

Travel Demand Analysis Needs for Project Planning

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The objectives of this paper are to review travel analysis needs for project planning and to provide a starting point for subsequent conference discussions of this topic.

At the outset of the paper, a working definition for project planning is presented that serves as a base line for the identification of necessary demand inputs to project-planning exercises. A rather broad definition is used on the assumption that at this point it is better to risk being overly comprehensive rather than being unnecessarily restricted in point of view. In discussing the demand requirements of project planning, some speculation is presented concerning how these requirements may change over the next decade as the nature of project planning changes.

Turning to the question of how well existing demand analysis methods meet existing and emerging requirements, we first present some generalizations concerning the current state of the practice. Then a set of idealized attributes for project-planning demand analysis is generated from several different perspectives. We conclude with a brief commentary concerning how well existing methods satisfy these desired attributes.

DEFINITION AND DESCRIPTION OF PROJECT PLANNING

Although most transportation planners have a fairly clear concept of what constitutes project planning, these concepts can vary depending on the perspective and past experience of the individual planner. In order to discuss the travel demand forecasting requirements of project planning, it is important that there be a common understanding and working definition of project planning.

As used here, project planning is the stage in the planning process at which site-specific transportation facility and service alternatives are analyzed in sufficient detail to support a firm implementation decision. Generally, project planning involves the consideration of capital-intensive proposals that are analyzed in comparison with alternatives involving less capital investment or no action at all. Geographically, project planning focuses on travel corridors or subareas and considers alternatives that, for the most part, could be implemented in their entirety and operate successfully independent of any other unbuilt facilities.

In this paper, as in the conference, we are concerned with project planning for both highway and transit facilities in urban and rural contexts.

With this background characterization of project planning stated, it is useful to go a bit further and identify the key aspects or objectives of project planning that in turn influence travel demand analysis requirements. There are three interrelated objectives that, although not mutually exclusive, are particularly useful for organizing our thoughts in this regard: feasibility determination, impact estimation, and design inputs.

Feasibility determination is concerned with both the absolute and relative feasibility of all alternatives under consideration. This includes the engineering, operational, and economic feasibility of alternatives, concentrating on the direct travel benefits and costs of each alternative. Impact estimation as used here examines the indirect impacts of the alternatives under study and considers concerns such as air quality, noise, economic devel-

opment, and community disruption. The final objective--design input--recognizes that it is often during project planning that data and forecasts are developed that are subsequently applied with little or no change as inputs and/or requirements for final design. This relationship that project planning has to subsequent design and engineering activities is of critical importance, but it has sometimes been forgotten in the transition from transportation planners to design engineers.

REQUIREMENTS FOR PROJECT-PLANNING TRAVEL DEMAND ANALYSIS

The travel demand analysis requirements that arise during project planning respond to the key objectives cited above. In each case, it is the demand forecasts that tend to drive subsequent analysis activities.

Feasibility Determination

Determining the relative and absolute feasibility of alternatives is the key concern of project planning. Travel demand estimates are critical inputs to the determination of the travel benefits and costs associated with each alternative, and these estimates must be responsive to the overall evaluation methodology. Summarized below are some typical evaluation factors and examples of associated demand measures. Highway- and transit-oriented measures are included, but the lists are not intended to be comprehensive.

<u>Category</u>	<u>Demand Measure</u>
Facility or service use	Person trips, ADT, VMT, passenger miles, mode choice
Travel benefits	Travel-time savings, travel-cost savings, average speed, point-to-point travel-time reductions
Capital costs	Peak vehicles or passenger demands by direction, peak-hour vehicular turning movements, peak-hour station passenger volumes
Operating costs	Temporal distribution of travel demand by direction, peak-load-point passenger volumes

These travel demand estimates must be developed with sufficient accuracy and detail to distinguish between alternatives and enable clear-cut feasibility determinations. Moreover, they should be consistent with the accuracy and detail levels of the evaluation and estimation procedures for which they are inputs. Often the level of detail required in response to feasibility determination is not so great as that which will ultimately be required for design or for certain impact assessments.

