Regionalizing Public Transportation

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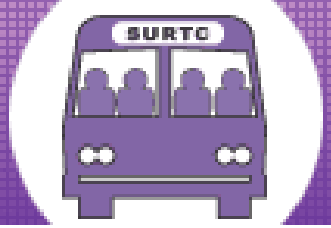
David Ripplinger
Small Urban & Rural Transit Center
Upper Great Plains Transportation Institute
North Dakota State University



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Regionalizing Public Transportation

- Motivations for Regionalization
- Public Transportation Systems
- Regionalization Models & Examples
- Economics of Regionalization
- Measures in North Dakota

Regionalizing Public Transportation

Regionalization – the process of establishing a organized regional effort to improve the effectiveness and efficiency of public transportation

Not Necessarily

- Regional coordination
- Involving a regional planning organization
- Having a single regional provider

But does include

- Multiple counties and jurisdictions
- Rural areas

Motivations

- Possible implications
  - Accommodate long-distance trips
  - Regional planning
  - Increased levels of coordination
  - Economies of size
  - Funding
- Real and perceived needs and impacts

Public Transportation Systems

- Public transportation and mobility is a complicated proposition
- Many components
- Interact with each other in many of ways
- Consider public transportation as **CLIOS** system and use tools/processes from systems engineering
- **C**omplex, **L**arge, **I**ntegrated, **O**pen, **S**ocio-technical system

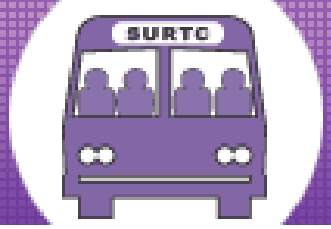
Regionalization Considerations

System Components/Stakeholders

- Federal government
- State government
- Local/regional government
- Transit agencies
- Riders
- Taxpayers
- Many more…

Functions

- Funding & oversight
- Planning & coordination
- Service
- Vehicle ownership
- Governance



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Regionalization Considerations cont.

Geography

- Road network
- Population distribution

Economic

- Service efficiency
- Network efficiency

Operational

- Routes & fares
- Managerial ability
- Effectiveness
- Cost-sharing

Political

- Local buy-in
- State/federal regulations

Organizational

- Transition
- Incentive
- Requirements

Technology

- Existing systems
- Infrastructure

Models of Regionalization

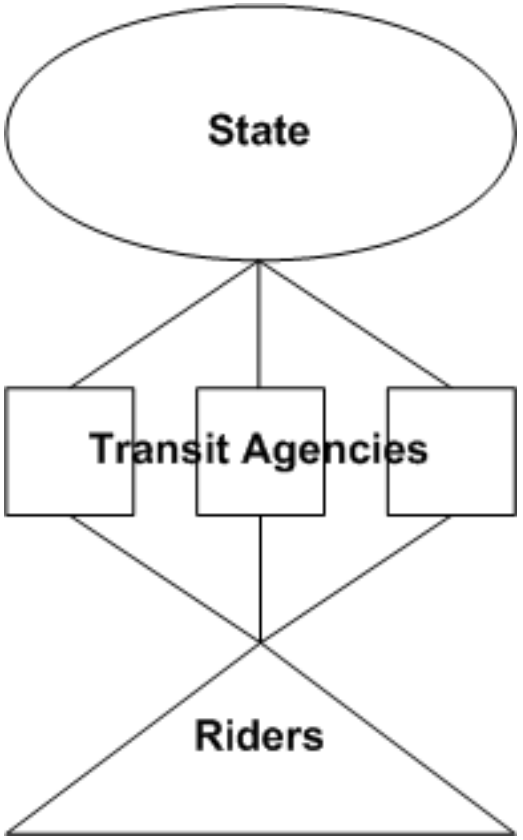
There are many successful models of regionalized public transportation

5 Prototypes

1. Multiple Agencies
2. Regional Planning Organization
3. Regional Transit Authority
4. Lead Transit Agency
5. State Transit

