Bevorzugter Zitierstil für diesen Vortrag

Axhausen, K.W. and M. Kowald (2011) Agent-based travel demand models and social networks: Next challenges, presentation at the *4th International Workshop Frontiers in Transportation*, Niagara on the Lake, October 2011.

Agent-based travel demand models and social networks: Next challenges

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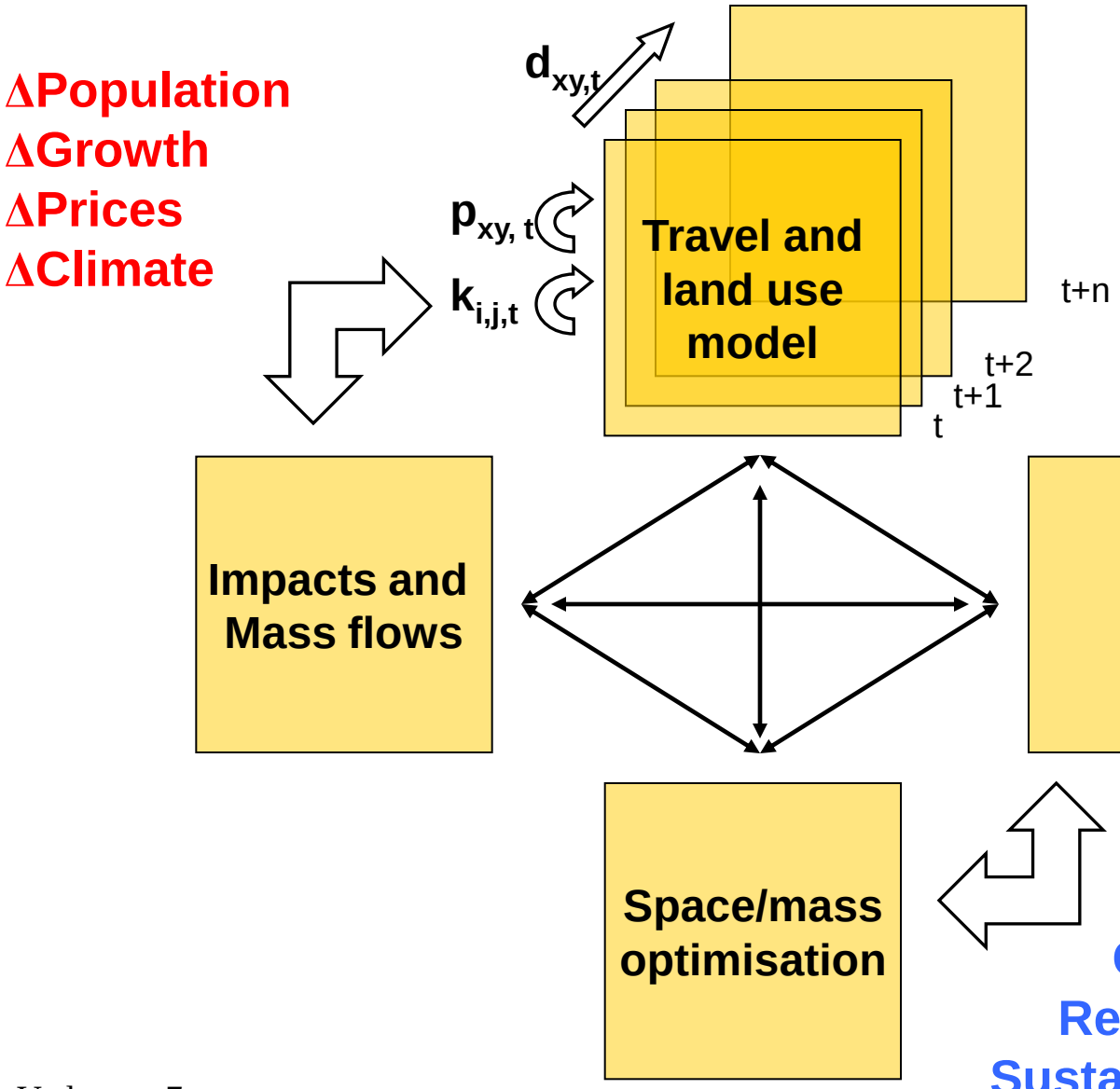
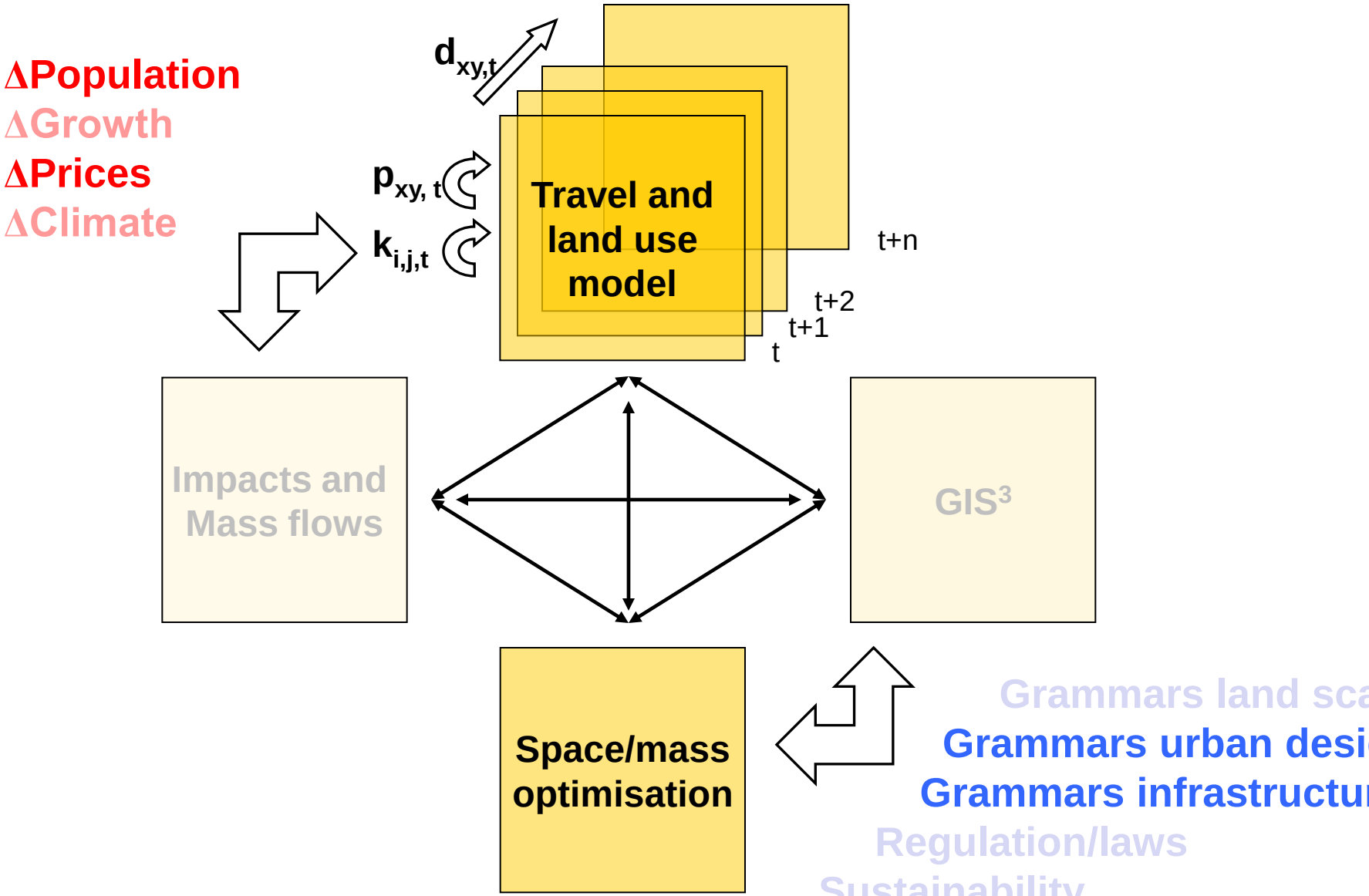
Directions ?

