Rethinking Public Transportation: Understanding Commuters' Intention to Adapt

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Open-Minded

Introduction

Study

Technical progress in highly automated vehicles inspires researchers and experts to reinvent established public transportation, augmenting the infrastructure with **innovative on-demand** solutions (von Behren et al., 2022). The availability of a new transportation mode in turn could inspire commuters to rethink their everyday mobility behavior (Yap et al., 2016). This study therefore explores the **psychological factors** influencing the intention to adapt to on-demand callable highly automated vehicles as a new form of public transportation (automated public transportation, APT).

We build on researching the intention to use a technology via the **theory of planned behavior** (e.g., Golbabaei et al., 2020) and enhances this approach by considering APT- and environmentfocused constructs.

Our study explores **the intention to adapt** rather than the intention to use highly automated

Method

- N = 251, data cleanup contained test of basic understanding of new technology (66 failed), 84 participants were excluded for timing, failing the attention check or not recommending the use of their data
- 100 % commuters

Sample

Procedure

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 $n = 101 (41 \,, 60 \,, 60 \,,$

M = 49.3 years

SD = 10.2; 27-68 years

online study

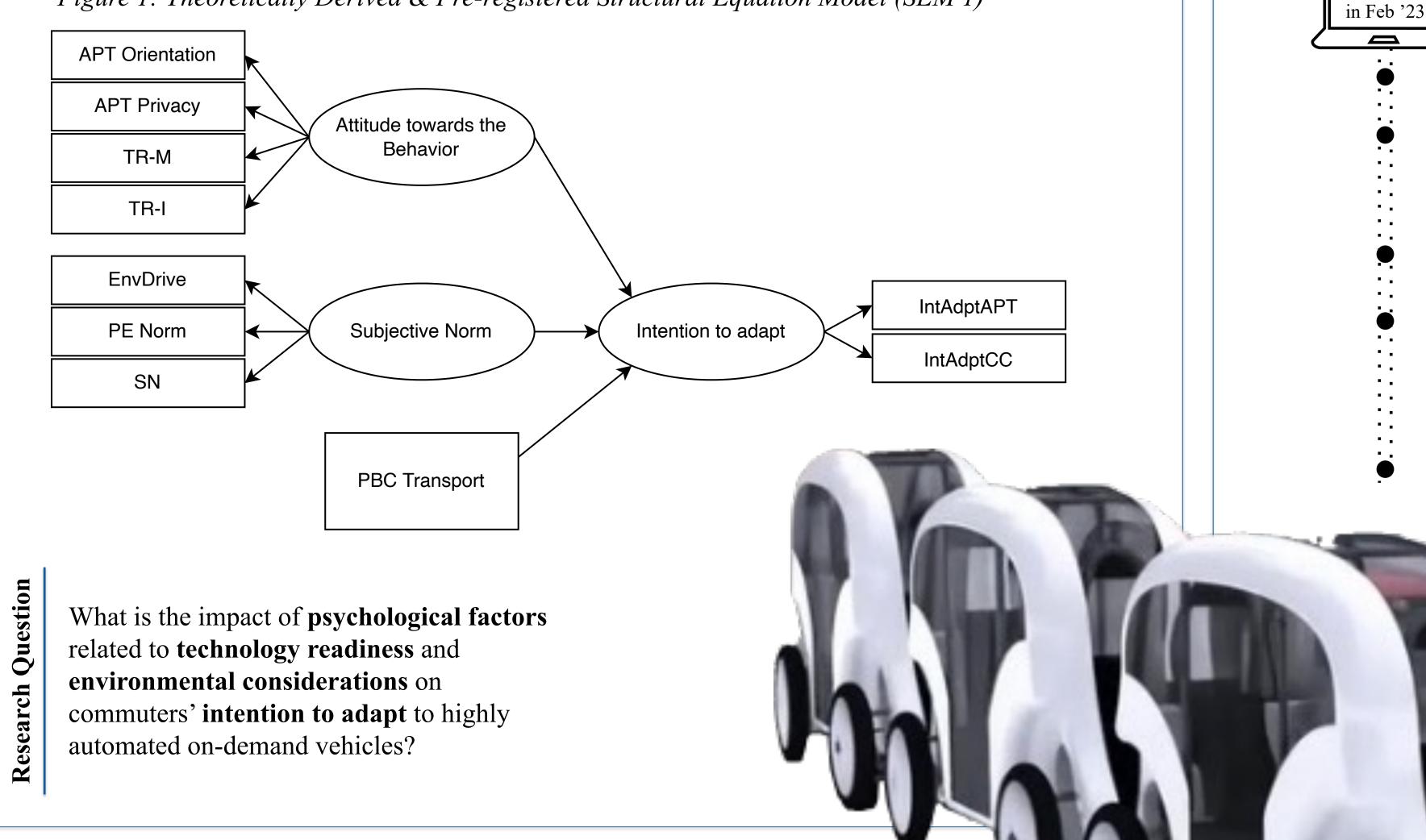
- 12.9 % restricted in mobility for health reasons
- 45.5% live in the city, 20.8% in the suburbs, 33.7% in a rural environment





vehicles. This dependent variable sets stronger focus on the **behavioral change** that is necessary 0 for a successful implementation of APT.

