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# ASSESSING THE INFLUENCE OF ECONOMIC MODELING ON NEPA IMPLEMENTATION IN TRANSPORTATION PLANNING

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**A B S T R A C T**

The National Environmental Policy Act (NEPA), enacted by Congress in 1969, revolutionized environmental protection in the United States by introducing an environmental review process into decision-making practices. This process involves the creation of detailed Environmental Impact Statements (EIS) to assess the environmental effects of various projects, including infrastructure developments. EIS enables multi-disciplinary collaboration and provides a framework for choosing the most environmentally friendly project implementation. Federal agencies like the Federal Highway Administration (FHWA) play a crucial role in examining and mitigating potential impacts on both human and natural environments resulting from state highway construction. This paper explores the significance of NEPA and the EIS process in fostering harmony between humanity and nature while evaluating various project alternatives within the context of transportation planning.

**K E Y W O R D S**

National Environmental Policy Act, NEPA, Environmental Impact Statement, EIS, environmental protection, infrastructure projects, Federal Highway Administration, transportation planning.

## Introduction

In 1969, Congress enacted the National Environmental Policy Act (NEPA). NEPA established a national goal for environmental protection, and, for the first time, federal agencies were mandated to incorporate an environmental review process into decision-making practices. To identify the environmental effects of build projects (roads, dams, and other infrastructure projects), bureaucrats had to develop an environmental impact statement (EIS)[i], which is a detailed study that describes the environmental effects of projects proposed by bureaucratic agencies. The process of creating an EIS enables project planners to collaborate in a multi-disciplinary approach and determine the best available path for project construction. The EIS process creates "conditions under which man and nature can exist in productive harmony."[ii] Moreover, the EIS process requires planners to list alternatives to the proposed project. This rational administrative procedure forces planners to analyze multiple scenarios and, hopefully, choose the alternative that benefits the human environment while minimizing impacts to the natural environment.

Regarding the Federal Highway Administration (FHWA), the agency is responsible for examining and avoiding potential impacts to human and natural environments caused by state highway construction. However, the agency is also responsible for planning and accounting for the transportation needs of society. FHWA must balance the decision-making process and potential impacts on the environment within the context of transportation planning.

According to FHWA (2008), its policy is: To the fullest extent possible, all environmental investigations, reviews, and consultations be coordinated as a single process, and compliance with all applicable environmental requirements be reflected in the environmental document required by this regulation; alternative courses of action be evaluated and decisions be made in the best overall public interest based upon a balanced consideration of the need for safe and efficient transportation; of the social, economic, and environmental impacts of the proposed transportation improvement; and of national, state, and local environmental protection goals; public involvement and a systematic interdisciplinary approach be essential parts of the development process for proposed actions; measures necessary to mitigate adverse impacts be incorporated into the action (p. 1)

When developing the EIS, state transportation officials are required to analyze the economic impacts associated with a proposed project. This component of the EIS is called an economic impact analysis (EIA). In the enactment of the 1956 Federal-Aid Highway Act, transportation officials recognized the impacts a transportation facility could have on surrounding communities and the economy. In November 1956, the American Association of State Highway Officials (AASHO)[iii] passed a resolution "…urging all state highway departments to undertake and foster economic impact research pertaining to building surface transportation corridors…" (Highway Research Board, 1956, p. iii). The promotion of EIA by the AASHO was a major catalyst that required state Department of Transportations to implement economic impact research. In addition, in 1972, FHWA developed "process guidelines" that were intended to affect the procedures by which state Department of Transportations analyzed the impacts associated with highway projects. These guidelines were not intended to control or direct the state Department of Transportation's investigation process, but to offer suggestions and advice regarding the administration of an EIA. (USDOT, 1977, p. 375). Although there was a significant push for EIA between the 1950s and the 1970s, tremendous advancements have been made in the past twenty years. According to the FHWA (2003), "…significant progress has been made since that time in areas as diverse as modeling of future traffic flows; estimating the consequences of highway projects on jobs and incomes; and the application of computer technologies to support improved economic methods" (p. 8).

Traditionally, a benefits-cost analysis (BCA) was conducted to identify the benefits and costs of a highway project. However, the BCA method of analysis only measures the first order of effects associated economic impact. Typically, the BCA does not highlight the indirect and induced effects of highway improvement projects. A comprehensive EIA evaluates the direct, indirect, and induced effects (HLB, 2004; Weisbrod, 2000; Kaliski and Weisbrod, 1998; Weisbrod and Weisbrod, 1997) associated with the transportation system and the regional economy (FHWA, 2003). Indirect effects can include changes in employment, wages, or business sales. Induced effects can include changes in industry patterns, land use patterns, and land values (Harrison et al., 2006).

