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A conceptual, agent-based model of land development for UrbanSim

Christof Zöllig, Kay W. Axhausen

IVT
ETH
Zurich

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 *Institut für Verkehrsplanung und Transportsysteme*
Institute for Transport Planning and Systems

ETH

Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

Outline

- Motivation
- Development process and heterogeneous actors
- Developers in Zurich
- Conceptual model for UrbanSim
- Outlook

Motivation

- Potentials for sustainable development
 - Land consumption
 - Energy efficient buildings
 - Efficient distribution of uses
- Developers are key actors (catalysers, increasingly driving force)
- Supply side weakest point of LUTI modelling frameworks (Hunt, 2005, 358)
- Better understanding of supply processes
-> Improved governance

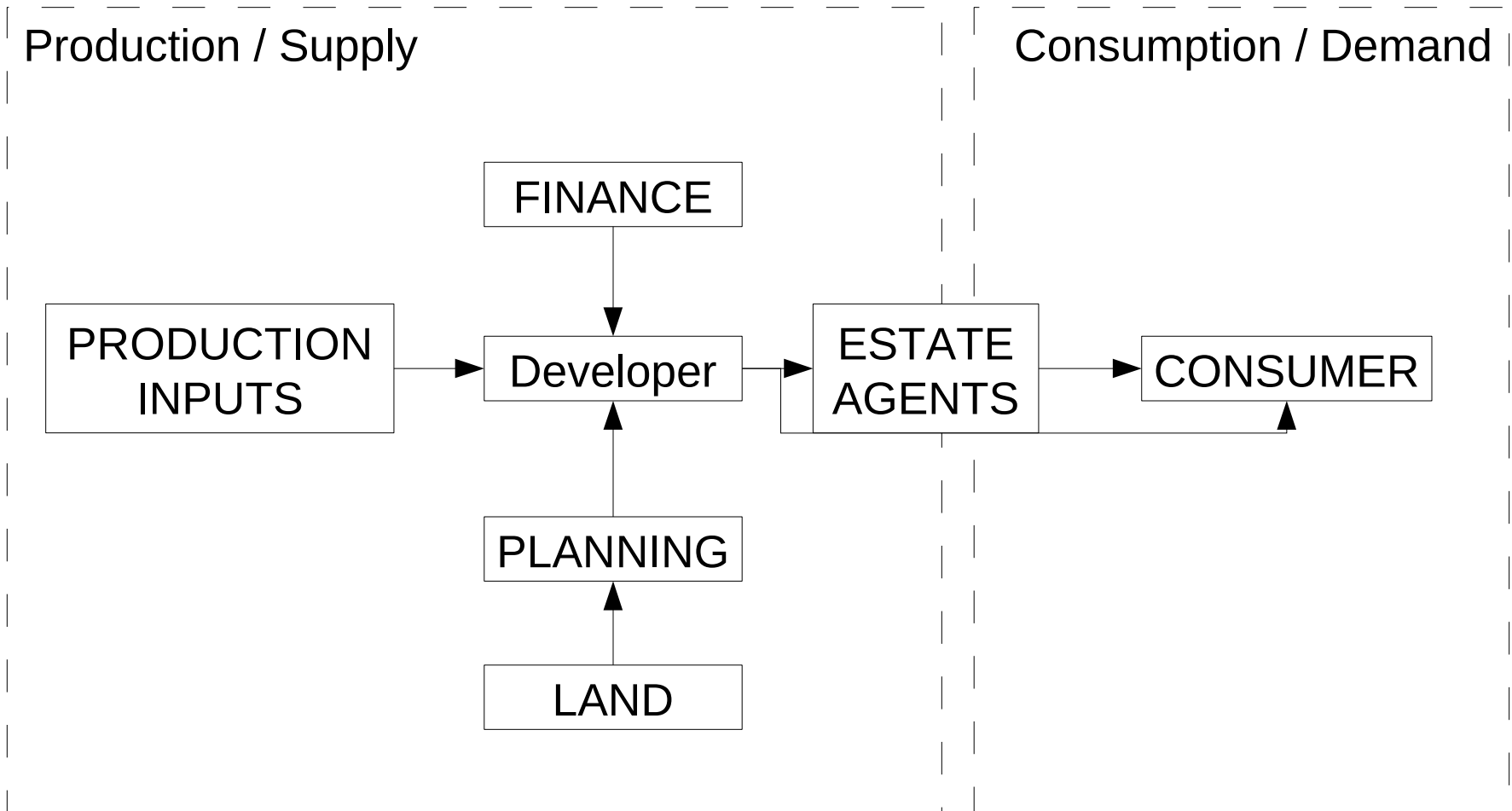
Research goals

- Identify real estate developers
- Investigate behavioural differences
- Reveal the composition of the market