Integrated land use transport model



What do we want to do ?



Land use and transport models: Example feature sets

Process	MATSim	UrbanSim
Scheduling SUE	Yes	No
Social network generation/impact	No	No
Price setting (tolls, parking)	No	No
Fare, headway, capacity setting	No	No
Work place choice	No	Yes
Residential choice	No	Yes
Capacity choice: Roads (0…n)	No	No
Capacity choice: Facilities (0…n)	No	Yes
Land price and rents	No	Yes
Land/ price equilibrium	No	No
Development process	No	(Yes)
Transport and land use externalities	(Yes)	No
Demographic change	No	(Yes)

Where can we see the impacts of social networks ?

Modelling activity location choice

- Competing variables:
  - Joint choice in the network
  - Crowding of the facility
  - Taste heterogenity (price worthiness, quality of the goods and experience) * group composition
- Choice sets
  - Word-of-mouth information spreading
  - Pooling of choice sets at the decision point-of-time

Modelling long-term location choice

- Competing variables:
  - Distance to the network members
  - Crowding of the location/price
  - Taste heterogenity (price worthiness, quality of the goods and experience) * reference group composition
- Choice sets
  - Word-of-mouth information spreading
  - Definition of acceptable choice alternatives (spatially and qualitatively)

Example: Residential location choice (Belart, 2011)

Variable	Beta	t-Test
Rent/Income	-5.51	***
log(m2/head)	0.98	***
Frequency weighted mean distance to friends	-8.16	*
Exponent (friends)	0.22	**
Mean distance to work/school	-1.59	**
Exponent (distance to work)	0.37	**
Travel time to Bürkliplatz	0.02	**
log(transit accessibility) * "No car"	0.41	**
log(car accessibility) * “Car"	-0.30	**
Share of equally sized HH within 1 km	0.02	*
Population density within 1 km	0.01	**
Share of empty flats in municipality	-0.11	
N= 683, rho² = 0.2128; * > 0.1; ** > 0.05; *** > 0.01		

How can we generate social networks for simulations ?

