On Improving the Transportation Planning Process

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•IN SPITE OF what many transportation planners believe, the history of architecture holds some lessons that may be of value to us in contemporary planning. Some of the most venerated architectural forms were conceived with functional beauty and simplicity. As the form became known and established, schools of admirers began to embrace its principles, and gradually the form became institutionalized in the social process. Then, as time passed, each practitioner of the art sought to improve the form by adding his own modifications and embellishments. As this process continued, the simple art form began to lose its original function and identity. Finally, a creation that once held appeal and beauty was rejected by the public as baroque or even grotesque. Subsequently, a renaissance was reached that resulted in the evolution of a complete new art form.

In many respects, the transportation planning process as it is applied today has evolved in a similar fashion. When the process was conceived some 15 years ago, it represented a fresh approach and introduced an element of science into the art of planning. For the first time transportation facilities could be planned on a systems basis, using an objective, quantifiable, and replicable approach. Even though the scope and accounting included in the process were limited only to transportation (and some will argue that only highways were given fair consideration in the earliest transportation studies), the step was a significant one because, for the first time, practitioners began to seriously consider transportation facilities as part of a future total system of facilities and not as a series of individual projects. In spite of its contribution, the process was still not totally embraced, and it was viewed by many administrators with a mixture of awe and suspicion during the late 1950s and early 1960s.

Then, as more and more responsible people began to see the value of planning transportation facilities on a systems basis (and other people became disenchanted with the way highways were being planned), pressures began developing for a more universal application of the transportation planning process in urban areas. Culmination of these concerns was the passage of the 1962 Federal-Aid Highway Act, a step that was to institutionalize the transportation planning process. This Act generated nationwide interest, and substantial research was undertaken on all elements of the process. Although some of this work in the years immediately following passage of the 1962 Act served to improve each of the elements of the transportation planning process, the process itself remained essentially unchanged from its original form.

Then, in the mid-1960s a new dimension was added to urban transportation planning. As the U.S. Department of Housing and Urban Development (HUD) became involved in transportation planning, it was mandated that transportation planning be couched within comprehensive planning in urban areas. In effect, transportation planners could no longer "do their own thing" in isolation from other urban systems planning. Transportation systems were no longer to be suboptimized but were to be developed as integral elements of the total urban system, with full consideration for transportation's influence on development and its interactions with other urban systems. But instead of

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redesigning the entire planning process to meet this new charge, the transportation and land use planning tools were conveniently combined and labeled "comprehensive planning."

The result of this merger is an eclectic set of tools that are not in accord with prevailing planning philosophy. Although we have mandates to plan long-range transportation facilities and urban development comprehensively, our tools are not tailored to this charge. Although we have developed methods to compare the direct costs and performance of alternative transportation systems for one future point in time, we find that the values that we have learned to measure and plan for are but a part of the total factors that society requires us to consider in order to implement the plan.

HOW HAVE WE BEEN DOING?

An evaluation of the large-scale land use and transportation studies of the last decade was recently made by Boyce and Day (1) of the University of Pennsylvania for the U.S. Bureau of Public Roads. In their report they state:

> Experience. . .indicates that the data requirements and data management problems in these programs, particularly those employing mathematical models, are immense. . . . Consequently, the number of alternatives tested and the differences among them were severely limited in the programs reviewed. Work schedules have been drastically revised, often resulting in a loss of credibility for the planning effort. Alternatively, agencies have resorted to crude short cuts, interim plans, or dropped the use of mathematical models altogether to stay somewhat close to schedule. The dilemma posed by this situation is particularly perplexing. While the use of computer methods is demanding of time and staff resources, important advances in metropolitan planning capability cannot be achieved without utilizing computer techniques. Because of the above problems, the evaluation phase of these programs has typically been hurried and too narrow in its scope. In addition, evaluation has been less meaningful than it might have been because of the narrow range of differences among the alternatives being evaluated.
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> The experience of the past few years also indicates that the growing understanding of metropolitan processes on the part of professional planners outstrips their ability to communicate this understanding effectively to public officials or to the general public. This situation has clear implications for evaluation methods and public participation. The decision process too often appears to have been a matter of sophisticated analysis versus blunt political or subjective reaction. In retrospect, the primary emphasis in these programs over the past few years has been the development and testing of planning methods, leaving insufficient time for a complementary emphasis on their application in fostering, examining and supporting creative ideas about the form and values of the future metropolis.

