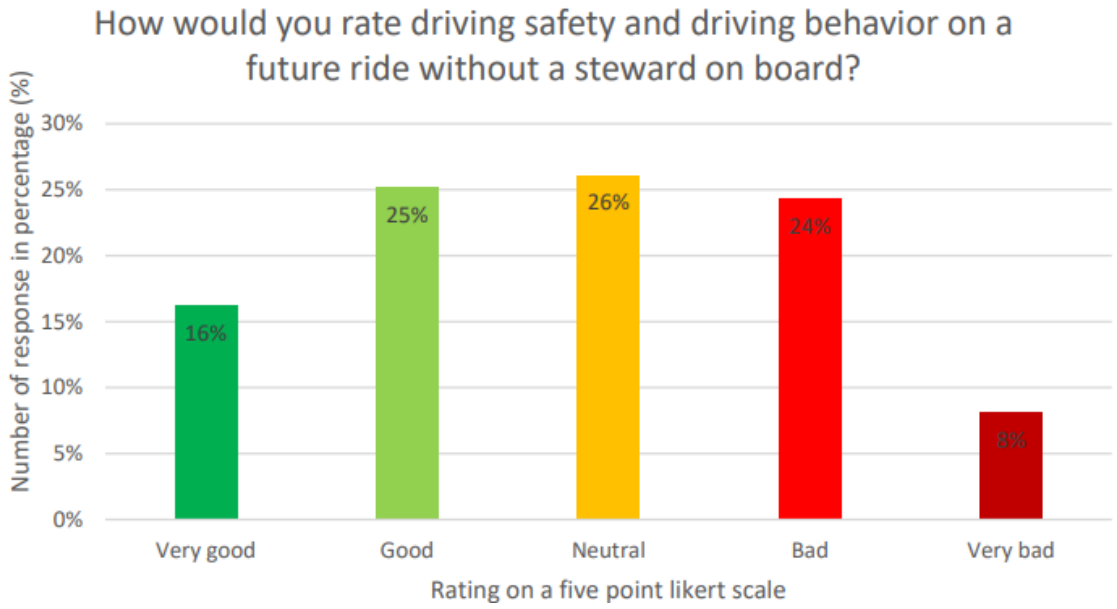
Attractiveness & Comfort





Trust & Security





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