Enhancing Accessibility and Safety in Automated Public Transport

Insights from Focus Groups in Germany

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Introduction

Passengers with special needs: 16% of the global population live with some form of disability (WHO, 2023), more than 20% of inhabitant of EU countries > 65 years old (Statista, 2025), Tourism in Europe steadily increases (Statista, 2024),

Barriers include accessibility such as inadequate space for devices, crowd-induced inaccessibility, non-standardized seating configurations, too steep lifts and ramps, lack of announcements (stops, route information), lack of tactile and auditory aids (e.g., Golbabaei et al., 2024; Mathé et al., 2024)

Design recommendations for doorways, ramps, seating, securement system, interior layout, interfaces (e.g., Golbabaei et al., 2024) are quite general

Automated Public Transport Vehicles (APTVs) can enhance quality of life for persons with special needs, acceptance of APTVs is often low (Kassens-Noor et al., 2021)

Focus on more concrete cases to identify needs, concerns or problems of passengers to increase safety, comfort, and acceptance of APTVs and gather solutions from different passenger groups with special needs

Method

4 focus groups à 2 – 2,5 h

- 15 participants, 7 female, 8 male; aged 24-75 years
- Wheel-chair user (1), visually impaired passengers (3), representatives of public transport operators (2), representatives of organizations for people with different disabilities (3), Elderly (2), tourists (4)

3 scenarios:

- onboarding
- abnormal situations
- passenger distribution

Concerns, problems conventional, automated driving (AD)-specific
Suggestions for solutions

Results (see Figure 1)

Suggestions for solutions

- **Proposals** based on problems and concerns
- **Automated ramps** (button press, automated triggering); support for boarding if designated area is occupied, with a priori reservation
- **Color-coded** doors for entry or station information on floor; app-based **guidance system** to aid orientation
- **Automated announcement** for line and destination
- **Adaptive dwell times** for passengers with limited mobility or vision
- Clear AD Status information for passenger (no driver will join)

- **AI-driven detection and automated response** to vandalism, harassment, and medical emergencies
- **Unified emergency system** with clearly labeled buttons, tactile markings, and video transmission for reassurance to central control + standardized emergency procedures and clear, loud announcements

- Color-coded traffic light system indicating **occupancy status** of wagons at the station, in the vehicle, and within an app
- **automated announcements** for optimized passenger and seat distribution

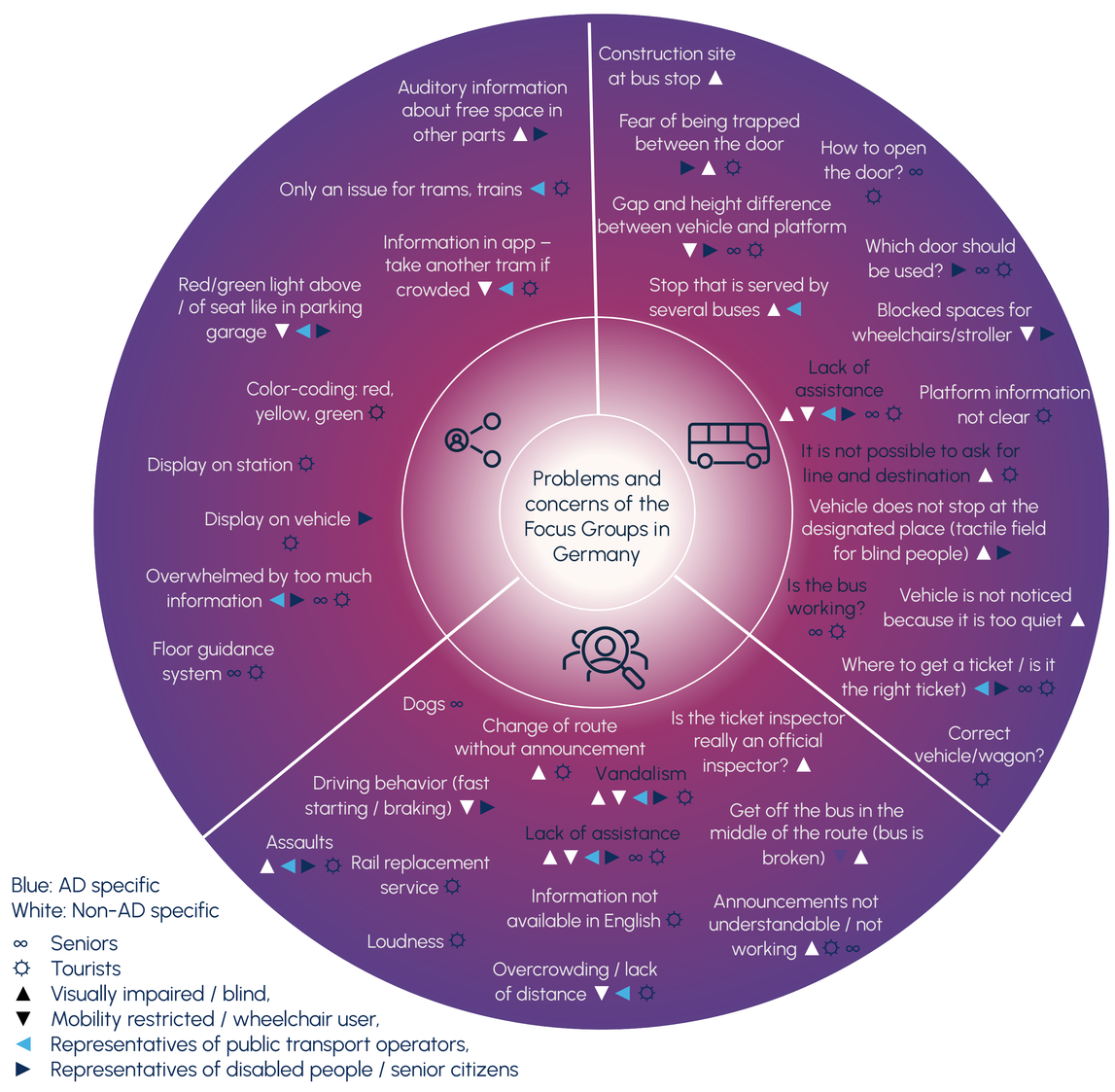

Figure 1. Problems and concerns for different passenger groups in the different use cases

Discussion

Passengers' concerns and solutions: specific concerns and problems faced by different passenger groups, such as driving behavior, overcrowding, blocked spaces for wheelchairs, and lack of assistance and suggestions for solutions were gathered.

Concrete suggestions for enhancing Accessibility and Safety (e.g., automated ramps, adaptive dwell times, automated systems and announcements)

Develop concepts, mock-ups and prototypes for user tests and investigate acceptance and impact with bigger samples

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Human Factors and Ergonomics Society – Europe Chapter – Annual Meeting – April 9th-11th 2025, Bologna

This project has received funding from the European Union's Horizon Europe research and innovation programme under Grant Agreement No. 101146513.