Developers within the development process



The developer as a role

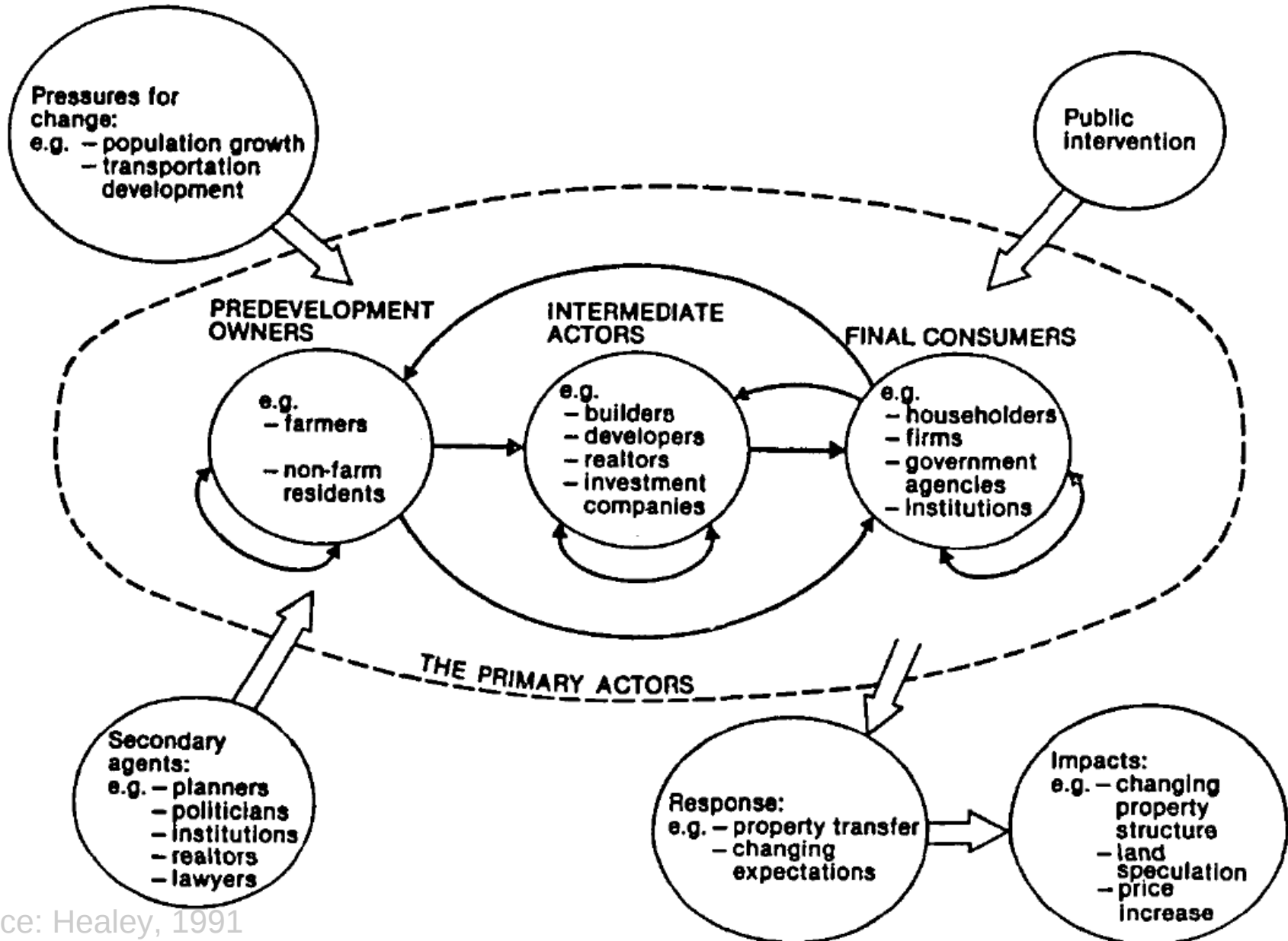


Development process and its actors

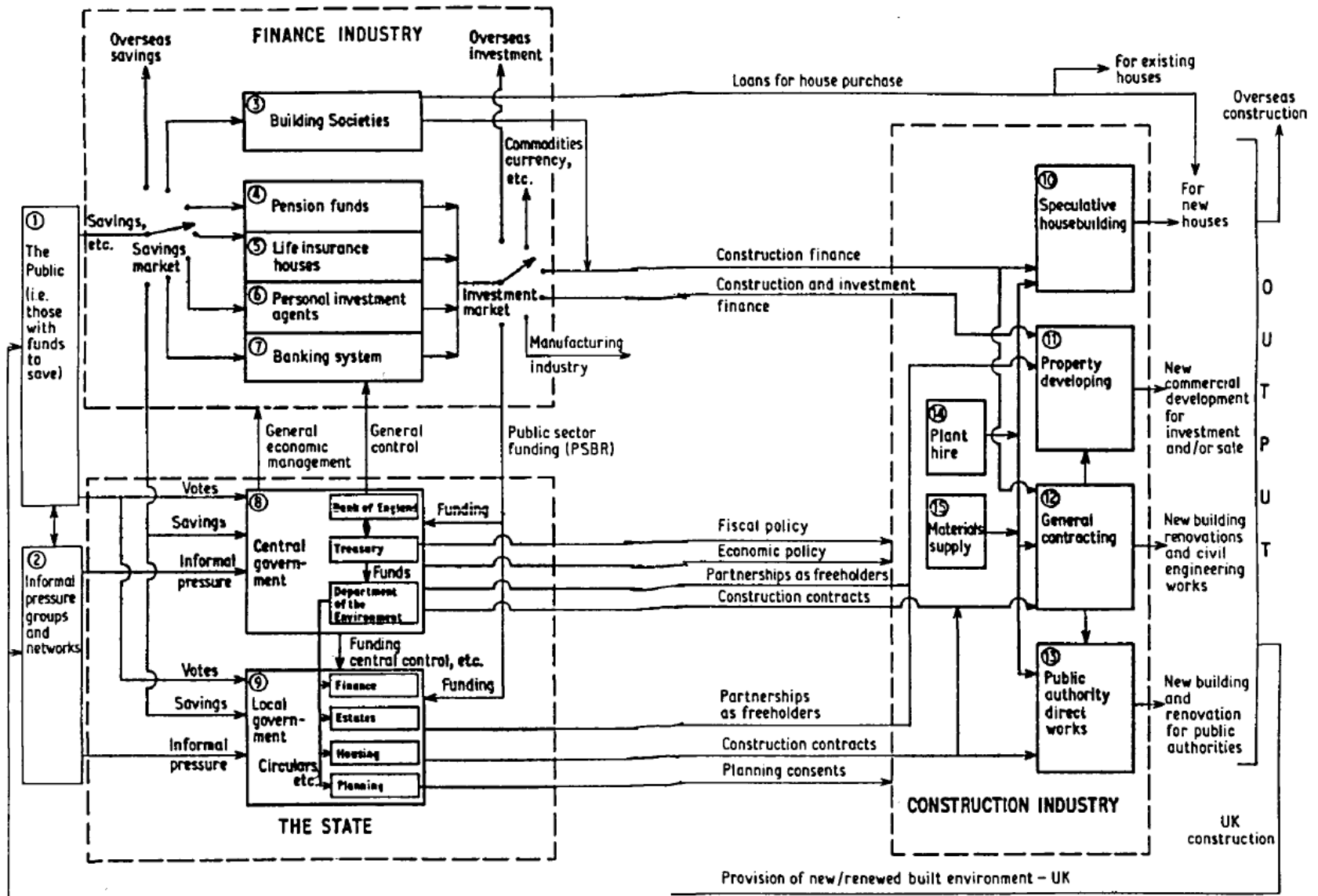
Healey (1991) identifies 4 types of models:

- Equilibrium models
- Event sequence models
- Agency models
- Structural models

An agency model by Bryant et al.



A structural model by Harvey



Previous studies, international

LUTI models

- Until recently focusing on projects

Considering developer information

Haider and Miller (2004)

- Different utility functions per housing type
- Spatial inertia present

Dong and Gliebe (2010)

- Clear taste variations across developers and projects
- Models work best with 3 segments
- Attachment to familiar locations (spatial inertia)

- Ott et al., 2005; Van Wezemael, 2005
 - Renewal of housing
 - What owner types in terms of investment behaviour exist?
 - Types: Owner-occupier, contractors
 - Motivation: Emotional, rational
- Schüssler and Thalmann, 2005
 - Housing supply
 - What hinders housing supply?
 - Types: Promoters, owner-occupier
 - Motivations: Provision of work (ca. 70%), spontaneous opportunities (ca. 55%), market analysis (ca. 20%)