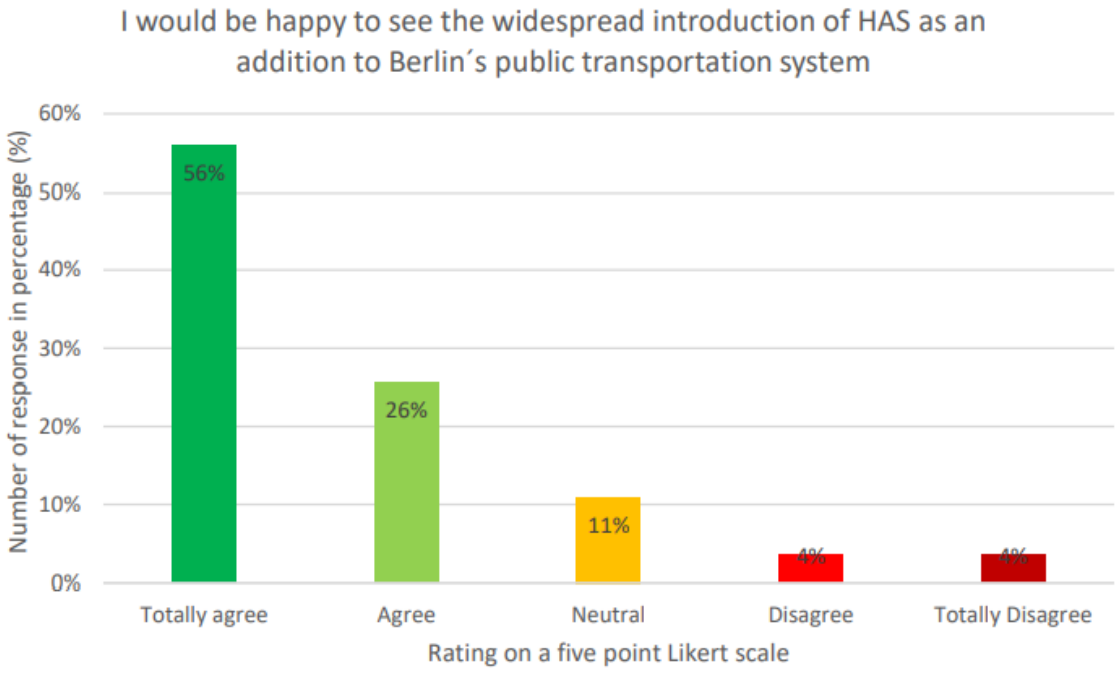
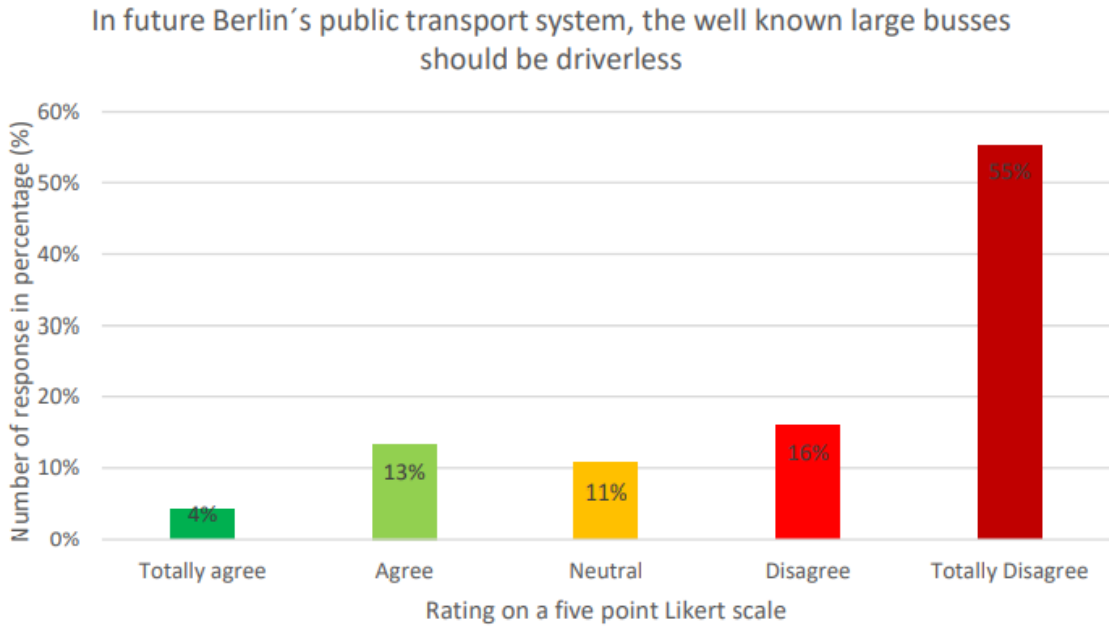
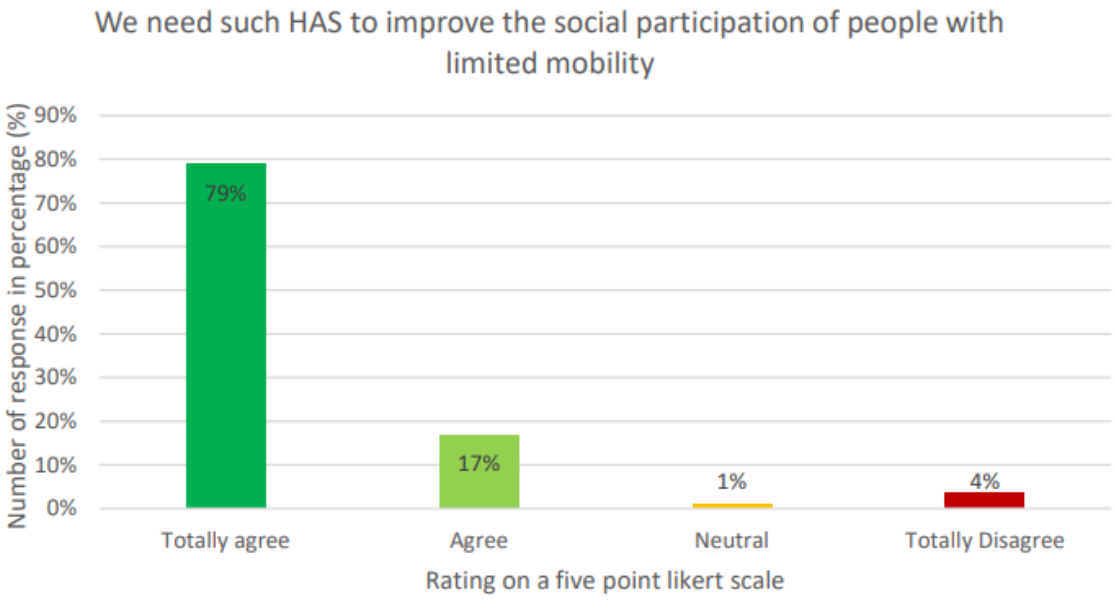
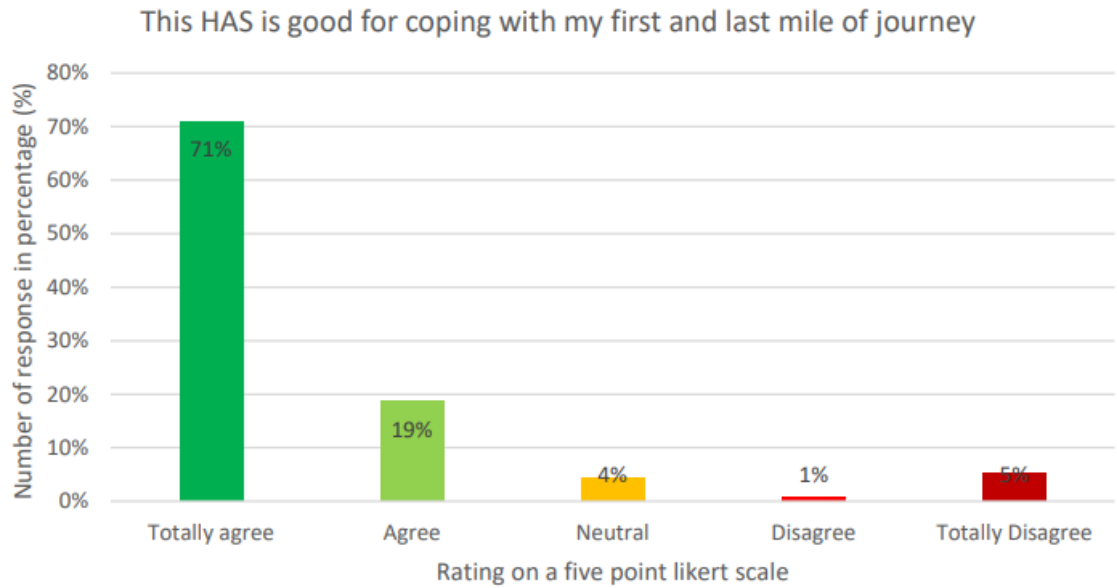


