

## Social and Economic Factors in Transportation

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Transportation Research Board's Committee on Social and Economic Factors in Transportation has in its scope "all direct and indirect social and economic effects of transportation systems both within the transportation corridor and within the larger regions affected, including those bearing on present and future transportation needs and services."

This scope now includes research in five primary areas:

1. The economic and social impacts of transportation projects, policies, and trends;
2. Methods of impact assessment;
3. The identification and valuing of externalities related to the use of the transportation system;
4. Sustainable transportation; and
5. Environmental justice as it relates to transportation.

Some of these areas overlap, and some of these fields might merit more attention than others, but they all fall within the domain of social and economic research. This paper examines each area, emphasizing current research directions and future research needs and challenges.

### ECONOMIC AND SOCIAL IMPACTS: PROJECTS, POLICIES, AND TRENDS

At present, there is a need for social and economic studies that evaluate the impacts of transportation projects. For example, what are the impacts of highway construction and improvement projects as we begin a new century? Palmer and colleagues (1) and Harvey (2) recently examined the impacts of highway improvement projects on economic activities located along a right-of-way to be improved; they attempted to generalize their findings for applicability to different localities and regions. This is the type of study that is necessary—one that attempts to generalize the impacts of the problem examined, so that other localities can apply the results. In the same vein, what are the social and economic impacts of relocations caused by highway projects? Are the federal programs in this area working as envisioned? We have seen few evaluations of the impacts of transportation projects. Some notable exceptions are summarized in a recent volume published by the Federal Highway Administration (FHWA) on mitigating community impact:

Aside from analyzing projects, there is a need for research that evaluates transportation policies and trends in terms of their human impacts. Far too little attention is given to these areas. Included would be a more thorough understanding of deregulation impacts and privatization. The entire process

of globalization is creating a demand for more transportation at a time when some are calling for decreases in the generation of traffic. There seems to be little understanding that NAFTA or a unified Europe will stimulate significantly more freight transportation. Other trends occurring at the present time that significantly impact urban travel are the increasing number of women joining the labor force, the increasing number of single-parent households, increasing numbers of elderly drivers, the entire area of “welfare to work” (often underpinned with the belief that welfare recipients can move into the labor force without the provision of transportation), and the increasing number of motor vehicle accidents globally. All of these trends have social and economic dimensions worthy of research and analysis (3).

In addition to policy changes and trends, environmental trends are worthy of study. For example, what are the social and economic impacts of transportation changes brought about by global warming? If policy makers decide to limit emissions of carbon dioxide, motor vehicle fuel use might be reduced through rationing or taxation. What would be the human impact of such actions? What are the economic impacts of a switch to sustainable transportation? Will it be possible for lower-income families to acquire sustainable transportation technology? How can this technology be distributed in an equitable manner? These are just a few of the issues that deserve attention because they involve significant social and economic impacts.

### **METHODS OF IMPACT ASSESSMENT**

Methods and procedures for assessing the impacts of transportation projects date from the 1960s and 1970s, when concerns mandated such studies [e.g., *The Environmental Assessment Notebook Series* by Skidmore, Owings, and Merrill (4)]. In conjunction with state and local transportation officials, FHWA recently developed a community impact assessment process that parallels its National Environmental Policy Act procedures, focusing attention on the human impacts that should be analyzed as part of any transportation project. The process identifies four benefits of assessing the social and economic impacts of transportation projects:

1. It allows for the support of sustainable, livable communities; it can promote community values and thriving neighborhoods; and it can contribute to general well-being.
2. It ensures that transportation policies and investments embrace the concerns of neighborhoods and communities, leading to better decisions and a greater acceptance of the projects.
3. It helps coordinate and integrate independent plans for land use, local economies, and transportation to achieve common goals.
4. It fulfills the legal obligations of environmental justice by maintaining nondiscriminatory principles and practices.

To carry out these assessments, we need to identify methods, tools, and techniques for practitioners. Although some methods date back to the 1970s, there has not been much progress in social and economic impact assessment techniques since then. We have seen major changes in research technology, notably through personal computers and geographic

information systems (GISs), but have not incorporated them effectively into our methods. These technologies would enable researchers to perform rapid preliminary assessments of the potential impacts of a given project. Whether the information needed is the number of potential riders within a quarter mile (.4 km) of a proposed transit line, or the accessibility to different centers (senior citizen, medical, religious, etc.) for some clientele, a GIS can give rapid answers, with a precision that depends on the quality of data available.

