

Conference Summary

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The Conference on Transportation and Economic Development was divided into six plenary sessions. The first session contained papers on economic impact methodology.

ECONOMIC IMPACT METHODOLOGY

The total benefits and impacts that result from a transportation improvement are never realized immediately. As Perera pointed out, a subtle but important distinction exists between transportation user benefit and economic impacts of a transportation improvement.

Hirschman and Henderson reported on a methodology used to project and evaluate the potential land use impacts of a proposed limited-access highway extension in the Rochester, New York, metropolitan area. The analysis examined the potential impacts of linking the towns of Brockport and Albion west of Rochester to the Rochester central business district via an extension of Route 531. It was decided that local land use impacts from improved highway access could be disaggregated into

1. Impacts on residential location decisions, plus associated impacts on locally based retail and service establishments that support residential development; and

2. Impacts of business location decisions occurring as a result of three possible actions: expansion of existing businesses in the corridor; attraction of new businesses from entirely outside the metropolitan region; and shifting of business to the corridor from other areas within the metropolitan region.

The approach used to project potential residential location decisions was to develop a "gravity model" of residential location. In general, gravity models, when applied to residential location, require calculation of "accessibility index scores" for subareas, which are then used to reallocate a regionwide growth projection to the subareas. The key advantage of this approach is that it is explicitly sensitive to changes in travel times between residential zones and major employment nodes.

A more qualitative approach was used to evaluate business impacts. The basic methodology involved a review of the competitive advantages of the area with and without the highway extension. This was supplemented by a more detailed analysis of such factors as developable industrial land, available financial incentive programs, and complementary transportation facilities. A separate regionwide marketing analysis was performed to assess retail development possibilities in the Brockport-Albion corridor.

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There is much to learn about the role of transportation investments in manufacturers' satisfaction with locations. Hartgen et al. reported on a study presently under way in North Carolina the goal of which is to better understand this complex relationship. With factor analysis and cluster analysis, the 100 counties of North Carolina were classified according to transportation access, economic structure, manufacturing composition, and socioeconomic characteristics. The 100 counties were then grouped into six clusters. On the basis of this cluster structure, about 1,000 manufacturing firms in North Carolina were surveyed with an extensive mail questionnaire. Manufacturers were requested to describe their perceptions of the importance of transportation systems and other factors in the import of materials, the export of products, and the access to labor markets. These data will be correlated with information on highway investments, location of the firm with respect to the highway system, and other transportation access measures. Techniques such as factor analysis, discriminant analysis, and canonical modeling will be used to determine the relative importance of transportation versus other socioeconomic and fiscal variables in determining manufacturer satisfaction. Then policy analysis of various transportation funding strategies will be used to determine effects of investment. Findings will be used to help prioritize transportation systems investments that are intended to strengthen the state's industrial base.

Most studies of linkages between transportation and economic development focus on the effects of transportation facilities on employment or on some indicators of economic productivity. Bell and Feitelson described an approach that focuses on transportation services as intermediary goods in the production and consumption processes. Because of economic restructuring in the United States and global economies, production and consumption processes change constantly over space and time. Thus, the role of various transportation services in the economy and consequently their effects on economic development are constantly in flux. To analyze the linkages between transportation services and economic development in such circumstances requires that analysis begin by identifying the role and potential of various sectors and functions in the economy (local, regional, or national). Then the importance of transportation services for the most important sectors and functions in the economy have to be identified. This requires highly disaggregate analyses of the role of transportation services in the location of the relevant industries and services differentiated by function rather than only by sector.

Such an analysis can help identify situations where the lack of specific transportation services is a bottleneck for economic development. This analysis process is a necessary first step toward a cost-effective policy for economic development.

However, it is not sufficient for formulating or evaluating transportation policy contributions to economic development. For this additional step, it is necessary to analyze the attributes of both transportation services and prospective users. Specifically, Bell and Feitelson suggested that the concentration ratios of users and operators be considered, as well as how footloose they are. These flexibility considerations are important to reduce the risk that long-term public investments will be made on the basis of an ephemeral conjunction of circumstances in the rapidly changing economic scene.

