SECTION 11. TRANSPORT

KEY ISSUES IN STUDYING URBAN TRANSPORT BEHAVIOUR IN UKRAINIAN CITIES DURING WARTIME

ОСНОВНІ ПРОБЛЕМИ ДОСЛІДЖЕННЯ ТРАНСПОРТНОЇ ПОВЕДІНКИ В МІСТАХ УКРАЇНИ ПІД ЧАС ВІЙНИ

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During the current war in Ukraine, studying urban transport behavior has presented unique theoretical, methodological, and empirical challenges that reflect both the extreme volatility of travel conditions and the limitations of pre-existing transport research frameworks. One of the central issues is the highly dynamic nature of mobility patterns in wartime, which cannot be adequately captured by traditional demand models developed for stable peacetime contexts.

Research in Kharkiv, for instance, showed substantial shifts in residents' travel behavior across multiple modes of transport including declines in metro usage and changes in public transport fare choices – when comparing periods of relative peace and active conflict, analysed using ordered and mixed logit models to account for behavior heterogeneity during armed conflict. These findings point to the need for models that explicitly

integrate conflict-driven variables such as perceived safety risks and service reliability disruptions [1].

In addition to methodological challenges, wartime conditions have led to significant infrastructure damage, service interruptions, and logistical constraints that shape travel choices in complex ways. For example, transport infrastructure – including roads, bridges, and public transit networks – has been subject to damage and operational limitations, fundamentally altering the accessibility of urban space and daily mobility routines for residents. Although comprehensive Scopus-indexed research focusing on these behavioral consequences is still emerging, early studies suggest that micromobility modes (such as cycling and shared mobility) may gain importance as alternatives when traditional transport systems are disrupted. However, stakeholders also highlight substantial barriers to micromobility adoption, including safety concerns, infrastructure deficits, and limited governance capacity to support active modes during wartime reconstruction [2].

Moreover, psychological and social factors have become dominant determinants of travel behavior under war conditions. Individuals' decisions about whether and how to travel are influenced not just by conventional variables like cost and convenience, but by security concerns, air raid alerts, curfews, and proximity to shelters [3]. These subjective risk perceptions complicate efforts to predict transport demand using standard quantitative approaches and require inclusion of behavioral constructs such as risk tolerance, trust, and perceived control in future mobility studies – yet empirical research integrating these psychosocial factors in Ukrainian contexts remains limited.

In wartime situations, travel data collection can also be a challenge. Traditional survey methods and sensor-based travel monitoring have been disrupted due to restricted movement, resource constraints, and ethical issues related to respondents' safety and well-being. As a result, many studies rely on online surveys or indirect measures, which may not fully represent the diversity of urban populations, particularly among internally displaced persons or vulnerable groups whose mobility patterns are less visible in digital datasets [4].

Economic pressures further influence transport behavior. Wartime inflation, fluctuations in fuel prices, and reduced incomes constrain households' transport choices and often lead to reduced ridership of formal public transport and increased reliance on informal or ad-hoc travel solutions. Although research on fuel price impacts has predominantly focused on broader European contexts following the 2022 invasion, such studies underscore how energy market disruptions can stimulate shifts in public transport use and highlight the relevance of socio-economic variables for understanding mobility behavior [5].

Finally, the inclusivity and equity aspects of urban mobility during war remain underexplored. Vulnerable populations – including the elderly, people with disabilities, low-income residents, and internally displaced persons – face heightened transport exclusion due to service reductions, safety concerns, and financial constraints [6]. Addressing these disparities requires both targeted empirical research and policy frameworks that prioritise equitable access to safe and affordable mobility in crisis settings.

In summary, wartime transport behavior research in Ukraine underscores the urgent need for adaptive analytical frameworks, improved data collection methodologies that can operate under conflict constraints, and interdisciplinary approaches that combine behavioral insights with transport planning and emergency management. Building this evidence base is vital not only for academic understanding but also for informing resilient mobility strategies in Ukrainian cities during and after the war.

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