According to the Transportation Equity Act for the 21st Century (TEA-21), transportation projects should "support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity, and efficiency" (USDOT, 2008, p.3). As the nation continues to move forward into an era of globalized economy, transportation officials must account for how the transportation system will influence the economic development and growth of a region. According to the FHWA (2003), by analyzing the economic impacts of a transportation facility, transportation officials, decision makers, citizens, and planners can benefit. By analyzing alternative cost-effective designs, planners can determine the best return on investment, highlight the complexity of the project, and document the decision making process (p. 8).

This article examines the utilization of information technology software when conducting an EIA, compared to not using the technology. Drawing from the New Public Management (NPM) movement, initiatives were

developed to transform "traditional bureaucracies" to "entrepreneurial organizations" (Page, 2005). Brudney and Wright (2002) state that this era of "reinventing government" was supported ardently by the Clinton administration through the National Performance Review (NPR), which was published in 1993. This report, which was led by Al Gore, touted the importance of leveraging information technology (IT) in governmental processes to achieve objectives, redesign process flows, increase customer service to citizens, and enhance the capacity of government (Fountain, 2001). Although the NPM promoted IT utilization in government, the notion of governance has focused on increasing the utilization of technologies to connect citizens to citizens, citizens to government, and government to citizens (Reddick, 2010). The core focus of governance is to develop a strong sense of community.

Using a quasi-experimental design, a control economic impact analysis (EIA) is compared with a test EIA that utilized the Regional Economic Modeling Inc. (REMI) software to determine how IT altered the test EIA process. In the next section, I explain the research design and methodology of the study, and highlight the findings of the comparative analysis between the two EIAs. Finally, I will discuss the implications of utilizing IT in the implementation process and provide a conclusion.

**Research Design and Methodology**

This research examines the utilization of information technology (IT) when implementing an economic impact analysis (EIA), which is required by the National Environmental Policy Act. Using a quasi-experimental design, a control economic impact analysis (EIA), which was conducted by a state department of transportation, is compared with a test EIA that utilized the Regional Economic Modeling Inc. (REMI) software to determine how IT altered the EIA process. REMI is an economic computing model that captures industrial structures in a particular region. The REMI model is a "dynamic forecasting" model that incorporates several modeling approaches, which provides a user with a model that answers "what if…?" questions about a specific region's economy. REMI employs Input-Output models, econometric models, and computable general equilibrium models (REMI Inc., 2009). This model provides analysts the ability to connect and account the effects of how transportation network changes impact the economy.

For this study, I had access to a REMI model that consisted of 37-regions, which included 82 counties[iv]. It is important to note that the state department of transportation had access to the REMI model when they conducted the control EIA, yet did not utilize it. In this research, a segment of I-269 that will traverse Memphis, TN provided a model test bed for this research (See Figure 1). In 2006, a state department of transportation completed an EIA for the corridor.