MODELING IMPACTS OF TRANSPORTATION INVESTMENTS

Beemiller described a hybrid approach to estimating economic impacts that uses survey information on the direct output effects in conjunction with RIMS II multipliers. He demonstrated that impacts can be estimated when the direct output effects of a change in final demand are themselves used as changes in final demand and applied to I-O multipliers to estimate the indirect effects. He then compared the impact estimates that result when the direct output effects applied to RIMS II earnings multipliers are (a) based on survey information and (b) estimated by RIMS II. The comparison indicated that the accuracy of the impact estimates can be significantly improved when the hybrid approach is used. In addition, the comparison indicated that survey information need only be collected on the most important inputs. The hybrid approach is demonstrated by estimating the earnings impacts associated with the operation of a General Electric Company plant in Charlottesville, Virginia.

Bennathan and Johnson described the links between the transport industry and other economic sectors of production or demand in Cote d'Ivoire, India, Mexico, the Philippines, and the United States. Their account was based on recent input-output tables of those countries.

Basic to all regional projection models are forecasts, which are relied on for making major long-term investment decisions. Hardison et al. framed aviation demand and economic impact forecasting in terms of the probabilities of meeting demand under selected development scenarios. The process to carry out the simulation was risk assessment. The risk assessment framework, customized for use in aviation strategic planning, would simultaneously evaluate the potential variability in the forecast inputs and therefore the potential variability in the outputs. Beyond the results, the process of preparing the analysis itself led the identification of new opportunities for the application of risk assessment. For example, the economic impact of each development scenario depends on the baseline used and assumptions pertaining to the redistribution of aircraft demand at capacity-constrained airports. The analysis presented focused on comparisons with what would happen under the base case with a predefined set of changes in aircraft mix. However, the base case is itself a moving target, with the practical capacity of the airport continually changing. In addition, in the face of severe capacity constraints, it is likely that the aircraft mix would change either as a result of fees, through restrictions, or naturally (as often happens when pilots of general aviation aircraft find capacity-constrained airports less attractive).

In another air transportation oriented economic development study, Norris and Golaszewski outlined a methodology for using consumer surplus as a proxy measure of the net economic development benefits from the construction of a regional airport. This methodology involves partitioning the impact of an airport into two parts: (a) the impact due to the purchases of air transportation services and (b) the consumer surplus due to a decline in the prices subsequent to the construction of the facility.

To identify the factors determining the size of the impact, these authors made a cross-sectional comparison of the economic impact of two airports, one in an island economy—with very few alternative means of transportation and no other airports—and the other in the Dallas-Ft. Worth Metroplex with an abundant supply of alternative airports and other modes of transportation.

The central thrust of the discussion was that although the size of the purchase impact closely relates to diversity of the economy, the size of the consumer surplus is a function of the accessibility of the region, its industry mix, and the importance that consumers attach to the continuing operations of the airport. To illustrate, in the Dallas-Ft. Worth Metroplex where demand for air transportation is elastic and there are extensive input-output linkages within the economy, there are substantial output multipliers indicating the number of times each dollar spent rolls over within the region. Here, both the absolute and relative size of the transportation purchase impact were larger when compared with those for the island economy. In the same two economies, because of the differences in accessibility and industry mix characteristics, the relative magnitudes of the consumer surplus were reversed. The Dallas-Ft. Worth region showed a relatively small economic development impact, whereas the island economy showed a relatively large impact (\$11.03 billion), which was three times as large as the purchase impact.

ECONOMIC IMPACTS OF MODAL INVESTMENTS

The variation of results in studies of transport and development may be explained by differences in two main factors: (a) the creation of economic opportunity and (b) the response to economic opportunity. The first depends upon the quality and quantity of resources in the regions served, the actual change in transport rates and service, and commodity price levels. The second depends on an awareness of opportunity and what may be broadly defined as attitudes toward economic change.

Attaran and Auclair tested the hypothesis that productivity in the private sector of the economy is strongly associated with the availability of highway stock. For this purpose, two separate sets of economic models were constructed to try to explain this association in terms of productivity of both capital and combined labor and capital inputs in the private sector. The first model attempts to construct a relationship between private-sector capital productivity and the level of public infrastructure stock. The second model simulates the relationship between total private-sector productivity and the level of public infrastructure. The results of the model confirm the proposed hypothesis, that variations in the availability of highway stock can, to a large extent, explain variations in the pro-

ductivity of private-sector capital investments as well as that of capital and labor combined. In other words, full economic benefits of investments in capital and labor in the private sector can be achieved when an adequate supply of public infrastructure in general, and highways in particular, exist to go along with such private investment. Conversely, a decline in the availability of highways would lead to a decline in the productivity of both labor and capital in the private sector of the economy. These findings are strongly supported by highly significant statistical results of the two models (over 98 percent explanatory power). Given this strong correlation, where should a state highway investment be made to promote local and regional development?