Multiple Transit Agencies

- Transit agencies interact directly with state, riders, local governments
- Transit agencies usually serve different areas with some overlap
- Varying levels of coordination among transit agencies
- Pros: Local service
- Cons: Lack of coordination, no economies of scale, may be gaps in service



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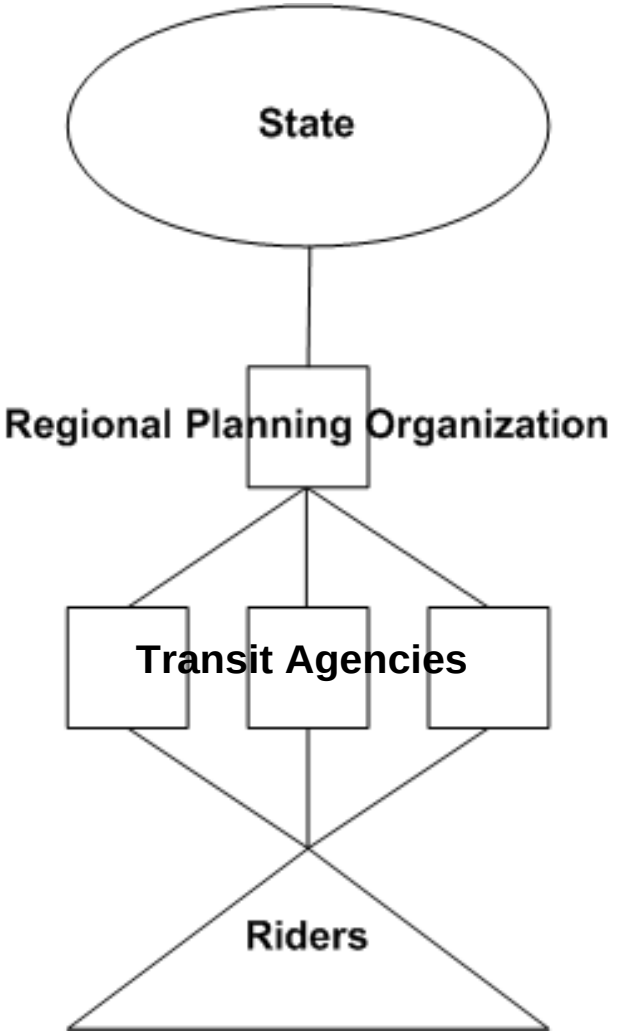
Regional Planning Organization

- Regional Planning Organization (RPO) administers program at the regional level
- The RPO interacts with state, transit agencies, local governments
- Conducts medium and long-range planning (equivalent to MPO)
- Pros: Specialization, promotes coordination
- Cons: May require large amounts of resources



