

Regional Research and Highway Planning

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● IT IS GENERALLY recognized that the demand for highway construction and improvement is greatly influenced by the rate and form of urban expansion, by regional economic growth, by growth in national income and interregional trade, and by similar developmental forces. It is also generally accepted that highway construction and improvement directly and indirectly influence these same developmental elements. The implications of these relationships are not yet so widely recognized, however, nor generally acted upon. This paper is concerned with one of the more evident implications: namely, that highway planning should logically be grounded in the most advanced knowledge concerning the developmental forces which influence, and are influenced by, highways—as well, of course, as other forms of transportation.

Three points are emphasized in this paper. Firstly, that the study of these developmental forces, with their many complicated interrelationships, can be brought into an understandable focus through regional analysis and the concepts of regional planning. Secondly, that regional research is currently providing a substantial and growing pool of knowledge and of analytical techniques which have great potential value for highway planning. And thirdly, that, given the actual and even greater potential value of regional research for highway development, highway people might well take a leadership role in trying to improve the caliber and applicability of regional research.

It is worth noting the many ways in which the knowledge and techniques of regional analysis can be helpful in the activities of highway units. Such knowledge and techniques can help (a) in the location and design of highways through analysis of the effect of changes in the developmental forces and in spatial arrangements on the generation and flow of traffic and alternative desire lines; (b) in pinpointing the economic impact of various types of highways, bypasses, and other facilities; (c) in the development of transportation system concepts and system services; (d) in the interpretation of O & D and other highway research activities that lead to the formulation of policies; (e) in clarifying the types of issues raised in public hearings and other public discussions of highway plans and other highway matters (that is, generally in public relations); and (f) finally, they can help through a broader and more rigorous definition of the many other types of problems that are involved in highway planning and highway research, and particularly in relating highway development to other important developments in the economy and society.

DEVELOPMENTAL FORCES

The country is experiencing extremely rapid industrialization, growth in service activities, and urban growth—particularly suburbanization. Historians looking back at this period may well use such terms as "Advanced Industrial Revolution" and "Age of Urbanization." The major phenomena are nationwide in character—as one would expect them to be in the closely knit national economy and society—but the timing and specific form they take tend to vary greatly from one part of the country to another. Thus, at any point in time, some regions—as is true of the Pacific Coast—are growing rapidly in population, industry, and income; others are growing slowly if at all; and still others are moving ahead at just about the national average. The picture is even more complicated than that. Some regions gain rapidly in population and industry, but not so rapidly in per capita income; others may gain in per capita income at the same time that population remains stable or declines, as has been true of some of the Plains states during the past two decades. If the 48 states are compared as to absolute and relative levels of growth with regard to only three indicators—changes in population, total real income, and per capita real income over the past two decades—no less than 25 different varieties of growth patterns are indicated. In other words, the regional growth picture is an extremely complicated one.

Many of the most significant changes that have taken place in the United States in recent decades have added up to a dramatic shift in employment from agriculture and other resource exploitation to employment in manufacture and services. Between 1939 and 1954, for example, at the same time that employment in agriculture dropped 15 percent and in mining 9 percent, employment in manufacturing increased by 63 percent, in construction by 121 percent, and in general services by 62 percent. (The percentages are not particularly significant in themselves since they vary depending on which years are chosen for the comparison, but they are useful in indicating the general order of magnitude of relative growth of the various sectors of the economy.) The consequence has been not only a very rapid growth in metropolitan communities in general, but a very great concentration of activities in regions with special advantages for different kinds of manufacture and service activities (including such services as wholesaling and recreation).

Relative regional advantages or disadvantages for economic growth are in very many instances largely a matter of access to markets, to raw materials, to labor force, and to special services. Access is, of course, essentially a matter of transportation cost and time—or what is sometimes called "distance friction." A transportation cost map looks very different than a linear distance map, and producer and consumer decisions are normally made in terms of cost and time considerations and not in terms of distance as such. It follows, then, that highway construction and improvement are among the significant molders of relative regional advantage and disadvantage.