A research team at the University of Minnesota recently conducted a study on this issue, looking at the effectiveness of highway funds on economic development. Stephanedes described the research, in which employment and income implications for counties in the upper midwestern region of the United States, with emphasis on localities and regions in Minnesota, were studied using a time-series analysis.

The finding that improved highways tend to help the economy of urban areas and may hurt certain of their adjacent counties should not be surprising. In particular, counties adjacent to urban areas tend to depend on these areas for the infrastructure necessary for development; better highways may allow agricultural county residents to conduct more of their economic activities in the nearby centers. Further, a comparison of the proportion of those working in the regional centers (66 percent) and those living there (47 percent) strongly suggests that highways are helping the residents of the adjacent counties to get to work as well as providing jobs for them.

The distributional nature of the effects is evident when analyzing the different parts of the state. In particular, although certain counties are likely to gain from improved roads, others are likely to lose and the statewide effect is not significant. In addition, the statewide effect is very small in size; that is, over 10 years a 10 percent investment increase would lead to only a 0.0 percent increase in jobs statewide (otherwise stated, an extra \$1 million would create an average of only five to eight new jobs statewide), most jobs due to the spending associated with the construction of the highway. Although highway funding can influence the economy of specific regions in the state, such as the regional centers; certain counties in the southeast; and the natural-resource counties in the north, it has negligible economic effect on a statewide basis. On the basis of these findings, it could be argued that the potential for statewide economic gains could not justify increased highway funding in Minnesota.

Airports and aviation make important contributions to local, state, and regional economies. A review of literature on the links between airports and economic development indicates that air transport is usually associated with significant portions of local business. Furthermore, the influence on local and regional economic activity extends well beyond the airport site itself. Also, the location of airports influences the geographic distribution of industries and can be a significant factor in the decisions of certain industries to locate in a given state or region. Data indicate that access to air transport plays an increasingly important role in the ability of some high-technology industries such as computers and electronics to

compete and that the location of airport facilities influences the location of these industries. Tourism has also been shown to be sensitive to air travel access.

Weisbrod presented findings from two recent studies specifically aimed at addressing these issues of economic benefits of general aviation airports. The first project was the state of Wisconsin's effort to develop and implement a computerized tool for assessing the economic benefits of airport improvements and prioritizing alternative airport investments. Known as the Airport Benefit-Cost (ABC) system, the evaluation tool provides a wide range of alternative measures of the economic impact of airport projects from the state's perspective and from the local perspective. The second project was the Massachusetts Aeronautics Commission study of the relationship of general aviation airport facilities to business attraction and growth. Findings from a detailed survey of businesses using general aviation aircraft in Massachusetts provided a basis for documenting the role of general aviation aircraft in business location, expansion, and investment in the state. These relationships were then implemented in a personal computer analysis tool known as the Airport Impact Model (AIM). Findings from these two studies highlight the multifaceted ways in which improvements to general aviation facilities can affect local and state economies and demonstrate the need for more analysis to better measure such effects.

For several years, the Urban Mass Transportation Administration (UMTA) has been developing procedural and technical guidance on the conduct of transit project planning studies. The section of UMTA's technical guidance on the analysis of land use and urban development impacts was recently revised. UMTA had found that, although many local transit planning reports stated that a major transit investment would promote economic development, this conclusion often was not supported by sound technical analysis. Emerson drew from UMTA's revised procedures. His framework may be of use not only to local planners involved in transit planning, but also to those engaged in other types of infrastructure planning. In it, he stated that the land use impact analysis for major transit projects should be performed on three levels: impacts on the region as a whole, impacts on the corridor, and impacts on specific station areas. The three levels of analysis should produce results that are internally consistent. That is, the sum of all of the land use changes predicted at the local level should add up to the regional total. Where land use impacts are an issue, UMTA urges local agencies to approach the analysis in both a "top down" and a "bottom up" manner and then to check the results to ensure consistency. In assessing the impacts of land use changes, Emerson, said, the following should be considered: (a) consistency with planning and zoning, (b) impacts on services and tax base, (c) impacts on transit system use, (d) impacts on traffic and parking, and (e) exploring value added to certain sides because of the investment.