Heterogeneity of real estate developers

Possible differentiations

- Legal status (Public, Private)
- Objective (Profit, non-profit)
- Strategy (Portfolio, object-oriented)
- Size
- Professionalism (Work oriented, non-work oriented)
- Purpose / Business plan (Promoter, self-owning)
- Organisation (Privat person, company)

Hypothesised types

- Promoters
- Self-owning with portfolio
- Self-owning without portfolio

Developers in Zurich

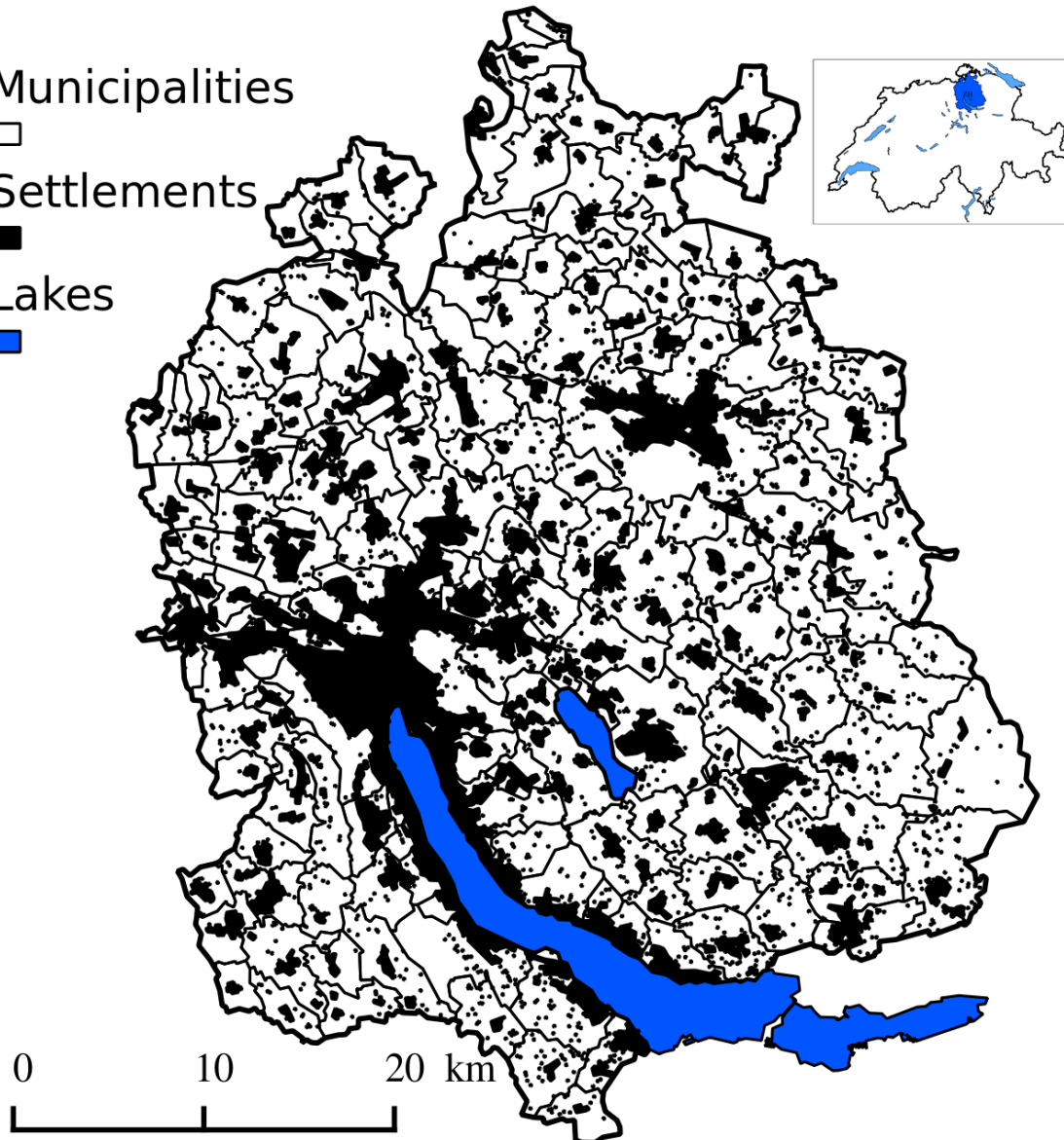
Municipalities



Settlements