Impact Estimation

Impact estimation is concerned with the ancillary, primarily nontransport impacts that would result from the alternatives under consideration. These impacts may be considered as environmental impacts in the broad sense of that term. Demand estimate requirements are dictated by the methodologies employed for impact estimation. Listed below are some

illustrative impact categories that require demand impacts and associated demand measures:

<u>Category</u>	<u>Demand Measure</u>
Air-pollutant emissions	VMT by facility and subarea, vehicle speeds, vehicle age distribution and fuel type, stationary power sources and fuel type
Noise and vibration	Traffic volumes by time of day and by vehicle type, vehicle speeds
Public safety	Conflicting vehicular traffic volumes, vehicular speeds
Special user groups	Transit use by specific population subgroups (e.g., elderly, handicapped, or low income), mode choice by specific population subgroups, accessibility to major facilities and employment
Neighborhood impact	Station-access mode choice and volumes by mode, parking demand by location, change in local and through trip-making characteristics
Energy consumption	Fuel use during operation by trip type, trip location, mode, or facility or service
Economic impact	Station volumes and access or egress modes, accessibility to major facility and employment, traffic demand alternatives during construction

In comparison with the requirements for feasibility determination, the travel demand requirements for impact estimation require greater detail and specificity, e.g., traffic demand estimates by vehicle type, time of day, and speed characteristics.

Design Input

Like the impact-estimation requirements, the design input travel demand measures also tend to be more detailed than those needed for feasibility determination. Examples are listed below under highway and transit design categories:

<u>Category</u>	<u>Demand Measure</u>
Highway design	Design hour and time-of-day volumes for all network links; peak-hour turning movements; vehicular volumes by vehicle class, particularly truck volumes; vehicular volumes by occupancy level for high-occupancy-vehicle facilities; vehicular speeds and queue lengths
Transit design	Maximum load-point volumes for peak 15 min, peak-hour station volumes by direction, peak-hour station access volumes by mode

Changing Requirements for the 1980s

The preceding sections have listed requirements for project-planning demand analysis that have evolved over the past 20 years. Before discussing the current state of the practice and developmental needs, it is appropriate to look forward over the next decade and explore how these travel demand requirements may change. Generally, any changes will be related to shifting conditions and perspective regarding public infrastructure investments, transportation investments in particular.

Shift Toward Maintaining and Better Utilizing Existing Infrastructure

The declining condition of the nation's transportation infrastructure is gaining increasing attention in technical and popular literature. The Interstate highway system is now 95 percent complete but reconstruction and other repair needs by 1990 are estimated at more than \$40 billion in 1979 dollars (1). Of the 558 000 bridges in the United States, approximately 44 percent are considered either structurally deficient or functionally obsolete (2).

It is estimated that properly maintaining and restoring the New York City subway system alone would cost approximately \$11.6 billion over a 10-year period (3).

For highway project planning, attention is increasingly focusing on resurfacing, restoration, rehabilitation, and reconstruction (4-R improvements). For transit, the shift toward maintaining existing facilities coupled with the prospects of limited capital federal funding assistance for rail projects will shift the emphasis in corridor development from rapid-rail and light-rail projects to freeway and arterial high-occupancy-vehicle (HOV) projects.

There will be several implications on travel demand requirements for project planning. Emphasis on 4-R projects, for instance, may shorten the planning horizon and will certainly tend to increase the level of detail needed. Since alternatives will tend to differ primarily in terms of design features, the requirements for alternative evaluation and selection will be virtually the same as the requirements for design.

It also can be anticipated that there will be a greater need for consistency in project evaluation from project to project so that comparable measures are available for statewide capital budgetary exercises and needs studies.

For transit, greater emphasis on lower capital projects will not necessarily require new demand measures but may require greater accuracy to detect differences between alternatives defined within a narrower spectrum.

Greater Dependence on Private and Nonfederal Financing Opportunities

Limitations on the availability of federal capital and operating funds for transportation are shifting the financial burden for transportation to state and local government. For transit, federal operating subsidies are being curtailed and are scheduled for complete elimination by FY 1985. In highway transportation, there is much talk of reducing or eliminating federal assistance for secondary roads and urban streets.

Already this trend has renewed interest in highway toll facilities, and a number of states (e.g., Wisconsin, South Carolina, Maine, Pennsylvania, and Virginia) are considering the imposition or expanded use of tolls to generate additional revenues for maintenance and the construction of new facilities. With respect to private financing, FHWA is sponsoring a study to assess the transferability financing mechanisms that involve private funding. Linked to the development process, such methods have been particularly successful at the local level in certain areas.

For transit, these trends have generated fare increases and greater interest in innovative fare

policies as transit authorities attempt to recover a greater portion of their operating costs through the farebox.

