

REPORT NUMBER FTA-GA-26-7000

**ALTERNATIVE PERFORMANCE MEASURES  
FOR TRANSPORTATION PLANNING:  
EVOLUTION TOWARD MULTIMODAL PLANNING**

Dr. Michael D. Meyer, P.E.

Georgia Institute of Technology  
Atlanta, Georgia 30332



December 31, 1995

**EXECUTIVE SUMMARY**

Prepared for  
U.S. Department of Transportation  
Federal Transit Administration  
University Research and Training Program  
Washington, DC 20590

Document is available to the U.S. public through the  
National Technical Information Service  
Springfield, Virginia 22161

HE  
206.3  
.M49  
A46es

34716807

1. Report No. FTA-GA-26-7000		2. Government Accession No.		3. Recipient's Catalog No.	
4. Title and Subtitle Alternative Performance Measures For Transportation Planning: Evolution Toward Multimodal Planning				5. Report Date December 31, 1995	
				6. Performing Organization Code	
				8. Performing Organization Report No.	
7. Author(s) Michael D. Meyer					
9. Performing Organization Name and Address Transportation Research and Education Center Georgia Institute of Technology 790 Atlantic Drive Atlanta, GA 30332-0355				10. Work Unit No. (TRAIS)	
				11. Contract or Grant No.	
				13. Type of Report and Period Covered Executive Summary	
12. Sponsoring Agency Name and Address Federal Transit Administration				14. Sponsoring Agency Code	
15. Supplementary Notes					
16. Abstract <p>This report provides a summary of a research project which examined incorporating mobility and accessibility considerations into transportation planning. The research was based on a series of case studies of State departments of transportation and metropolitan planning organizations that have begun to consider such issues. This report summarizes the key findings which include: mobility and accessibility should be important measures of system performance; travel time and modal availability should be the foundation for mobility measures; accessibility measures should be incorporated into project, plan, and system evaluation approaches; and market segmentation and distributional affects of mobility and accessibility changes should be part of measuring system performance.</p>					
17. Key Words Transportation planning, mobility, performance measures			18. Distribution Statement		
19. Security Classif. (of this report)		20. Security Classif. (of this page)		21. No. of Pages	22. Price

# Alternative Performance Measures for Transportation Planning: Evolution Toward Multimodal Planning

## Executive Summary

The Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 established an important foundation for multimodal planning in the United States. In addition, ISTEA provided a different perspective for transportation planning, one that is more concerned with the users or stakeholders of the transportation system. This perspective suggests that the operation of a transportation facility is indeed important; however, this facility or service is just one element of a user's trip. A user's perspective on transportation system performance that is more concerned with the ultimate purpose of transportation systems - **user mobility and accessibility**.

The purpose of this research project was to identify the key characteristics of mobility and accessibility-oriented performance measures. In particular, the research was aimed at the following questions:

- How is system performance defined, and who defines it?
- What is the difference between an "output" and an "outcome"?
- What are the most appropriate performance measures and how should they be used?
- What are the implications of performance based planning on data collection and on the types of analysis tools that are available to transportation planners?
- How do performance measures relate to goals, objectives, and measures of effectiveness?

The answers to these questions are critical to the development of a performance-based planning process that is meaningful to State and local transportation officials.

This research was based on extensive case studies of State transportation agency, metropolitan planning organization (MPO), and transit agency planning efforts that were characteristic of the performance-based planning process suggested by ISTEA. In particular, potential MPO case studies were identified through a telephone survey of the largest 50 MPO's in the country. In addition, on-going research and planning efforts at the State and national levels were monitored for application in this research. For example, the U.S. Department of Transportation sponsored a National Conference on National Transportation System Performance on November 1-2, 1995 which provided a unique overview of performance-based planning at the national level. Several on-going National Cooperative Highway Research Program (NCHRP) and Transit Cooperative Research Program (TCRP) projects also provided important background information. In particular, TCRP project H-2 "Measuring and Valuing Transit Benefits and Disbenefits" and

20950

MAY 10 1996

HE  
206.3  
.M49  
A46es

NCHRP Project 8-32(2) "Multimodal Transportation: Development of a Performance-Based Planning Process" identified some important elements of performance-based planning, especially in relation to transit investments, that helped guide this research project.