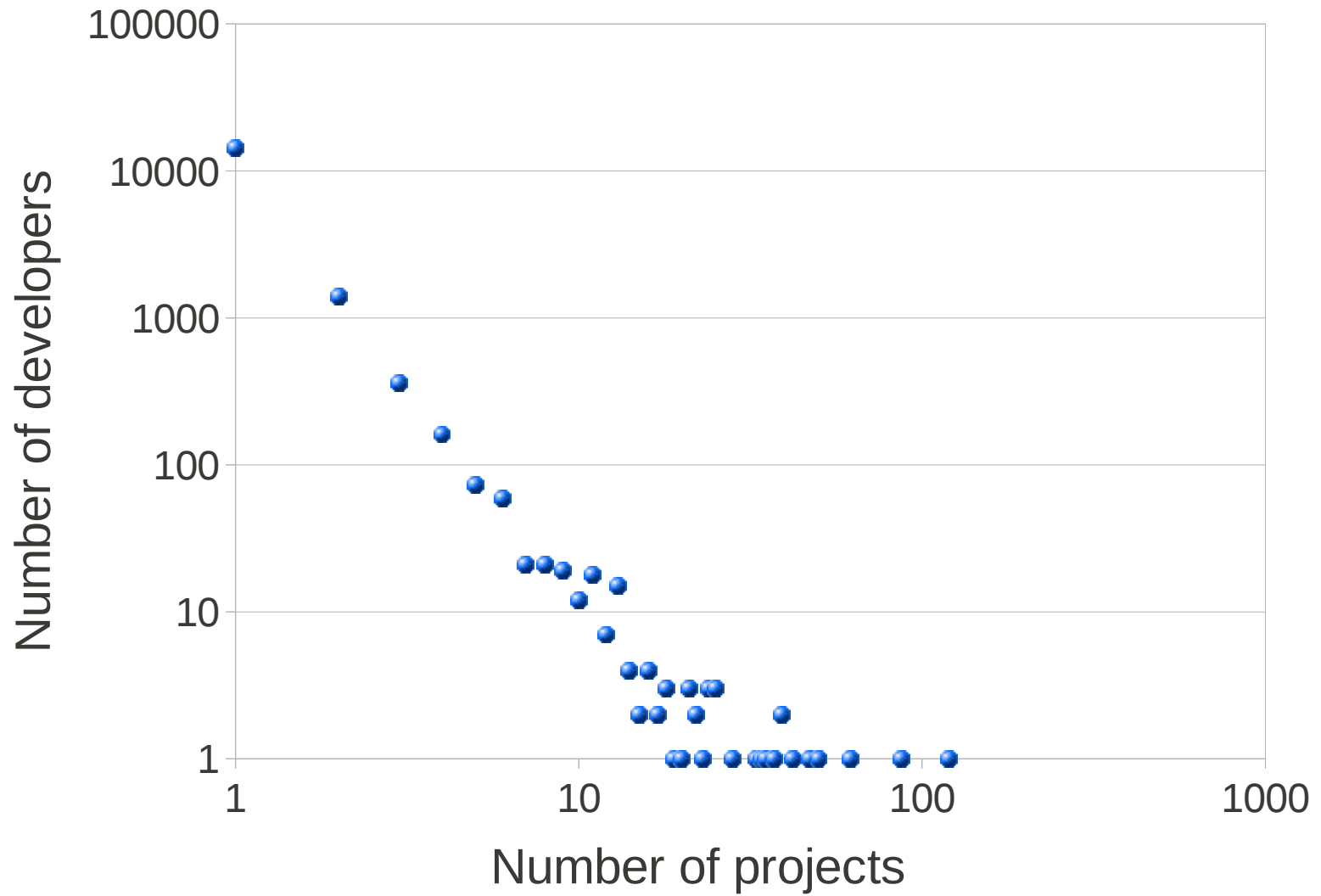
Lakes



DOCUMEDIA Dataset

- Entity: building project announcements
- Approx. 60'000 records
- From 2000 - 2010
- Attributes:
 - Number of floors
 - Area of parcel
 - Volume
 - Detailed information on construction
- Addresses of construction site, developer and planer
- Business plan

Many small, few big developers



Shares of business plans (DOCUMEDIA)

Plan	Freq	Share [%]
Letting	6042	10.06
Sell	4380	7.29
Own requirement	36402	60.61
0, undef	13231	22.03

