

1. Report No. TX/FHWA-99/1718-S	2. Government Accession No.	3. Recipient's Catalog No.	
4. Title and Subtitle ASSESSMENT OF THE ROLE OF TXDOT PROJECTS IN PROMOTING ECONOMIC DIVERSIFICATION		5. Report Date February 1999	
		6. Performing Organization Code	
7. Author(s) William R. Stockton, James L. Weatherby, Jr., Tina S. Collier, and Cynthia A. Weatherby		8. Performing Organization Report No. Report 1718-S	
9. Performing Organization Name and Address Texas Transportation Institute The Texas A&M University System College Station, Texas 77843-3135		10. Work Unit No. (TRAVIS)	
		11. Contract or Grant No. Project No. 0-1718	
12. Sponsoring Agency Name and Address Texas Department of Transportation Research and Technology Transfer Office P. O. Box 5080 Austin, Texas 78763-5080		13. Type of Report and Period Covered Project Summary: September 1996 - August 1998	
		14. Sponsoring Agency Code	
15. Supplementary Notes Research performed in cooperation with the Texas Department of Transportation and the U.S. Department of Transportation, Federal Highway Administration. Research Project Title: Develop Procedures to Encourage the Use of TxDOT Projects to Promote Economic Diversification as Part of a Statewide Economic Development Plan			
16. Abstract This research project examines the role of TxDOT projects in promoting economic diversification in Texas. The authors conclude that while good access is a necessary condition for diversification, it is not sufficient to assure diversification. The role of the transportation network is not dominant in the decision process for industrial site location, and thus a model describing how transportation investment causes economic diversification is not feasible. Therefore, it would be unwise to build highways or make major improvements for the sole purpose of promoting economic diversification. Since good access is essential for economic diversification, the authors examined how well TxDOT's current and planned networks provide access conducive to diversification, and concluded that Texas' network is highly conducive and has very few shortcomings. For future programming of Texas Trunk System roads, it is recommended that TxDOT give high priority to those segments that will connect economic development centers to major markets. The authors also recommend that TxDOT give further consideration to creating an "opportunity fund" to allow for spot improvements in communities recruiting specific industries. Such a fund would facilitate local entities overcoming access obstacles that could hinder a successful recruitment.			
17. Key Words Economic Diversification, Economic Development		18. Distribution Statement No restrictions. This document is available to the public through NTIS: National Technical Information Service 5285 Port Royal Road Springfield, Virginia 22161	
19. Security Classif.(of this report) Unclassified	20. Security Classif.(of this page) Unclassified	21. No. of pages 24	22. Price

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**ASSESSMENT OF THE ROLE OF TXDOT PROJECTS
IN PROMOTING ECONOMIC DIVERSIFICATION**

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Report 1718-S

Project Number 0-1718

Research Project Title: Develop Procedures to Encourage the Use of TxDOT Projects to Promote
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Sponsored by the
Texas Department of Transportation
In Cooperation with the
U.S. Department of Transportation
Federal Highway Administration

February 1999

TEXAS TRANSPORTATION INSTITUTE
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ACKNOWLEDGMENTS

The authors wish to acknowledge the support and guidance of Kelly Kirkland, project director, of the Texas Department of Transportation's (TxDOT's) Multimodal Operations Office; John R. DeWitt, Jr., P.E., of TxDOT's San Angelo District office; and Michael T. Leary, of the Texas Division of the Federal Highway Administration (FHWA). We also appreciate the assistance of Laura Higgins and Rachel Donovan of the Texas Transportation Institute's Systems Planning Division. In addition, the authors would like to recognize the support of TxDOT and the FHWA, who sponsored this research.

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IMPLEMENTATION RECOMMENDATIONS

Based on the results of this research project, the authors propose the following recommendations for TxDOT:

1. That TxDOT not pursue large-scale widening or major upgrade projects for the sole purpose of promoting economic diversification. There is no evidence to support the hypothesis that transportation improvements alone will cause economic diversification.
2. Since a predictive computer model was found to be impractical, it is recommended that TxDOT employ other approaches in considering the economic diversification potential of a highway project. Specific approaches are described in recommendations 4 and 5.
3. That TxDOT continue to make programming decisions on the basis of traditional criteria, such as traffic and safety, rather than attempting to establish a new basis of economic diversification. However, because economic diversification can potentially result under certain circumstances, it is recommended that such potential be given some, but not overriding, consideration in the programming process.
4. Because improved access to the designated “economic development centers” of Texas offers the most potential for economic diversification, it is recommended that elements of the Texas Trunk System that serve those centers be given high priorities for funding. Those segments include:

- US-83, south of San Angelo
- US-87, north of San Angelo
- SH-6, south of Bryan/College Station
- US-190/SH-21, east of Bryan/College Station
- US-277, north of Del Rio
- US-90, east of Del Rio
- US-67/90, north of Alpine
- US-83, south of Perryton

Because there is no guarantee that an upgrade will result in economic improvement for the area, priorities for these routes should be established according to traditional methods. When the priorities for these and other routes are roughly equal, the economic diversification potential resulting from these improvements should be given priority.

5. TxDOT should examine whether currently available discretionary funds provide sufficient opportunity for local governments to be successful in recruiting businesses to the area. If the determination is that the existing mechanisms are sufficient, then TxDOT should broaden the awareness among the districts and communities that such funds may be used for localized needs. If the determination is that another category of funding is required, then TxDOT should review the programs in other states to identify the most appropriate features of such a fund.

6. TxDOT personnel in the district and area offices should acquaint themselves with the factors affecting economic diversification so that they can assist local officials in identifying key issues in economic diversification and the role that transportation improvements might play.

PROBLEM STATEMENT AND RESEARCH OBJECTIVES

Throughout Texas, there are many communities that are dependent on only one or two export industries, and these communities are extremely vulnerable to industrial economic fluctuations and non-economic influences. Rural areas that are dependent on agriculture or ranching can be devastated by bad weather. Similarly, border areas that are dependent on trade with Mexico can be devastated by devaluations of the peso, and small urban areas that are dependent on a single branch plant of a large corporation can be devastated by a decision to close the plant. The loss of jobs and income in these areas' export sectors inevitably spread to local retail businesses and financial institutions via multiplier effects. In all these cases, the area has no control over the event that triggers its economic distress and no means at hand to mitigate the severity of the economic losses sustained by its residents. These periods of severe economic distress can recur often and, in many cases, can lead to the abandonment of the area by a significant portion of the population. The solution to preservation of these areas and their way of life is economic diversification to broaden the area's range of economic activities and reduce the area's vulnerability to exogenous influences that can occur in any one of the area's primary economic activities.

In practice, economic diversification usually means the attraction of a new type of economic activity to an area, typically a manufacturing plant of some kind or a distribution facility. Since adequate infrastructure, including good transportation linkages to markets and sources of inputs, is essential to attract new industry to an area, transportation projects may be able to assist rural, border, and small urban areas to achieve economic diversification. Any project that lowers the cost or improves the reliability of transportation to and from a given area will make that area more attractive as a site for industrial expansion or relocation. However, many other factors are involved in the site selection process.

This research seeks to determine if, when, where, and under what pre-existing conditions transportation projects are likely to lead to economic diversification in non-metropolitan areas that are dependent on only one or a very small number of export activities. If these principles can be determined, they need to be translated into a procedure that can be used by transportation planners to rank proposed projects in terms of their likelihood of promoting, or resulting in, successful economic diversification.

The original objectives of the research were to develop a set of procedures and a computer model that would allow TxDOT to assess the economic diversification potential of individual highway projects. During the course of the research, it was concluded that development of such model was impractical, so the objectives were amended to provide TxDOT with guidance on ways to positively influence economic diversification in the programming of projects.

RESEARCH CONDUCTED

The research conducted on this project consisted of an exhaustive review of the literature and practices of other states regarding economic diversification programs. This approach was necessary to attempt to establish the causative relationship between highway investment and economic diversification. The following were examined:

- general studies to determine the relationship between transportation investments and economic growth (economic growth defined to include growth in existing economic activities, the addition of new activities related to existing activities, and economic diversification into new activities); and
- industrial site location or selection theory.

These studies have pursued two primary approaches:

- econometric studies that use transportation investments and other factors as independent variables and measures of economic growth (such as employment, personal income, and/or the number of business firms) as the dependent variables; and
- studies to identify the factors and/or conditions that are essential in attracting new industry to a location.

After the first year, it became clear that the sought-after relationship was impractical and possibly impossible to establish. At that time, the focus of the research shifted to identifying what actions or possibilities were at TxDOT's disposal that could have an impact on economic diversification. The bulk of that effort consisted of adapting the findings of the literature and state practices research to the needs and practices of TxDOT.

