MIT Portugal

Strategic Options for Integrating Transportation Innovations and Urban Revitalization (SOTUR)

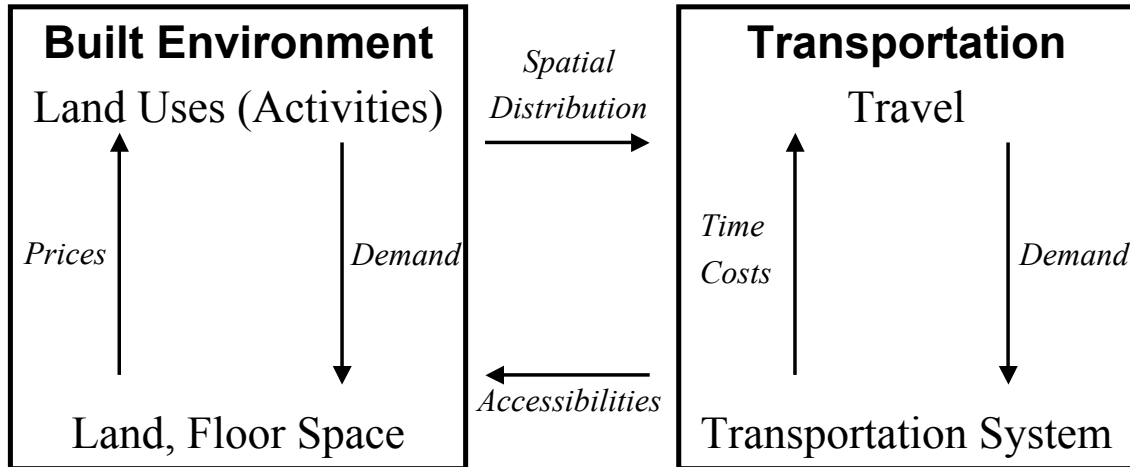Transportation Systems

Project Overview

MIT | IST | | U.PORTO

Overall Aims

○ Capitalize on land use-transport (LUT) interaction

- To leverage transportation innovations (including from SCUSSE and CityMotion) to promote desirable urban development patterns/outcomes (e.g., urban revitalization)
- And, vice versa

Basic Theoretical Foundation: Land Use Transport (LUT) Interaction

Built Environment		**Transportation**
Land Uses (Activities)	*Spatial Distribution* →	Travel
Prices ↑ ↓ *Demand*		*Time Costs* ↑ ↓ *Demand*
Land, Floor Space	← *Accessibilities*	Transportation System

Basic Project Logic

State of the Practice: Global Scan of policies, programs, etc. to produce desired changes in LUT system

State of the Context: Characterization of PT urban space (typologies)

State of the Context: Policy, institutional, and finance architectures

Qualitative Data → The Dynamics: Modeling the interactions ← Quantitative Data

Evaluation: Performance Indicators, Environmental Assessment, Urban "fit," Scenarios

Dissemination: Knowledge Transfer

Links to other TR SYS Projects

- Data
  - Land uses/built environment
  - Travel behavior (revealed and stated)
- Information Management Infrastructure
  - To support and facilitate data management/sharing
- Institutional, finance and policy frameworks
- Energy

Existing Work Packages Under Current Project Outline

- WP1: Inventory of Current Knowledge on Policies and Effects
  - Working Paper completed by Lisa Rayle, MIT
- WP2: Characterization of Portuguese Urban Contexts
  - Work begun this summer
- WP3: Assessment of Relevant Institutional and Finance Structures
  - Working Paper completed by Joshua Nelson, MIT
- WP4: Survey of Residential Choice and Transport Preferences
- WP5: Development of Integrated LUT Level of Service Indicator(s)

Existing Work Packages Under Current Project Outline (II)

- WP6: Deepen Understanding of Relations Between Land Owners/Developers and Government Agencies
- WP7: Developing Urban System Models (Model "Test Bed")
  - Work underway by Luis Martinez, IST
  - Work to begin in Sept. by Angelo Guevara, MIT
  - Work to begin in ??? by Coimbra
- WP8: Strategy Development and Scenario Testing/Analysis
- WP9: Strategic Environmental Assessment
- WP10: Modeling Quality of Fit (calibration with physical reality)
- WP11: Development of Project Handbook

WP 1: Land Use-Transport Policies

Review of literature on land use-transportation planning interventions.

Research Questions:

- How **effective have** these policies been?

- How do **economic and institutional factors** influence outcomes of these interventions?

- How does research assess the prospects of transport investment as a means for **urban revitalization**?

WP1: Summary of Findings

○ The interaction between built environment and transport is well-studied
  - but not entirely conclusive.

○ The success of land use policies depends
  - on **local context** and **institutional structure**, esp. **coordination** between governments and sectors.

○ Transport system interventions may support urban **revitalization** when:
  - economic conditions are favorable
  - economic and land use policies support development.

○ Policies are most successful when **combined** with complementary measures.