Urban transportation planning agencies and their sponsors must also struggle constantly at the other end of the scale. Transportation systems are not built instantaneously, and highway and transit project planning and programming are too often a world apart from long-range comprehensive planning. The values of individual projects that can relieve short-term problems can be substantially different from the values of a total transportation system that is 20 years or more away. More often than not transportation administrators and public officials responsible for project programming and implementation do not want to hear of the abstract benefits and costs of the "some day" total system; they are more concerned with the pragmatic details of a project's short-term impacts. A major problem is that transportation planners are not equipped to provide rapid and reliable analyses and information that would assist in making decisions on such projects.

IMPROVING THE PROCESS

How can we reorient the transportation planning process (and its methodologies and tools) so that it can be a more meaningful part of long-range comprehensive planning and also a more effective guide in individual transportation project decisions? First, we must recognize that transportation facilities will have impacts and effects on urban areas that will extend far beyond our present ability to define and measure. Entire new urban forms and structures will grow around the transportation corridors that are planned today. Unfortunately, we know little about the indirect values and benefits that,

because of the urban forms resulting from present transportation decisions, will accrue to society over time.

To become more effective, we believe that the transportation planning process must be broadened in terms of both planning scale and time horizon. At the regional scale, we must relegate to a lower level of significance the present methodologies and tools and search for sincere answers to complex, far-reaching questions that extend beyond the horizon of transportation alone. In effect, we must learn to do comprehensive region-wide planning before we can do a good job of regional transportation planning.

To date, we have spent most of our resources producing detailed forecasts of traffic volumes on every significant link in an assumed future transportation system or systems. It is perhaps the one thing that all of the approximately 200 land use and transportation planning programs have in common. The assumptions, data requirements, data processing and analysis, forecasts, models, and computer programs designed to produce these forecasts are legion and need not be elaborated here.

We believe it is impossible to forecast accurately the travel demand that will exist in 20 years on each transportation link at the regional scale. We further submit that the estimation of traffic volume for 20 years or more into the future should not be the overriding concern of the urban transportation planning process.

Transportation systems, unlike single facilities in rural areas, are dependent on and interact with all other links (and modes) in the system. Aside from the obvious difficulties of forecasting future small area population and employment, assumptions made concerning the system are crucial. All parts of the system must be built exactly as assumed if the forecast link volumes are to occur, even if the forecasts made and the models used are 100 percent accurate. Similarly, the economic analysis as now performed is at best only a measure of a portion of the benefits and costs in a system that may not materialize entirely as planned.

We presently have some measure of how transportation facilities will affect development patterns, but little has been done to determine how human values vary with alternative region-wide forms and development patterns. Is it, as has been alleged, cheaper to provide public services (including transportation) to a densely developed region? If it is, do people wish to live and work at such densities? It may be that there are no strong differences in the costs or values of alternative development forms over long periods of time at the regional level but that these factors are only meaningful at a finer scale such as a neighborhood.

REGIONAL TRANSPORTATION PLANNING

Transportation facilities constructed in urban areas will serve as facilities for movement by some mode throughout decades and even centuries. When viewed at this scale, factors such as link volumes in 20 years or attempts to optimize service for short-term demands lose their importance. Two parameters of regional transportation system planning then stand paramount—spacing and continuity. If the long-range plan for transportation facilities has good spacing and continuity, it will stand the test of time regardless of shifts in technologies, modes, or development patterns. However, if spacing and continuity are comprised for shorter range objectives, the long-range consequences could vary from additional investment in transportation facilities to major urban inefficiencies or disruption when maximum urban development is achieved.

These principles should determine the broad corridors within which individual transportation facilities must be designed and located. The regional scale, then, should establish the overall spacing plan for the highest level of transportation improvement. The development of such a plan does not require the detailed small area data collection, forecasting, and modeling now undertaken at the regional scale. Much simpler, more direct procedures are desirable and badly needed.