Whenever a firm makes a locational decision—either in expanding its existing plant, moving its plant to another area, or deciding where a new plant is to be located—it naturally considers relative total cost in one location versus all other possible locations, as well as relative sales and gross returns in the different possible locations. Everytime a new major highway is constructed or improved the likelihood is that it has changed the relative cost of moving things and persons and therefore influenced the basis on which locational decisions are made.

For many firms, the ability to get a given number of workers of the appropriate skills to their plants or offices is the central consideration in location. Commuting time to and from the plant serves to determine the size of the labor pool which the firm may tap. Highway improvements are thus critical factors in the location and size of labor markets.

The importance of what is called "access" considerations for locational decisions of business firms has, of course, been dramatically highlighted in recent years through the developments along such highways as the New Jersey Turnpike, Route 128, near Boston, and the East Bay Freeway in the San Francisco area. But while these developments are dramatic enough to bring attention to the role of highways in locational decisions, the much more pervasive force of changes in access through highways (and other forms of transportation) on the growth and economic health of regions is not seen except through regional studies of a comprehensive type.

It seems that what needs major stress is the fact that the nation as a whole is best off when each region of the country is carrying out those activities for which it is best suited. In turn, the people in every region of the country can enjoy a high level of income, if not always a rapid growth in the over-all volume of activities, if the region is making a sound socio-economic adjustment in tune with the demands of the pervading national developmental forces. In other words, each region can enjoy economic health, if not hectic growth—but only if the important things are kept in balance and the needed adjustments are helped along through conscious group efforts. This would suggest the necessity of at least a minimum of regional planning, which can lay a foundation for decisions in such fields as city planning, industrial location, natural resources development, and transportation.

Such planning, and sensible decisions within each of the important development fields, calls for a great deal of information and knowledge. It is essential, in the making of decisions which have important impacts, that they be based on an understanding of the key forces at work in the economy and society. This is possible. For in spite of all the complications and in spite of the speed with which certain changes take place, careful and imaginative study often reveals patterns which can make the

changes understandable and at times even predictable—at least in broad ranges and in terms of probabilities. Since it can be assumed that highway planners would want to base their decisions on the most advanced knowledge available concerning the forces which influence, and are influenced by, highways, there would seem to be value in discussing the state of such knowledge and the desirability of improving it.

REGIONAL STUDIES

The developmental forces with which we are concerned tend simultaneously to play a role on the national, the regional, and the local scene. Thus, technological and economic changes which may have national and even international roots—say, automation of a given industrial process for making plastics—and which influence national supply and demand for the product, will at the same time influence the amount produced and purchased within each region—that is, have a regional impact—and also at the same time influence the choice of the local site on which a new plastic plant may be built.

The elements which are of particular interest for highway planning are those related to the location of persons and economic activities and to the movement of persons and things. For that reason, from the standpoint of highway planning, the picture of the developmental forces can be brought into focus most sharply through regional analysis and the concepts of regional planning. Regional analysis serves to bring national and local forces, as well as regional elements, into a manageable framework and serves to bring to the fore questions of location and of spatial arrangement—or more generally, the interrelation of persons, things, and forces in space.

The relevance of regional research for highway planning can also be highlighted by listing the developmental questions which are of particular concern for any type of transportation planning and noting the extent to which they fall within the context of regional studies. These would include such items as: (a) the rate and pattern of regional economic growth; (b) the changing patterns of interregional trade; (c) interregional, urban-rural, and intra-metropolitan population migration; (d) the rate and form of urban expansion; (e) the changing structure of the metropolitan community (f) industrial location and siting; (g) urban, suburban, exurban, and rural land-use patterns; and (h) relation of urban expansion to natural resource use and development; and (i) patterns of interregional and intra-regional movement of persons and things.

