

INTEGRATED ECONOMIC-SOCIAL-ENVIRONMENTAL PLANNING

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This paper deals with the practical application of integrated economic, social, and environmental analyses to transportation planning and implementation. It is based on projects including urban transportation planning for a municipal government, corridor planning for a state department of transportation, and national-level planning for an overseas federal government. Each project was real, not theoretical or part of advance planning. Two of the projects were responsible for the U.S. Department of State request for a paper on the subject to the 1972 U.N. Conference in Stockholm on the Human Environment. First, the paper is based on an attempt to improve and broaden the understanding of integrated analysis. Three projects are used to point out selected and particularly difficult problems. Next, the paper describes the philosophical basis for and approach to integrated analysis. Key aspects and issues are reviewed by using selected references to identify strengths and weaknesses with specific elements of the approach. A special effort is made to identify and rank the more important elements of the approach so that planners might draw some inferences or conclusions on the utility of important elements as well as the overall approach. Finally, the paper concludes with answers to questions on what the results of the integrated analyses were, how the decision makers reacted to the results, and what decisions were made concerning the projects that were directly traceable to parts or all of the approach and integrated analysis. The paper refers to other theoretical and applied efforts. Emphasis on actual experiences and practicality is maintained throughout the discussion.

•THE PAPERS by Hammer (1) and Mandelker and Stamper (2) stressed the fact that transportation planning is becoming different because of current and developing economic, legislative, and energy issues. To follow this presentation of new transportation and land use imperatives with a discussion of some current attempts to respond to these issues seems appropriate. Thus this paper will be based on the premise that one can respond to these issues with integrated economic, social, and environmental analyses. It has the following 3 objectives:

1. To relate the integrated analysis approach to policy formulation as well as to project evaluation and to place the analyses in the context of real organizations and institutions,
2. To continue the dialogue regarding the need for well-implemented citizen participation in the approach, and
3. To stress the need for and the role of improved communications in the new planning process.

Before trying to meet these objectives, I would like to state that I feel that both the approaches and techniques for meeting the new transportation and land use imperatives are at an immature stage of development. Thus the review of the earlier efforts can be viewed only as a progress report on longer term development.

Professionals working in transportation and land use planning are responsible for

preparing practical evaluations for policy formulation and decision making. Thus they are forced to deal with a range of issues that is becoming wider and wider. Some of these issues are technical, and some are economic. We have dealt adequately with the technical factors in the past possibly because they are some of the easiest to understand. The social and environmental factors are those with which we are not so familiar. Most of these factors are of a combined social, economic, and environmental character, and this requires that they be dealt with in an integrated manner. In fact, political and legal requirements for an integrated approach are beginning to arise so consistently that the integrated evaluation can be said to be an idea whose time has arrived.

The response to the broader range of issues also must include a recognition that development goals change; therefore, some way must be found to deal more effectively with change and with the uncertainties brought about by change. In addition, because the decision makers and their constituents are largely responsible for setting goals, they must involve a larger group in the planning processes. This requires more effective communication with the social, economic, and environmental planner and with the lay citizen.

This discussion of 3 projects that I would like to present deals with the practical application of integrated economic, social, and environmental analysis to transportation planning and implementation projects. The projects were completed during 1972, which is early enough to allow for at least a preliminary postevaluation of the planning efforts. The projects include an urban transportation plan for a municipal government, a 250-mile-long (400-km-long) corridor study for a state department of transportation, and a regional, all-mode project for a government in Africa. Each project emanated from and was cast in a real-world, political decision-making context.

PERSPECTIVE FOR INTEGRATED ANALYSIS

Before discussing the previously mentioned projects, I would like to identify my own perspective regarding integrated planning in terms of its meaning and in terms of my understanding of the larger sociopolitical environment in which we find ourselves today. Every theoretician and practitioner in the field probably has his or her own definition for the word "integrated." In this paper I will stress the meaning that involves the bringing of things into a common and equal status. By using this understanding of the term, we might find that many engineers and transportation analysts would interpret integrated to mean multimodal planning; that is, analyses relating planning for automobile, bus, and rapid transit services. Some include in their interpretation of integrated planning for cargo plus passenger transportation. To the social planner, integrate might mean the coordination and balance of social services such as education, legal protection, recreation, and mobility. Or the social planner also might interpret it to mean the equitable provision of a service, such as transportation, to all socioeconomic groups. The economist might view integrated planning as that which ties together planning for the primary, secondary, and tertiary service sectors or, alternatively, that which coordinates planning between the public and private sectors. The environmentalist might interpret integrated planning as that which provides for change or development in a natural order without any limiting or destructive implications to related orders. What this means is that, among the participants in integrated planning, there is not even a common language that the professionals can use.

