

Transportation and Economics: Tools for Assessing Wider Economic Benefits of Transportation (Part 1)

Emmanuel Nsonwu
Frank Baukert
INDOT Planning
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SHRP-2

- **Strategic Highway Research Program 2**
 - Created and funded by FHWA
 - Purpose was to find strategic solutions to meet 3 challenges
- **National Transportation Challenges**
 - Improving highway safety
 - Reducing congestion
 - Improving methods for renewing roads and bridges
- **SHRP2 Economic Analysis Tool bundle(C03 &C11)**
 - C03 – Transportation Project Impact Case Studies (T-PICS)
 - C11 – Tools for Assessing the Wider Economic Benefits of Transportation
 - Tools will help planners make better assessments of projects.
 - Better tools will lead to better projects and better highways



SHRP-2 Project Planning

■ Early Stage Planning

- “broad brush” scan of available options
- Range of potential impacts of these options
- Example – Long Range Plans and Transportation Needs Studies

■ Middle Stage Planning

- Early analysis refined with “sketch planning” tools
- Consideration of project-specific factors
 - Local context, access impacts, and changes in transportation conditions
- Example – project lists for programming & corridor planning

■ Late Stage Planning

- Uses detailed modeling & analysis to refine impact estimates
- Consideration of project details, traffic & economic forecasts
- Example – project prioritization, alternatives analysis, and environmental studies



T-PICS: What is it?

- **Transportation Project Impact Case Studies**
 - Web-based viewing and analysis system for case studies
 - Complements existing economic impact analysis
 - Intended for early stages of the planning process
 - 105 post-project economic impact studies
 - Cases are biased towards mega- & industrial access projects
 - Researchers have supplemented some of the case studies
 - Three part tool
 - A Search function that allows for user-defined screening of cases
 - A Case Study Viewer that provides impact summaries, maps, documents
 - An Impact Estimation Calculator that shows the range of impacts expected from a user-defined project profile



Why T-PICS?

■ Economic Vitality

- A primary reason for investing in highway capacity
- Better access and reduced transportation costs are key to this
- Better understanding of impacts leads to funding better projects
- Better projects lead to better outcomes & a better economy

■ Planning disconnect

- Economic impacts are important but aren't addressed until later in the planning process
- Tradition analytical methods are resource-intensive and reserved for the later stages of the planning processes

■ The Solution

- Create an easy to use tool to provide rough estimates of impacts
- Economic impacts can be considered in the early stages of the planning process



When to Use T-PICS

- **Early-stage policy or strategy development**
 - Identify the types and scale of impact tradeoffs to be expected
- **Early-stage “sketch planning” processes**
 - Identify local barrier & success factors to be addressed in later planning stages
- **Study/Citizen Advisory Committees**
 - Inform discussions with the experiences of other communities with similar projects
- **Public Hearings**
 - Temper the hopes of project proponents
 - Address fears of project opponents



T-PICS: Who is it for?

Everybody!

- **Decision-makers**
- **Elected officials**
- **Stakeholders**
- **Planners**
- **Public**
 - Potential proponents
 - Potential opponents



T-PICS: Case Search

- **Filter Cases by multiple criteria**
 - Project Type, Cost, Region, Area Purpose, Economic Climate,
- **Select Cases**
 - View cases separately or
 - Compare based on user-defined criteria
- **View Pre/Post-Project conditions & impacts**
- **Read short narrative on the case**
 - Project background & impact on local area
 - Non-transportation factors that enhanced/mitigated project impacts
- **View Google map image of project**



T-PICS: My Project Tools

- **Provides an estimate for a hypothetical project**
 - Estimate is a range – x,xxx to y,yyy for each impacts
 - Direct, Indirect, and Total impacts on jobs, wages, and output
- **Estimate based on user-defined factors**
 - Project type, region, setting, economic climate, and length
- **My Tools estimates project profile & impacts**
 - Project cost, AADT, mileage estimated by initial inputs
 - Estimate of Direct & Supplier/Wage impacts
- **Estimate can be refined by user**
 - Adjust project cost and AADT
 - Adjust non-transportation factors that impact development
 - Land use policies
 - Infrastructure
 - Business Climate



