

JOINT TRANSPORTATION RESEARCH PROGRAM

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Economic Development Impact of Corridor Improvements

Introduction

The Indiana Department of Transportation (INDOT) has undertaken a set of joint research efforts to gain a better understanding of the economic impacts that could arise from transportation investments, as well as to develop mechanisms to quantify them, especially during the early stages of the project development process. This study focuses on a set of corridor improvement projects that do not physically expand the capacity of corridors.

The primary objective of this research is twofold: (1) develop a theoretical framework where the effects of corridor improvements on the facility performance could be used to estimate a set of economic development indicators, and (2) develop a sketch-planning tool where the proposed framework is made operational.

Theoretical Framework and Tool Overview

To develop the study framework, it was necessary to account for key differences between corridor improvements and traditional capacity expansion projects. Typically, corridor improvements involve shorter project lifetimes. Similarly, because the benefits are highly dependent on the type of technology implemented, they are not static, as the technology continually evolves. Finally, the expected impacts of their implementation are much smaller than those of capacity expansion projects.

Within this context, the adopted approach for evaluating the economic impacts of non-capacity transportation projects involved the following:

1. estimating the impacts of the corridor improvement on key performance measures (such as mobility and safety) and corresponding user costs;
2. estimating the portion of user costs that corresponds to business savings; then
3. translating the accumulated business savings to

economic development impacts through statewide economic multipliers.

Based on the theoretical framework, literature review findings, and existing tools for similar analyses, four tool development options were considered. The preferred option was a framework based on the Federal Highway Administration's (FHWA's) tool, Tool for Operations Benefit Cost Analysis (TOPS-BC). The resulting tool, called Tool for Operations—Economic Impact Analysis (TOPS-EIA), is briefly described in the following section.

TOPS-EIA Tool

TOPS-EIA is a tool that is applicable at the initial stages of the project development process, where various project alternatives or configurations can be examined with a low level of detail in the inputs and outputs. In that sense, TOPS-EIA calculates the economic savings in travel time, travel time reliability, vehicle operating costs, and safety by mode and trip purpose using a set of expected impacts taken from past studies and projects. Subsequently, the annual business savings corresponding to trucks and automobiles on business purpose are translated into economic development impacts using statewide economic multipliers.

The main inputs of the tool include the length of the period of analysis, the length of the segment, the number of lanes, and the volume of vehicles on the segment under analysis. Optional inputs include free-flow speed, link capacity, and strategy-related impacts on facility performance. The outputs of the tool include three types of economic impacts: gross regional product (GRP) in millions of dollars, personal income in millions of dollars, and employment in job-years.

TOPS-EIA is subdivided into four modules, with one module for each strategy. These strategies are arterial signal coordination (ASC) projects, traffic incident management (TIM) projects, work zone management (WZM) projects, and Access Management (AM) projects. A qualitative tool was developed for road diet (RD) strategies called the *RD case search tool*.

To demonstrate TOPS-EIA, two case studies involving arterial signal coordination strategies were conducted—one in Indiana and one outside Indiana. The case study in Indiana involved the implementation of a traffic-actuated system on a five-mile segment of SR 37 between I-69 and SR 32 in Hamilton County. The results of the ASC tool showed that this project brought not only significant user costs savings, but also economic development impacts expressed as GRP, employment, and real personal income.

Implementation

TOPS-EIA can be used for project selection, project prioritization, or multi-criteria analysis (MCA). Intermediate outputs of the tool, such as user benefits (e.g., travel time savings), can be used in benefit-cost analysis (BCA). The latter, however, will require the calculation of project costs, which is not available in TOPS-EIA. For MCA, different indicators such as GRP, personal income, employment, and other intermediate outputs generated by the tool can be incorporated directly as criteria in the decision-making process. The main advantage of MCA is its robustness with respect to double-counting or overlap of users' benefits. In this process, it should be taken into account that the economic development benefits measured by the tool are statewide impacts.

Further steps for the tool implementation, as part of this project, included a set of training sessions, webinars, and presentations provided for INDOT and Metropolitan Planning Organizations (MPOs). These sessions covered both the theoretical background and a case study to demonstrate the use of TOPS-EIA.

Tool Limitations and Future Research

While TOPS-EIA has the potential to measure the economic development impacts of a wide range of strategies, its simplicity and practicality brings a set of assumptions and

limitations that are opportunities for future improvements. These include the following:

- The tool does not account for possible synergies among multiple strategies implemented on the same corridor.
- TOPS-EIA does not take into account either induced travel or consumer surplus.
- Although TOPS-EIA is able to account for nonrecurring congestion, a more detailed breakdown of nonrecurring congestion sorted by its causes can be added.
- The economic multipliers used in TOP-EIA reflect statewide impacts. Therefore, they are applied independently of the region where the project is located.
- Finally, the tool estimates the economic development impacts from savings in business travel costs as a result of the implementation of the nontraditional corridor improvements. Future research could explore additional economic benefits triggered by improvements on market accessibility or enhancements on intermodal connectivity.

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