Statistical and spreadsheet microcomputer software has not been used effectively, nor have more recent approaches. Instead, there seems to be a reluctance to dispense with worksheets and pencils, which are less reliable and more time-consuming. We should take advantage of the technology to improve the quality of our assessments and the accuracy of our evaluations.

Beyond computer technology is the problem of research methodology. We do not have rigorous definitions for some of the basic notions in this field. For example, we continue to wrestle with definitions of such basic concepts as community cohesion. The recently published *Community Impact Assessment: A Quick Reference for Transportation* seeks to address some of these points. In addition, a National Cooperative Highway Research Program project, now under way, might resolve some of these questions, but probably will only be able to scratch the surface. Researchers from other fields—such as sociology, social psychology, and psychology—must be involved in defining some of these concepts.

### **EXTERNALITIES: IDENTIFICATION AND VALUE**

There has been a significant effort lately to identify the major externalities associated with the dominant highway–motor vehicle transportation system (5–9). Although no one questions internalized costs such as fuel, insurance, registration, and the like, the same cannot be said for the external costs. These include accident costs not covered by insurance, the medical costs of local air pollution, the costs of policing the highway system, the loss of productivity caused by motor vehicle accident injuries or fatalities, time loss by personal and commercial vehicle users due to congestion, and the like. These costs usually are borne by individuals or society, not by the transportation sector.

The reason for concern is that society is subsidizing these costs; but if the costs were understood, they would be allocated logically to the modal sector, perhaps as a tax. Few can fault placing transportation modes on a level playing field. At the same time, expectations must not be unreasonable; for example, by trying to account for the costs of global warming, the costs of maintaining a military presence in the Persian Gulf, and similar variables, the argument loses its strength. If the costs of all externalities could be valued and incorporated into the price of fuel, the result would effectively halt the nation's transportation system, as well as the national economy.

The focus should be on a few of the external costs not currently covered by traditional methods—such as local air pollution costs—and on attempting to value and recognize some of the expenditures that society should recoup. This does not mean that the social and economic impacts of global warming on the transportation system should be ignored, but that it will take many decades to understand them. Nonetheless, seeking to include all of the external costs weakens the argument for including some of the main, quantifiable external costs.

## SUSTAINABLE TRANSPORTATION

The notion that any human activity should be sustainable probably has been accepted as a basic premise in agriculture, manufacturing, tourism, transportation, and other sectors for so long that its origin cannot be found. However, all human activities involving the use of resources—soils, minerals, environmental aesthetics, or finite fossil fuels—cannot go on forever, and it is necessary to manage resources carefully if they are to last beyond the next century.

The transportation sector has realized this only in the past few years. But its understanding is partial—it assumes that only the environment limits the sustainability of transportation (10). However, it has been argued that our current highway–motor vehicle transportation system is nonsustainable, because

1. It uses a finite fossil fuel;
2. This fuel creates local air-quality problems;
3. This fuel contributes to global warming;
4. The system produces an excessive number of fatalities and injuries; and
5. The system suffers from congestion in major urban areas (11).

All of these problems must be addressed if the transportation sector is to be sustainable beyond the 21st century.

Among the proposals to create a sustainable transportation system are the following:

1. Switching to an alternative fuel that is renewable and does not pollute, such as solar energy or hydrogen fuel;
2. Increasing the safety and reducing the emissions of motor vehicles through intelligent transportation systems; and
3. Decreasing the demand for motor vehicle transportation through various public policies, demand management, and educational actions.

The last of these falls within the general area of social and economic research in transportation, and it has the most potential to resolve the problem of sustainability. This area includes evaluations of the social and economic impacts of “value pricing” (formerly congestion pricing) and toll strategies, telecommuting or teleworking, educational programs to influence modal choice, and the provision of alternative modes.

There are also trends toward the purchase of larger and larger vehicles, typified by the sport utility vehicle (SUV), which are far from sustainable in terms of fuel use. Accidents involving SUVs also produce significantly higher fatality rates for passengers in the other motor vehicles. Little action is being taken to reduce the accident risks from these large vehicles, and there have been no studies to assess their social and economic impacts.

## ENVIRONMENTAL JUSTICE

A final area of interest in the social and economic research realm of transportation is environmental justice. Its major concern involves situations in which different population groups are affected negatively by a transportation action. In an equitable world, there would be no disparate impacts. The concept of environmental justice arose when toxic or noxious facilities were sited in or near minority residential areas. This siting has produced significant

activity at the federal level for nearly all federal programs, beginning February 11, 1994, with Executive Order 12898, *Federal Actions To Address Environmental Justice in Minority Populations and Low Income Populations*, up to the Department of Transportation (DOT) Final Order on Environmental Justice, *DOT Actions To Address Environmental Justice in Minority Populations and Low-Income Populations*, dated February 3, 1997. However, there appears to be less environmental justice activity in the transportation area than in some other fields. It is difficult to point to recent examples of disparate impacts in the transportation sector, although research is under way to identify cases.

