

# Evolution of Methods for Assessing Economic Development Impacts of Proposed Transportation Projects

Glen Weisbrod

Economic Development Research Group  
gweisbrod@edrgroup.com

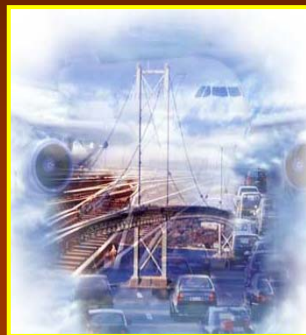


**TED2006 Conference,  
Little Rock, March 2006**

1

## Overview

1. Economic Development Background
2. Early Computer Models
3. Access and Connectivity
4. Productivity, Other Factors
5. Spatial Databases
6. Multi-modal, int. trade
7. New Evaluation Tools



2

# Economic Development Background

## Access to Markets: Creating Jobs & Income

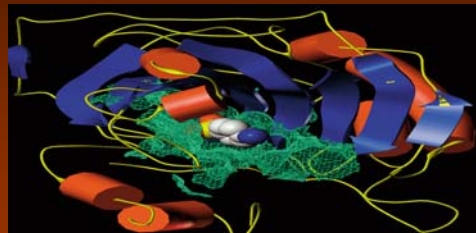
- Ancient Sea-Land Trade Routes; risk analysis, freight hub at Timbuktu
- Romans: 50,000 mile interstate & national defense highway system; Inter-modal transfer via in Caesaria
- US Govt: Cumberland Pike (1818), Erie Canal (1825), ADHS (1964)
- Congestion regs to preserve access: Ancient Rome, Medieval London



Freight Vehicles

## Concept of Computer Models

Take a complicated situation...

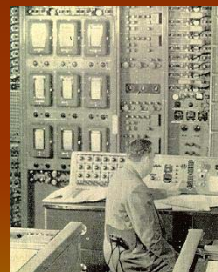


and represent it as "simplified" processes...

## Early Computer Models

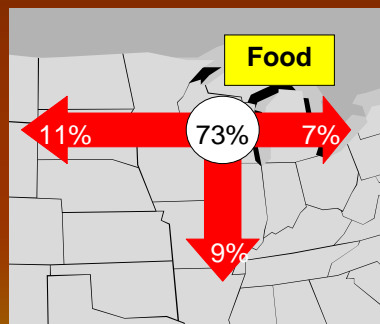
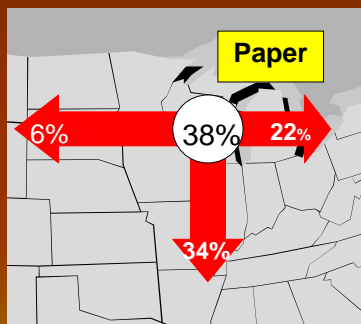
### *Will Model Building and the Computer Solve Our Economic Forecasting Problems?" (HRR, 1967)*

- 1960's-1970's: "I-O Econ Models (inter-industry \$ flows) and Urban Road Network models (route flows)
- 1980's: REIMS and later REMI (regional impact models)
- 1988-92: combination models (WI, IA, IN)
  - Hwy model: time & cost change
  - Exogenous: tourism & freight markets
  - REMI: cost and indirect econ growth



## Supplementing REMI for Mode, Corridor & Industry Flows

- Connectivity benefits differ by mode (road, rail), vehicle type (truck, car), corridor direction, and industry



## Access and Connectivity Tools

### **Rural Problem: no cost savings if no connection**

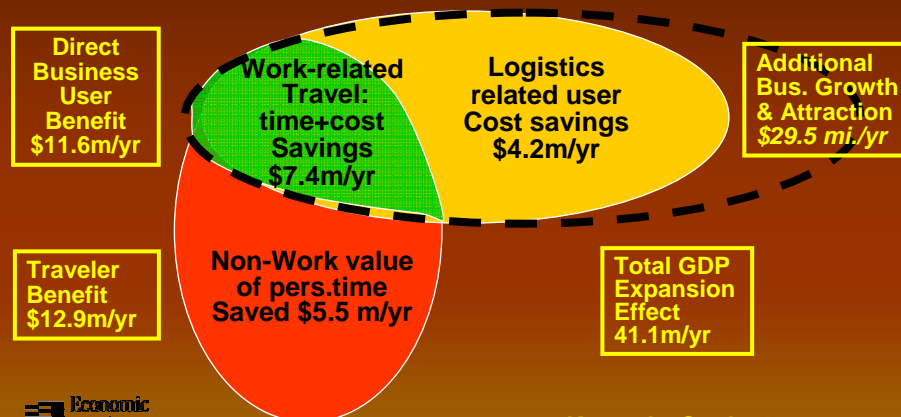
*Spreadsheets for access impact on business attraction*