The implications of this trend are at least two-fold. First and foremost, there will be an increased need to accurately forecast modifications in travel behavior resulting from user cost increases that are incorporated in the definition of project alternatives. These modifications range from trip generation through route choice. In this connection, we may see a need for a closer linkage and consistency between travel demand methodology typically applied in the urban transportation planning process and the methods and techniques used for toll studies involving revenue bonding or alteration of existing toll schedules. This concern over cost comes at a time when the relationship between consumer travel-related choices and automobile costs has been muddled by reduced new-car fuel consumption, higher vehicle capital costs, and resultant trade-offs between fixed and variable operating costs.

The second implication is that quick response in project-planning studies will become increasingly important. The prospects for involving private funds will certainly diminish if it takes two to three years to make a decision regarding project implementation. Generally, transportation studies--especially project-planning studies for major capital improvements--have a poor record for on-time completion.

Greater Emphasis on Demand Management

An inevitable result of the first two trends will be greater emphasis on demand management. Demand modification is becoming more acceptable as available resources for transportation supply changes become more scarce.

From an analysis perspective, this means that demand forecasting methods for project planning must be capable of addressing policies such as

1. Restrictions based on vehicle occupancy,
2. Employer-based mode-of-access restrictions,
3. Road pricing, and
4. Automobile-restricted zones.

Greater Concern Over Goods Movement

The lack of a constituency, combined with the technical complexities involved, has inhibited the development of goods-movement planning activities. Certainly, during the 1970s, goods-movement planning did not reach the level of activity many had expected at the outset of the decade.

Although these inhibitions will continue, there are two reasons to expect greater interest in goods movement, which may filter down to project planning. First, at least in relative terms, it is likely that projects aimed at supporting economic industrial development will increase. We have already seen this for rail and port planning (e.g., related to coal export), and it may become increasingly important in highway planning. Westway in New York City and selected federally funded highway projects in Appalachia are current urban and rural examples, respectively. Second, as noted earlier, highway project planning is becoming increasingly concerned with maintenance resurfacing and renovation, all of which is related to the extent and composition of truck traffic.

Thus, from these two widely divergent perspectives, the impetus will exist to increase our concern with goods movement. Analytically, the demand analysis requirements involve a more accurate esti-

mate of truck traffic in terms of total trips, link volumes, temporal distribution, and composition by truck category.

Less Rigidity in Federal Planning Guidelines

Since the Reagan Administration assumed office, there has been a clear trend toward modified planning requirements that are less prescriptive and afford greater flexibility at the state and local levels. This is worth mentioning because it affects how rapidly the profession will be able to adapt to the trends of the 1980s.

Although there will be some sacrifice in consistency, less-prescriptive planning requirements should foster more rapid adaptation of innovative demand analysis techniques. This should happen because the factors that are changing the travel demand analysis requirements are being felt most directly by state and local governments--the level at which project planning is conducted.

To summarize, travel demand analysis needs in the next decade will

1. Reflect an increased level of detail and specificity with regard to forecast traffic and demand characteristics,
2. Require greater accuracy and sensitivity with respect to changes in user travel costs and demand management policies,
3. Be increasingly concerned with quick-response planning, and
4. Reflect greater emphasis on goods-movement and truck-traffic demands.

CURRENT STATE OF THE PRACTICE: SOME GENERALIZATIONS

Subsequent sessions and papers will discuss the state of the art and state of the practice with regard to specific categories of travel demand analysis methodologies. As part of this paper, it is important that the current state of the practice as it applies to project planning be examined in an overview context.

Project planning in practice uses a wide range of different modeling techniques for demand analysis; they range from conceptually elegant model formulations to very simple forecasting techniques. With the exception of aggregate modeling approaches (e.g., land use transport models) or microscale, operational techniques, most travel demand analysis methods have been applied in project planning at one time or another. Thus, travel analysis for project planning involves the fundamental demand modeling issues that are pervasive throughout the United States--lack of recent data, need for model validation, or inherent limitations of model structure.

Although there is considerable breadth to the travel analysis techniques used for project planning, some approaches are more common than others, so useful generalizations can be made. These generalizations will be helpful in the subsequent discussion of analysis problems and deficiencies.

Two General Approaches

There are two general approaches to project-planning travel demand analysis in current practice--one is based on surveys and counts of existing conditions and the other is based on the chain of travel demand models frequently maintained as part of the urban transportation planning process (UTPP). Although these two approaches are interrelated to some degree, there are fundamental differences in perspective between them.