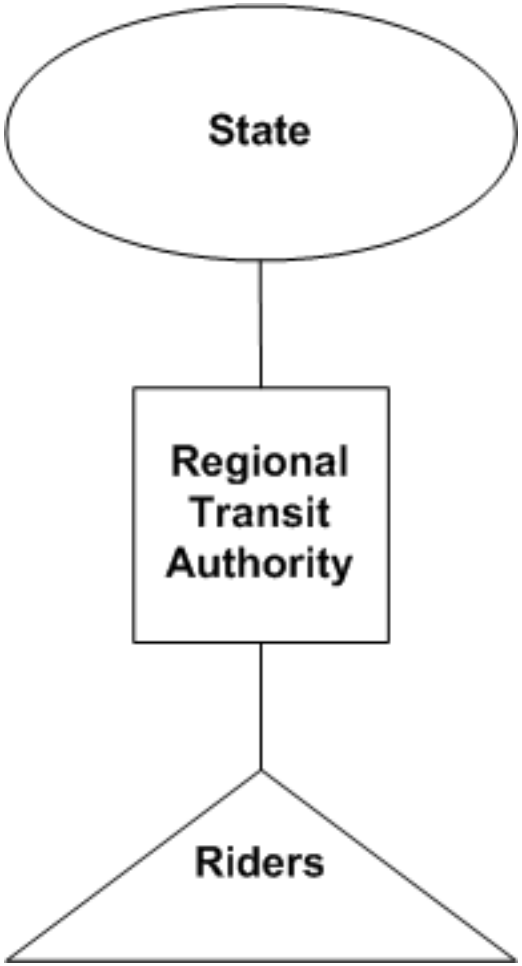
Regional Planning Organization

EAST CENTRAL IOWA COUNCIL OF GOVERNMENTS
YOUR REGIONAL PLANNING AGENCY

- Transportation department, Regional Planning Affiliation (RPA), created to assist with the implementation of ISTEA
- ECICOG is responsible for planning, administration, and coordination of transit services in seven county region
- Each county operates its own service to rural, elderly, and disabled clientele
- Separate urban systems

Regional Transit Authority

- Regional agency responsible for planning and service delivery (not always sole transit provider in region)
- Interacts directly with state, riders, local governments
- Pros: Economies of scale, local input
- Cons: Lack of local interaction
- Examples: Iowa, North Carolina



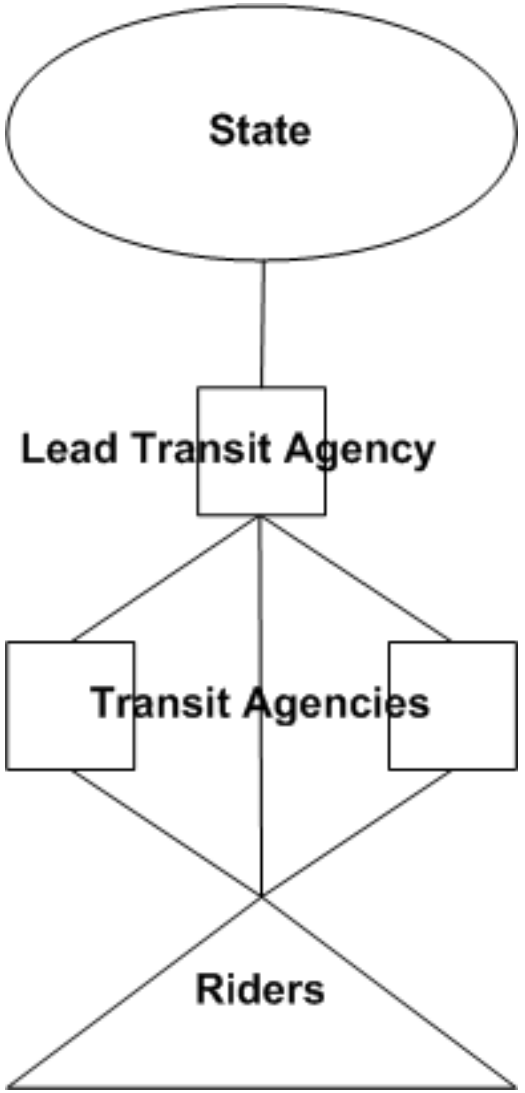
Regional Transit Authority

Western Piedmont Regional Transit Authority

- Four counties in Western NC
- Provides service to urban and rural areas
- Combined four existing systems

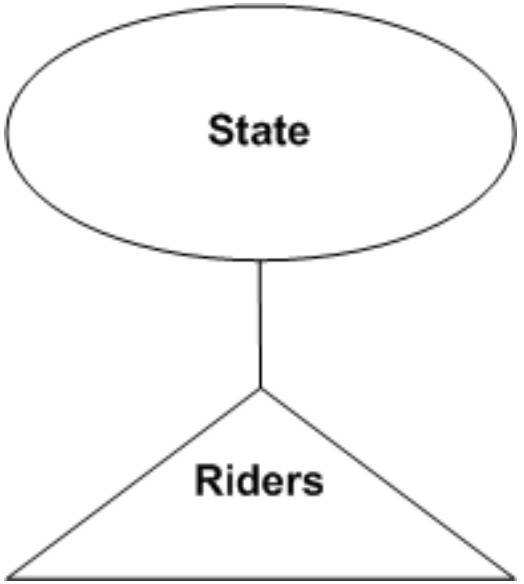
Lead Transit Agency

- Local agency performs administrative duties and provides service
- Pros: Increased local control and specialization
- Cons: May lead to animosity from other transit agencies