The word "need" is like integrated in that it means something different to the transportation planner, the sociologist, the economist, and the environmentalist. Understanding these differences is necessary because it is not easy to develop a common understanding of related social, economic, and environmental issues so that practical analyses and timely decisions can be made. This is partly due to the fact that transportation planning to engineers or specialists is paramount to their jobs and can be key to their respect for themselves and their professions. On the other hand, transportation is merely a part of the economist's infrastructure and a service to his or her various economic sectors. To the sociologist, transportation may be merely a means to a social end, and to the environmentalist, it may be a necessary evil whose impacts on

the larger social and environmental systems must be minimized.

The economist, sociologist, and environmentalist have different priorities; therefore, we know that any useful broad interpretation of integrated planning will be difficult to find. I contend that these different understandings and priorities are the heart and strength of integrated planning. In my opinion, it is the key to the processes of policy formulation and planning that each contributor bring his or her individual ideas and goals before the decision makers during the planning and implementation stages. Conversely, a legal conflict is likely to arise only when one discipline or group preempts the rights of others.

The decision maker must be able to understand and deal with the results of planning efforts. Whether this decision maker is a private individual using existing legislation to delay a project or an elected official at the municipal, regional, state, or federal level, his or her real world is similar in its social, economic, and environmental character. Thus his or her decisions are similar in that a need exists to make an informed, practical, and timely decision that simultaneously involves economic, social, and environmental concerns.

Before I discuss the examples, I would like to add a couple of final perspectives on the need for integrated planning. Hauser (3) concluded that

the 1960's were a period of dramatic change in the distribution and structure of the U.S. population, some of them already well known, others not so well known It seems . . . that in the 1960 decade the U.S. may have returned to the long-term downward trend in population growth that had been interrupted in the 1940's and 1950's by the effects of World War II and its aftermath.

If this is true, it will have significant implications for the techniques used in future transportation and land use planning. In a similarly broad evaluation, Silberman (4) stated:

Unprecedented social, political, and psychological uncertainties will affect growth prospects for the Seventies. The difference between high and low projections (for nationwide economic growth) works out to an incredible \$500 billion in the 1980 GNP.

The implications of this uncertainty for transportation planning and implementation are also enormous.

Of course, national trends will not necessarily be the primary determinants of change in any given area. Equally obvious, however, is the increasing need in planning and decision making to take into account the uncertainties regarding future growth and to realize that earlier planning and projection techniques have not been entirely adequate in terms of the ways that we deal with change. Silberman (4) went on to say:

Certainly the greatest need, so far as both businessmen and economists are concerned, is to reexamine the political, social, cultural, and technological as well as economic forces that underlie and ultimately determine the validity of any projections. The most interesting questions about the economy these days are, in fact, noneconomic questions.

Neither changing our planning approaches as suggested nor taking uncertainty into account is an easy task. However, among the existing techniques, the flexible and practical use of development goals and objectives and integrated analyses offers one of the best methods for dealing with current issues and for adapting to future changes.

THREE PROJECTS FOR EVALUATION

Let us briefly consider some projects that exemplify the challenges in attempting an integrated analysis. I will describe the projects in terms of the problems, scope, and objective of integrated planning, in terms of the decision makers, and in terms of conflicting goals. All of the descriptions will be mere sketches for purposes of brevity.

All 3 projects were initiated because of related social, economic, and environmental needs, and each had financing constraints and a time by which some decision had to be reached. An understanding of the related social, economic, and environmental issues was vital to their decision-making processes. It is notable that each centered around transportation or that transportation was viewed as a central part of the possible solution.

Municipal Transportation and Land Use

Municipal transportation and land use were the key issues in the university town project. A series of studies started with what appeared to be a simple but severe problem of parking around the university. This study resulted in a further exploration of relationships between

1. University traffic and parking and city traffic and parking,
2. City transit service and the university shuttle-bus service, and
3. Planned land uses of the university and the land-use and transportation plan of the city.