The first approach, termed "survey-based," relies on detailed observations of existing conditions and is most frequently applied to highway project planning. Specifically, it is often used for studies involving toll roads and project planning oriented toward upgrading existing facilities, possibly related to new development. It is applied when the planning horizon is short, and it tends to be very responsive to design requirements. Consistency with systems planning demand forecasts is of relatively little concern. In the transit area, the survey-based approach is used for short-range, operationally oriented planning.

The second approach, UTPP-based, tends to be applied to more complex project-planning studies where alternatives may be multimodal, involving totally new capital facilities. Alternatives-analysis and corridor-refinement studies have generally used this approach. Usually, the approach has been employed in an urban context, but it has also been used in rural contexts. As a consequence, UTPP-based as used here refers to a technical approach that may be used in either urban or rural project planning.

Unlike the first approach, the second is very much concerned with consistency relative to system-planning work. It tends to be less concerned with travel demand analysis needs relative to design.

Refinement and Special-Purpose Procedures and Techniques

Both forecast approaches use special procedures and techniques to produce final demand estimates.

The survey-based approach begins with detailed observations of existing conditions (e.g., temporal demand distribution and vehicle mix) aimed not only at measuring conditions but also at understanding them. As a consequence, the special-purpose and ad hoc techniques employed are not needed to add detail but rather to forecast changes in demand that may result from the alternatives considered. For instance, the techniques can involve superimposing traffic demands from new development over existing conditions or altering traffic route selections and link volumes in response to new facilities or tolls.

For the UTPP-based approach, the refinement procedures used are aimed at adjusting and adding detail to the raw forecasts produced by UTPP models. Adjustments are required because the zone system and network abstraction used in the UTPP models are often so coarse that individual link or station volume estimates are not reliable. Therefore, a rationalization step is needed that produces more reliable network assignments while maintaining overall consistency with UTPP model outputs.

Added detail is also necessary. The 24-h assignments that are often produced by the UTPP models must be converted to time-of-day and directional distributions for specific network links and stations. Further refinements may be needed to address vehicle classifications, turning movements, and the interpolation/extrapolation for additional forecast years.

Informal Procedures

The special-purpose and refinement procedures and techniques common to both approaches are generally not formalized and are not well documented. In part this is a result of a tendency, and perhaps a need, to develop and apply ad hoc procedures on a study-by-study basis.

Over the past decade, the need for additional detail in travel demand forecasts for transit alternatives analysis studies was recognized and incor-

porated into the federal review process. Methodological development in response to the requirements has lagged behind.

In highway project planning, the design orientation of state highway agencies has traditionally recognized a need for considerable detail in traffic forecasts and this has led to the development of methods and techniques that are applied consistently within certain states. However, there had been little technology sharing in this area between states until a current NCHRP project was initiated. This project (Project 8-26, Development of Highway Traffic Data for Project Planning and Design in Urbanized Areas) is aimed at evaluating and synthesizing procedures for developing traffic data for highway project planning and design.

PROBLEMS AND DEFICIENCIES

The previous sections have laid the foundation for a discussion of the key concern of this paper and this session--the problems and deficiencies with existing travel demand analysis methods used for project planning. First some fundamental concerns stimulated by the preceding section will be reviewed, and then existing methods will be discussed in light of idealized characteristics or standards.

Fundamental Concerns

Earlier, two general approaches to project-planning demand analysis were identified--a survey-based approach and a UTPP-based approach. A major concern of mine is that there is no general recognition of these two significantly different approaches, existing side by side, for project-planning demand analysis. Certainly, this lack of recognition is related to the nature of project planning. As defined here it covers different modes and alternatives, with varying planning horizons and geographic settings. The survey-based approach is most often used for highway planning that is more likely to involve upgrading facilities than constructing new facilities on new rights-of-way. The UTPP-based approach is most often used when major new facilities are being considered, possibly in a multimodal setting.

Whereas most transportation planners are aware of the UTPP-based approach and it has been the subject of much research, the survey-based approach has received relatively little attention. As a consequence, there is little documentation of the survey-based approach, and no widely accepted guidelines for using one approach or the other exist.

As the nature of project planning evolves in the 1980s, with capital projects being of smaller scale, it seems likely that the survey-based approach will take on greater relevance. Also, the need for an integrated approach that draws on survey-based and UTPP-based methods will become increasingly desirable. Pivot-point, elasticity, and other incremental forecasting techniques are illustrative of approaches that include features of both survey-based and UTPP-based techniques.

