



Modellierung der Moduswahl und Routenwahl des Radverkehrs im Wuppertaler
Verkehrsmodell und Evaluation einer Infrastrukturmaßnahme

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Abstract

The objective of this thesis is to enhance the representation of cycling in a strategic transport model by explicitly incorporating qualitative infrastructure-related factors. Traditional macroscopic models often account for cycling demand primarily through travel time and distance, while qualitative aspects such as perceived safety remain insufficiently represented, despite their relevance for cycling behavior. To address this gap, a methodological framework is developed that consistently combines cycling-specific travel time calculation, route-based assessment of infrastructure quality, and an extended mode choice model. Topographical effects and infrastructure characteristics are explicitly integrated into the modeling approach. The inclusion of safety as an independent utility component enables a more differentiated representation of cycling behavior and allows for the consideration of heterogeneous sensitivities across population groups.

The proposed approach is applied to an exemplary cycling infrastructure measure. The results indicate that qualitative improvements in cycling infrastructure can lead not only to increased cycling demand but also to changes in spatial usage patterns within the network. The model thus provides a robust basis for comparative scenario analysis and the assessment of relative impacts at a strategic level. Overall, the thesis demonstrates that qualitative infrastructure attributes can be consistently integrated into strategic transport models. The developed methods enhance the explanatory power of cycling demand modeling and offer valuable insights for the strategic evaluation of cycling infrastructure measures.

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