RURAL AND AGRICULTURAL IMPACTS OF TRANSPORTATION INVESTMENTS

In the initial stages of economic growth, the introduction of modern transportation makes a wide variety of new economic opportunities available simultaneously and is therefore likely to promote growth; in the more advanced stages, transpor-

tation is one of the many sectors in which productive investment may be channeled, and the observed effects of initial transportation provision should not be falsely projected as likely results of modern transport elaboration.

The economic and social consequences of transportation improvements in a rural setting in a developing country are intertwined in a complex fashion. It is this complex blend of economic and social consequences that is taken to be the object of "development"—the process of increasing human welfare for a given population in a region or community through increasing economic and social activities. Cook and Cook examined the ways in which the analysis of rural transportation impact in developing countries has evolved over the last 25 years, with the objective of formulating a framework for impact analysis that covers the full range of expected primary and secondary effects. Although evaluators frequently acknowledge the wide range of transportation impacts in rural areas, quantitative analysis of these impacts has focused almost exclusively on direct, readily measurable economic effects. Surprisingly little attention has been paid to the measurement of multiplier effects and to the social distribution of economic costs and benefits. Current models demonstrate a very imperfect understanding of the workings of the rural economy, focused as they are on agricultural production and often exclusively on cash cropping.

In another study Mazlumolhosseini examined the correspondence between the level of advancement of major components of socioeconomic development and the level of transportation activity in rural areas of developing countries. Because access to roads is the most essential element of a transportation system, the degree of accessibility of a certain rural area was considered in this study as a good indicator of the level of development of the transportation system.

The degree of access to rural roads can be determined according to the joint consideration of two simple criteria: the proximity of the village to the nearest motor vehicle road and its distance to the nearest town. The villages with identical degrees of accessibility can be thought of as arranged in a group forming a certain access area, regardless of the geographical location of the component villages. The creation of four such access areas may be considered as adequate through the proper choice of distance intervals in the application of stability criteria. In the order of increasing accessibility, these four access areas may be described as hardly accessible, poorly accessible, fairly accessible, and easily accessible. Each access area can be assigned an access value proportional to some measurable transportation activity, for example, the number of daily trips per household in that area.

The concepts developed by Mazlumolhosseini in this study are illustrated by data provided through a large survey based on interviews at the household level carried out in the Philippines in 1983. The survey included 1,002 households with 5,228 individuals living in 25 different villages in 5 different municipalities on Cebu Island. The analysis of the study variables as functions of access value revealed that the major elements of socioeconomic development vary sharply with a change of access value and are strongly associated with it. It was also found that both the income from sale of cash crops and the efficiency of agricultural production increase considerably as access value increases. This indicates that a transportation investment may have a good chance to succeed in

generating development in other sectors. However, the degree of success would depend on how efficiently the investment is coordinated with other measures that would ensure reasonable utilization of the improved transportation facilities by local inhabitants.

All-weather roads act as a catalyst that brings together various ingredients leading to accelerated economic development. Their catalytic role in addition to their direct contribution through reduced transaction costs was discussed by Khan. It was found that the total benefits obtained using the more traditional approach to estimating development benefits of the road would be too low to justify the road development given the construction costs in Bangladesh. However, using the benefits from transactions costs model the road development would be justified.

The results of a first effort to highlight the contribution of transport to economic development in Mexico, specifically in the field of agroindustry, were presented by de Buen and Lapiedra. The purpose of this work was to examine the way in which transport-related considerations should be linked to agroindustrial project design and implementation in order to increase the probability of success of the firms dealing with them. Two conclusions were drawn from this study. First, transport has to be properly regarded during agroindustrial project development, because otherwise it has enough potential to disrupt project design and to reduce or eliminate its contribution to economic development. Second, detailed industry and product-specific studies are needed to gain a better understanding of the agroindustrialist shipper's needs to better shape the response that transportation services can provide.

A review of the transport sector in Botswana is of interest because of the important role it has played in the growth of the economy in the 23 years following independence. Although the country has been fortunate in discovering natural resources to finance economic developments, sound policies have ensured that the transport sector grew at an affordable pace commensurate with demands for services. Lionjanga and Raman highlighted the system of national planning and project appraisals, the major historical developments in transport, and the framework of policies that has been evolved to encourage future growth.