The literature suggests that economic diversification is most likely to occur in locales that have most of the influential factors already in place. The Iowa concept of "growth centers" was applied to Texas by examining whether the growth centers in Texas have adequate access; any that do not would be excellent candidates to give a high priority in future programming of highway investments.

As part of the literature review, the practices of other states, as documented in the available literature, were reviewed. This review indicated that 36 states take economic development into account in their highway programming activities. The most promising of these practices were examined in detail for potential application in Texas.

RESEARCH FINDINGS

There were several key findings of the research. As is occasionally the case, the significant results include both what we did find and what we did not find. Those key findings are as follows:

1. Adequate access to markets is a necessary but not sufficient condition for economic diversification.

The literature review reveals that efforts to link transportation investments directly to economic growth have rarely been successful. The economic development process is too complex, and the role of transportation is not sufficiently dominant to allow causal relationships to be established. There is broad agreement that transportation linkages to sources of inputs and markets for output are a necessary prerequisite for economic development to occur in a particular place. But, transportation linkages in and of themselves are not sufficient to guarantee that economic development will occur in a particular place. Many other factors are necessary. As a result, econometric studies of the relationship between transportation investments and economic development show a very weak relationship. What little effect has been found primarily reflects the short-term increase in local employment attributable to the construction activity itself, not a long-term impact on economic development.

- Transportation investment alone will not cause economic development. Other factors such as availability of resources, local leadership, cooperation and initiative, adequate infrastructure, a trained and high-quality workforce, and a supportive community environment are a few of the things necessary to attract business.
- Highway investment is permissive. That is, although it may not cause economic development, it may permit otherwise impossible or unlikely development to proceed. Also, highway deficiencies, such as narrow pavement, congestion, and inadequate bridges, may be significant barriers to economic development.
- The bottom line for attracting businesses is lower costs. Transportation improvements, including rehabilitation and reconstruction, contribute to lower operating costs.
- The relative quality of the transportation system is important. Location decisions are made on a comparative basis, so communities and regions with substantially poorer transportation systems are at a disadvantage. However, investing large amounts of money to improve a system to an above average standard may not yield a commensurate payoff since other factors are at play in the decision process.
- The road with the lowest operating cost is not always four-lane. Under conditions of low to moderate traffic, a good quality, two-lane road may result in operating costs and travel times comparable to those of a four-lane highway. Four-lane, limited access highway

improvements generally promote economic development only if access to markets and resources located outside the state is improved.

- Perceptions of the transportation system quality may be as important as actual conditions. User costs and levels of service provided by two-lane highways may be comparable to those of a four-lane road, but regions without four-lane roads may be perceived as inferior. Needs for highway transportation may vary greatly among industries. Efficient truck and/or rail transportation is especially important for manufacturing, agriculture, and wholesale trade. High-tech industries require quick access to air service and the ability to move employees to/from work each day.
- Economic growth will primarily occur in and near urbanized areas that have necessary physical and human resources. By focusing transportation improvements on regional economic centers with growth indicators, a state can use transportation improvements to support those areas with economic growth potential.

The greatest economic impact will result from improved access to regional and national markets, raw materials, and to the regional labor force.

2. **Because of the very low and imprecise probability of economic diversification, it is not practical to develop a predictive model that would be of any meaningful use to TxDOT in prioritizing projects based on economic diversification potential.**
3. **It is impractical, and even imprudent, for TxDOT to undertake a significant program of widening highways expressly to promote economic diversification. Any such widening program should be based primarily on other factors, with economic diversification as a consideration.**

In support of the notion that transportation infrastructure is necessary but not a sufficient condition for location, a study of the impact of non-interstate highway improvements on economic development concluded “major highway investments should not be made in areas that lack the necessary infrastructure, raw materials, strategic planning and other resources required to support manufacturing, wholesale, or distribution facilities” (6). In short, without other necessary conditions for locating an economic enterprise, enhancing the transportation system of an area will not be sufficient to sway a location decision.

4. **The potential of enhancing economic diversification on a macroscopic statewide basis would be improved by including consideration of “growth centers” throughout the state in the planning and programming of the Texas Trunk System development.**

The research team found that, like Texas, similar efforts nationwide were motivated by an interest in promoting a sound economy, not only statewide but for individual communities as well. Among the most notable of the practices documented in the literature was that of Iowa, which concluded that the most productive approach was to assure adequate access to “growth

centers.” A process similar to that was applied to Texas to provide a gauge of the adequacy of access statewide.