Another major concern that affects the UTPP-based approach, and perhaps contributes to the need for an integrated approach, relates to the continuing maintenance and testing of the UTPP models. In many instances these modules, particularly the trip-distribution components, are based on data that are more than 15 years old. The lack of recent data for both calibration and validation has been a major question for some time and generally has remained unresolved. Now, with there being some uncertainty with respect to MPOs and the governmental responsibility for regional-level planning, it is not incon-

ceivable that upgrading UTPP models will receive even less priority in the future. Although the specific demand analysis needs and prospects for system-level planning are being examined in other papers and sessions, it is important to recognize that problems and deficiencies at that level will trickle down to project planning.

As a footnote, it should be pointed out that the advent of microcomputer hardware and software presents a significant opportunity to address these concerns. In particular, microcomputers offer a relatively inexpensive means of formalizing and transferring survey-based methods. Similarly, they are very promising with respect to implementing integrated-analysis approaches.

Existing Methods in Light of Idealized Attributes

The desirable attributes of demand analysis methods for project planning are derived from several different perspectives:

1. Sound modeling practices: Sound principles of predictive modeling are applicable to travel forecasting for project planning. Although they may seem obvious, it is nevertheless important that existing models and techniques be reexamined periodically from this perspective.

2. Output requirements: The output requirements referred to are the basic demand analysis outputs needed to conduct project planning.

3. Emerging requirements: As the assumptions, constraints, and objectives for project planning shift, the demand analysis requirements will shift as well. Thus, idealized attributes for demand analysis developed at this time should be responsive to emerging trends and should incorporate these changing requirements.

4. Practical concerns: Finally, idealized attributes must reflect practical concerns related to the development and application of travel demand estimates for project planning.

Listed below are idealized attributes for project demand analysis methods organized under the perspectives they represent. Not all attributes are mutually exclusive, and the list is not necessarily complete. We hope that it will be a useful departure point for further discussion. Accompanying each attribute is a brief commentary concerning how well existing methods address that attribute.

1. Sound modeling practices

a. Behaviorally based: The major behavioral concerns and potential deficiencies with regard to UTPP-based methods involve forecasting

- (1) Trip distribution,
- (2) Automobile ownership and automobile occupancy (including carpool and vanpool use),
- (3) The impact of cost and pricing policies as well as demand management techniques (e.g., HOV lanes), and
- (4) Vehicle mix, time-of-day distributions, or other demand characteristics that are not produced by UTPP models and that require special refinement procedures.

With regard to survey-based techniques, behavioral issues arise concerning the special-purpose and ad hoc techniques used to forecast changes in demand from existing conditions.

b. Calibrated with recent and appropriate data: As noted previously, this is a major issue with regard to the UTPP forecast models. For the survey-based approach, this issue involves the rele-

vance and applicability of data used to develop the special-purpose and ad hoc relationships that predict changes in travel characteristics from existing conditions. Because these relationships do tend to be developed in an ad hoc fashion, there appears to be considerable variability in their quality.

c. Consistent with systems-planning models and forecasts: By definition, a UTPP-based approach is consistent with systems-planning models in structure. Inconsistencies can be introduced, however, through differing model input assumptions (e.g., employment or population). The survey-based approach has no such inherent consistency with systems planning of models and forecasts, and often no explicit attempt is made to reconcile project-level forecasts developed in this way with regional forecasts.

d. Validated with recent and appropriate data: The issue of validation data is virtually the same as that for calibration data with respect to project-planning demand analysis techniques. In addition, it can be observed that in practice it is very unlikely that two recent, independent data sets will be available, one for calibration and one for validation.

2. Output requirements

a. Provide demand inputs for feasibility determination: Of existing methods, the UTPP-based methods tend to be the best in this regard, having a comprehensive, multimodal structure. Limitations and deficiencies are related primarily to inherent behavioral shortcomings in the demand models.

b. Provide demand inputs for impact determination: In current practice there appear to be some inconsistencies between the desired (or implied) levels of confidence and detail for impact estimates on the one hand and the available levels of confidence and detail of demand inputs on the other. The deficiencies of existing travel demand techniques in this respect cannot be evaluated without reexamining impact-estimation techniques. More specifically, there is a long-standing need to assess, in a consistent manner, the levels of confidence and detail needed for impact estimation in project evaluation. Such an assessment would provide a basis for subsequently examining travel demand analysis techniques from the standpoint of their ability to provide appropriate inputs for impact estimation.

c. Provide demand inputs for design: The need for considerable detail in demand inputs for design cannot be avoided. Of existing techniques, the survey-based approaches provide this detail in the most direct manner, whereas UTPP-based approaches require special refinement procedures. As with demand inputs for impact estimation, there is a potential trade-off between the limitations of existing demand analysis techniques and the costs or consequences of design errors. Thus, the deficiencies of existing procedures must be assessed with respect to these consequences and the sensitivity of design decisions to demand inputs, which tend to vary by mode and facility type in accordance with design practice and standards.