CASE STUDIES OF MODAL INVESTMENT IMPACTS

In the first case study, presented by Dunbar, a representative subset of the North Central Texas airport system was evaluated. The economic impacts on the Dallas-Ft. Worth International Airport were determined in a separate effort by the airport as part of a recent update to the airport's master plan. Airports the size of the Dallas-Ft. Worth International Airport are frequently subjects of economic impact studies. The main purpose of this effort by NCTCOG was to measure the economic benefits generated by the other airports in the North Central Texas region. The basic methodology used in this study is consistent with that advocated by the Federal Aviation Administration. It is important to distinguish that this is an "impact" approach, not a "transportation benefits" approach. In other words, the efficiencies of air travel are not explored, but the contributions of these local airports in terms of jobs

and dollars in the region's economy are. Three different types of impacts were estimated to determine the total economic impact for the 23 existing airports in the Dallas-Ft. Worth region: direct, indirect, and induced impacts.

Direct impacts typically occur at the airport and usually involve the provision of some type of aviation service. Indirect impacts most frequently occur in the region removed from the airport. All passenger expenditures on entertainment and accommodations are most representative of indirect impacts. This study also included the expenditures of large aviation-related industries that might be located on or near an airport but could not be considered completely airport dependent. These impacts were referred to as industrial development impacts and were added to the indirect impact category. The industrial development impacts also included a few nonaviation-related businesses that happened to lease space at an airport. Direct and indirect impacts represent net increases in final demand, whereas induced impacts represent what is called the multiplier effect of the direct and indirect impacts. In this study, the multiplier impacts were estimated with the Regional Input-Output Modeling System calibrated for the 16-county North Central Texas region by the U.S. Department of Commerce.

Airports, seaports, and transportation facilities are now being recognized as strategic sites, not only to shape and target economic development but also to increase the flow of goods throughout the international economy. Such international transportation factors, as described by Ferri, are the determinants of an effective export transportation network, one that can meet international freight movement requirements to service and handle a variety of foreign destinations and multiple volumes, weights, sizes, time-sensitivities, and cost requirements as well as to achieve compatibility with both intermodal and multimodal transport connections. An adequate infrastructure undergirds the interconnection of the nation's transportation system and sustains the efficacy of the export transportation network. The investment in maintenance and expansion of reliable infrastructure depends upon the involvement of all levels of government, a strong degree of intergovernmental cooperation, and substantial input from the private sector. Catalyzing such a coherent, coordinated strategy, as learned, requires overcoming a number of problem areas: institutional, intermodal, and intergovernmental. Ferri described a case study stemming from an ongoing transportation-investment-trade-economic development project initiated by a private-sector foreign trade, development, and management firm. Ferri examined what, if any, correlation existed between urban transportation access and the viability of international trade and investment activity. With an intensified push for U.S. exports, several factors should be integrated into the export investment strategy: urban goods movement, international transportation features, infrastructural capacity, and the entire export transportation process. To assemble the necessary catalyst for such an export trade investment strategy, both the private and public sectors must be informed, educated, and mobilized to the urgency of the problem. Creating a multifaceted solution requires the input of transportation planners, economic development specialists, governmental entities, private-sector concerns, and so on. The author discussed such an alternative, coalition-building process.

As U.S. railroads continue to restructure and reduce their physical plants in an effort to reduce costs, light-density branch lines continue to be targets of abandonment actions. Thus, many communities continue to be faced with loss of rail service. The public- and private-sector costs and infrastructure deterioration associated with rail line abandonments inhibit economic development. A methodology developed for the Washington State Rail Development Commission (RDC) that provides a means to measure the impacts and associated costs was discussed by Taylor et al. The case study involved what has become labeled as local rail service. This is appropriate, because the concerns and impacts are indeed local. From a state perspective, transportation infrastructure requirements to locate a business can usually be found in one part of the state or another, but the local community does not have the same selection expanse. Thus, at the local level it becomes necessary to preserve and improve what infrastructure exists.

STATE PLANNING ISSUES IN TRANSPORTATION INVESTMENTS FOR ECONOMIC ENHANCEMENT

The methods of analysis of economic impact associated with growth centers, functional economic centers, central places, and trade centers have been well documented. This "center" theory provides the basis for the economic analysis methodology utilized by Baird and Lipsman. The agricultural recession led to the emergence of economic development as a goal of the highway improvement program in Iowa. The state's first effort in this regard, the Revitalize Iowa's Sound Economy (RISE) program, was established in 1985. The Iowa legislature funded the program by increasing the state motor fuel tax 2 cents per gallon, which yielded approximately \$33 million annually. Half of these funds were used to provide road improvements needed to attract new businesses to the state and to retain and support the expansion of existing businesses. Baird and Lipsman described the research initiated by the Iowa Department of Transportation to develop a methodology that can be used to factor economic development considerations into the programming of improvements for the commercial and industrial network.