In-depth interviews

- Open, semi-structured
- Five blocks:
 - Developers' information
 - Decision process
 - Type of projects
 - Location of projects
 - Opinion on market
- Telephone or personal interviews
- 30-45 Minutes

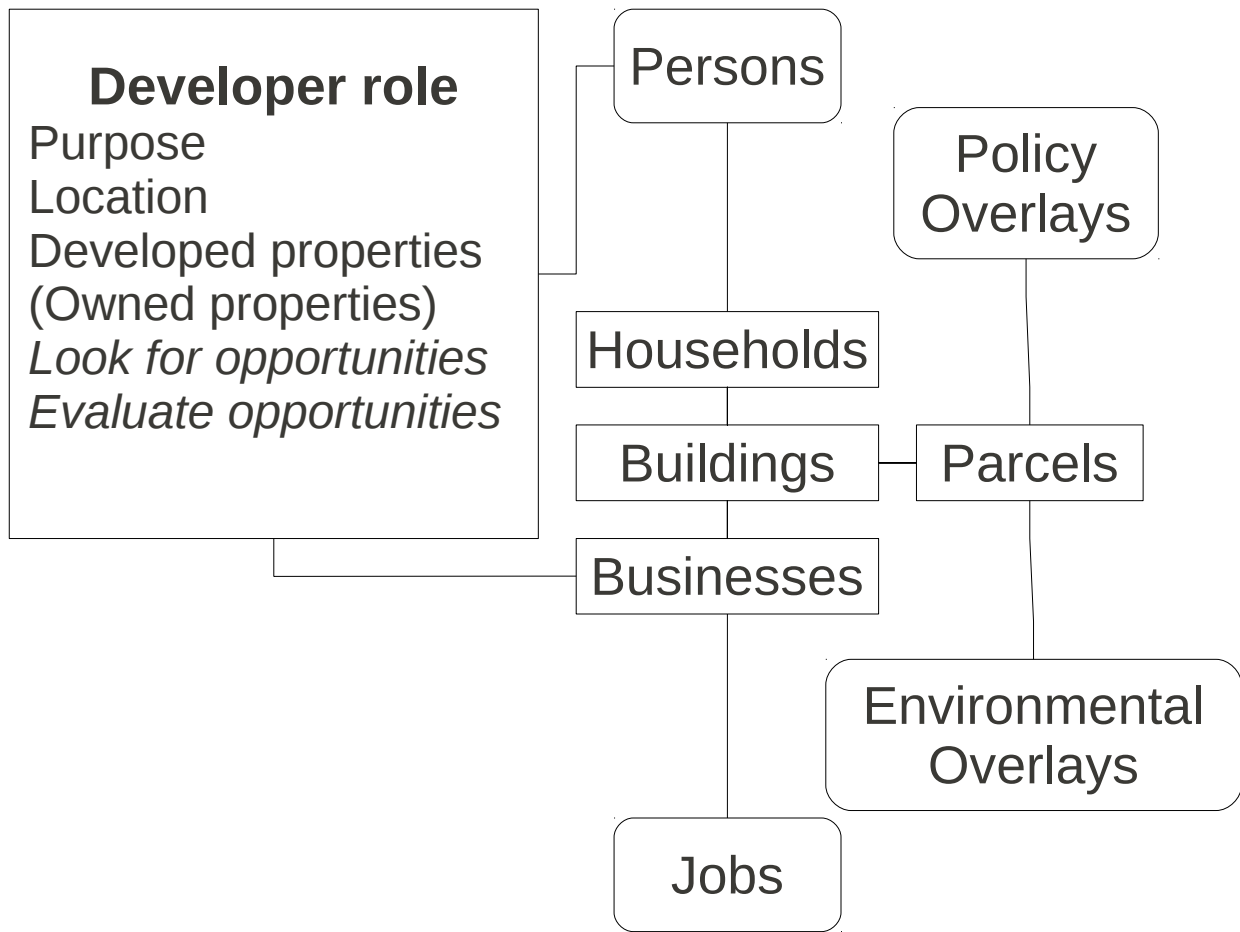
First results

- Specialisation
- Different strategies
- Groups and alliances

A conceptual model for UrbanSim

Aggregation/ Translation layer

Object store



Model Coordinator

Transition Models

Relocation
Models

Location
Choice Models

Land Price
Model

Development
Models

Next steps

- Finish and evaluate interviews
- Data enrichment
 - Geocoding
 - Matching with parcels
 - Neighborhood analysis
 - Combine with ownership structure
- Data analysis
- Modelling

Questions!

Literature

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