State Transit

- State directly operates transit service
- Often broken into regional divisions
- Pros: Economies of scale
- Cons: Possible lack of local input
- Examples: Connecticut, Rhode Island, Delaware



State Transit

- Rhode Island Public Transit Authority
- Established in 1966
- Provides service to nearly all RI communities
- Fixed-route, ADA complementary paratransit service, and flexible-route service

RIPTA
RHODE ISLAND PUBLIC TRANSIT AUTHORITY

Evaluating Regionalization Alternatives

Feasibility of Regional Alternatives

- Identify which alternatives are possible
- Identify which alternative is best

Use the acronym TELOS

- **T**echnical
- **E**conomic
- **L**egal/Regulatory/Political
- **O**perational
- **S**chedule

Evaluating Regionalization Alternatives

Technical

Is the necessary expertise available?

Economic

Do the benefits versus costs clearly favor one model over the other?

Legal/Regulatory/Political

Do regulatory or legal constraints prohibit or limit a particular model?

Do any models present significant political challenges (local/regional/ state)?

Operational

What are the needs and expectations? Do any models better serve these needs?

Economic Considerations

Cost Structure of Transit

- What happens to costs if I combine two systems? (Economies of Size)
- What happens if I increase the amount of service in a particular service area? (Economies of Density)
- Should one agency provide intercity service while another provides local demand-response? (Natural Monopoly)

Cost Structure

Data

- North Dakota transit agencies that receive 5311 funding from 1998-2008, removed city taxis
- Annual grant applications and quarterly reports
- Variables
  - Output – demand-response miles & intercity miles (intermediate measures)
  - Prices – labor, fuel, maintenance
  - Level of capital
  - Network size – service area
  - Environmental/technological variables – average sized vehicle, regionalization, full-time director, ratio of elderly and disable passengers to total ridership, rides per mile, time

Cost Structure

Method - Fit a short-run variable cost function with share equations using seemingly unrelated regression.

-Impose homogeneity in prices

-Use adjusted level of capital (Oum & Zhang)

$$\ln VC = \propto + \sum_i \beta_i \ln P_i + \sum_i \gamma_i \ln Y_i + \sum_i \sum_j \beta_{ij} \ln Pi \ln Pj + \sum_i \sum_j \kappa_{ij} \ln Pi \ln Yj$$

$$+ \sum_i \sum_j \gamma_{ij} \ln Yi \ln Yj + \psi \ln S + \sum_i \beta_{is} \ln Pi \ln S + \sum_i \gamma_{is} \ln Yi \ln S + \eta \ln N$$

$$+ \sum_i \beta_{in} \ln Pi \ln N + \sum_i \gamma_{is} \ln Yi \ln N + \sum T_i$$

$$Si = \beta_i + \sum_j \beta_j P_j + \sum_j \kappa_j Y_j + \sum \beta_{is} S + \sum \beta_{in} N$$

Results

Parameter Estimates

Demand-Reponse Miles	0.75	**
Intercity Route Miles	0.22	**
Capital	-0.31	**
Seats	0.03	*
Regionalization	-0.08	
Technology	0.09	
Time	-0.01	**
Elderly-Disabled Ratio	0.03	
Service Area	-0.03	
Rides/Mile	0.07	**
Director	0.12	

Measures

- Increasing Returns to Size
- Increasing Returns to Density

Implications for Regionalization

Does this mean that a single agency should provide service in a region?

Questions?