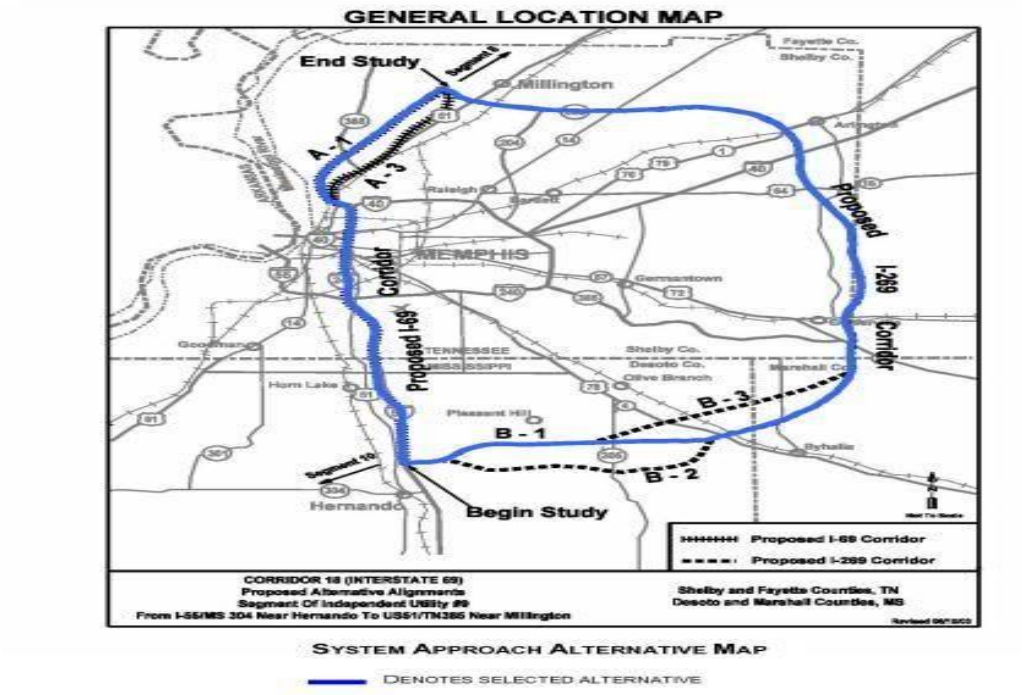


**Figure 1: Map of I-269 Corridor**

For comparison, I utilized REMI[v] to conduct a test EIA on the I-269 corridor. In an attempt not to bias the research procedures, I conducted interviews with Department of Transportation personnel and REMI specialists to determine the appropriate modeling techniques and data inputs. Due to this effort, I discovered that travel demand data and cost estimations were necessary to forecast economic impacts associated with the construction of the I-269 corridor. Therefore, trip count, vehicle miles travel (VMT), and vehicle hours travel (VHT) data along the I-269 corridor were requested from the DOT.

Additionally, I collected cost estimation data. Once the data were received, REMI support staff was contacted to assist in entering the information into the appropriate fields within the REMI model. Upon completion of simulating building I-260, economic impacts associated with the construction of the I-269 were forecasted. Using an EIA Framework[vi], I juxtaposed the two EIAs to determine how the utilization of REMI altered the test EIA, compared to the control EIA, which was conducted by the state department of transportation.

**Findings**

This section highlights the comparison between the control EIA and the test EIA. An Economic Impact Analysis Framework was utilized to compare the two processes of analysis. The six-step framework includes: 1) Scoping, 2) Literature Review, 3) Approach and Methodology, 4) Analysis of Study Area, 5) Case Study Analysis, 6) Base Case Scenario v. Alternative Case Scenario. Table 1 compares the changes found in each step between the two EIAs.

**Table 1 Comparative Analysis between the Control EIA and the Test EIA**

| | Control EIA | Test EIA |
|---|---|---|
| Step 1: Scoping Process | Narrow scope: Two-mile path along corridor<br>Desoto County<br>Marshal County | Broader Scope<br>Region 1: Desoto County<br>Region 4: Marshall, Tate and Tunica Counties |
| Step 2: Literature Review | Road access points can impact land development<br>Road development can induce economic growth Deficiencies in a transportation network can affect travel patterns | Compiled from FHWA<br>SAFETEA-LU<br>Highlights the economic and non-economic elements associated with transportation development<br>Transportation policy can affect local, regional, and national economy<br>Quality of life income, and population<br>Efficiency<br>Market accessibility<br>safety<br>Access to leisurely benefits, healthcare, and education |
| Step 3: Approach and Methodology | Data<br>Primary data<br>Secondary data<br>Case studies<br>40 hours of field observations<br>Tax rolls<br>Dataset from MPO<br>Sample<br>Nine Organizations | Data<br>Interviews<br>Travel demand data<br>Cost estimations<br>Sample<br>Seven organizations |
| Step 4: Analysis of Study Area | Maps<br>Tables<br>Indicators<br>Population<br>Employment<br>Industry Growth<br>Narrative highlighting regulatory policy and major development stimuli<br>Twenty year incremental snapshot of seven counties<br>Analysis begins in 1980 | Graphic outputs<br>Tables<br>Indicators<br>Population<br>Employment<br>Industry Growth<br>Cross-Sectional analysis<br>Longitudinal analysis<br>Time-Series analysis<br>Analysis begins in 1990 |

| | | |
|---|---|---|
| Step 5: Case Study Analysis | I-75: Tampa, FL<br>I-4: Orlando, Fl<br>Extrapolated estimations to Step 6 | Eliminated due to the REMI's capability to estimate economic changes over time |
| Step 6: Base Case Scenario v. Alternative Case Scenario | Outcomes<br>Employment<br>Aggregate Wage<br>I-269 development will have a positive impact on the study area | Outcomes<br>Employment<br>Population<br>Industry Impacts<br>I-269 development will have a negative impact on the study area<br>Multi-Regional analysis<br>Statewide analysis |

*Step 1: Scoping*

The first step consisted of scoping the study area in both EIAs. In the control EIA, specific "spatial and technical parameters" were established. For instance, DeSoto and Marshall Counties were identified as accommodating the proposed I-269 corridor. Additionally, the control EIA indicated that the analysis considered only selected direct economic impacts, which occurred within a path approximately two miles wide that corresponded with the corridor.