T-PICS Demo

- **Intro to website**
 - Overview
 - Case Search
 - My Project Tools
 - Resources
- **Performing a query**
 - Basic Criteria
 - Supplemental Criteria
 - Viewing a case
- **My Project Tools**
 - Basic input
 - Refining the outputs



T-PICS Guidance

■ Case search

- Focus on project and area type
- Secondary criteria not really worth the effort
- Query goal is a 10-20 case pool
- Review case summaries to identify likely candidates & thin field
- View detailed documentation of case studies

■ My Project Tools

- Collect project type, length, cost, and AADT
- Basic inputs: project & area type, economic distress, and length
- Refine with project cost and AADT
- Defaults for infrastructure, business climate, and land use policy

■ Inputs

- Use available data
- Use model data only if available. Do not run model!



T-PICS Conclusions

- **T-PICS has a limited role in INDOT's planning process**
 - Decision-makers prefer objective, project-specific data at the onset of project development
 - INDOT attacked the planning disconnect with another strategy
 - INDOT has invested in improving its in-house economic analysis capabilities to increase their scope and shorten turn-around time
 - Traditional economic impact analysis can be done in a few days
 - Estimates are requested at the earliest planning stages
 - This has served to compress the planning process
- **Case Search**
 - Address the concerns about reliability of estimates
- **My Project Tools**
 - Provide very quick and dirty estimates



C11: What is it?

- **Tools for Assessing Wider Economic Benefits of Transportation**
 - Spreadsheet-based, sketch planning
 - Complements existing economic impact analysis
 - Intended for middle stages of the planning process
 - Avoids double counting
 - 4 Tools
 - Reliability
 - Market Access
 - Intermodal Connectivity
 - Accounting framework



Why C11?

- **Complement C03 T-PICS**
 - Incorporate economic issues into mid-stage planning
- **Increase tools available to planners**
 - Open source analytical tools and database
 - Available to the public and planners
- **Reinforce the SHRP 2 decision-making framework**
 - Integrating multi-stage planning
 - Improve the utility of multi-criteria decision-making



Wider Transportation Benefits

- **Traditional Benefit-Cost Analysis (BCA)**
 - Benefits are defined as a reduction in costs
 - Focused on direct impacts to travelers
 - User Time Costs
 - Vehicle Operating Costs
 - Safety Costs
 - Limited consideration of indirect impacts such as pollution
- **Economic Impact Analysis (EIA)**
 - Indirect impacts on employment, income, and output
- **Wider Transportation Benefits**
 - Direct benefits that aren't captured by traditional analysis
 - Impacts on business productivity
 - C11 focused on three classes of effects – reliability, market access, and intermodal connectivity



C11: Who is it for?

- **Work for planners**
 - Requires technical expertise to use
 - GIS and/or model data needed for inputs
 - Collecting input data is a labor-intensive
- **Results for everyone**
 - Decision-makers
 - Elected officials
 - Stakeholders
 - Public



When to use C11

- **EA/Planning Studies**
 - Provide additional criteria for alternatives analysis
- **Project Prioritization**
 - Provides additional criteria for project selection
- **Corridor Planning**
 - Better inform stakeholders, elected officials, and the public



Reliability

- **Reduction in variability and uncertainty in travel**
 - Reduce congestion
 - Reduce number and duration of incident
- **Reliability Benefits**
 - Supply chain logistics
 - Labor productivity
- **Inputs**
 - Facility type, traffic, speed, lanes,
- **Outputs**
 - travel time index, average delay, buffer time, and cost of delay
 - Direct benefits estimated from travel time index & buffer time



Market Access

■ **Accessibility**

- By reducing travel time, projects can expand the available supply of customers, employees, and suppliers
- Measured by effective density or effective size

