



mobility. sustainability. livability.

Synopsis of project:

The aim of this research is to develop an integrated model of regional planning governance networks using Complex Systems Dynamics (CSD) and Agent-Based Models (ABM). The central research question is: *How can the diffusion of informatics concerning the governance dynamics of a regional planning network shape the selection and implementation of particular regional planning strategies?* This project breaks new ground in policy studies, natural resources and environmental engineering, transportation and civil engineering, and complexity sciences by modeling the complex interactions of social (e.g. inter-organizational networks), built (e.g. transportation, housing), and natural systems (e.g. ecosystems, agricultural lands, watersheds, air sheds) that are driven by human decision makers at various geographic scales and social sectors.

Background

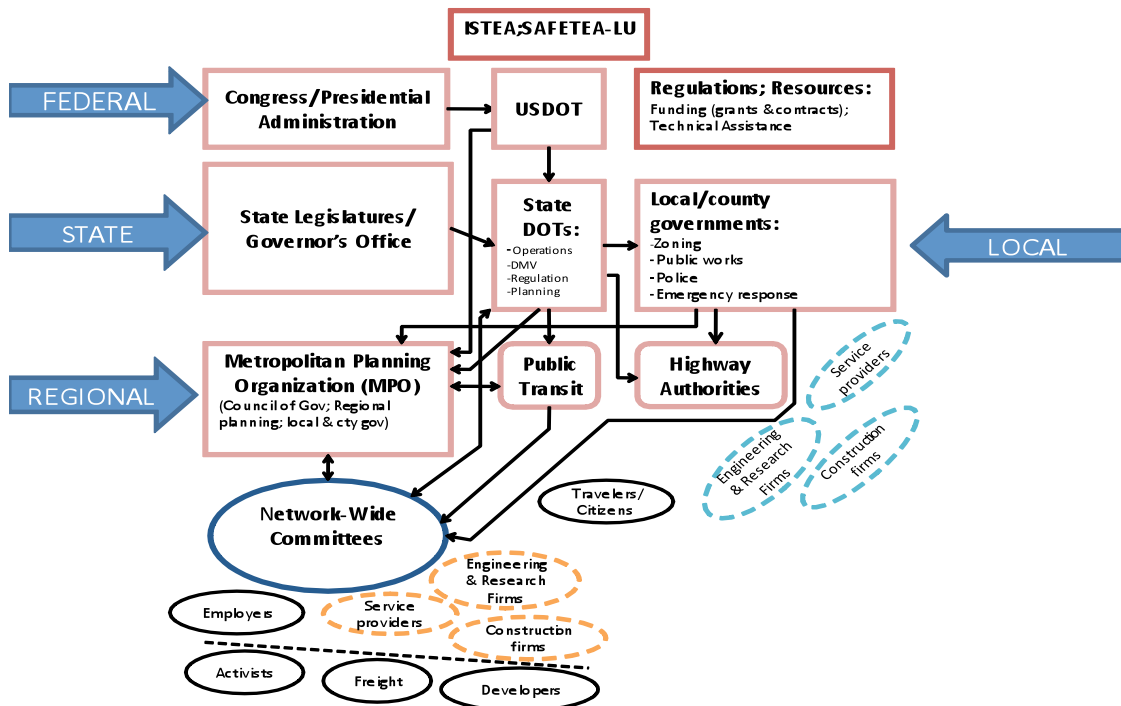
Public-public, private-private, and public-private partnerships at multiple geographic scales have evolved to deal with “wicked” and complex governance problems.

We will use Agent-Based Models (ABMs) to determine how these Complex Governance Networks (CGNs) are formed, how they operate, what types of activities they are involved in, how they make decisions, how performance is managed, who is represented, and how goals are formed.

ABMs are well-suited for the systematic assessment of CGNs through alternative theoretical lenses: theory testing, policy analysis of complex systems, ability to model complex decision heuristics, and governance informatics.

Figure 1 shows the complex interplay between MPOs and other federal, state, and local actors involved in transportation planning. With the ABM we are developing for this research, we seek to better understand these relationships and explain them in a way that is useful for the MPOs involved and allows them to manage the complexity within their organizational structures and relationships.

Figure 1. A Typical Transportation Planning Network



COMPLEX GOVERNANCE SYSTEM DYNAMICS

RESEARCH INITIATIVE:

The Analysis of Complex Governance System Dynamics: Emergent Patterns of Formation, Operation and Performance of Regional Planning Networks

FACT SHEET

Governance networks:

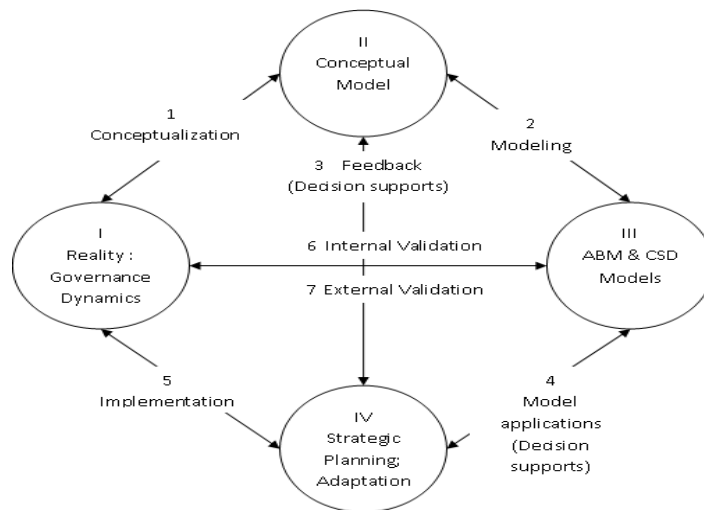
Have a relatively stable pattern of coordinated action and resource exchanges.

Involve policy actors crossing different social scales that are drawn from the public, private, or nonprofit sectors and across geographic levels.

Interact through a variety of competitive, command-and-control, cooperative, and negotiated arrangements.

Can include organizations such as watershed partnerships and Metropolitan Planning Organizations (MPOs), which are the focus of this research.

Figure 2. A Systems View of Problem Solving: Modeling for Decision Support (adapted from Mitroff, et al., 1974)



The utility of this analysis:

Developing the situational awareness of network administrators.

Using computer simulation modeling to learn and adapt.

Demonstrating how social actors interact in certain kinds of public policy and governance contexts.

Next steps:

Hypothesis testing using MPO dataset.

MPO case study data collection: Burlington, VT, Manchester, NH, Portland, ME.

Model development.

Resource acquisition – National Science Foundation, private foundations, and other sources.

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