Conversely, in the test EIA, the scoping process consisted of identifying affected *regions* for analysis, instead of a two-mile corridor path. The REMI model is calibrated in regions, not counties. Within the regional configuration of the REMI model, DeSoto County is classified as a single region in the REMI model, but Marshall County is "lumped" with Tate and Tunica Counties. Therefore, in the test EIA, the analysis includes four counties, which are classified as Region 1 (DeSoto County) and Region 2 (Marshall, Tate and Tunica Counties).

*Step 2: Literature Review*

Step 2 of the EIAs was a literature review. In the control EIA, the literature review highlighted the linkage between road access points and land development. The literature review indicated that road implementation is "integral" for development. The control EIA literature review also suggested that road development could induce economic growth because businesses, such as gas stations and motels, can develop storefronts along a corridor. Finally, the control EIA literature review indicated that deficiencies in a transportation network can affect travel patterns and cause users to alter their behaviors.

In the test EIA, elements of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), and its predecessors, Intermodal Surface Transportation Efficiency Act (ISTEA) and Transportation Equity Act for the 21st Century (TEA-21), were highlighted, both of which were based in part on the philosophical ideals of "reinventing government" rooted in the NPM.

The test EIA literature review suggested first that transportation network improvements affect both economic and non-economic issues. For example, the quality of life can alter due to the construction of a transportation facility, which can increase income, population, and employment in a community. The implementation of a transportation project could potentially alter the social fabric of a community. Second, the review highlighted the idea that the implementation of a transportation project may alter the local, regional, and national economy. Because a transportation facility can potentially enhance travel efficiencies, users can have increased access to other markets, which can increase leisurely activities, and also increase access to healthcare and educational facilities. Finally, increased safety could be a benefit associated with developing and improving transportation networks.

Although this step did not utilize REMI, it is important to highlight the differences between the EIAs' literature reviews regarding the theoretical and empirical relationships among transportation systems and economic development, economic expansion, and productivity. The test EIA provided significantly more literature regarding how transportation network improvements influence market access, mobility, and safety.

*Step 3: Approach and Methodology*

In Step 3 of the control EIA, primary and secondary data were gathered in the analysis. Direct inquiry, field observations, and case studies were collected in order to analyze the economic impacts of the I-269 corridor. Due to these efforts, the analysts interviewed local governments, agencies, and other organizations to develop an understanding of the economic impacts.[vii] In total, nine organizations were consulted and more than 40 hours of field observations were conducted by the analysts. In addition, in the control EIA, a dataset from the local metropolitan planning organization (MPO) and Woods and Poole[viii] were utilized to analyze the study area.

In the test EIA, interviews with transportation experts, local planning agencies, and REMI consultants were conducted to determine the data needed to analyze the economic impacts of I-269 utilizing REMI. Travel demand data, as well as cost estimation, were necessary to simulate the economic impacts of I-269. After requesting the travel demand data from the DOT, the data were copied from the Excel document into the REMI model.

In addition to collecting the travel demand data, cost data associated with the construction of I-269 were entered in the REMI model. With travel demand data and cost data entered in the model, a simulation of the potential economic impacts associated with the I-269 corridor was conducted.

In this step, the changes that occurred due to the utilization of REMI consisted of both approach and methodology. First, the control EIA required both qualitative and quantitative approaches to analyze the economic impact. Conversely, due to the utilization of REMI, the data collected were exclusively quantitative. Second, the data sets changed between the two EIAs. The control EIA utilized MPO and Woode and Poole data sets to determine growth patterns and economic impacts, whereas the test EIA collected travel demand data and cost estimations. To determine the study area growth patterns, which are illustrated in the next steps, data were extracted from REMI's control file. The REMI model is constructed with over 20 different databases[ix] that support the model. These data provide users the ability to survey economic indicators of a study area. For example, with REMI, a user can identify population and employment projections in a region, with or without transportation or policy changes entered in the model.

*Step 4: Comparative Analysis of Study Area*

In Step 4the study area and important economic impact measures were examined in both EIAs. These indicators included retrospective data and value added projections. For example, historical demographic and employment trends, as well as future projections, were highlighted. The control EIA data were represented in maps and tables. These data were presented in 20-year snapshots. For example, historical data were expressed represented 1980 and 2000, and growth projections represented 2000 and 2020. The control EIA analyzed two economic indicators: population and employment.

In the test EIA, spatial tools are not utilized in the analysis. Instead, output is presented in graphic form, which highlights time-series data. The historical analysis begins in 1990, which is 10 years later than the snapshots highlighted in the control EIA. For illustration and comparison, the test EIA presented population and employment. Moreover, the projections that were simulated from the REMI model extend to 2030, which provides an additional 10-year forecast. Table 2 compares the control EIA outcomes with the test EIA outcomes in order to identify differences in the area growth projections. Notably, these data are growth projections of the specified

study areas. These data do not include the effects associated with the construction of I-269. That scenario is presented in step 6.