3. Emerging requirements

a. Responsive to project alternatives aimed at better use of existing infrastructure: Some implications for travel demand analysis techniques generated by this trend have already been mentioned:

- (1) Reduced planning horizon,
- (2) Added level of detail to evaluate alternatives that may differ primarily with respect to design features, and

(3) Greater consistency between project-planning studies to facilitate regional- and state-level priority programming.

b. Responsive to demand management and user pricing alternatives: Existing methods are better suited to analyze new, conventional highway and transit facilities than to analyze incremental changes in the operation of existing facilities or the development of new, hybrid facilities. Thus, existing demand analysis techniques have difficulty with projects such as arterial and freeway HOV lanes, automobile-restricted zones, park-and-ride lots, advanced traffic control systems, and pricing policies. To a large degree, these difficulties are related to inherent limitations in the structure of existing techniques or to behavioral weaknesses.

c. Responsive to goods-movement concerns: Existing methods for forecasting vehicle traffic related to goods movement are not widely used or accepted. Generally, neither UTPP-based nor survey-based methods are capable of anticipating basic shifts in goods-movement traffic.

4. Practical concerns

a. Minimize data requirements: There is a trade-off between minimizing data requirements and achieving many of the other desired attributes for project-planning demand analysis methods. Existing methods, though data intensive, are often applied without recourse to recent data for calibration or validation. A major advantage of the disaggregate modeling techniques developed over the past 10 years is their reduced data requirements. As new project-planning and related systems-planning techniques are developed, a major concern and constraint will be data requirements.

b. Improve documentation: A shortcoming with existing demand analysis methods is the lack of documentation for the special-purpose and refinement procedures that are used in both UTPP-based and survey-based approaches.

c. Use known and predictable variables as inputs: The reliability of any predictive model can be no better than the reliability of the inputs to that model. To a great degree, erroneous demand forecasts for project-planning studies can be related to the use of unreasonable but politically acceptable input variable values and assumptions.

d. Incorporate capability for sensitivity analysis: Since this attribute relates more to how a forecasting technique is used than to its structure or formulation, existing demand analysis techniques generally have this capability. In application, however, sensitivity analyses are not always conducted as part of project-planning demand analyses.

e. Facilitate quick-response planning: None of the existing approaches can be characterized generally as quick response. UTPP-based methods are cumbersome because of the nature of the UTPP process, whereas the survey-based methods often may require time for special data collection.

SUMMARY

By using a reasonably broad definition of project planning, current demand analysis requirements related to feasibility determination, impact estimation, and design have been identified. Over the next decade, these requirements will change in response to a number of trends, including

1. A shift toward maintaining and better utilizing existing infrastructure instead of building new infrastructure,
2. Greater dependence on private and nonfederal financing opportunities,
3. Greater emphasis on demand management,
4. Greater concern over goods movement, and
5. Less rigidity in federal planning guidelines.

Current project-planning demand analysis methods tend to fall within two related but significantly different approaches to demand estimation. One approach--survey-based--uses detailed surveys and counts to measure demands and understand the use of existing facilities, whereas the other approach--UTPP-based--relies on a chain of travel demand models often maintained as part of the urban transportation planning process. Both approaches use special-purpose techniques that are often developed on an ad hoc basis. The survey-based approach uses such techniques to forecast demand shifts from existing conditions, whereas the UTPP-based approach uses them to adjust and add detail to raw UTPP model outputs.

A fundamental concern related to existing demand analysis methods is that there is no general recognition that these two different approaches coexist. Although the UTPP-based approach has been the subject of much research and training, the survey-based approach has received little attention. As the nature of project planning evolves in the 1980s, it is likely that the survey-based approach will take on added importance and that the need for integrated approaches will increase.

As a starting point for session discussions, a set of idealized attributes for project-planning demand analysis methods has been presented. These attributes are derived from four different perspectives--sound modeling practices, output requirements, emerging requirements, and practical concerns. Comparison of existing methods with these desired attributes reveals a number of problems and deficiencies within existing methods.

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