Kennedy has analyzed two major transportation cases (12). The first was *Ralph W. Keith v. Volpe* (858 F2d 467, 9th Circuit, 1988) which concerned the displacement of minority and low-income residents by freeway construction in Hawthorne, California. The dislocation of this population mandated the construction of additional housing. However, the provisions for low-income units in this housing failed, raising charges of discrimination. In the final analysis, the case revolved more around housing than transportation.

The second case involved the construction of Interstate 670 in Columbus, Ohio (*Coalition of Concerned Citizens Against I-670 v. Damian*, 608 F. Supp. 110, S.D. Ohio, 1984). The plaintiffs maintained that the highway had a disproportionate impact on minority citizens. Although this was true, the defendants were able to demonstrate that the selected corridor created fewer adverse impacts on minority populations than the alternative corridors that had been under consideration.

However, these are court cases, not research studies. There are not many research studies because the negative impact of transportation projects in the United States was reduced in part by federal legislation beginning in the 1970s. It is probably fair to say that the major transportation cases involving environmental justice go back to that decade. Moreover, any study that demonstrates discrimination or disproportionate impacts might tie up its authors in the courts for years. Nevertheless, resources are available: a guide for research on the topic, a preliminary bibliography, and a resource paper (12–14).

## CONCLUSIONS

Social and economic research related to transportation is a broad subject, because of the many ways in which transportation policies and actions can produce social and economic impacts on the population. At the same time, social and economic policies can produce unforeseen and unintended transportation impacts on the population—such as the transportation-related problems generated by the welfare-to-work movement. These fields, along with research needs in sustainable transportation and environmental justice, present a research agenda that merits significant effort and attention in the coming century.

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**REFERENCES**

1. Palmer, J.A., J.P. Cornwell, and W.R. Black. *Effects of Road Reconstruction on Adjacent Economic Activities: A Retrospective Study*. Transportation Research Center, School of Public and Environmental Affairs, Indiana University, Bloomington, 1995.
2. Harvey, T.N. *Synthesis of Highway Practice 221, Assessing the Effects of Highway-Widening Improvements on Urban and Suburban Areas*. TRB, Washington, D.C., 1996.
3. FHWA. *Community Impact Mitigation: Case Studies*. U.S. Department of Transportation, Pub. No. FHWA-PD-98-024 HEP-30/5-98 (30m), 1998.
4. Skidmore, Owings, and Merrill. *The Environmental Assessment Notebook*. U.S. Department of Transportation, Washington, D.C., 1975.
5. Black, W.R., and D.L. Munn. Comprehensive Transportation Costing. *SEFTalk*. TRB Social and Economic Factors Committee, Fall 1994.
6. Black, W.R., D.L. Munn, R.J. Black, and J. Xie. *Modal Choices: An Approach to Comparing the Full Costs of Transportation Alternatives*. Report to the Indiana Department of Transportation and the Federal Highway Administration. Department of Geography and the Transportation Research Center, Indiana University, Bloomington, June 1995.
7. Black, W.R. Full Costing. *Journal of Transport Geography*, Vol. 5, No. 1, 1997, pp. 36, 46–47.
8. Litman, T. *Transportation Cost Analysis: Techniques, Estimates and Implications*. Victoria Transport Policy Institute, Victoria, British Columbia, 1995.
9. Litman, T. Full Cost Accounting of Urban Transportation: Implications and Tools. *Cities*, Vol. 14, 1997, pp. 169–174.
10. *Toward a Sustainable Future: Addressing the Long-Term Effects of Motor Vehicle Transportation on Climate and Ecology*. TRB, National Research Council, Washington, D.C., 1997.
11. Black, W.R. Sustainable Transportation: A U.S. Perspective. *Journal of Transport Geography*, Vol. 4, No. 3, 1996, pp. 151–159.
12. Kennedy, L.G. *Environmental Justice*. Resource paper prepared for the Conference on Refocusing Planning for the 21st Century, Washington, D.C., February 1999.
13. Forkenbrock, D.J., and L.A. Schweitzer. *Environmental Justice and Transportation Investment Policy*. Public Policy Center, University of Iowa, Iowa City, 1997.
14. Black, W.R. *Environmental Justice in Transport: A Preliminary Bibliography*. Prepared for TRB Summer Meeting, Seattle, Wash., July 1998.