RELEVANCE OF PLANNING TECHNIQUES TO DECISION-MAKING

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During the past 10 or 15 years we have spent more than $250 million nationwide on planning transportation facilities. Nevertheless, the critical decisions on transportation are still made external to this process and to the techniques used in the process. And there is good reason for that: There are serious shortcomings in the models that we now use. Some of these shortcomings are clear, and we have known about them for years but have not responded with improvements. During the past 4 or 5 years there have been repeated warnings to modelers about those shortcomings from citizen groups, elected officials, and even transportation experts, but to no apparent avail. What are the shortcomings?

First, the models are too time-consuming and too expensive to operate. I can recall a situation in a western state not so long ago where the chief engineer of a very large transit operation requested one of the regional planning groups to give him some help on revising the routes and schedules for the area's bus system. He wanted to make the revisions to accommodate some of the expected increase in visitor traffic because of an upcoming social event. The event was 3 months from the date of the request. The answer he got from the regional planning group was that his problem would take about 6 months to analyze and could not even be started until he provided $20,000 for the computer analyses. You can imagine his answer; he will likely never again ask the planning group to help him make a decision. Most decision-makers today are hampered by 2 key constraints: They do not have time to analyze and debate all of the salient issues that surround a particular problem, and they certainly do not have the cash in hand to have somebody else assist them. So models must be more responsive to time and money constraints if they are to be useful to decision-makers.

A second clear shortcoming is that models fail, in many ways, to examine all relevant points in the decision-making process. They certainly cover the demand elements and the capacity elements, but they do not do a very good job of covering the impact elements or the total cost elements of the alternatives under consideration. They do little to trade off one impact

with another in the decision as to which of several examined alternatives should be built. The sophisticated models that we now have deal with those elements in the decision-making process that are perhaps not the most important ones. We spend a great deal of money refining and further defining the travel-demand forecast, even though urban expressways are clearly either 4, 6, or 8 lanes wide and making that choice on the basis of geometrics and flexibility is not too difficult. What we seem unable to do is to account for the impacts among those 3 widths and other choices.

Third, existing models really box us in. I am sure each of us has been in meeting after meeting where some modeler goes through his song and dance about his sophisticated model and spends three-fourths of the time allotted for his presentation explaining the workings of the model and only a fourth explaining what that means in terms of either the demand for travel or the impact of the facility to meet those demands. In other words, we think too much about the models and too little about the maps and charts and photos and common sense that sell particular planning strategies.

Fourth, present models are geared to the 1990 situation or the 20-year situation when in fact transportation problems are now and projects are now. The average time span of the term of the local or state official is 2 or 4 years or certainly 8 years at the most. A mayor wants to know whether he should proceed with a particular transportation facility. Modelers tell him what the situation will be in 1990. The mayor finds it difficult to respond to the criticism of his constituents as to why he either does or does not proceed with a particular project. Models fail to give him the information he needs on today's situation.

Fifth, the technicians themselves may not always understand the models. Two modelers may argue the merits of an experimental finance factor of 1.2 versus 1.8 related to the distance factor, which may account for only 5 or 10 percent of the sensitivity of the model. We get so wrapped up in technical aspects of a model that too often we fail to view it in its overall perspective.

Sixth, models are just too data hungry. Regression equations that describe the trip-making rate per household are sometimes composed of as many as 30 variables. At the same time that we use those equations, we make the statement that trip-making is predictable. In my mind, those 2 actions are just irreconcilable. Increasingly, policy-makers side with the view that trip-making is predictable, and increasingly model-makers pump more variables into the equation. In other words, we tend to scoop up the data as though they were going out of style while losing sight of the generalizations that we make and also of the extreme costliness of collecting the data.

How did these shortcomings develop? Back in the early 1960s when computers came into wide-scale use, many transportation people immediately selected a course that led to the development of models that were complicated, time-consuming, expensive, and research-oriented. At the same time, other groups were predicting travel by using much less sophisticated models. Neither one of those was satisfactory for urban transportation planning purposes, and so we settled for something in the middle. We have ended up with a set of models that are almost useless for both research purposes and decision-making, and we have lost all the way around.

