

Transportation Planning and Modelling

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Transportation Planning and Modelling

INTRODUCTION – 1ST MEETING

References

- **Willumsen and Ortuzar** Transport Modeling
- **N. Oppenheim** Urban Travel Demand
Modeling: From Individual Choices to General
Equilibrium
- **Y. Sheffi** Urban Transportation Networks:
Equilibrium Analysis With Mathematical
Programming Methods

Course Expectations

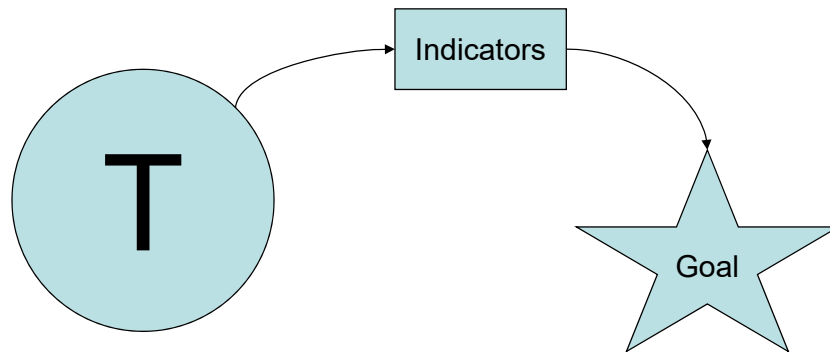
- Homework
- Quizzes
- Projects
- Visual basic for applications (VBA)
- TFTP
- ZIN

Comprehensive Transportation Planning Dimensions

- Economic
- Social
- Environmental

Systematic Evaluation for Sustainability

- Can we always count on data being there?
- If we don't have data then what can be done?

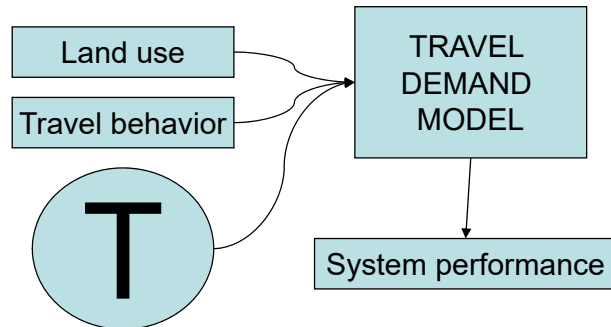


Objectives of Travel Demand Model

- Reduction in or modification of travel behavior
- Reduction of environmental damages
- Increased land use efficiency
- Enhanced travel safety

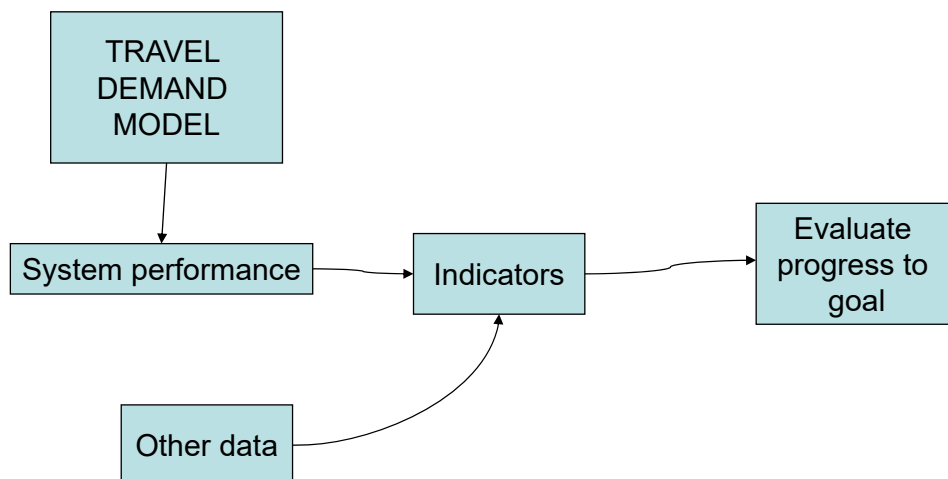
Why Use Travel Demand Models

- A relationship between transport system and indicators
 - Access
 - Purpose
 - Frequency
 - Use



