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TIGRIS XL project:
Towards a new land-use and transport interaction model for the Netherlands

1

Topics of the presentation

- What is a land-use and transport interaction model?
- Description of the project
- Discussion of model design
- Discussion of model estimation
- Conclusions

2

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Characteristics of a LUTI-model (1)

- Key point is the focus on the two-way interactions between spatial development and transport

3

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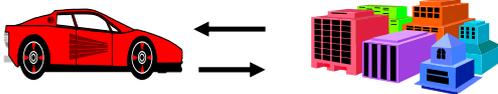
Characteristics of a LUTI-model (2)

- Modeling of the land-use changes, including the location choices of residents and firms (often simplified to jobs)
- Often operating at an urban or regional scale level, high spatial resolution
- Strong in assessing the spatial impacts (distribution of jobs and residents), less strong in assessing the economic impacts (GDP, jobs)
- Multi-disciplinary (transportation, physical planning, economy, software and database management, etc.)

4

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Land-use and transport Interactions

5
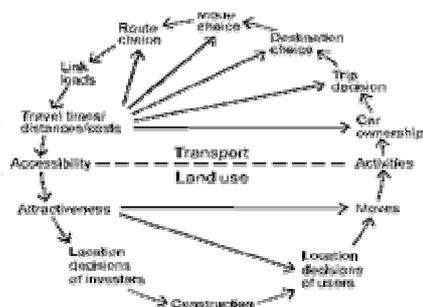
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Project description

Client: Transport Research Center (AVV), Netherlands Ministry of Transport

Background:

A first version of the TIGRIS model has been developed in the 90s. The TRC plans to replace this model.

Partners:

RAND Europe, BureauLouter, Spiekermann & Wegener

6

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Why is a new TIGRIS model needed?

- Insight in the deviations from spatial developments as planned in the National Spatial plans. Friction between spatial planners and infrastructure providers. Simplified stated as:
  - Spatial planners *design* their *preferred* future
  - Infrastructure providers need to *facilitate* the *most likely* future
- The structuring impact of transport measures (land-use changes, property values) is often part of the evaluation of transport policies. A reliable instrument to quantify this relationship is missing.

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7

Recommendations model design

- Incremental model
- Relation between location of jobs and residents is not hierarchical
- Behavioral modeling approach for the demand side of the housing market
- Supply side should be capable to address different levels of government involvement
- Focus in the labor market modeling on the distribution of jobs (fixed totals for the study area)
- Use the National model system as transport model
  - consistency in the results
 - cost considerations

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8

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model requirements

- Avoid scientific adventures; use mature not too complex methodologies
- Interaction with existing transport models; focus on designing land-use model and integration with existing transport models
- National and regional scale level of analysis
- Involve key stakeholders in the process
- Model should be calibrated on real world data
- Economic/behavioral theory

Focus on the most useful model for the client rather than on the "best" model ever

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9

Overview of the sub-modules in TIGRIS
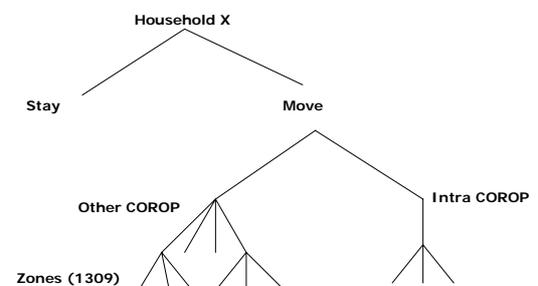

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10
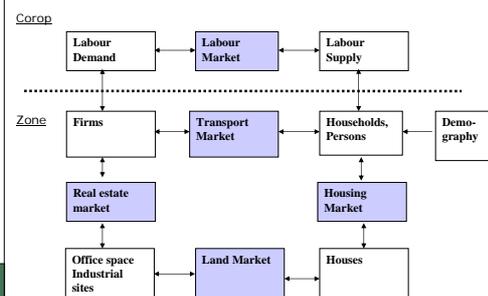
Modules TIGRIS XL

- **Demography,** module addressing basic demographic developments
- **Land market,** simplistic, excludes role of land-owner and project developers. Policy oriented and flexible towards very different land-use policies.
- **Housing market**, behavioral choice model estimated on housing market survey (WBO 2002)
- **Labor market,** calibration on period 1986-2000
- **Transport module,** NMS, integration is not realized within current pilot version

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11

Housing market structure

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12

2

Move/Stay choice

Explanatory variables

- Household size
- Employment
- Household income
- Age head of household
- Zone type classification (urban to rural)
- Vacant houses in region
- Accessibility current location

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Household location choice

Explanatory variables:

- **Number of vacant houses in a zone**
- **Average price of houses in a zone**
- **Zone type classification (urban – rural, 5 categories)**
- **travel time (travel time between old and new location)**
- **Accessibility location, purposes all, commuting, education and other**
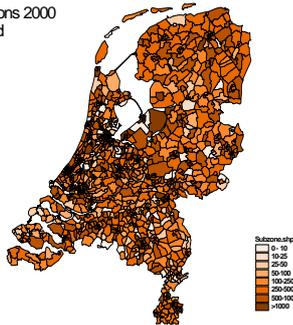- **Zone characteristics as water, services, green, population density, income level**

* Six models estimated for different household types

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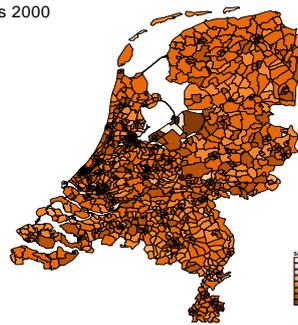
Observed relocations WBO

Relocations 2000
observed

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Modeled relocations

Relocations 2000
modeled

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Job location choice

Explanatory variables:

- **Accessibility employees**
- **Population in a region**
- **Accessibility business**
- **Accessibility freight**
- **Agglomeration**
- **Urbanization**
- **Relative share of sector in a region**
- **European location**

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Economic sectors

- **Agriculture**
- **Industry**
- **Logistics**
- **Retail sector**
- **Other consumer services**
- **Business services**
- **government**

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Conclusions: transport – land-use

- Accessibility differences in the Netherlands (rather homogenous network and spatial structure) are rather small and therefore expected structuring impact relatively (international) low.
- Accessibility is a significant variable in the labor market module.
- Accessibility is a significant variable in the Move/stay choice in the housing market module and travel times define the size of the search area.
- Accessibility is not a dominant variable in the household location choice, it is hard to empirically determine accessibility coefficients among multiple other variables

19

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