Leonard reported on the Transportation Economic Assistance (TEA) program, which was created in Wisconsin to help communities and businesses pay for road, rail, harbor, or airport improvements needed for economic development. The objective of the program was to attract employers and to create more jobs for the state. The TEA applications were evaluated against a dozen criteria, including transportation costs and benefits, numbers of jobs, ratio of cost to the number of jobs, local funding, compatibility with other transportation in the area, and financial soundness of the business. The most important criteria have been the ratio of the transportation improvement cost to the number of direct jobs, transportation costs and benefits, value of increased wages, and the income and tax benefits to the state's economy. The economic impacts of TEA improvements involve both reductions in transportation cost due to the transportation improvement and changes in the state's economy due to the economic development project. Transportation costs and benefits were measured, in this case, by the Highway Investment Analysis

Package (HIAP). If the benefits, such as reduced travel time, reduced traffic accidents, and possibly reduced operating cost, exceed the improvement and maintenance costs, the project is considered a good investment from a transportation standpoint. The other economic development benefits were calculated using a model of the Wisconsin economy. This model, developed by Regional Economic Development Models, Inc. (REMI), measures changes due to economic development projects. It measures net increases in employment, employee wages, sales taxes, and income taxes.

WHAT HAVE WE LEARNED?

The relationship between transportation and development is a subject that has occupied a good deal of attention over many years in both advanced and less-developed countries. Policy concerns as well as political and analytical issues are increasingly driven by questions of economic development impacts at the regional level, program level, and for specific projects. As a result, efforts to analyze the link between transport investment and economic development must take a broader view both spatially and in the range of analytical tools used.

Experience and research tend to support the following conclusions:

- Transportation investment alone will not result in development.
- Transportation investment may remove barriers to development.
- The bottom line is lower transportation costs.
- Businesses make decisions on a comparative basis, and accessibility to materials and market is a major consideration.
- Both undercapacity and overcapacity of infrastructure can reduce a region's ability to serve industrial needs at a cost that helps them to be competitive.
- Perceptions of transportation system quality may be as important as actual conditions.
- Transportation needs may vary greatly from industry to industry.
- Economic growth will occur primarily in or near urbanized areas that have in place the necessary physical and human resources.
- A good transportation system is a necessary but not a sufficient condition for development.

The question at this conference was whether transportation can induce economic development and, if so, whether the causative relationships can be established and measured. Development, however, is one of those ambiguous concepts that means what the user wants it to mean. Transportation is "a growth shaper," but development is more than growth. If transportation's impact on development is to be measured so as to optimize investments, development must be quantified, and the role of transportation investment must be appor-tioned.

The tie between future economic growth and improved productivity is clear. What is unclear is whether transportation improvement contributes more to increasing productivity than other investments (whether they are public or private). Questions concerning cause and effect and how public capital stocks are incorporated as components of production are extremely relevant if transportation investment is to be used as an element of a fiscal policy for stimulating growth beyond the localized benefits of individual transportation projects. The frequently found correlation between the level of infrastructure services and income does not really reveal much about whether there is a causative or merely a coincidental relationship.

After reviewing the methodologies and modeling that were presented at this conference, one must conclude that there is no single causal-based, policy-sensitive methodology applicable to all modes for all levels of analysis (national, regional, or project level). In considering the conclusions from the impact studies it is instructive to recall that even though an impressive amount of effort was spent on this type of research, the results were meager.

The need for a causal-based methodology has been stressed over and over during this conference. Unquestionably, there is a relationship between transportation and economic development. Transportation affects both product and service costs and provides opportunities to obtain needed materials and services and to deliver goods and services to markets at a competitive price. However, transportation, although a necessary element in the economic development equation, is only one of many elements. With the current state of knowledge, it is impossible for public policy makers to establish reliable, measurable, causative relationships between given levels of transportation investments and resulting economic development. This problem is further compounded by the current pattern of incremental change in the quality and level of transportation that is currently attracting most transportation investments in the developed countries.