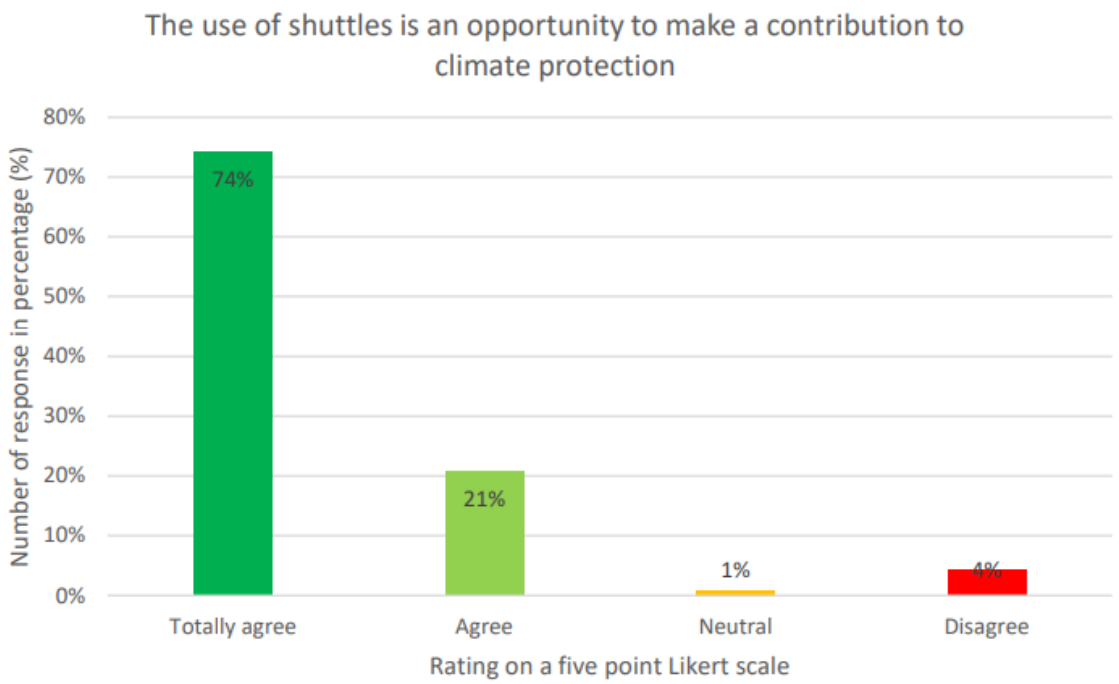


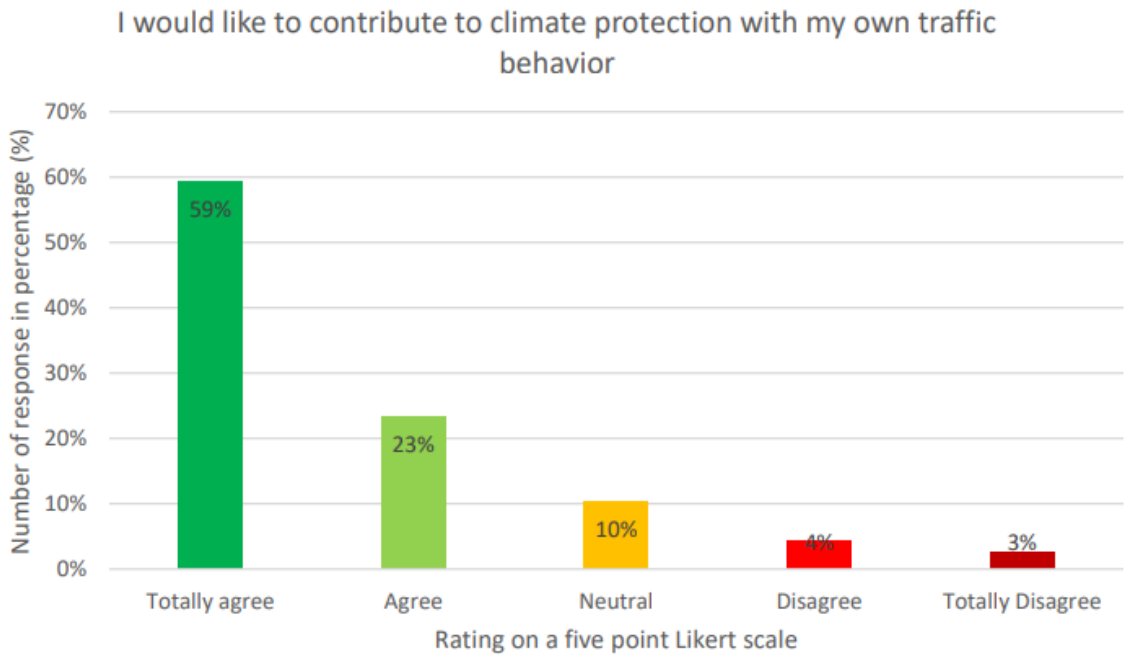
For First and Last Mile …..





Environment friendliness





Inference Among the three age groups

Items	Respondents (n)	H	Significance	Effect size
Comfort				
How would you rate the level of convenience in the shuttle?	237	15.428	<0.01	0.06 (Moderate)
How would you rate this statement: I feel cramped inside the shuttle	237	6.128	0.047	0.02 (Small)
Trust and Security				
How would you rate the driving safety and driving behavior in the highly automatic shuttle in future ride without a steward onboard?	225	11.018	0.004	0.04 (Small)
Driverless vehicles in Berlin´s public transportation system should get along without a steward on board	228	7.697	0.021	0.03 (Small)
I would be happy to see the widespread introduction of driverless shuttles as an addition to Berlin´s public transportation system	225	9.71	0.008	0.03 (Small)
In future Berlin´s public transport system, the well-known large busses should be driverless	227	35.102	<0.01	0.15 (Large)
Perception towards the autonomous shuttle				
This shuttle is good for coping up with my first and last mile of journey across	228	18.871	<0.01	0.07 (Moderate)
We need such shuttles to improve the social participation of people with limited mobility across	227	7.515	0.023	0.02 (Small)
The use of shuttles is an opportunity to make a contribution to climate protection	231	8.318	0.016	0.03 (Small)

Recommendations

- The innerdesign elements such as **seats**, **holding bars**, and small **size** of the shuttle should be adressed
- The design elements which directly affect the mobility restricted people such as **seat belts**, **control buttons** and **information screen** should be made easily acessible
- looking at the physical condition of the elderly **height of seats** should be raised by some centimeters so that they do not have to be seated low, which causes pain to the knee joints.
- The **control buttons** should be provided on both the extreme seats so that a person does not have to get up and press the button before arriving at the stop.
- Feeling of security and trust could be increased by providing a **drivers view** to the passenger, **dedicated communication line** with a **remote safety personnel** and encouraging more **public participation** during test trails of these shuttles

Conclusion

- Overall, the elderlies found the HAS **comfortable, attractive, easy** and **useful**.
- A few design issues were raised by the elderly, which, if addressed with care, could increase the level of convenience of the HAS.
- The elderlies showed comparatively high level of **trust** and **security** towards the HAS with a steward on board than **without** an onboard **steward**.
- The elderlies are still not ready to embrace a fully autonomous vehicle as public transport.
- The elderlies find HAS to be a good means of transport for their **first and last mile** journey and a means of social inclusion for mobility restricted in the society (with the steward onboard).

Thank you

Kontakt :

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