What started as a student parking problem escalated to an areawide concern over (a) what was seen as an undesirable development trend, (b) a city ban on providing services to certain developments, and (c) a strong growth-versus-no-growth controversy.

The overall objectives of the study included the analysis of alternative growth and density concepts and their implications for transportation development, protection of the scenic environment, and identification of those who would benefit from the proposed changes and those who would pay for such changes.

The primary decision makers were clearly an aroused voting public. The decision-making group also included a strong, progressive, city-manager government with its own municipal department of transportation. To a lesser degree, the decision-making group included the regional, state, and federal agencies that offered development financing support.

1. The desire for low-density housing and, at the same time, a low-cost, extensive transit service and
2. The desire to maintain a small-town character with a strong sense of community and, at the same time, to develop a relatively expensive and high level of municipal services.

The State-Level Corridor Project

The state-level corridor project was not particularly unique in that the social and environmental problems were central to the analysis from the beginning. However, the state government had not only some of the earliest and strongest environmental legislation in the country but also one of the earliest and strongest departments of transportation. The project covered a cross-state, 10-county region that was afflicted by the combined economic and social ills that are endemic to much of the Appalachian region. This setting resulted in an unusual contract objective: to provide information concerning the feasibility of the project to decision makers within the context of alternatives for improving the economic, social, and physical conditions of the state's population. I think that this is an incredible framework for a transportation study. The principal decision makers in this project were the state department of transportation and the governor's office. The region's populace, although concerned and aware of the legal tools at its disposal, represented only about 5 percent of the state's population and was spread over more than 25 percent of the state's land area. Furthermore, the 10 counties of the study region did not represent a cohesive region from either an economic or social standpoint.

1. A desire for economic improvements and, at the same time, an alleviation of some severe environmental pollution problems and
2. A desire for economic, educational, and social improvements without disrupting the existing wide variation of rural and small-town life-styles.

The Overseas Project

The overseas project was unusual in that its basic problems were quite similar in character to problems in the 2 previously mentioned projects. Economic and social growth, avoidance of the problems of rapid urbanization, improved job mobility, and the rejection of rapidly changing life-styles were all problems in a region about the size of Michigan. Somewhat different was the existence of a very fragile physical environment on which much of the regional economy was based. Continued competition among potential developments actually threatened the life of the existing economy. The physical environment and resources had been so damaged by earlier developments that economic losses and severe social dislocations could be documented easily.

The objective for this project was to identify the alternative socioeconomic activities that would permit a long-term, sustained economic production given the limited human and physical resources.

The decision makers in this project were primarily the major international lending agencies. Local agencies were understaffed and often not qualified to conduct analyses or to organize data for decision-making purposes. Even so, there were some organized and highly qualified groups in the country that prepared well-documented environmental and social inputs to the planning and decision-making process. However, these citizen groups were not politically strong or in possession of the social or environmental legislation that we have in this country.

CONCEPTUAL APPROACH TO INTEGRATED ANALYSIS

There is obviously too much in this subject to cover in the space available. The conceptual approach, quantitative and qualitative techniques, and political and organizational issues cannot be covered in any detail. Thus my approach will be to sketch the conceptual approach, illustrate it with selected techniques, and identify references wherever possible. I will sum up with what has occurred in the projects over the last 2 to 3 years and draw some conclusions from the results in terms of their implications to the transportation planning community. Naturally, this approach represents only 1 alternative to integrated analysis. Much more needs to be done to make integrated planning a reality.

The basis approach is a 3-step process. The first step is to build with a series of microanalyses to an overall or comprehensive growth strategy. This includes microeconomic, microsocial, and microenvironmental analyses. The strategy incorporates a participatory process by those affected to reach a knowledgeable consensus on social, economic, and environmental issues and objectives. Transportation alternatives then are organized to support the alternative strategies. This is quite different from the traditional transportation planning approach that has been oriented primarily toward accommodating the tremendous growth that has taken place throughout this country since World War II. However, it is the concept identified by Hammer (5, p. 87). He contends that an increasingly common approach is the

promulgation of new master plans representing community growth objectives and the translation of these growth objectives into immediate implementation devices such as capital improvement budgets, street and highway construction plans, and zoning regulations.

I like another of his contentions that "there is nothing new or unconventional about this approach except that it is finally being used." I am a firm believer that the data required for starting this process already exist. In fact, we often have so much that the data

problem is one of discrimination, not collection.

