Unraveling the Complexity of Urban Transport Behavior:
A Qualitative Review of Factors Influencing Mode Choice in Developed and Developing Regions

Deepthi Swamy¹, Sibel Eker¹,²

¹ International Institute for Applied Systems Analysis (IIASA), Laxenburg, Austria, ² Radboud University, Nijmegen, Netherlands

What determines transport mode choices of individuals and societies, and how? What individual, social, and infrastructural factors influence the adoption of low-carbon urban transport options? How do these factors interact and vary across different regions and demographic groups?

Why is human behavior important in the context of transport sector decarbonization?

The Importance of Demand-side Strategies: IPCC estimates significant mitigation potential of individual and societal behavior in transport sector (~5.8 GtCO2e by 2050)

Need for Integrating Human Behavior in Energy and Climate Modeling: Studies across multiple disciplines have attempted to synthesize the key drivers of such behaviors. Recent modeling studies have tried to incorporate the drivers for mode choice to improve the realism of demand-side mitigation scenarios.

Gap in Current Behavioral Reviews: Existing literature lacks focus on interactions between individual, social, and contextual factors during energy transitions. Additionally, most studies focus on high-income countries, neglecting the growing energy demands of emerging economies.

Methods

Qualitative review of 55 studies from developed and developing countries, to investigate significant factors affecting urban mobility choices – individual (e.g., socio-economic, demographic, psychological, cognitive), social (e.g., norms, influence), infrastructural (e.g., built environment, public transport service quality, policies and incentives)

Examines four urban transport mode choices – private motorized vehicles (cars and 2-wheelers), public transport, non-motorized transport (cycling and walking), Electric Vehicle preferences.

Examines interactions between factors such as income levels, age, social norms, public transport service quality etc. using causal mapping of relationships in Vensim.

Key Findings

Why is human behavior important in the context of transport sector decarbonization?

The Importance of Demand-side Strategies: IPCC estimates significant mitigation potential of individual and societal behavior in transport sector (~5.8 GtCO2e by 2050)

Need for Integrating Human Behavior in Energy and Climate Modeling: Studies across multiple disciplines have attempted to synthesize the key drivers of such behaviors. Recent modeling studies have tried to incorporate the drivers for mode choice to improve the realism of demand-side mitigation scenarios.

Gap in Current Behavioral Reviews: Existing literature lacks focus on interactions between individual, social, and contextual factors during energy transitions. Additionally, most studies focus on high-income countries, neglecting the growing energy demands of emerging economies.

Methods

Qualitative review of 55 studies from developed and developing countries, to investigate significant factors affecting urban mobility choices – individual (e.g., socio-economic, demographic, psychological, cognitive), social (e.g., norms, influence), infrastructural (e.g., built environment, public transport service quality, policies and incentives)

Examines four urban transport mode choices – private motorized vehicles (cars and 2-wheelers), public transport, non-motorized transport (cycling and walking), Electric Vehicle preferences.

Examines interactions between factors such as income levels, age, social norms, public transport service quality etc. using causal mapping of relationships in Vensim.

Key Findings