**Table 2: Control EIA vs. Test EIA**

| | Control EIA Population Projection (2020) | Test EIA (REMI) Population Projection (2020) | Percent Change Control and Test Case | Control EIA Employment Projection (2020) | Test EIA (REMI) Employment Projection (2020) | Percent Change Control and Test Case |
|---|---|---|---|---|---|---|
| Study Area | DeSoto Co 186,578 | Region 1 214,479 | +14.9% | DeSoto Co 76,936 | Region 1 77,922 | +1.3% |
| Study Area | Marshall Co. 46,146 | Region 4 82,134 | +77.9% | Marshall Co. 14,964 | Region 4 42,787 | +186% |

Comparing the study area growth projections uncovered interesting findings. Table 2 indicates that not all economic indicators share the change proportionately. In other words, regarding Region 1, the test EIA projects a 14.9% increase in population by 2020 in comparison to the control EIA. However, the test EIA projects a mere 1.3% increase in employment in comparison to the control EIA.

In addition, Table 2 illustrates that compared to the control EIA, the test EIA forecasts dramatic population and employment increases in Region 4, 77.9% and 186% respectively. It is important to note that the comparison is skewed because the scope of the study area changed in step 1. Region 4 includes Marshall, Tate, and Tunica Counties, whereas the control EIA is reporting only findings from Marshall County

*Step 5: Comparative Case Studies*

In the control EIA, case studies were utilized to determine growth estimations. By analyzing I-75 and I-4 in Florida, the analysts determined estimations that were extrapolated to the I-269 corridor. Accordingly, "[case studies]… allowed the planning team to set outside boundaries for the analysis. In effect, the case studies established an apparent limit on the reasonable outcomes that might be achieved in all but the most favorable or aggressive scenarios" (USDOT, 2006, p. 25).

Although case studies were utilized in the control EIA, this step was eliminated in the test EIA. This process change was a result of REMI's modeling capabilities. According to REMI analysts, the model is dynamic, which means it can estimate economic changes over time. By incorporating the model's complete inter-industry relationship with changing economic conditions, which are based on general equilibrium economic theory and underlying equations and response estimations, the model provides users with the capability to answer "what if?" questions about the economy (http://www.remi.com/index.php?page=structure&hl=en_US). Most importantly, the response estimations provide a feedback loop in which the model integrates policy changes. Due to these modeling capabilities, case studies were not conducted to determine growth estimations in the test EIA.

*Step 6: Base Case v. Alternative Case Scenarios*

By utilizing the REMI model in the test EIA, the simulation indicates that there will be potential negative economic impacts associated with the construction of the I-269 corridor. However, the control EIA alternative case scenario suggests potential positive economic impacts associated with the construction of the I-269 corridor.

In other words, REMI simulated that the development of the I-269 corridor will induce negative economic impacts in Region
1 and 4. (See Figure 2)