CORRIDOR PLANNING

Within the framework provided by the regional system, corridor or subarea analysis should be used to study alternative improvement proposals for each mode of travel. At this scale, network assumptions, data requirements, forecasting, and modeling become

more manageable. Shorter range projections (e.g., 10 to 15 years) are appropriate. The nature and staging of specific improvements takes on added significance. It is at this scale that our present transportation planning methodology is most applicable. We have spent too much detailed effort in dealing with end-state alternatives, but far too little time testing, evaluating, and recommending improvements to the partial transportation systems that exist today and will still exist 5, 10, or even 20 years from now.

Within these corridors, research efforts also should be directed toward better methods of land use control to ensure that a reasonable level of service is maintained. All too often, the expenditure of funds for highway facilities to improve the level of service has been immediately offset by rapid growth in land development producing subsequently higher travel demands than anticipated. Alternative ways to achieve a balance between land use and transportation in corridors include the following:

1. Restricting land development in the corridor to an amount that can be accommodated by the transportation improvements provided;
2. Controlling the amount, type, and location (or arrangement) of land uses so that the same objective is reached;
3. Modifying the supply of transit facilities and services provided to change the modal split in the corridor so as to maintain a high level of transportation service;
4. Metering the flow of traffic to maintain a high level of service; and
5. Some or all of these four in combination.

The demand as well as the supply side should receive study.

PROJECT PLANNING

Project planning should also receive more emphasis. At this level, all of the detail and information that we can muster is needed, but only for the specific transportation facilities that have been identified in the corridor planning phase as the earliest action priorities. First, we need to know in considerable detail the peak volume ranges for which we are designing the facility. We should know these design volumes, not only for an arbitrary design year 20 years in advance, but also for the variations in demand that will occur before the design year so that the design and staging can anticipate interim operational needs as well.

Decision-makers want short-range information, and we need to develop improved methods of defining the project's short-term impact on the existing transportation system and its surrounding environs. A major need in this regard is tools to evaluate the transport and other impacts of large-scale developments such as shopping centers, office complexes, and the like. Recommendations must be made by local planning bodies to accept, modify, or reject the proposed development and revise the transportation system as required. Reliable knowledge of nonresidential trip generation characteristics, essential to such analyses, is lacking. Less emphasis on home interviews as a way of obtaining basic data is indicated (with studies made at these sites instead).

Similarly, the definition and measurement of the land use and socioeconomic impacts of individual transportation projects is one of our most profound challenges. We need to have better measure of the disruptive effects of projects, and need to acquire the ability to evaluate how alternative alignments, cross sections, and modes of travel in a corridor can minimize this disruption. Planning for the relocation of people displaced should be included as well.

SUMMARY

As presently practiced, the regional land use and transportation planning process rests far too heavily on the assumption that the inputs to the process can be forecast with an acceptable degree of accuracy over a 20- to 25-year period. Although some progress has been made in improving the traffic simulation models that utilize these inputs and although some research has been directed recently toward improving methods of evaluating outputs, the process itself remains largely one of testing alternative end-state assumptions. It can be characterized as "what would happen if" art and, as such, is still too far removed from the decision-making process.

It is, therefore, essential that the urban transportation planning process be reoriented from its present overwhelming preoccupation with detailed long-range forecasting and end-state planning at the regional scale. The urban transportation planning process must be made more relevant to decision-making and implementation. Most transportation decisions are not made at the regional scale, but at the corridor and project levels. Much of today's transportation planning methodology can be applied at these finer degrees of planning, but new methods and techniques specifically tailored to these scales need to be developed as well. At the same time, much broader regional studies involving human values, as well as physical and economic considerations, should be undertaken. We badly need more specific, fine-grained tools for short-range planning, and also broader social and economic planning tools to apply at the regional level.

REFERENCE

1. Boyce, David E., and Day, Norman D. Metropolitan Plan Evaluation Methodology. Institute for Environmental Studies, Univ. of Pennsylvania, March 1969.