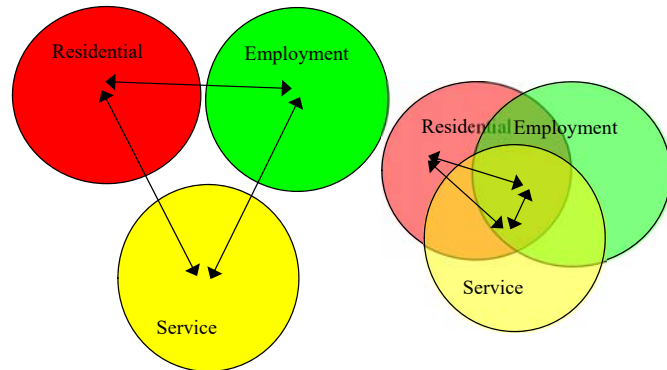
Economic, Social, and Environmental Dimensions

- Where do they come in to this process?



...through performance indicators

- For example:
 - Commute speed
 - Land use mix
 - Transport diversity
 - Transport equity



Example

- Model output = travel times between all points
- Indicator: Commute speed
- Indicator: Land use mix
- Indicator: Transport diversity
- Indicator: Equity

Transport Planning and Modelling

- Transport modelling is not transport planning
- It can only support planning, and in a few cases it may have the most important role in the process.

- In truth, planning and implementation have the power to change the world and transport modelling can only assist in this if adopted as an effective aid to decision making.
- A model is a simplified representation of a part of the real world—the system of interest—which focuses on certain elements considered important from a particular point of view

Aggregate and Disaggregate Modelling

- Aggregate models were used almost without exception in transportation studies up to the late 1970s. they became familiar, demanded relatively few skills on the part of the analyst.
- However, aggregate models have been severely (and sometimes justifiably) criticised for their inflexibility, inaccuracy and cost.

- Disaggregate models, which became increasingly popular during the 1980s, offer substantial advantages over the traditional methods while remaining practical in many application studies.
- However, one important problem in practice is that they demand from the analyst quite a high level of statistical and econometric skills for their use (in particular for the interpretation of results)

Cross-section and Time Series

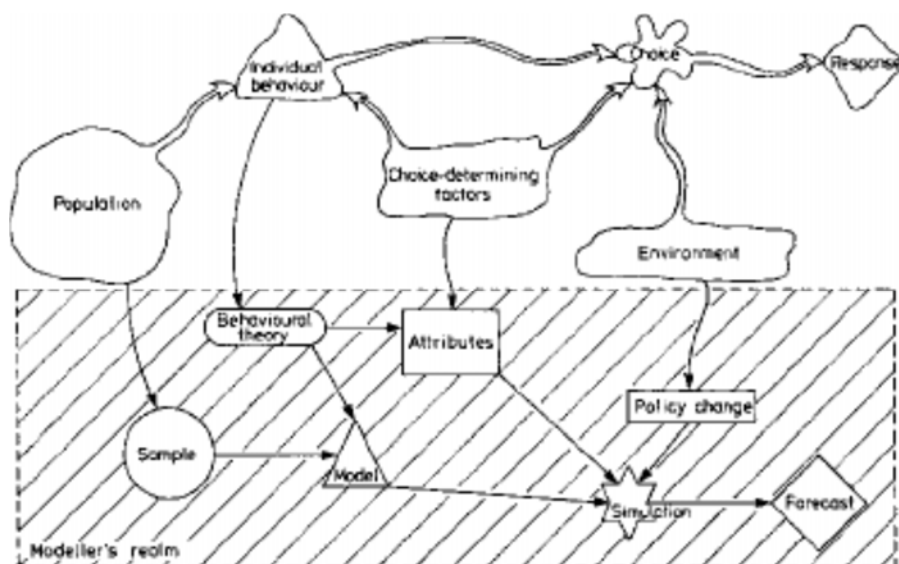
- Cross section : several variable at the same point in time
- Time series : several variable over a period of time

