

# EPIC Interconnectivity Tool

**T**ransportation providers and decision makers need tools that accurately assess the performance of their transportation system. And while intramodal and intermodal transfer facilities play an important role in a transportation system, no tools currently exist to scientifically evaluate the qualitative level of service impact that a particular transfer facility improvement is likely to provide.

The **EPIC Interconnectivity Tool** research project is focused on developing a tool that can be used by transit agencies, metropolitan planning organizations, and others. This tool, based on the specific improvements at a location, can accurately project the quality of service at a specific transfer facility. In contrast to the current practice of using “lists” of good things to do when identifying improvements at transfer points, the EPIC Tool uses a scientific basis for identifying the most effective thing to do.

Using the EPIC Tool will ultimately lead to better transfer efficiencies, better utilization of public transportation resources and improved quality of service to users. Its availability provides users with a way to maximize the return on their investments at intramodal and intermodal transfer facilities.

## What Is Being Done In This Research

This research has four primary objectives:

- Determination of the state of practice of evaluating intermodal connectivity
- Identification of institutional connectivity factors
- Identification of user connectivity factors, and
- Development of an evaluation tool for practical application

The research methodology in the initial research task includes five sub-tasks. The first three sub-tasks focus on identifying the factors that play a significant role in determining the perceived quality of service for transportation system interconnectivity. The research identifies those factors important to both institutional stakeholders and to public users, including factors related to convenience, safety, and security of transfers and the actual physical condition of the intermodal passenger transfer facility. In the final two sub-tasks, interpret each factor in specific terms, determining how it can best be measured and evaluating its importance relative to other factors. This information supports the framework for the tool itself and forms the basis for validating it.

The ultimate goal of this research project is to identify what specific transit connectivity factors are most important from the perspective of stakeholders of a specific transfer facility. The goal is to determine the criteria that should be used to assess the *suitability* of transit transfer facility improvements.

An important issue in meeting this objective is the matter of scale. The scale of travel connectivity can be addressed at three primary levels: mesoscopic, macroscopic and microscopic scales.

- The mesoscopic scale is related to intra-city level and deals with locations of transportation facility and proximity to origins and destinations of passenger trips.
- The macroscopic level is related to regional and urban scale of the transportation system in relation to residential and work locations.
- The microscopic scale focuses on the individual transportation facility and its connectivity to adjacent areas.

Within these categories, there are two different levels of institutional stakeholders. The first group consists of those who make plans for the larger regional transportation system with a focus on enhancing travel connectivity at the mesoscopic and macroscopic scale. The second group consists of those who are involved in improving infrastructure and service at a more microscopic scale. This research is focused more on the microscopic scale than on the mesoscopic and macroscopic aspects of connectivity.

## Conclusions:

From analysis of the passenger/user perspective, one principal finding clearly stands out.

*With regard to a transit stop or station, the most important determinant of user satisfaction is frequent, reliable service in an environment of personal safety. The physical improvements of that stop or station are indirect determinants.*

In other words, most transit users prefer short, predictable waits for buses and trains in a safe environment over longer waits in elaborate and attractive transit facilities. This preference is especially marked if users fear for their safety at the transfer facility. While this finding will come as no surprise to those familiar with past research on the perceptions of transit users, it does present a contrast with much of the descriptive and design-focused research currently available on transit stop and station improvements.

A companion part of this analysis compares how transit managers and neighboring communities view transit stops and stations. Perhaps reassuringly, the principal finding precisely matches

that of the transit user investigation.

*For operators, safety- and security-related factors far outweighed other attribute factors at transit stops, stations, and transfer facilities.*

Based on this research, a **3-Step Preliminary Assessment Tool** framework is now available. Transit operators can employ this framework to guide them when considering improvements to existing transfer facilities or developing initial plans for new facilities.

**Step 1:** In a general sense, all transfer facilities have a *Hierarchy of Traveler Wait/Transfer Needs* that succinctly describes those characteristics most important to users. Decision makers can use this hierarchy to determine the relative importance of specific improvements at any stop or station.

**Step 2:** For transit stops and stations serving particular user populations (children, immigrants, the elderly, etc.) or for facilities in unique environments (adjacent to airports, amusement parks, hospitals, etc.), this research has provided a *User Perception Survey Instrument* that can be used to determine the unique perceptions of passengers using that facility.