1. 1988: Expert panels (*Wisconsin*)
2. 1996: HEDE - Highway Economic Development Estimator (*Indiana*)
3. 2001: ARC-Opps – Appalachian Region Highway Opportunities (*Mississippi*)



## Separating Productivity from Business Attraction Effects

- Delete jobs gained at expense of other areas
- Keep net productivity – logistic efficiencies, scale economies



## Consideration of Transportation vs. Other Business Factors

2004: LEAP - Local Economic Assessment Package (Tenn)

(1 = CRITICAL DISADVANTAGE; 2 = IMPORTANT DISADVANTAGE)

Sector	DEFICIENCY (# OF JOBS)	TOTAL PRODUCTION COSTS	Factor Costs				Labor Market		Transportation			
			LABOR COSTS	LAND COSTS	ENERGY COSTS	TAXES	WORKER BASE	SKILLED WORKERS	WATER TRANS	AIR TRANS	RAIL TRANS	HIGHWAY TRANS
Food products	507	2			2							
Textile mill products	90	2			2							2
Apparel and other textile	1,277	2								2		2
Furniture and fixtures	192	1								2		
Rubber and plastics	957	1										
Leather products	56									1		
Industrial machinery	357	1						2		2		
Electronic/electric equipm	4,724	2						2		1		1
Trucking & warehousing	610	1		1						1		1
Transportation by air	236	1	2		2		2	2		1		

**Economic  
Development**  
RESEARCH GROUP

9

## Development of Spatial Databases

*Geographic information systems (GIS) - effects on market access and inter-modal connectivity*

- Integrating GIS, trans network, multi-modal terminal data
- Impacts of connections on corridor reach to markets, terminals, hubs and gateways
- Oregon, Montana, Mass.

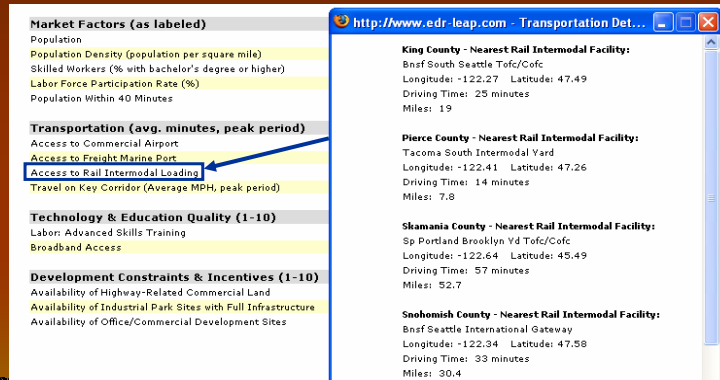


**Economic  
Development**  
RESEARCH GROUP

10

## Tools Using Spatial Databases

- EDR-LEAP: impacts on market size, inter-modal terminals
- HEAT: statewide hwy connectivity to markets, facilities

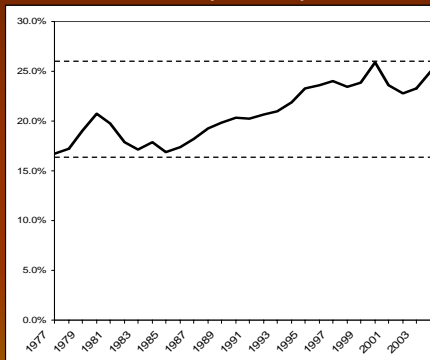


**Economic  
Development  
RESEARCH GROUP**

11

## International Trade Growth

**US Growth of International Trade**  
(import+exports rel to total GDP)

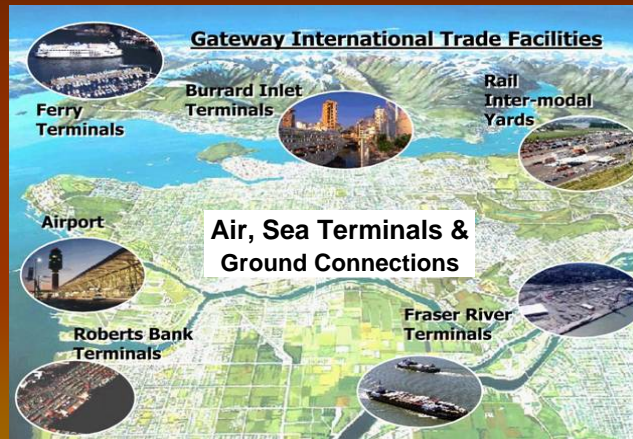


**Economic  
Development  
RESEARCH GROUP**

12

## Modeling Effects on Hubs, Gateways

Traditional models miss peak period congestion, schedule reliability, inter-modal connections, int. trade competition