Generating social networks

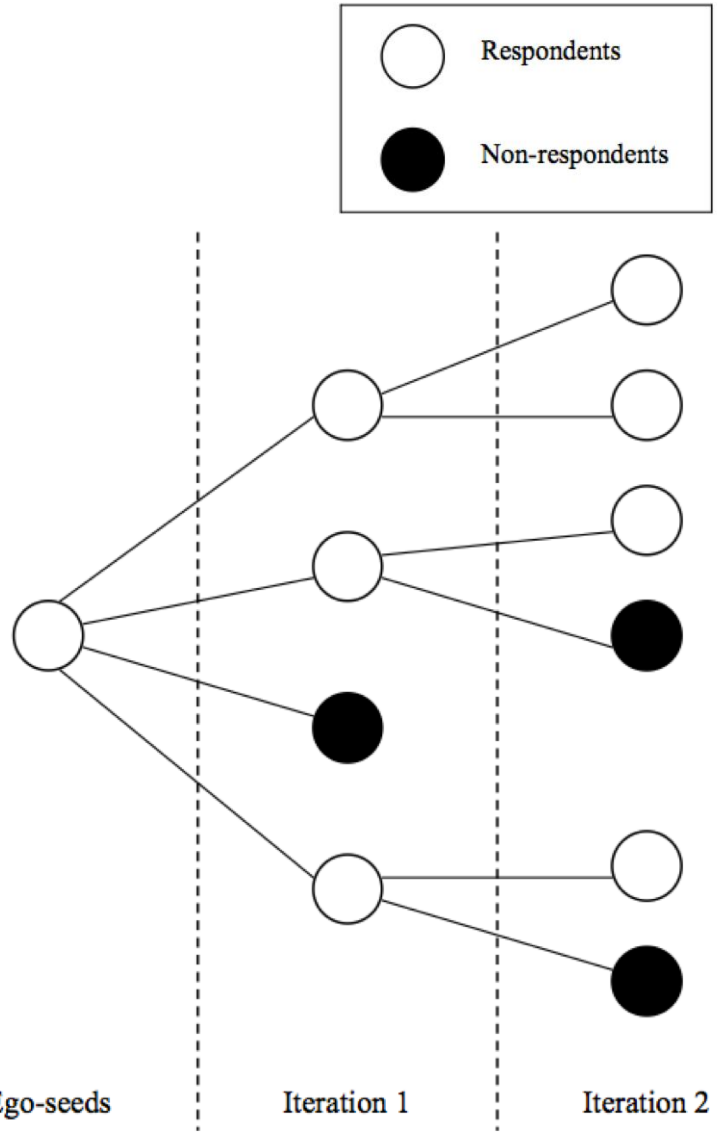
- Wait for Theo Arentze's talk

Collecting the social networks for the models

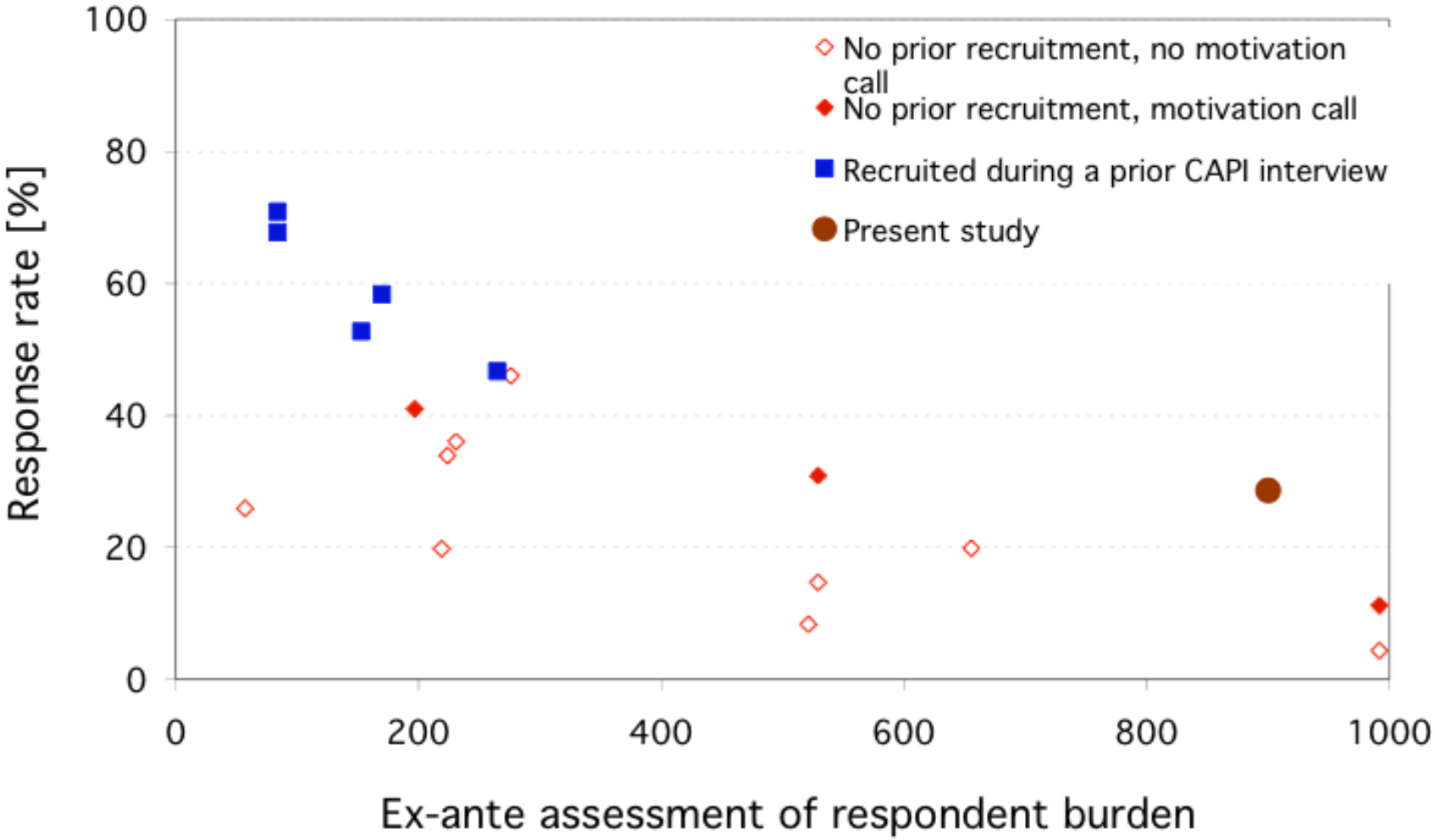
Challenges of snowball sampling

Challenges:

- Start with representative seeds
- Avoid selection bias
- React to homogeneous clusters
- Correct the overrepresentation of ‚socializers' and underrepresentatio of ‚isolates'



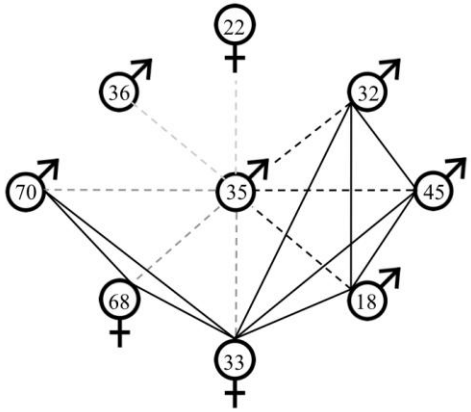
Response rate and response burden

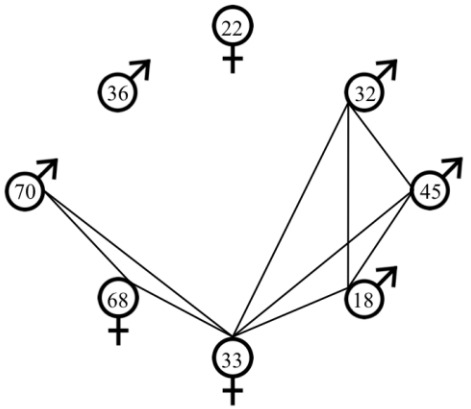


Behind egos' horizons: The connected 'snowball'-graph

	Vertices	Edges	Density	Components	Trinangles
Without sociogram	6'584	7'349	0.000	19	0.017
With sociogram	6'584	32'671	0.002	19	0.518

Personal networks (of egos with sociogram)





(n = 531)	Mean	1st qu.	Median	3rd qu.	St.-dev.	Range
Number of alters	21.5	13.5	20.0	29.0	10.1	38.0
Number of relations	46.4	10.0	23.0	56.5	61.0	398.0
Isolates	6.7	2.0	5.0	10.0	6.1	33.0
Cliques	4.2	2.0	4.0	5.0	2.7	19.0
Components (w/o isolates)	2.6	1.0	2.0	3.0	1.5	8.0
Centralization	0.2	0.1	0.2	0.3	0.2	1.0
Betweenness	0.1	0.0	0.1	0.1	0.1	0.5

Next steps

- Social networks
  - Repeat and scale up data collection
  - Scale network generation
  - Re-estimate the generation models
- Choice models
  - Isolate variable versus choice set impacts
  - Estimate the impacts of the different variable sets

Questions ?

- www.ivt.ethz.ch

- www.matsim.org