■ **Markets**

- Buyer-Supplier Market
 - Enable scale economies in production and delivery processes.
- Labor Market
 - enable scale economies through better matching of specialized business needs and specialized worker skills
 - enable more innovation through greater interaction of complementary firms and their employees

■ **Tools**

- Effective density w/ spatial decay – Labor & Buyer/Supplier
- Impedance threshold metric – Labor market access



Intermodal Connectivity

- **Improve speed & frequency of intermodal travel**
 - Improvements in the efficiency of intermodal connectors
 - Improvements in the frequency of intermodal service
 - Increase in the number of destinations served by terminal
- **Benefits**
 - Decrease in travel costs for existing travel
 - Increase the number of trips made
- **Inputs**
 - projected ground access volume
 - change in access time
 - fraction of vehicles on affected routes going to the terminal
- **Outputs**
 - Connectivity Index used to estimate direct economic benefits

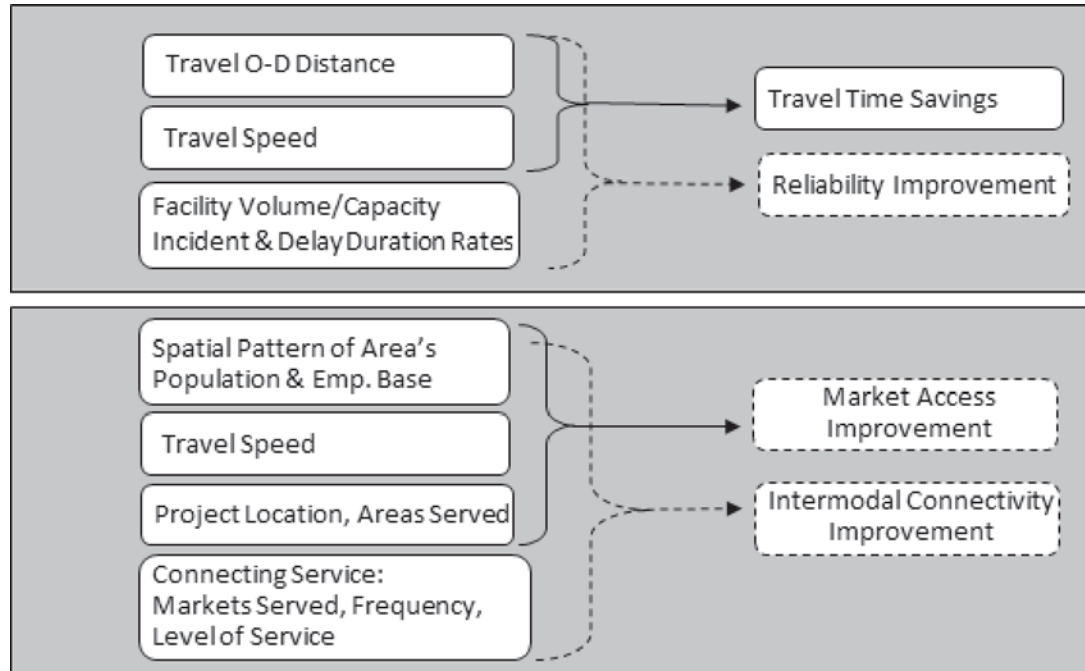


Accounting Framework

- **Lays out categories of direct economic benefits**
 - Users
 - Businesses served
 - Indirect and secondary effects not included
 - Impacts are monetized
- **Incorporates benefits into BCA framework**
 - BCA analysis is primary focus
 - Metrics can be incorporated into multi-criteria rating
 - Results can be used as inputs for EIA
- **Inputs**
 - Project data
 - Output from Reliability, Intermodal Connectivity, and Market Access tools



Accounting Framework



Thanks!

- **Frank Baukert**

- INDOT Modeling & Forecasting
- 317-232-1486
- fbaukert@indot.in.gov

- **Emmanuel Nsonwu**

- INDOT Technical Planning
- 317-232-5485
- ensonwu@indot.in.gov

