OTREC
OREGON TRANSPORTATION RESEARCH AND EDUCATION CONSORTIUM

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HOW LIVABLE IS YOUR TRANSIT SYSTEM?

OTREC researchers work towards developing a set of performance metrics to measure the livability of a public transit system.

The Issue

The U.S. Department of Housing and Urban Development has identified some "livability principles" which include healthy, safe and walkable neighborhoods and safe, reliable and economical transportation choices. Transit agencies and local governments routinely use metrics to evaluate the performance of transit systems, but a uniform standard of transit data collection does not exist outside of the reporting requirements of the National Transit Database (NTD). Because of the types of data collected for the NTD, the focus of performance measurements is often on ridership and financial performance, leaving aside the question of livability.

In an OTREC-sponsored project, principal investigator Marc Schlossberg of the University of Oregon, along with co-investigators Jennifer Dill of Portland State University and Nico Larco, also of the University of Oregon, set out to create a set of tested and refined performance indicators that transit agencies across the nation can use to evaluate and improve their system performance in relation to livability goals.

The Research

Traditionally, planners analyze transit systems in terms of the whole picture: how the system serves a region, city or community. In order to evaluate the quality and accessibility of transit from a livability perspective, researchers developed some micro-scaled measures of very localized conditions. These measures evaluate the ability for individuals to access individual points along the system.

Investigators developed spatial indicators using geographic information systems (GIS). They conducted a regression analysis linking those indicators to ridership at the stop level. Three metropolitan regions in Oregon were included, representing a range of sizes and characteristics: TriMet (Portland), Lane Transit District (Eugene), and the Rogue Valley Transportation District (Jackson County). Using the regression analysis results, researchers

THE ISSUE

Evaluating how a transit system's overall performance impacts a community's livability is a new type of endeavor, compared with traditional evaluative methods which typically focus on ridership and financial performance.

THE RESEARCH

Researchers identified aspects of transit that correspond with livability goals, and developed ways to monitor transit performance with regard to those goals. They sought to understand the relationships between:

- Ridership at the stop level;
- Urban form (the physical layout and design of a city);
- Transit service characteristics (travel time and efficiency).

THE IMPLICATIONS

Researchers found that urban form has a significant impact on transit use. Service frequency is an important factor as well; this research points out that if resources exist to improve transit service frequency, priority should be given to areas with more supportive land use and urban form.

Photo: This TriMet stop in Southeast Portland, Ore. offers a comfortable pedestrian environment.

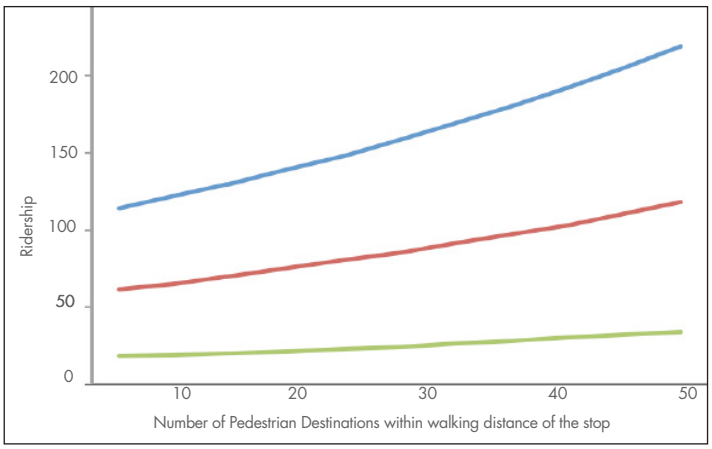
identified approximately 40 stops that had unexpectedly high or unexpectedly low ridership for further investigation.

They printed an aerial photo and street map of the area for each of these stops and visually examined the neighborhood's connectivity, along with physical or spatial barriers that might prevent a pedestrian from reaching the transit stop easily. They also looked at the density of the surrounding area, and for any competing stops in close proximity. In the urban form analysis, researchers found some potential barriers that can separate transit stops from the surrounding environment. These included freeways and other large roadways, city block structures that limit more direct access, walls that separate distinct land uses and limit pedestrian connectivity, and parking lots that create "virtual barriers" by creating unpleasant pedestrian environments. With such design, it is likely that only captive riders, rather than choice riders, would use transit.

Based upon these research findings, investigators identified three primary indicators of a transit system's livability: urban design at the stop level, which evaluates accessibility and connectivity of a transit stop; urban form on a neighborhood scale, dealing with the density of walkable destinations surrounding transit access points; and urban form on a regional scale, which focuses on the needs of people getting to destinations (particularly jobs and commercial centers) in addition to the geographic coverage of transit.

Implications

Investigators identified three policy areas where transit agencies and local or regional governments could bring about a more transit-supportive urban form. First, service frequency. Holding all else equal in terms of urban form, transit ridership increases when service increases.



Effect of Pedestrian Destinations on Ridership, controlling for service frequency

The blue line represents ridership at stops with a 15-minute service frequency, the red line 30 minutes, and the green line 60 minutes. All other things being equal, ridership increased when more pedestrian destinations surrounded the stop.

Second, clustering of destinations at transit stops is important. The models developed from this research can be used to prioritize locations for changing land use based upon desired transit ridership.

Third, connectivity is important, as measured both by GIS analysis of existing networks and urban form analysis of connectivity barriers. In terms of connectivity, the area immediately adjacent to a transit stop must be pedestrian-friendly. Most transit users are pedestrians at the beginning and end of any transit trip. Therefore, focusing on the walkable zone around each transit stop is important.

PROJECT INFORMATION

TITLE: Livability Performance Metrics for Transit

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MORE INFORMATION
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