Influence of cognitive biases on the societal acceptability of innovative transportation technologies in Germany

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Abstract

Researchers and policymakers acknowledge the importance of innovation to reach sustainable development. Yet technology rejection is a key contributor to innovation inertia. Research efforts have focused on conscious factors and their impact on technology rejection. Our study aims to understand the role of unconscious factors in shaping and reshaping one's acceptability of innovation in the transportation sector, sector with a high decarbonization potential but victim of technological momentum. We use the eHighway megaproject in Germany as a case study. The eHighway is an innovative technology for road freight transport as it enables electric trucks to charge while driving via an overhead catenary system. We adopt a mixed-mode data collection method including on-street and online surveying to evaluate the impact of the anchoring, confirmation, status quo biases, and the bandwagon effect on the societal acceptability. Besides, we compare respondents and press' main critics via a thematic analysis of media coverage among newspapers. In opposition to the eHighway, more people want to invest in hydrogen as an alternative drive system that they know about it. People with an already stated opinion developed through the media are less likely to change opinion after learning about the eHighway.

Introduction and Motivation

The growing recognition of the need to address climate change highlights the importance of sustainability-oriented innovation (Adams et al., 2016). However, barriers such as political, financial, and technological challenges persist (Banister, 2004), as do psychological factors that remain underexplored. The transportation sector is particularly relevant as it has a high decarbonization potential but is victim of technological momentum. Besides, transport infrastructure projects rely on public acceptability for their implementation (Rothengatter, 2019). Thus, this study examines the role of cognitive biases in social acceptability shaping of innovative transportation technologies. We use Germany's eHighway megaproject as a case study. The eHighway is a pilot initiative with proven environmental and technical feasibility (Linke et al., 2024; Schöpp et al., 2024) but hindered by limited public and political support (Gnann et al., 2023). Thus, our study answers the following questions: (a) How does

initial knowledge about the eHighway system affect the acceptability towards it? and (b) To what extent do cognitive biases influence change in acceptability of the eHighway system after receiving new information?

Applied Method

We assess the importance of biases in shaping and changing the societal acceptability of the eHighway technology via an online survey. The survey evaluates the participants' familiarity with alternative drive systems, with an accent on understanding the population's acceptability towards the eHighway. After providing respondents with scientific facts, we reevaluate the acceptability.

To complement the analysis, we conduct a thematic analysis of national and local newspapers. We compare the analysis' outcome with the qualitative analysis of the open field survey questions.

Outlook on the results

We expect our results to show that the German population accepts the eHighway system and presenting scientific facts generally increases acceptance towards the eHighway. However, people with a high media consumption question the correctness of the provided information. The information covered topics from another perspective as the ones covered in the media. Besides, people prefer more conventional alternatives to diesel trucks such as hydrogen trucks, and this, despite acknowledging not being familiar with them. The population prefers freight transport to be switched to rail "that already works" instead of innovative systems.

The results of our study are the first findings on the role of unconscious psychological factors in transportation innovative mega projects acceptability.

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