Figure 1: Theoretically Derived & Pre-registered Structural Equation Model (SEM 1)



Briefing & Consent

Introduction to Technology via text (80 words) & video (2 minutes)

Watch the introduction video (Password: FLAIT2023 all rights reserved)

Test for a basic understanding of the new technology (FLAIT)

Vignette

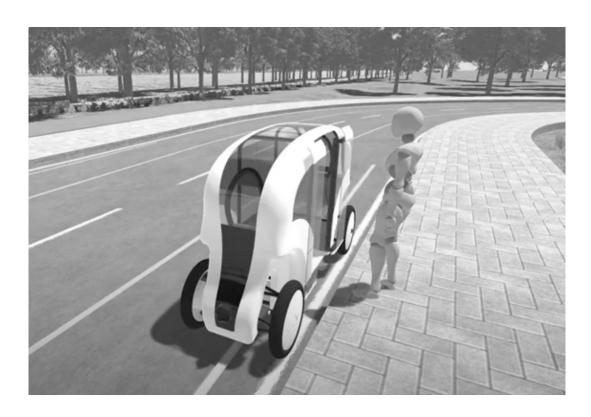
"Imagine yourself in a future where automated vehicles exist in your city, and you can use the technology on your daily commutes. For example, you regularly use it to cover part of your commute to work."

Questionnaire

Scales customized and validated via confirmatory factor analysis

- Technology Readiness Index 2.0 by Parasuraman and Colby (2015)
- PsyVKN by Hunecke et al. (2021)
- EnvDrive by Kumar & Ghodeswar (2015)
- IntAdptAPT by Masud et al. (2016)

Qualitative questions Demographics & Debriefing





SEM 2

to

SEM

from

scan QR code to access the pre-registration & poster https://osf.io/fmnc2/

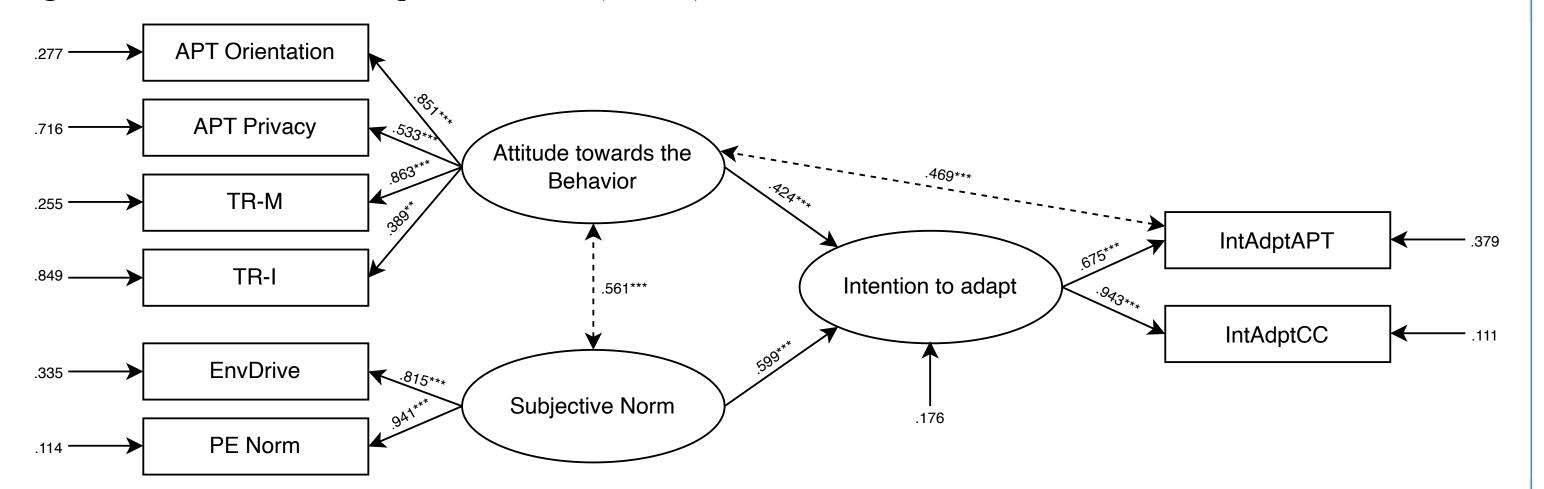
Results

•	SEM 1: partially acceptable model fit, but all paths in the model were significant, except the path between PBC Transport and Intention to adapt						
	\rightarrow PBC Transport excluded						
•	• CFAs showed valid operationalization for most constructs, except for SN ($\alpha = .622$)						
	\rightarrow SN excluded						
•	Modification indices (Mplus) advised to admit a covariance between Attitude						
	towards the Behavior and IntAdptAPT \rightarrow covariance admitted						

Table 1: Goodness-of-fit of Structural Equation Models									
	df	χ2	df/ χ2	CFI	RMSEA	SRMR	Conclusion		
SEM 1	32	74.025	2.31	0.91	.11	0.148	partially acceptable model fit		
SEM 2	16	20.563	1.29	0.99	.05	0.039	excellent model fit		

Note. df = degrees of freedom, SRMR = Standardized Root Mean Square Residual, RMSEA = Root Mean Square Error of Approximation, CFI = Comparative Fit Index.

Figure 2: Final Structural Equation Model (SEM 2)



Note. Figure shows factor loadings for the latent variables, residual variances, and direct effects with their respective ß-weights and level of significance. **p < .01, *** p < .001. SEM 2 explains 82% of the variance in the Intention to adapt.

Conclusion

- Within attitude, motivators and inhibitors of technology readiness play a role, as well as a general orientation towards the automated public transportation \rightarrow Technology readiness is important!
- Within subjective norm, environmental drive and personal ecological norm drive the Intention to adapt

 \rightarrow Sustainability is important!

- Intention to adapt to highly automated on-demand vehicles can be explained by commuters' attitude towards using the technology and their subjective norm \rightarrow Insights on why commuters intent to change!
- structural equation modelling with latent variables offers a valuable approach to the study of technology adoption

→ Let's continue TPB research with SEMs!

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