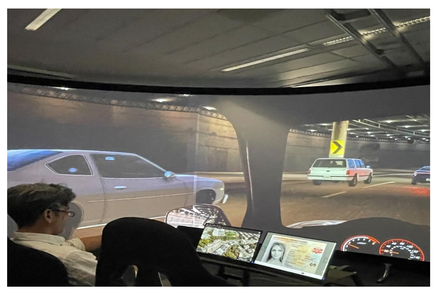
Driving social change in mobility - Towards an AI-driven, collaborative future

Madeleine Neumann
Prof. Dr. Marc Kuhn, Dr. Katrin Merfeld, Prof. Dr. Sven Henkel

Research Problem

Global urbanization is rapidly increasing, with projections indicating that two-thirds of the global population will reside in cities. This urban growth exacerbates social segregation, particularly in access to multimodal urban transportation, which is often limited by socio-economic factors, leading to increased inequality. To combat this, AI-enabled mobility solutions like autonomous and shared services are being promoted, as they can reduce travel time and costs. AI plays a crucial role in optimizing these mobility services, enhancing their sustainability and effectiveness by analyzing data and making real-time decisions that improve efficiency and accessibility. Despite existing research on autonomous mobility, which often centers on technical aspects like safety and comfort, the social effects and long-term consequences of AI in mobility are underexplored. As a result, it remains unclear how AI systems in the mobility sector make socially orientated decisions and what impact this could have on users and society. Closing this research gap is relevant to gaining insights into the role of AI in social contexts of mobility and shaping the development of smart mobility systems in such a way that they not only drive technological innovation but also promote social justice.



Research approach: three-stage, paper-based approach

	PAPER 1	PAPER 2	PAPER 3
Research questions	What socially oriented AI-based mobility concepts exist and how do they integrate different social aspects?	What are the perspectives, needs and expectations of stakeholders in the context of developing AI-driven social mobility solutions?	How does the integration of socially aware AI influence user acceptance of smart city solutions and what are the key factors?
methods	systematic literature review (PRISMA method; bibliometric analysis)	Qualitative methods (Expert interviews, MEC)	Quantitative methods (simulations, standard. survey, structural equation modelling)

Research Contributions

» Development of deeper insight into the role of AI in the social contexts of mobility and the factors that influence citizens' perception and acceptance of socially oriented AI systems in smart mobility solutions.
» Gaining a comprehensive understanding of the social impacts of AI-controlled, shared, and autonomous mobility.
» Extending the marketing literature on mobility service innovation by considering social aspects in their development and acceptance.
» Contributing to the transportation literature by providing a thorough understanding of how mobility innovations can affect society.
» Creating a foundation for companies and policymakers to develop mobility solutions that consider both social and economic sustainability.

General informationen

The Ph.D. project is a cooperative collaboration, which is article-based and conducted in English:

» Madeleine Neumann (Centre for Empirical Research – DHBW Stuttgart, EBS University), Doctoral Candidate

» Prof. Dr. Marc Kuhn (Centre for Empirical Research – DHBW Stuttgart), academic supervisor

» Dr. Katrin Merfeld (Utrecht University), academic supervisor

» Prof. Dr. Sven Henkel (EBS University), academic supervisor

Outlook

» Starting in August 2024, this dissertation this dissertation project follows a three-stage, paper-based approach.
» Completion of the doctorate is planned by the end of 2027.

Cooperative Partners

References

» Bathla, G., Bhadane, K., Singh, R. K., Kumar, R., Aluvalu, R., Krishnamurthi, R., Kumar, A., Thakur, R. N., & Basheer, S. (2022). Autonomous Vehicles and Intelligent Automation: Applications, Challenges, and Opportunities. Mobile Information Systems, 2022, 1–36.
» Groth, S. (2019). Multimodal divide: Reproduction of transport poverty in smart mobility trends. Transportation Research Part A: Policy and Practice, 125, 56–71.
» Hidayati, I., Tan, W., & Yamu, C. (2021). Conceptualizing Mobility Inequality: Mobility and Accessibility for the Marginalized. Journal of Planning Literature, 36(4), 492–507.
» Merfeld, K., Wilhelms, M.-P., Henkel, S., & Kreutzer, K. (2019). Carsharing with shared autonomous vehicles: Uncovering drivers, barriers and future developments – A four-stage Delphi study. Technological Forecasting and Social Change, 144, 66–81. https://doi.org/10.1016/j.techfore.2019.03.012
» World urbanization prospects: the 2018 revision. https://population.un.org/wup/publications/Files/WUP2018-Report.pdf, Stand: 01.02.2024.

Contact

Duale Hochschule Baden-Württemberg Stuttgart

Paulinenstrasse 50, 70178 Stuttgart
Madeleine.Neumann@dhbw-stuttgart.de