Since Texas cities did not comport to the “growth center” definition from Iowa, the rough equivalent of “economic development centers” was used. Economic development centers (EDC) are designations recognized by the federal Economic Development Administration and represent a regional consensus on the most appropriate community to receive local and federal support. In order to leverage the funding and support already focused on these communities, the research team used them to measure the adequacy of current and future access provided by the Texas highway network.

The default standard for access (or perception of access), according to the literature, is a four-lane highway connecting an economic development center with either an interstate highway or a major market (metropolitan area). Thus, the presence or absence of four-lane connections can serve as a measure of the quality of access afforded a community.

Although two-lane highways may actually provide adequate access to a community, the literature review revealed that the absence of four-lane access might cause industries to eliminate a community from consideration without a more detailed examination. Therefore, access to the EDCs in Texas was gauged by the presence of four-lane access to interstate highways or major metropolitan markets.

The analysis of access showed that 30 of the 36 Texas economic development centers already have continuous four-lane access to interstate highways or major markets (Figure 1). Of the six that do not, five will be upgraded as a part of the Texas Trunk System program, leaving only Borger without at least the nominal access identified in the literature. Therefore, it was the conclusion of this phase of the research that TxDOT has been very proactive in providing the kinds of access needed to promote economic diversification and that no large-scale programmatic effort is justified. It is further concluded that about the only large scale programming impact that might affect economic diversification would be on the remaining segments of the Trunk System that will complete the four-lane network. While it is not practical to estimate the economic impact that those remaining sections would have, the results of this project suggest that the impacts would not be insignificant. Therefore, TxDOT should consider this factor in setting priorities in programming. We are not able to attach a weighting factor to this attribute but recommend that it be given due consideration.

- 5. The potential of enhancing economic diversification on a local basis could be improved if TxDOT were to establish an “opportunity fund” or “quick response fund” to aid in overcoming small transportation barriers in the recruitment of industries to communities.**

Although there appears to be little justification for TxDOT to embark on a roadway building or widening program to foster economic diversification, there appears to be significant value in a program to provide spot improvements as a part of local recruitment of new industries. Other states have found that access issues are often more local than long haul, meaning that