For purposes of this research, the following definitions were used:

**Mobility:** The ability and knowledge to travel from one location to another

**Accessibility:** The means by which an individual can accomplish some economic or social activity

This research concluded the following:

**Mobility and Accessibility Should Be Important Measures of System Performance--** As noted in earlier sections, the identification of performance measures should be tied to the desires and requirements of local decisions. In addition, these measures of system performance should also be linked to the ultimate roles that the transportation system plays in a metropolitan area. Although the identification of these measures should be primarily left to the local level, every effort should be made to encourage the adoption of mobility and accessibility measures. These two types of measures provide the closest linkage to the ultimate purpose of the transportation system, and go beyond simple measurement of the characteristics of system performance.

**Travel Time (and Related Measures) And Availability of Alternative Modes Should Be The Foundation For Mobility Measures--** Mobility was defined in this report as the ability and knowledge to travel from one location to another. Most measures of this ability include some estimate of travel time (or delay or speed). Travel time thus becomes a critical element in the assessment of system performance. Few metropolitan areas conduct travel time surveys, instead relying on survey results or estimates that come from model runs. It seems likely that the user perspective on system performance will require more attention given to actual travel times for specified trips. In addition, the definition of mobility suggests that ability to travel means having travel options. This can be interpreted as meaning having numerous modal options available for a trip, but also characterizing the respective travel time characteristics of such modal trips.

**Accessibility Measures Should Be An Integral Part of Project, Plan and System Evaluation--** Accessibility measures are extremely useful indicators of transportation system and service effectiveness. Within project planning, such measures could be defined simply as the level to which major sites are served by transportation services within a certain threshold time. At the regional level, this measure could be aggregated to measure the percent employment opportunities that are within a certain travel time, or could even be linked to specific types of activity centers (e.g., percent population accessible to recreation sites, medical facilities, or retail centers). At the aggregate level, the travel time element could be eliminated from the definition of the measure so that the function that the accessibility serves can still be achieved (e.g., telecommunications).

**Performance Measures Should Reflect the Desires of the Transportation User--** For many years the key indicators of system performance were related primarily to providing input into decisions relating to individual elements of the transportation system under the jurisdictional control of one agency. The users of the system, however, do not distinguish elements of the transportation system by who has control over the provision and operation of services. A users perspective on system performance therefore necessarily requires an extensive outreach effort to identify what characteristics of system performance are most important. Clearly, traditional measures such as volume-to-capacity and ridership will continue to provide important input into organizational decisions. However, a much broader definition of system performance as seen from the eyes of the customer or user would be an important addition to the perception of successful transportation system performance.

**Market Segmentation and Distributional Effects of Mobility and Accessibility Changes Should Be Part of Measuring System Performance--** The importance of mobility and accessibility as measures of system performance needs to be balanced with an understanding of the relative impacts on society of such changes in the transportation system. This means that market segmentation approaches for analysis and evaluation are critical to identify distributional impacts. This also means distinguishing the impacts between existing users of the system and those new users to the system that are taking advantage of the new travel opportunity presented by enhancements to system performance. Current analysis procedures are able to adopt such a market segmentation approach, however, such an approach has significant implications for data collection, technical tools, and evaluation methodologies. For example, assessing the changes in mobility might require a determination of changes in consumer surplus of those affected by the change. This in turn requires a fairly sophisticated demand model and associated demand functions that can be used to estimate this change in consumer surplus.

In summary, transportation planning is a dynamic process, responding to and reflecting the trends of society. In an era of increased public accountability and responsiveness, the transportation sector has been increasingly under pressure to justify its expenditures. From the planning perspective, this means that the planning process should be designed to provide feedback linkages between what is actually happening on the system to the identification of strategies for enhancing system performance. In this report, the type of transportation planning process that can respond to these needs is called a performance-based planning process. Such planning is an important evolutionary step in a planning process that has been evolving over the past 50 years, and provided an important link between investment decisions and system response. Such an approach is critical for the future of transportation in an era of scarce resources.