Revealed and Stated Preferences

- Up to the mid-1980s it was almost axiomatic that modelling transport demand should be based on information about observed choices and decisions, **i.e. revealed-preference data.**
- Within this approach, project evaluation requires expressing policies in terms of changes in attributes which 'map onto' those considered to influence current behavior

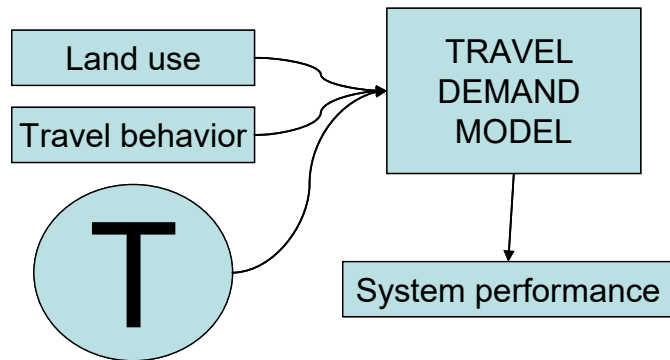
- **Stated-preference/intentions techniques**, borrowed from the field of market research, offering a way of experimenting with transport-related choices
- Stated-preference techniques base demand estimates on an analysis of the response to hypothetical choices; these, of course, can cover a wider range of attributes and conditions than the real system.

Model Calibration, Validation and Use

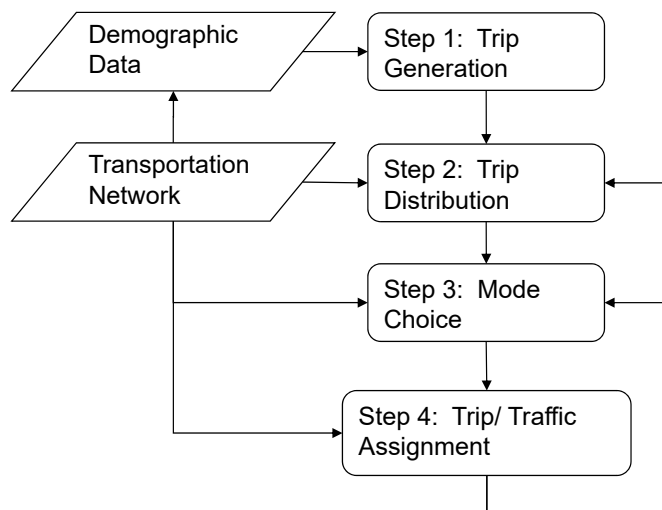


Introduction to Travel Demand Modeling

- What is a travel demand model
- Assignment: Discuss your knowledge
 - Input data
 - Trip generation
 - Trip distribution
 - Mode choice
 - Traffic/trip assignment



Four Step Travel Demand Model (FSTDMD)



Trip Generation Questions

- How much do people use the transport system?
- Why do people use the transport system?
- Where can different types of activities be satisfied?

Trip Distribution Questions

- Given a location, where do people go to satisfy demand for an activity type?

Mode choice Questions

- How do people use the transport system?
 - What modes do they choose?
 - How do they react to varying transport service quality?

Trip / Traffic Assignment Questions

- How do people use the transport system?
 - Given a mode, which route do they choose?
 - Do they satisfy multiple activities in one tour?
 - Which parts of the transport system do they use?
 - How do they react to varying transport service quality?

Demographic Data

- Autos per household
- Income level
- Household size

Network Data

- Highway network
- Transit network
- Graph

Representing a Network

