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

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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)**
  - CO3 – 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 on-set 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

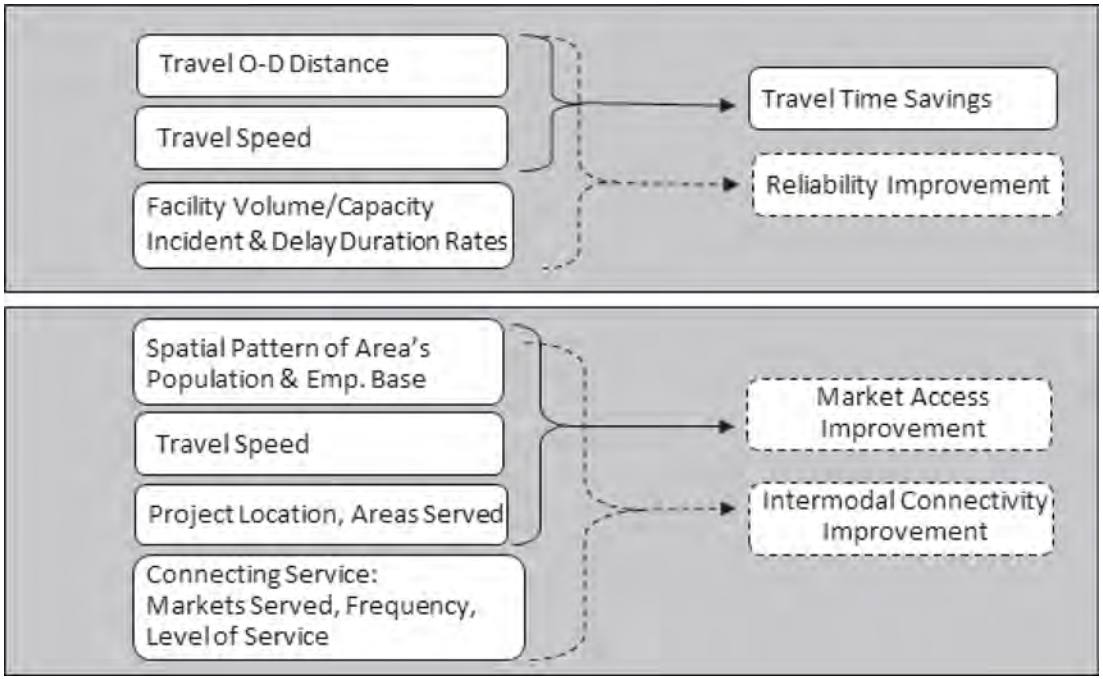
Intermodal Connectivity

- **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!

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