It is worth noting that problems of this type are being intensively studied in many centers throughout the country. A survey of regionally-oriented research and graduate education activities at U.S. universities, conducted by Resources for the Future, Inc., and published in May of 1957 (1), has revealed that over eighty universities are now carrying out regional studies of one type or another. Certain of these studies are providing valuable new data and insights into the developmental forces and spatial problems which are of significance for highway planning.

Even persons who have long been connected with the field of regional studies have been surprised to discover how extensive the current efforts are. There is regional work of some importance under way within each of the social science disciplines and in a number of the natural and technical sciences as well.

Every major graduate geography department in the country is sponsoring regional research of one type or another and, as a matter of fact, the whole discipline has a strong regional orientation. Among other subjects, land forms, land use, and land planning are receiving a good bit of research attention, as are resource use and resource management problems more generally. The study of physical elements and natural resources within a regional framework is carried out also by many other departments and schools. While much of this research is rather specialized, a significant portion of it is directed at a basic understanding of the physical environment of the type needed as background for various types of developmental efforts, including transportation planning.

Regional Economic Development

Regional economic development is a central focus of interest of bureaus of business and economic research in universities throughout the country. Such bureaus gen-

erally provide continuing research on the economic problems of the state within which they are located. A few titles of studies carried out by various bureaus of business research can suggest the type of problems covered: An Analysis of Iowa Income Payments by Counties; Retail Trade Area Analysis of 11 Southwest Iowa Towns; Economic Development in South Central Kansas; Coal in the Maryland Economy; Tourist Days and Tourist Spending in Southeastern Florida; Retail and Service Business Classified by City Size; An Economic Survey of Dallas County, Texas; and Factors Influencing Plant Location in West Virginia.

In addition, in quite a few of the universities, research in local economic problems is carried out by departments of economics, schools of business, departments of geography, departments of agricultural economics, and similar units. It would seem that there are few, if any, states in the country which do not have at least one research center concerned with questions of regional economic development.

The Metropolitan Region

The metropolitan region is currently the subject of a great deal of university, as well as non-university, research—much of it of direct or indirect relevance for highway planning. Metropolitan physical structure, patterns of growth, land use, urban economic development, social structure, and political problems—these and related topics concerning the metropolis are all being investigated. In quite a few instances, problems of transportation are specifically studied within the context of urban research. Examples are the study of "Commuting Patterns of Industrial Workers", which was carried out by the Housing Research Center of Cornell University, and the urban transportation studies carried out by the Department of Land and City Planning of the University of Pennsylvania. Even where transportation is not studied directly, the research often provides concepts, methods, and data of some value for highway planning.

Some of the research currently under way is directly concerned with methods and techniques of regional analysis. While it is difficult to generalize about methods which are likely to be especially valuable in one particular area of concern, such as highway planning, there seems little doubt that highway planning will increasingly be able to draw on the growing and improving kit of tools of regional analysis. Several of the foci of methodological research deserve attention. Included are those in the realm of population and human ecology, such as methods of analyzing regional population structure and shifts, and of projecting future populations within regions; geographic field survey methods; techniques for analyzing industrial location, including the market potential concept; methods of regional income accounting and interindustry or input-output analysis; spatial interaction methods of analysis; and techniques for making regional economic projections.

The main point is, there is every reason why highway research and planning should make optimum use of such studies and why, in fact, regional analysts and planner should be drawn into the highway planning process.

Comments thus far have been concerned only with possible use of regional research by highway planners. Actually, of course, regional studies, as well as other types of socio-economic and physical research, have long been used in highway planning. A current example is the series of economic impact studies being sponsored by the various state highway departments and the U.S. Bureau of Public Roads. These studies are suggestive in a number of ways, and serve to symbolize the current stage of regional research in general.