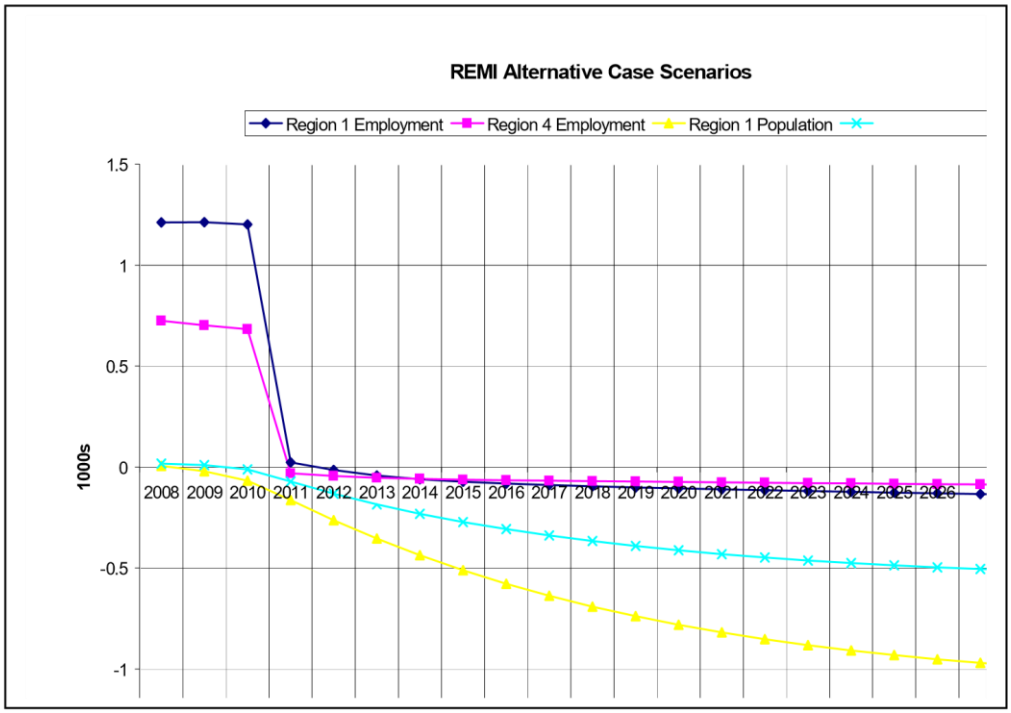


Figure 2: Employment Output for Alternative Case Scenarios

Although the test EIA indicates that the construction of the corridor will produce negative economic impacts, the negative economic impacts will not be immediate. According to the REMI model, both Regions 1 and 4 will experience a surge of employment, which is due to the construction of the corridor. However, after the corridor is operational, the regions will experience negative employment impacts compared to the base case (no-build) scenario.

Regarding population, Region 1 will experience a slight growth in population during the first year of construction. However, after the first year, compared to the base case (no-build) scenario, both regions will experience less population growth. Thus, according to REMI, the development of I-269 will produce negative economic impacts.

Regarding industry analysis, REMI simulated long-term negative economic impact on the study area. Table 3 illustrates the projection by industry. Notably, there is employment gain during the period of construction, but once the corridor is operational, the employment declines compared to a base case (no-build) scenario.

**Table 3: Test EIA Base Case v. Alternative Industry Analysis**

| Industry (Data include Region 1, 4 & Memphis MSA) | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|
| Construction | 1,838 | -48 | -42 | -331 | -291 |
| Manufacturing | 20 | -50 | -6 | -7 | -8 |
| Trade | 195 | -7 | -15 | -21 | -25 |
| Transportation | 54 | -10 | -11 | -10- | -12 |
| Services | 318 | -41 | -61 | -81 | -99 |
| Government | 108 | -25 | -46 | -58 | -67 |

By comparing the control EIA base case vs. alternative scenarios with the test EIA base case vs. alternative case scenarios, REMI changed the direction of the projected impacts. In other words, the control EIA suggested that the development of I-269 will produce positive economic impacts compared to not building the project. Regarding employment, compared to a base case (no-build) scenario, the control EIA suggested that the development of I-269 will produce an additional 1,399 jobs in DeSoto County and 2,379 in Marshall County by 2020. However, the test EIA, which utilized REMI, indicated that the construction of I-269 will negatively impact the regions economics. Table 4 compares the 2020 employment projections between the control and test EIAs.

**Table 4: Base Case v. Alternative Case Scenarios between Control EIA and Test EIA Outcomes**

| Employment (2020) | Base Case(No-Build) | Alternative Case | % Change |
|---|---|---|---|
| Control EIA | | | |
| DeSoto County | 44,000 | 45,399 | +0.0317% |
| Marshall County | 44,000 | 46,379 | +0.054% |
| Test EIA | | | |
| Region 1 | 77,922 | 77,797 | -.0016% |
| Region 4 | 42,787 | 42,710 | -.0018% |

**Discussion**

With the utilization of REMI in an economic impact analysis, which is required by the National Environmental Policy Act (NEPA), I observed changes in the process that do reflect tenets of the New Public Management (NPM) philosophy. For example, according to the tenets of the NPM, a top-down approach to utilizing IT would enhance decision-making power among users (Reddick, 2011). Tools sought to reinforce and support the objectives of actors and bureaucrats are reflective of NPM. Notably, with the utilization of REMI, the transportation network changes were measured in the model, which enabled me to understand how alterations in the network will affect the larger economy. This feature of the model enhances the capacity to integrate network changes and policy changes into the simulation of developing a transportation corridor. REMI is a tool that can reinforce decision-making.

Regarding the literature review section of the EIAs, it is important to highlight the theoretical and ideological implications that are couched in the NPM paradigm. The test EIA literature highlighted the elements of SAFETEALU, ISTEA, and TEA-21. The origins of these acts parallel with the development of the NPM paradigm.

According to Weingroff (2001), President George H. W. Bush claimed ISTEA to be "the most important bill since President Eisenhower started the Interstate System 35 years ago… this bill also means investment in America's economic future, for an efficient transportation system is absolutely essential for a productive and efficient economy" (p. 2).