**Step 3:** Analyze the survey results to produce a *Transit Stop Needs Ratings Matrix* with respect to the importance and satisfaction levels for the users and facilities surveyed. Relative to both the *Importance Rating* axis and *Satisfaction Rating* axis, the facility attributes will fall into one of the four identified regions having specific assigned actions. Finally, once the attributes are identified and assigned to a region, use the *Hierarchy of Traveler Wait/Transfer Needs* graphic above to determine the most effective improvements at that facility.

### Recommendations

This research has taken substantive steps toward:

- Determining the connectivity of transit systems and how this connectivity (as well as other service attributes) influences travelers' satisfaction with transit services, and
- Examining how public transit systems can reduce the burdens of out-of-vehicle "travel" times in order to help make public transit more attractive resulting in ridership increases.

However, there are limitations to the research conducted to date. While the survey to determine factors affecting user perceptions of waiting, walking, and transferring included over 700 transit users, each category of attributes was corre-

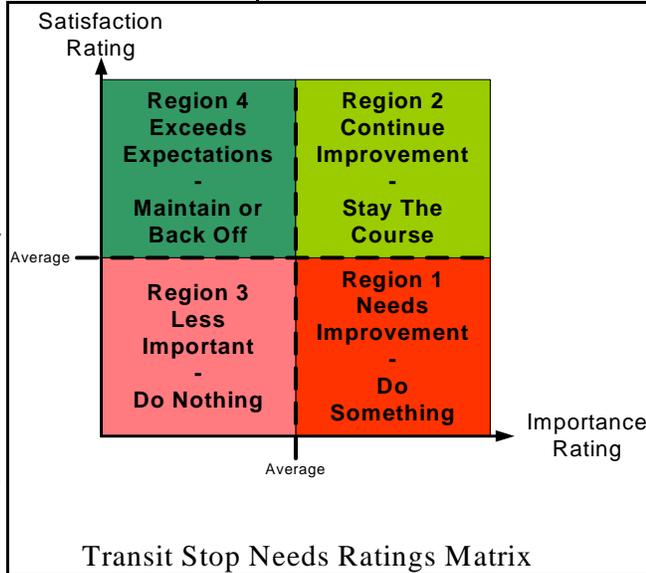
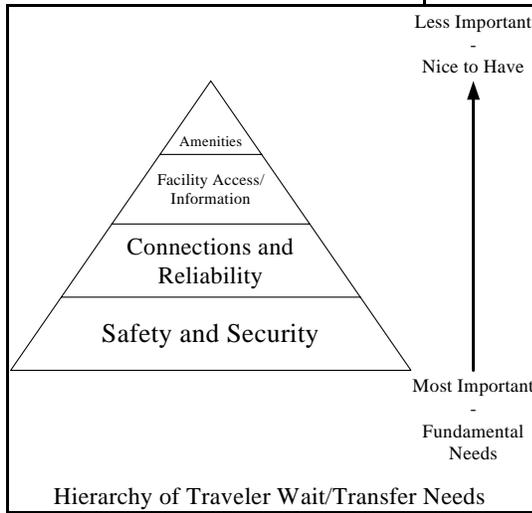
lated with data from a limited inventory of 12 transfer facilities within Los Angeles County. This small sample does not adequately reflect the variability of individual improvements. Therefore, this survey does not allow establishment of the relative importance of unique facility attributes in determining a users probable overall satisfaction level.

The evaluation framework provides a strong theoretical foundation on which to expand the study of transit users and facilities beyond Los Angeles County.

The EPIC research team is embarking on follow-on research to:

- Evaluate a wider cross-section of users over a wider array of transit systems;
- Expand the stop/station **3-Step Preliminary Assessment Tool** and apply it to a broader range of transit user populations and operating environments
- Do a field test implementation phase, and
- Expand the stakeholder analysis and include the perceptions and motivations of local governments, since they actually control the physical location and development of most transfer facilities.

The next segment of this research intends to expand the inventory of transfer facility locations surveyed from 12 to approximately 50, with a goal of surveying approximately 2,000 additional individual users. This expansion will help solidify the findings, making them more usable to cities and transit operators. If possible, the research will do a field test at specific transit stops and stations around California to show how the EPIC Tool can help transit operators attract more riders by cost-effectively and selectively addressing those specific aspects of waiting and transferring that transit users find most burdensome.



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