What we really need is 2 sets of models, one for use in research and one for use in solving practical short-range transportation problems. I have no doubt that, given free rein, technicians could develop such models.

I would like to devote the remainder of my remarks to the decision-making models, not because they are more or less important but because I think enough attention has been given to the research side. Unless immediate attention is given to these models, we in the transportation planning business may well find ourselves in the back seat—or in the rumble seat because we may already be in the back seat when it comes to assisting decision-makers make critical transportation decisions.

It is no secret that transportation decision-makers are increasingly coming under attack from local political leaders, environmentalists, and all sorts of groups, young and old, from east and west, north and south, rural and urban. The criticism on all fronts is that the right kinds of transportation decisions are not being made. If our techniques are not responsive to pressures that decision-makers normally find themselves subjected to, then our usefulness is outlived.

The total technique models that I am talking about will have to have the following key features.

First, they will have to deal explicitly with the issues of the day and be oriented toward answering questions that decision-makers face today. That gets back to the impact question and to the question of dealing with 1990 or dealing with today. The models must frame answers in terms of today's time schedule. That is, they must explicitly measure present impacts of all the alternatives from the standpoint of build or no-build so that the impacts can be objectively debated and discussed within the public arena. In other words, I am not suggesting a series of regression equations that compute the impact of building highway A as being the introduction of so much air pollution into the air, so much loss in tax value, and so much reduction in time and cost to the automobile user; match the value of those negative impacts with the value of the positive impacts; and then come out with a decision as to whether or not highway A should be built. I am suggesting that the analysis of the impacts of highway A on air pollution, economic base, travel considerations, and a host of other factors be framed in terms of the kinds of data that elected officials, citizens, and technicians alike can use in public discussions. That is difficult to do, but I suggest that, if we expect models to have impact on decisions, then we have to meet that objective.

Second, the models do not have to do everything. There are some repetitive and highly complicated analyses that models can do, but they do not include things like travel demand, impact on parks, and impact on historic sights. Photographs, maps, and field surveys can be used to answer many of the kinds of questions that are being asked by elected officials and by citizen groups and answer them perhaps better than models do.

Third, the models must produce results quickly and simply, even at the expense of accuracy. A decision is going to be made regardless. Whether the model is the basis for the decision depends primarily on whether the model can be responsive in terms of the financial and time constraints that decision-makers operate under. A serious credibility problem has developed with regard to models because they do not address the right issues in a timely and politically sensitive way. We have got to build models that do.

Fourth, the models must deal with all possible options—from low-capital-intensive programs to high-capital-intensive programs, from existing technology to new technology, from what happens if we do to what happens if we do not. We cannot afford to have a screening process that knocks out these alternatives before they get ample public discussion and ample public hearings. For example, if patronage of a system of buses operating on existing congested facilities is forecast by current modal-split models, the figure will not be much lower than one for a rail rapid transit system that costs billions of dollars. The models are incapable of dealing in a rational way with the full range of options.

Fifth, and I touched on this earlier, the models must make it possible for trade-off analyses to be made among the impacts of any individual alternative. We should not try to develop a formula for doing this, for it is a matter of values, of goals, of objectives that may be different for each individual or group. The model output has to be sufficient so that those analyses and judgments can take place in the public arena. The model need do no more.

Sixth, the models have to be tied more readily to available data sources so that the need for new data collection is minimized. Governments and private sources collect literally millions of data bits every day. The national census, the state data collection activities, and many other data collection activities are not fully exploited. Major efforts must be made to reduce the need for new data collection and maximize the use of the existing data.

There is a vast difference in the types of questions that are asked by decision-makers at the various stages of planning. One overall series of models cannot be all-inclusive in terms of answering all the questions at the various stages or times in the planning process. The model that determines air pollution at the system level is quite different from the model that determines air pollution at the corridor or engineering design level. The questions of the past are almost irrelevant today. We do not quite know what the questions are going to be tomorrow, but right now we have to get today's questions answered.