WP1: Questions for Further Research

○ How will new travel modes/arrangements influence development patterns?
  - What policies can enhance the positive aspects of those modes?
○ Empirical studies on the impacts of car and bike sharing programs, and bike and ped infrastructure.
○ Must transport policies necessarily be supported by land use policies?
  - Or should the focus be on transport policies?
○ What is the tradeoff between density and congestion and what does this mean for sustainability?
○ Clearer, more consistent definitions of land use patterns to aid in evaluation
  - e.g. neighborhood type and walkability

WP2: Urban Form, Status Quo

- Define **typology of neighborhoods**
  - in terms of factors important for land use-transport policy
- Purpose: create a **baseline of information** on **urban form** in Portuguese cities
  - to support SOTUR <u>and</u> other projects
- Also, find ways to objectively **characterize** neighborhood-level urban form
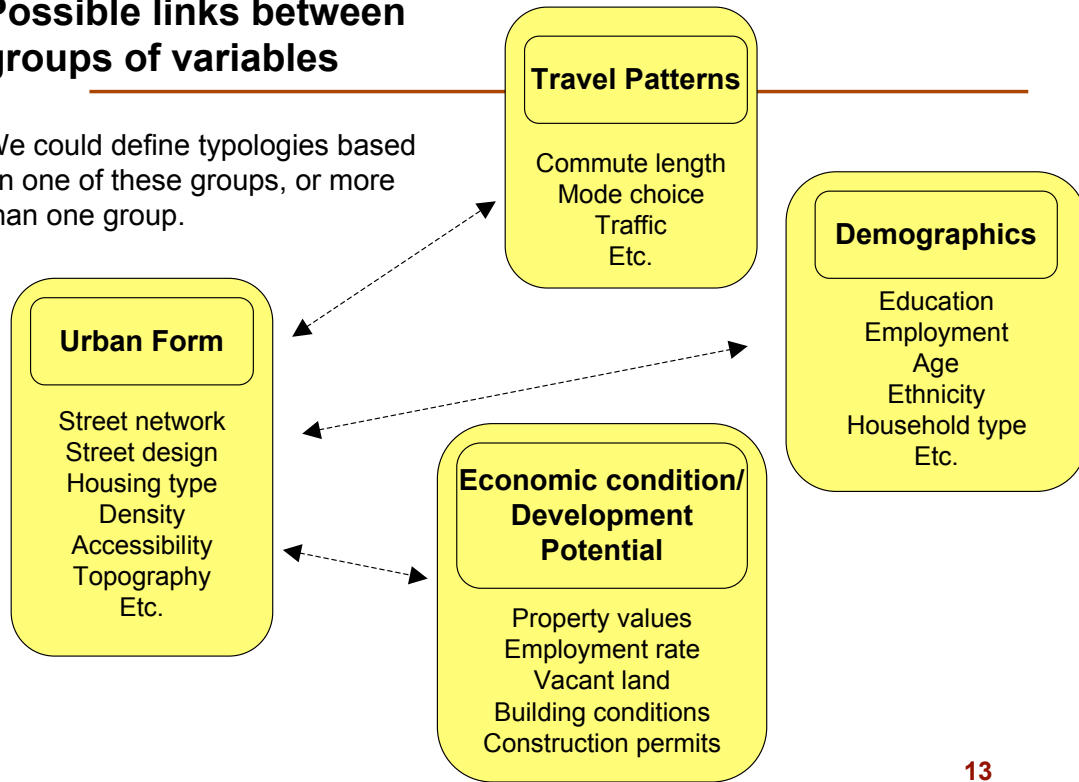
WP2: Approach

- Collect data on physical form, economic condition, travel behavior, and socioeconomic factors

- Use factor analysis/cluster analysis to describe neighborhoods/define groups of like neighborhoods
  - as data permits

Possible links between groups of variables

We could define typologies based on one of these groups, or more than one group.

Travel Patterns

Commute length
Mode choice
Traffic
Etc.

Demographics

Education
Employment
Age
Ethnicity
Household type
Etc.

Urban Form

Street network
Street design
Housing type
Density
Accessibility
Topography
Etc.

Economic condition/ Development Potential

Property values
Employment rate
Vacant land
Building conditions
Construction permits

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WP2: Progress

○ Data collection in progress
   ● Still need data on land use, parking, crime rates, economic indicators – especially for areas outside the Lisbon Municipality
○ Early stages of analysis

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WP3: Institutional and Financial Architectures

○ Case study analysis of State owned enterprises (SEE), public transportation operations, and public transport infrastructure investments

- Fiscal equivalency not aligned with relevant authority: central government maintains excessive control over local level
- Local governments need relevant fiscal authority and greater autonomy
- Sector needs clearer rules and regulations regarding the distribution of relevant resources (e.g., transfers from central government)

SOTUR Needs

○ Data and data infrastructure system

○ Industry/agency partners

○ Additional PT university partners

- Porto

○ Explicit links to Energy Systems

- e.g., urban metabolism

Some Potential Extensions

- Urban logistics – e.g., role of built environment on "last mile" for distribution
- Deepening the Finance/Institutional Context Knowledge
- Comparative Analyses (beyond Portugal) – e.g., Boston-Lisbon