The second basic step involves the preparation of a program for implementing related projects that support the overall development strategy (starting with the smaller projects first and building toward the larger system). The goal here is to avoid those implementations whose impacts we cannot, with existing tools, identify or analyze. In the case of San Francisco, the approach would have been to initiate the municipal systems first and then to tie those together with the Bay Area Rapid Transit (BART) system. Possibly some of the economic and social consequences of such an approach can be determined from the results of the Metropolitan Transportation Commission's current multimillion-dollar postevaluation of BART. In any event, the analytical transportation planning tools were not then and, I contend, are not now available to assess the economic and environmental impacts of such massive investments or the changes to the social system that are brought about by such projects.

The third and final step in the proposed approach is the incorporation of a practical feedback mechanism into the step-2 implementation efforts. This feedback would identify actual social, economic, and environmental effects as individual projects under the overall development strategy are completed. If such a feedback mechanism could be successfully implemented, it would give us a practical way of dealing more effectively with unpredictable effects and with the uncertainties of change.

This 3-step approach requires the use of qualitative as well as quantitative methods, none of which are particularly new and all of which need to be improved. The tools or techniques that I will cover here briefly are citizen participation, communication between professionals and citizen groups, and integrated analysis. This order also identifies my priorities for the process.

Citizen involvement procedures have been developed over a period of years, and ours is described in one of my earlier papers (6). These concepts are similar to the practical and applied concepts used by Fielding (7).

The main points that should be made concerning the iterative participation process are that it is organized

1. To involve the citizens in the identification of the alternatives that are then subjected to the same analytical investigation by specialists,
2. To involve the citizens in the evaluation of alternatives on which they will likely be asked to vote and with which they will have to continue to be involved in the event a long-term implementation is required, and
3. To provide for a citizen review as a technique for monitoring changes as the project develops to be able to deal more effectively with uncertainty and risk.

For citizens to participate meaningfully, they must have an overall understanding of the project and issues. In developing this understanding, they must be able to communicate with the professional planners. Thus, as evidenced by the number of papers on the subject at the 1975 Transportation Research Board Annual Meeting, communications are a critical part of the planning process. In fact, I expect that the development of understanding through communicative arts may take on the kind of importance in the near future that community participation has been assigned in the recent past.

I would like to skim the analytical techniques that place transportation into larger economic, social, and environmental frameworks. Most of these techniques are in their infancy or are a part of a continuing progression of change. This is particularly true of economic techniques and the changes that have taken place in economics, from Adam Smith in his 1776 work, *Wealth of Nations*, to John Maynard Keynes, to the establishment of the Nobel Prize for "economic science" in 1969, and finally to the economics of Lewis Mumford or E. F. Schumacher (8). Each period in history has had its own economic theory that was appropriate to the times. In fact, we may not as yet have found the theory most appropriate to the current time. However, we have a start in the Brookings Institution's Transportation Research Program where Harral (9), as early as 1965, said that "a central theme is that the value of transportation is measured by the degree to which it contributes to goals" and that "sound investment analysis requires awareness of the interrelationships between transportation and the economic

and social] sectors it serves." Much of this newer work supplements Robley Winfrey's extraordinarily detailed work on user costs and benefits and helps to identify the costs and benefits arising from projects that are directly related to the transportation project. That costs and benefits directly related or attributable to the transportation project be included in a broader "income" analysis is important to integrated analysis. Their dismissal as second-order effects or externals is a reflection of a failure to understand basic economic relationships. It will be an indication of our maturity as professionals when we learn to deal effectively with these relationships that are no less reliable nor more difficult to quantify than the values of time that are in common use in traditional analyses.

As an example of the integrated approach, planners conducted numerous micro-analyses in building toward the overall assessment of the 250-mile (400-km) corridor study previously mentioned. This project started from a wood pulp and paper production plant that required some highway improvements because a rail line that had served the plant was abandoned. However, the improvements were controversial because the plant had caused such severe water pollution during its operation that economic losses had occurred in sporting goods sales for recreational hunting and fishing. Closing the plant meant the loss of about 350 jobs and the entry onto welfare roles of about 100 employees and their families. Integrated analysis resulted in the identification of the possibility of providing state funds for pollution research and pollution abatement hardware (possibly on a no-interest or low-interest basis) and for the transportation access roads. Private investors could then be encouraged, because of the new access roads and lake cleanup, to invest in second-home and recreational developments.

