



NITC Research Roadmap: A decade of transportation and land use research

Travel behavior and land use are interconnected. In academic research, travel itself is often treated as a demand derived from the activities for which it serves. In practice, coordinating transportation and land use decision-making can be challenging.

In a series of NITC Research Roadmaps, we surveyed the state-of-knowledge and where we're headed across six areas of transportation. Here we share the contributions of a decade of transportation and land use research from the National Institute for Transportation and Communities (NITC). Download the full literature review from this roadmap here: <https://nitc.trec.pdx.edu/nitc-research-areas>

Travel Behavior, Land Use Patterns, and External Impacts

NITC research has helped to unpack the influences of the built environment on travel behavior. A [series of studies investigating trip generation rates](#) found that the Institute of Transportation Engineering Trip Generation Handbook vastly overestimates vehicle demand, and developed alternative methods to estimate pedestrian trips in urban environments. Other NITC studies have improved our understanding of how transit-oriented development (TOD) can improve transit access, increase multimodal travel, and [decrease transportation costs](#) associated with vehicle ownership and use. Over time, [TOD neighborhoods encourage residents to walk and take transit more](#) while driving less.

We have improved our understanding about the travel behavior of people living and working in dense urban centers. A [study of 70+ retail and service locations](#) observed higher rates of multimodal travelers than previously expected by industry standards. Having this qualitative information has made it easier for practitioners to predict the outcomes of new developments, and to meet goals on reducing greenhouse gas emissions, decreasing automobile traffic congestion, and improving air quality and overall public health.

Transportation, Jobs, Housing, and Property Value

Economic vitality is a primary goal that practitioners consider when evaluating transportation and land use plans. A series of NITC studies explored the [contribution of transit investments](#) – particularly fixed-guideway transit systems – on real estate values, as well as employer and household location changes. Quality transit investments see higher rates of adjacent development within walking distance to the station, and often corresponding increases in land value. This indicates a vast latent demand for high-quality, TOD's in U.S. metropolitan areas. This study also offers a robust data repository, publicly accessible, containing demographic data for workers and longitudinal employment data in relation to 52 transit systems in 35 metro areas across the country.

Other NITC work has focused on the relationship between [bike accessibility and economic measures](#), such as business vitality and property values. Higher bike accessibility ratings were associated with higher residential – especially multifamily – property values, as well as office, retail, services, and park employment. Significant attention has been placed on how to consider the social equity impacts of bike infrastructure, including the impact of new plans on historically marginalized communities.

Attitudes, Preferences, Choices and Decision-Making

Attitudes and preferences for characteristics of travel, households, and neighborhoods play a powerful, but less understood, role in understanding how different strategies

and programs might increase access to destinations, lower transportation costs, and improve quality of life. NITC has contributed several studies that explore market response to programs and strategies targeting improved access to services. One study evaluated whether a [pilot transportation demand management program](#) in Portland, Oregon improved mobility by providing a suite of discounted transportation services to low-income participants. More than half of the participants tried new transportation modes they had not used before, including bike share, transit and ride-hailing.

Other NITC work recommends evaluating transportation options before residential (or workplace) location choices are made. One study evaluated [residential location preferences](#) and found a dissonance between stated preferences and location choices; in that residents often say they prefer more dense, urban neighborhoods than they actually do move to. This indicates a latent demand for more multimodal and accessible neighborhoods.

Housing and Transportation Affordability and Vulnerable Communities

Increases in land value are often a result of increased competition for limited supply, and rising rents and property values can displace vulnerable households. While transportation infrastructure investments may aim to improve multimodal access to opportunities, they could be adding pressures to the very communities they sought to help. NITC research offers strategies to address this, including the recommendation that the U.S. Department of Housing and Urban Development's [direct subsidies to more compact, walkable, and transit-oriented](#) neighborhoods.

National-scale performance metrics are incredibly valuable, but not without limitations. Several NITC studies have demonstrated the value of locally driven data and analysis that can better identify neighborhoods' and households' needs. While multimodal investments can improve location efficiency and affordability, successful implementation requires localized analysis and meaningful public participation to achieve results that benefit all members of the community.

Our work has focused on vulnerable populations and the nuanced ways in which different people experience environments differently. These have included [environmental](#)

[justice populations within fast-growing suburban "boom towns;"](#) [refugee and immigrant communities](#) in Texas and Arizona; [people experiencing homelessness](#) who access social services; and [former inmates returning to society](#).

Integrated T&LU Planning and Trade-offs

Transportation and land use regulation and governance tend to be tied to different political jurisdictions, complicating the ability for local and regional practitioners to think about travel and land use in an integrated and complementary manner. NITC researchers have explored a variety of strategies to better synchronize transportation and land use planning. For example, rural towns and places with high natural amenity value are currently experiencing "big city problems" like rapid increases in population growth and tourism, low wages, lack of affordable housing, and income inequality. A series of NITC studies has focused on assessing challenges specific to these "[Gateway and Natural Amenity Region Communities \(GNAR\)](#)" to support stakeholders in effectively studying these areas to a degree that reflects their regional importance.

Conclusion

In order to move forward with more coordinated transportation and land use practice, it is essential that we identify, understand, and communicate the trade-offs on a wide range of goals and outcomes. The research summarized in this roadmap has taken steps toward achieving a variety of measurable outcomes that are sensitive to the implications for different populations, as well as producing evaluation and communication tools that can help facilitate discussions on these trade-offs as they correspond with both transportation and land use decisions.

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The National Institute for Transportation and Communities (NITC) is one of seven U.S. Department of Transportation national university transportation centers. NITC is a program of the Transportation Research and Education Center (TREC) at Portland State University. This PSU-led research partnership also includes the Oregon Institute of Technology, University of Arizona, University of Oregon, University of Texas at Arlington and University of Utah. We pursue our theme — improving mobility of people and goods to build strong communities — through research, education and technology transfer. Learn more at <https://nitc.trec.pdx.edu/>