In addition, in early 1987, FHWA formed a task force known as the Futures Group, which was led by Executive Director Richard D. Morgan. The group was divided into 19 working groups and tasked with "…taking a strategic look at issues, trends, technologies, and program options that would ultimately impact highways in the midrange future (2005) and the long-range future (2020). This would be… a zero based review. If the conclusion was that federal-aid highway program was no longer needed after the completion of the Interstate System, so be it" (Weingroff, 2001, p. 3). Specifically, the Futures Group explored ways of increasing state and local flexibility reflected the philosophy of the departing Reagan Administration (Weingroff, 2001). When George H. Bush took

office in 1989, his administration began developing a National Transportation Policy initiative. The National Transportation Policy shifted America "from building the nation's basic transportation system to adapting and modernizing transportation facilities and services to support economic growth, meet the competitive demands of the international marketplace, contribute to our national security, and improve the quality of life for all Americans" (p. 8). The transformation of a basic transportation system to an adaptive and modernized system echoes the notion of transforming a "traditional bureaucracy" to an "entrepreneurial organization," which is the foremost tenet of the NPM movement.

Regarding this study, the control EIA literature review reflected characteristics of road access, implementation, and transportation deficiencies, whereas the test EIA literature review highlighted the importance of market access, safety, quality of life, and efficiencies. Moreover, the changes in Step 3 have significant implications for planners and citizens. Although the data collection efforts were streamlined due to the utilization of the REMI model and no fieldwork was required, this process change may not be beneficial to all actors. For planners, this reduction in data collection efforts can save money and time. However, by only using information produced from the REMI model, planners discount democratic values. Without visiting the construction site or interviewing local citizens and business owners in the community, planners are not engaged with the community and businesses, and they do not develop "grout knowledge" of the local economy (Schmidt, 1993). Dialogue between the DOT and the local community should enhance the decision-making process regarding the construction of the planned transportation project.

Regarding the analysis of the study area, compared to DeSoto County in the control EIA, the test EIA predicts a 14.9% increase in population for Region 1. For employment, the test EIA predicted a mere 1.3% increase compared to the control EIA. This differential between population and employment may be due to the proximity of Memphis, Tennessee. Region 1 borders Memphis, which is the 18$^{th}$ largest city in the US, and is a major economic hub that borders the study area. Due to propinquity of Memphis, many people reside in DeSoto County, which is Region 1, but work in Memphis. DeSoto County has experienced exponential growth in the last 20 years, and the county has successfully positioned itself to absorb the spillover growth from Memphis and Shelby County. The municipalities within DeSoto County, which have assembled the appropriate urban infrastructure to attract growth, have taken advantage of their proximity to the major employment areas in the Memphis area. Regarding the scenario comparisons in Step 6, the test EIA changed the direction of the projected economic impacts. This finding raise two important questions. First, why did REMI simulate this? Second, what does it mean for the community and the DOT? The answer to the first question lies in the travel demand data that were collected. According to the data provided by the DOT, when the I-269 corridor is completed, it will develop increased traffic congestion, decrease the level of service, and produce less trip counts in the study area. For reliability, the travel demand data were verified by modelers at Oakridge National Laboratory (ORNL). Due to the projected transportation network inefficiencies, the REMI model simulated negative economic impacts associated with the construction of I-269. However, this finding is contradictory to the control EIA.

So, what does this mean for the community and the DOT? The agency did not utilize REMI in the control EIA. Instead, the agency administrators contracted the EIA to consultants. This is surprising knowing that the state spent over $450,000 on the REMI model (Personal Communication, 2009).

Although many assumptions can be drawn from this decision, it was not determined why the DOT did not utilize the model. If the agency was initially attempting to achieve organizational objectives, but the REMI model did

not produce sufficient evidence to support the construction of I-269, bureaucrats could have easily neglected utilizing the model, which discounts democratic values.

However, on the other hand, the agency may not have utilized the model due to the lack of expert personnel to conduct the EIA. The REMI model is extremely complicated and requires expert knowledge in economic modeling, as well as a foundational knowledge in traffic modeling. Regardless of the reason, a large amount of money was spent on the REMI for it not to be utilized in the control EIA.

Finally, even though this research presents REMI as an IT application that can be utilized in the EIA process, which is required through NEPA, many limitations are related to the REMI model. First, the estimations in the model are at the regional level. Not having data at a sub-county level can prevent DOTs from adequately analyzing the economic impacts associated with a localized transportation projects. Second, the cost of the model is a limitation. The REMI model utilized in the study cost the DOT $450,000 (Personal Communication, 2009). Many DOTs may not be willing to invest this amount of money into a tool that only analyzes the economic impacts of a project. Considerations for social and cultural impacts are equally important. Notably, the price depends on the number of regions included in the model. According to REMI analysts, the model used in this research is an extensive REMI model. Third, the model is essentially a black box and works only within the parameters that are built within the model. Finally, additional economic models are being utilized in transportation policy. For example, the MEPLAN, TRANUS, METROSIM, and TELUS models have been used to measure three-way relationships between transportation, land use, and economy.