Real dollar benefits could be attributed to the integrated activities in enlarged paper production and reestablishment of recreational activities and from new second-home activities. Furthermore, the state would avoid a sizable annual welfare cost. Unfortunately, one of the real difficulties with the plan and analysis was the number of different state agencies that would have to be involved with the solution. This type of interdepartmental cooperation in planning and financing brings into question whether our institutions are organized in a way that permits us to deal rationally with economic-social-environmental factors in transportation and land use planning. In any event, the process provides decision makers with a significantly improved basis for understanding the implications of their decisions.

SUMMARY

One might ask at this point how the various decision makers reacted to the overall approach and to the integrated analysis. The overseas project resulted in a series of tightly related investment decisions for an international road link, road-related resource developments, and an industrial food-processing plant; stronger environmental legislation and land use zoning; and a stimulation of private investments in tourism and a chemical plant. The idea of cautious, progressive investments with a finely tuned feedback mechanism, however, was lost in the burst of understanding that a series of related and carefully scheduled investments might be more economically and socially attractive than 1-time investments in transportation, agricultural, or industrial projects, which has been the traditional approach. A key to the decision for coordinated investments was the lack of a rigid institutional structure that exists in so many levels of government.

The university town called a temporary halt to transportation and land use decisions. In halting the development process, the decision makers may have overreacted to the advantages of using a cautious, progressive, decision-making approach to dealing with uncertainty. Even so, some transit development and zoning decisions were made, and any overreaction seems to be disappearing as different government agencies gain experience in working together in support of the overall community goals for life-styles and urban and environmental forms.

The decision makers concerned with the 250-mile (400-km) corridor study apparently were satisfied with the results of the integrated analysis. The project was the subject

of a special report in the New York Times on June 18, 1972, was presented in an article in the July 13, 1972, issue of Engineering News Record, was the subject of an editorial in the same journal, and was the basis for a U.S. Department of State request for a paper for the 1972 United Nations Conference on the Human Environment (10).

Within the state, selected transportation investments were made and the involved citizens of the 10-county region were divided into smaller groups (according to common socioeconomic interests) for continuing planning and implementation. As I mentioned earlier, however, the principal decision makers were the state-level planners, and the program of related investments ran into the difficulty of interdepartmental planning and financing. One of the significant results of the project was the identification of the fact that no state agency acting alone would be able to meet the state objectives for the region, and that integrated analyses could be used to identify each agency's involvement in terms of planning and budgeting requirements.

In summary, the need for and validity of integrated analyses appear to be justified despite some conflicts with institutional forms. That these conflicts did not arise with the people involved is notable. In fact, in all 3 instances, those involved appeared to be able to use the approach as a basis for adjusting their own goals and in suggesting adjustments to their institutions and institutional processes to attain those goals.

Finally, I agree with Hammer that the deployment of transportation facilities and services is the basis for growth management and that tightly integrated land use and transportation planning is an essential tool of public policy.

REFERENCES

1. P. Hammer. Issues and Actions for Managing Development. Paper in this Record.
2. D. R. Mandelker and H. A. Stamper. New Frontiers for Land Development Controls. Paper in this Record.
3. P. M. Hauser. The Census of 1970. Scientific American, Vol. 225, No. 1, July 1971.
4. C. E. Silberman. The U.S. Economy in an Age of Uncertainty. Fortune, Vol. 83, Jan. 1971.
5. P. Hammer. Growth Management: A New Framework for Land Use and Transportation Planning. Transportation Research Record 508, 1974, pp. 85-90.
6. C. D. Bigelow. Goal-Responsive Community Participation: An Imperative for Integrated Social-Economic-Environmental Analyses. Transportation Research Record 481, 1974, pp. 11-20.
7. G. J. Fielding. Community Involvement in Highway Planning and Design. Federal Highway Administration, Jan. 1973.
8. E. F. Schumacher. Small Is Beautiful: Economics As If People Mattered. Harper and Row Publishers, Inc., Scranton, 1973.
9. C. Harrall. Preparation and Appraisal of Transport Projects. Brookings Institution, Washington, D.C., 1965.
10. C. D. Bigelow. Capital Financing for Development in the Context of the Human Environment. United Nations Conference on the Human Environment, Stockholm, June 1972, U.S. Department of State.