First, it is worth noting that in getting economic impact studies under way in 21 states, reliance in the majority of cases has been placed on university research groups. The remainder are being carried out by the state highway departments themselves (as in California, Oklahoma, Missouri, and South Dakota) or by private consulting groups. As might be expected, quite a few bureaus of business research have been tapped, as in the case of the bureaus at the University of Oregon, the University of Kentucky, and the University of Wyoming. Several of the universities are relying on schools of business administration, others on transportation institutes (e.g., Michigan State University and Texas A & M), and still others on ad hoc interdepartmental research groups. It is worth noting that in many instances the individuals carrying out the impact

studies have been closely associated with regional research and tend to apply the concepts and methods of regional analysis.

The economic impact studies are certain to be valuable in highway planning, as well as for other purposes, and are likely to be the first stage in a continuing series of studies geared to providing socio-economic information for highway officials and the general public. The persons carrying out these studies would be the first to indicate that the methods which must be employed are crude and imperfect and that more sophisticated concepts and methods must be worked out if the best results are to be obtained from impact studies and similar studies with a regional socio-economic focus.

Actually, it is only too evident that the potentialities of regional research are only beginning to be touched. What is involved here is not a perfected system of analysis whose value needs only to be appreciated by highway planners and other possible users. What is more to the point is that regional studies to date have shown that regional research has much to offer to highway planners as well as to other groups whose functions are influenced by, and who in turn influence, regional socio-economic and physical development. If regional research is to realize anything approaching its potentialities for usefulness, it will have to be strengthened. This really means that abler persons will have to be recruited into the regional field and that they will have to be better trained when they are at present. Better research almost always implies better education—the two generally go hand in glove. Highway researchers and planners have a vested interest in the field and might well take the lead in an effort to strengthen regional research and regionally-oriented graduate education. The objectives would be to help in the establishment of strong research centers at universities to which highway departments can turn for help in dealing with complicated socio-economic research problems, and in the establishment of regional educational centers which can provide graduates well equipped to do, among other things, high-caliber highway research and planning within highway departments.

In a recent book (2) it was suggested (as have others) that the highway planner can function most effectively as a member of a team concerned with regional planning and development. Other members of this "team" are (a) persons concerned with other forms of transportation, (b) those with a responsibility for the development and conservation of natural resources within regions, (c) those working on problems of metropolitan expansion, (d) individuals concerned with area development or industrial development, (e) those in state planning, and (f) individuals with responsibilities for regional research, including research in industrial location, marketing, and similar fields sponsored by public and private groups. These persons, in carrying out their activities, are inevitably concerned with many physical, economic, political, and social elements which are closely interrelated. The education of persons who have, or will have, responsibility for such activities—no matter what their professional training may have been—can hardly be considered to be adequate unless they have had an opportunity to achieve an understanding of these forces, and of methods for analyzing them, through specially focused interdisciplinary study. Such study might be in the form of supplementary education, in large part for persons already in the field who return to a university on a fellowship basis. If properly organized, regional education programs of this type would tend to have a strong research focus. The task of advancing regional research and of improving the education of persons with responsibilities in regional planning and development should logically go hand in hand.

There is every reason why highway researchers and planners should take a leading role in the sponsorship of such regional education and research programs.

Highway officials have been entrusted with a powerful tool, one which, properly employed, can help promote sound regional development and healthy national growth. This is a most serious responsibility; it is also an exciting and challenging opportunity. They are in a position to provide leadership in getting the diverse developmental efforts to add up to something really effective and sensible. This opportunity can be pursued in a number of ways: by helping to bring into being what is called the "regional team" as the focus for cooperative effort and coordinated regional planning; through raising the level of public discussion of the key regional factors which shape the development

and welfare of the various parts of the country; and, finally, through alliance with other interested groups in increasing the excellence of regional research and regional researchers. The obvious direction in which to move to do these things is a joining of forces with universities in the development of strong centers of regional research and education in various parts of the country, where, among other things, highway and other transportation studies can be carried out in a broad and fruitful framework.

The requirements for decision-making in a field as significant as highway planning are demanding. It is only a matter of common sense that those who have this responsibility do everything they can to strengthen the sources of the knowledge on which such decisions must inevitably depend.

REFERENCES

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