**Conclusion**

In terms of the New Public Management, the paradigm focuses on developing a responsive bureaucracy that utilizes information technology (IT) to achieve objectives, redesign process flows, increase customer service to citizens, and enhance the capacity of government. This study found that the utilization of IT did alter the EIA. With the utilization of REMI, the scope of the EIA broadened, the data collection efforts decreased, and capacity to analyze economic impacts was enhanced. In addition, by comparing the control EIA with the test EIA, which utilized REMI, the direction of the economic impacts changed. In other words, the control EIA projected positive economic impacts associated with the construction of I-269, but the test EIA projected negative economic impacts. Although the REMI model altered the EIA, this study highlights limitations that are associated with utilizing IT in the NEPA process. First, the lack of "grout knowledge" may negatively affect the decision-making process. Second, the cost of the software may limit DOTs from utilizing the tool. Third, the REMI model is not capable of analyzing sub-county level data, which is a limitation for transportation planners. On one hand, this research highlights NPM as an impetus for utilizing IT in the NEPA process. However, on the other hand, this research discovers actions that may cause suspicions of discounting democratic values when IT is available for utilization

**References**

Brudney, J. & Wright, D. (2002). Revisiting Administration Reform in the American States. The Status of Reinventing Government during the 1990s. *Public Administration Review. 62*(3). 353-361.

Carroll, J. (1995). The Rhetoric of Reform and Political Reality in the National Performance Review. Public Administration Review. 55(3). 302-312.

FHWA. (2008). Environment/Project Development. Retrieved June 12, 2008, from www.environment.fhwa.dot.gov/projdev/index.asp.

Fountain, J. (2001). *Building the Virtual State*. Washington, D.C.: Brookings Institution Press.

Garson, D. (2006). *Public Information Technology: Policy and Management Issues.* Hershey, PA: Idea Group Publishing.

Harrison, R., Chiu, Y., & Schofield, M. (2006). *Design and Operation of Inland Ports as Nodes of the Trans-Texas Corridor*. Texas Department of Transportation, August.

Haque, M. (2007). Revisiting the New Public Management. *Public Administration Review.* (67)1, 179-182 Highway Research Board. (1956). *Economic Impact of Highway Improvement.*

Conference Proceeding, Washington D.C. March 18-19.

Kaliski, J. & Weisbrod. (1998). *Guide to Major Corridor Investment-Benefit Analysis System (MCIBAS) and Its Impact Analysis Component*, Indianapolis, IN.

Moe. R. (1994). The "Reinventing Government" Exercise: Misinterpreting the Problem, Misjudging the Consequences. *Public Administration Review. 54*(2). 111-122.

Osburne, D., & Gaebler, T. (1992). Reinventing Government, How the entrepreneurial spirit is transforming the public sector. Addison-Wesley Publishing, Reading, MA.

Page, S. (2005). What's New about the New Public Management? Administrative Change in the Human Services, *Public Administration Review. 65(6).* 713-727.

Reddick, C. (2011) *Public Administration and Information Technology*. Jones & Bartlett Learning. Burlington, MA.

REMI, Inc. (2009). The REMI Model. Retrieved March 2009 from Regional Economic Model Inc. http://www.rem.com/index.php?page=model&hl=en_US.

Riccucci, N. (2001). The "Old" Public Management Versus the "New" Public Management: Where Doest Public Administration Fit In? *Public Administration Review (61)2*, 172-175.

Schmidt, M. (1993). Grout: Alternative Kinds of Knowledge and Why They are Ignored. *Public Administration Review.* (53)6, 525-530.

US Department of Transportation. (1977). *America's Highways: 1776-1976: A history of the Federal-Aid program.*: Washington, DC.

US Department of Transportation. (2006). Final Environmental Impact Statement, provided by the Mississippi Department of Transportation: Jackson, MS.

US Department of Transportation. (2008). Federal Highway Administration, Transportation Equity Act of the 21st Century. Moving Americans into the 21st Century. Bureau of Transportation Statistics. Fhwa.dot.gov/tea21/h2400enr.htm

Weingroff, R. (2001). Creating a Landmark: The Intermodel Surface Transportation Act of 1991. *Public Roads. 65(3).* Retrieved on May 3, 2009 from: http://www.tfhrc.gov/pubrds/novdec01/istea.htm

Weisbrod, G. & Weisbrod, B. (1997). Assessing the Economic Impact of Transportation Projects: How to Choose the Appropriate Technique for Your Project. *Transportation Research Circular Number 477*, National Academy Press 1977. Presented at TRB 76th Annual Meeting January 12-14, 1997, Washington D.C.