Economic  
Development  
RESEARCH GROUP

13

## Regional Econ Devel Impacts vs Benefit-Cost Analysis

- Econ. Dev. Impact counts effects of construction and attracting business investment from other regions.  
→ **NOT ECON EFFICIENCY BENEFITS!**
- Econ. Dev. Impact shows safety improvements as loss of jobs in health care & insurance  
→ **NO ECON GROWTH**
- Personal time and air quality improvements do not directly affect flow of \$\$, only indirectly through migration  
→ **NO MATCH OF ECON IMPACT TO SOCIAL VALUE**

Economic  
Development  
RESEARCH GROUP

14

## Example of B/C Accounting

	1st Yr	NPV
<b>A. Travel Efficiency Benefit</b> • <i>Savings in Travel Time &amp; Cost –air, ground</i>		
<b>B. Other Public Benefits</b> • <i>Emissions, Noise, Safety</i>		
<b>C. Local Econ Development Benefits</b> • <i>Net Income Growth, Special Populations</i>		
<b>D. Government Revenue Benefits</b> • <i>Taxes &amp; Fees – airport, community, state</i>		
<b>E. Benefit Cost Analysis</b> • <i>Travel Efficiency, Statewide Public Benefit, Local Public Benefit, Fiscal Impact</i>		

## Needs for Econ Devel Models

1. Capture **Multi-modal** implications
2. Industry reliance on **specific modes, corridors**
3. Data on Travel time/cost **plus access & reliability**
4. Consideration of **local factors** (utilities, land, buildings)
5. Separation of **\$ flow impacts** from other benefits
6. Distinguishing **economic, social, environmental** impact
7. Distinguishing **local, state, national, global** impact
8. Distinguishing B/C **perspective** (traveler, resident, etc.)



# TREDIS: A New Framework

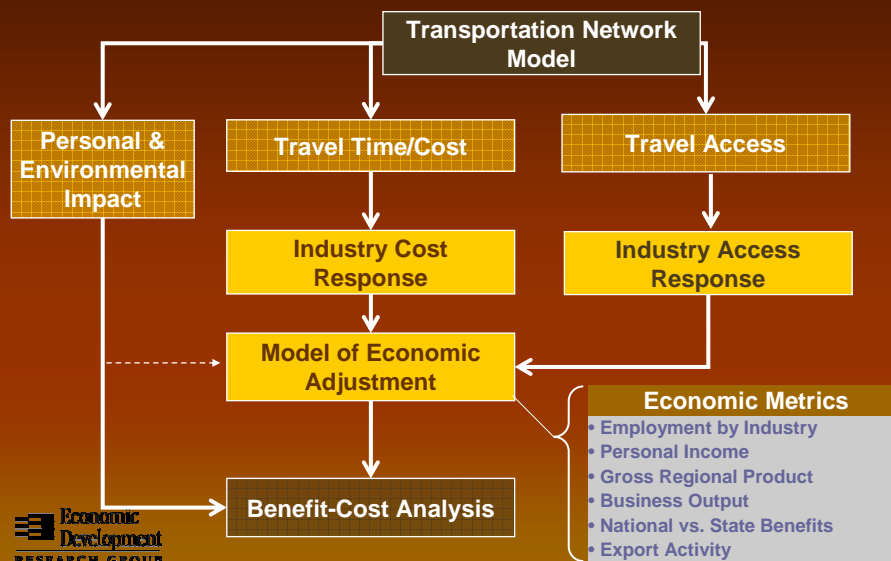
## Transportation Economic Development Impact System

- **Comprehensive** -- All modes, purposes, time periods
- **Sensitive** – to reliability, market access, inter-modal, peak congestion by mode & corridor
- **Modular** -- works with congestion/reliability, spatial access, econ devel and traffic network models
- **Web based Flexibility**– multi-user collaboration, “on the fly” changing of study regions, corridors
- **Tailored to Audiences** – reporting on alternative perspectives for measuring benefits and impacts



17

## TREDIS Components



## TREDIS Applications

- Vancouver Gateway – port connections
- Portland Congestion – logistics industries
- Calgary-Edmonton HSR – labor markets
- Chicago Freight Plan – truck and rail yards



## Moving forward...

- Data for analysis of logistics, international trade and productivity benefits
- Representation of commodity flows by industry & mode
- Workforce migration and wage responses
- Treatment of quality of life factors



## **For Further Information**

### ***EDRG Web Download Library***

[www.edrgroup.com/edr1/library](http://www.edrgroup.com/edr1/library)

### ***FHWA Econ Devel Links***

[www.fhwa.dot.gov/planning/econdev](http://www.fhwa.dot.gov/planning/econdev)

### ***TRB Econ Devel Committee Links***

[www.tedcommittee.com](http://www.tedcommittee.com)



Economic Development Research Group, Inc.  
2 Oliver Street, Boston, MA 02109 USA  
1.617.338.6775 [www.edrgroup.com](http://www.edrgroup.com)

21