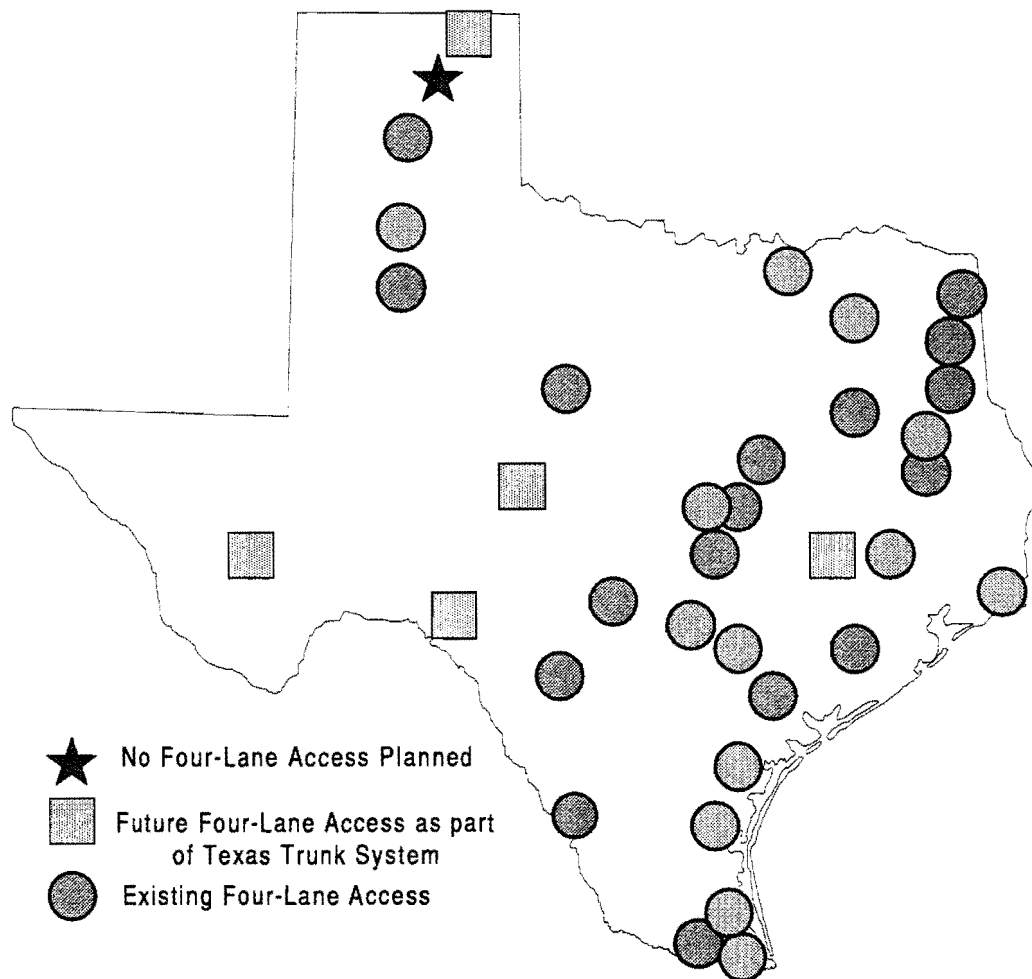


Figure 1. Access Provided or Planned for Texas' Economic Development Centers

relatively small improvements could significantly improve a community's ability to attract a new industry.

This research briefly explored factors that TxDOT should weigh in considering such a program. For the most part, other states provide the opportunity for a local government to draw on an improvement fund to cure access obstacles identified in the recruitment of a specific company. The local government then uses the promised funding or improvement as part of a package in the recruitment. Typical projects would include intersection improvements, widening of existing roadways that are primary access routes to the subject site, or building new access routes. Most agreements for use of these "quick response" funds are not consummated until the final agreements on the recruitment are reached.

Some of the funds are loans, some grants, and most require local matching funds. Nearly all of the programs consider factors such as jobs created in making decisions on funding. A key in most funds is the ability of the state to provide quick review and approval of applications.

The practices found in two states, Wisconsin (13) and Iowa (6), while different, provide some guidance in the area of economic benefit to expenditure of funds on local highway projects.

The Wisconsin approach is relatively simple. They have established a dedicated “quick response economic development fund” that is applicable only to situations in which a community has negotiated a plant relocation or expansion, but closing the “deal” is subject to a specific transportation project. Normally, a city or county applies for the funds, and the process is relatively quick. The evaluation of an application normally takes only six to eight weeks. Seven other states have similar programs.

Texas might benefit substantially from a quick response or spot improvement program. The improvement opportunities are likely to be higher in some communities than others, depending on the proportion of the local network that are state routes. The research conducted in this project should serve as a starting point to TxDOT in considering an “opportunity” or “quick response” fund. If such a program is of interest to TxDOT, additional research should explore key questions, such as local interest, appropriate size of fund, and criteria adapted to Texas’ needs.

PROJECT DELIVERABLES

This project has produced three deliverables. The first is the traditional research report, which includes the detailed information, analyses, and references upon which the findings are based. This deliverable will be of primary benefit to others attempting to research the implications of transportation investment on economic diversification or development. It may also be of use to TxDOT staff attempting to further examine findings 4 and 5 above, regarding improving access to growth centers and providing an opportunity fund.

The second deliverable is a manual that describes the whole concept of economic diversification as it applies to TxDOT. The principal audience of this manual is the TxDOT staff member at the district level who may be called upon to interact with local groups regarding TxDOT's role in economic diversification. This manual describes the other conditions that are necessary for economic diversification and illustrates how improved access is a facilitator or economic diversification, not a cause.

The final deliverable is this summary report. The principal audience is policy makers who are interested primarily in the findings and implications for future decision making. Readers of this document who want more information would find the research report useful.

FUTURE RESEARCH DIRECTION

Some of the most useful findings of this research came as a result of discovering the original objective (a computer model) was unattainable. Thus, the findings and recommendations regarding ways to evaluate and prioritize access to growth centers (finding 4) and the potential for an opportunity fund (finding 5) have not been developed as fully as may be appropriate. Should TxDOT desire to pursue either of those avenues of enhancing economic diversification, it would be appropriate to conduct additional research, either in-house at TxDOT or through the formal research program. The following should be added in that research:

Access to economic development centers (growth centers):

- process for considering economic diversification
- weight to be given
- potential changes in future programming

Opportunity fund for local improvements:

- size of fund
- criteria for participation
- applicable uses
- grant/loan criteria