



# Planning models as decision support systems: Useful tools for planners?

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DIFFERENCE



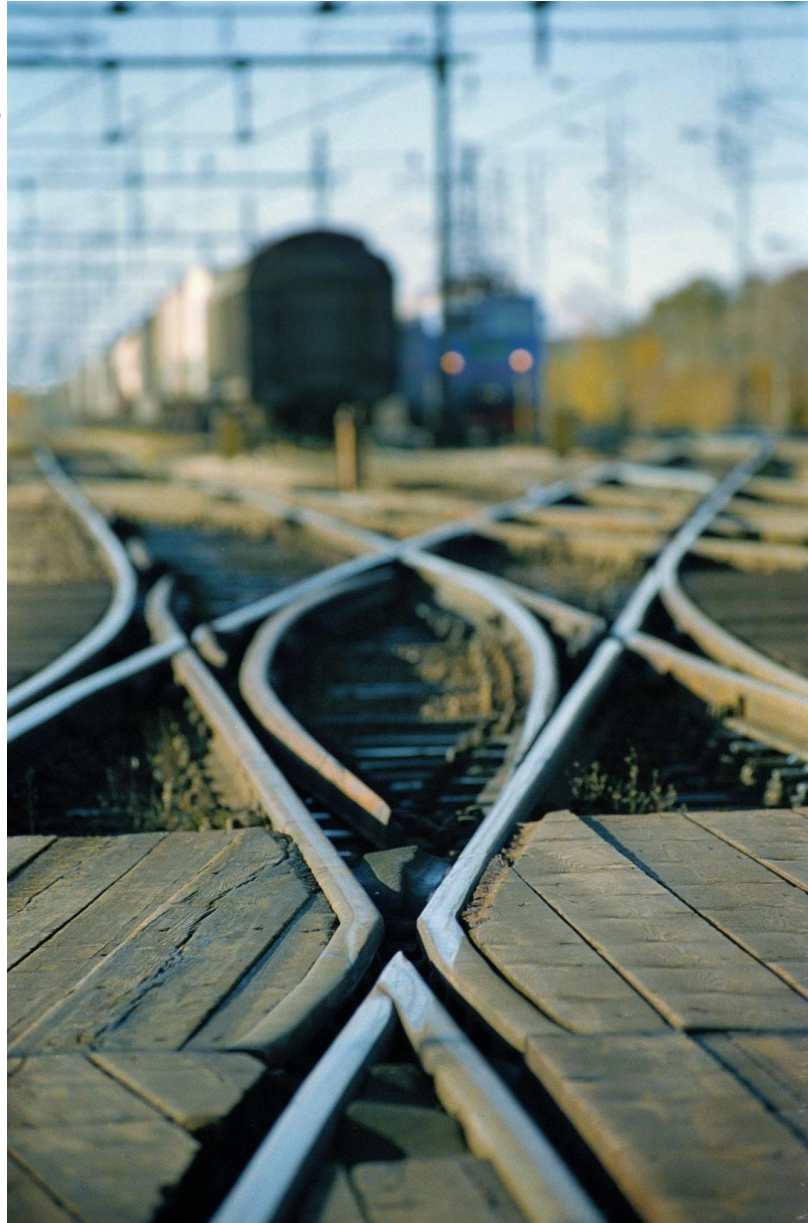
## Disposition

1. Introduction and background
2. Present challenges for planners
3. Tools for scenario testing
4. Nordregio's review of land-use models
5. Conclusions

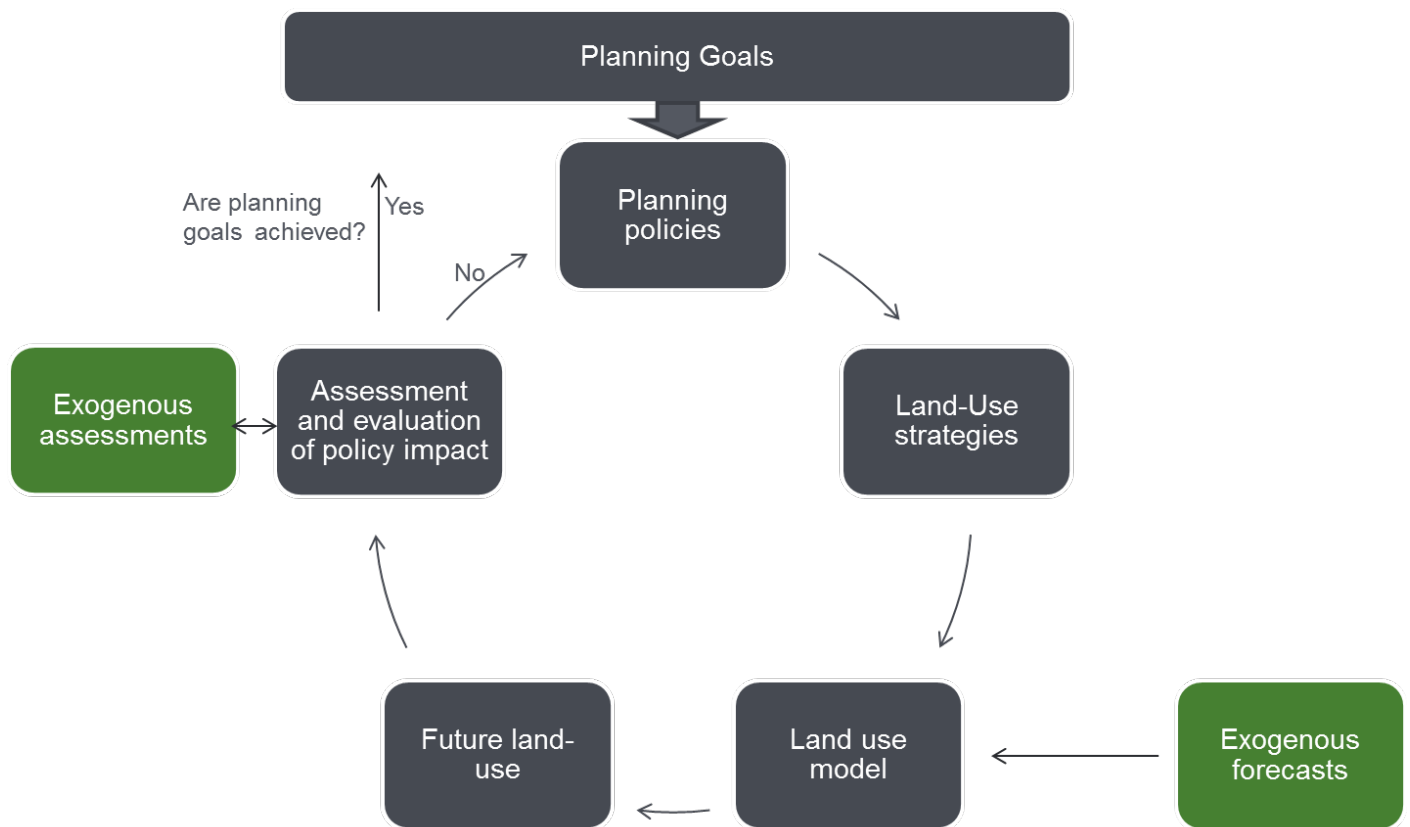


## Present challenges for planners

- Planners have to manage a complex world
  - The importance of integrated planning
- Design of planning policies that facilitate both economic and sustainable growth
- Appropriate planning policies are important!
  - New land use are structuring:  
Today's decisions will affect future opportunities
- Difficult to assess the possible impacts of different land-use policies and strategies

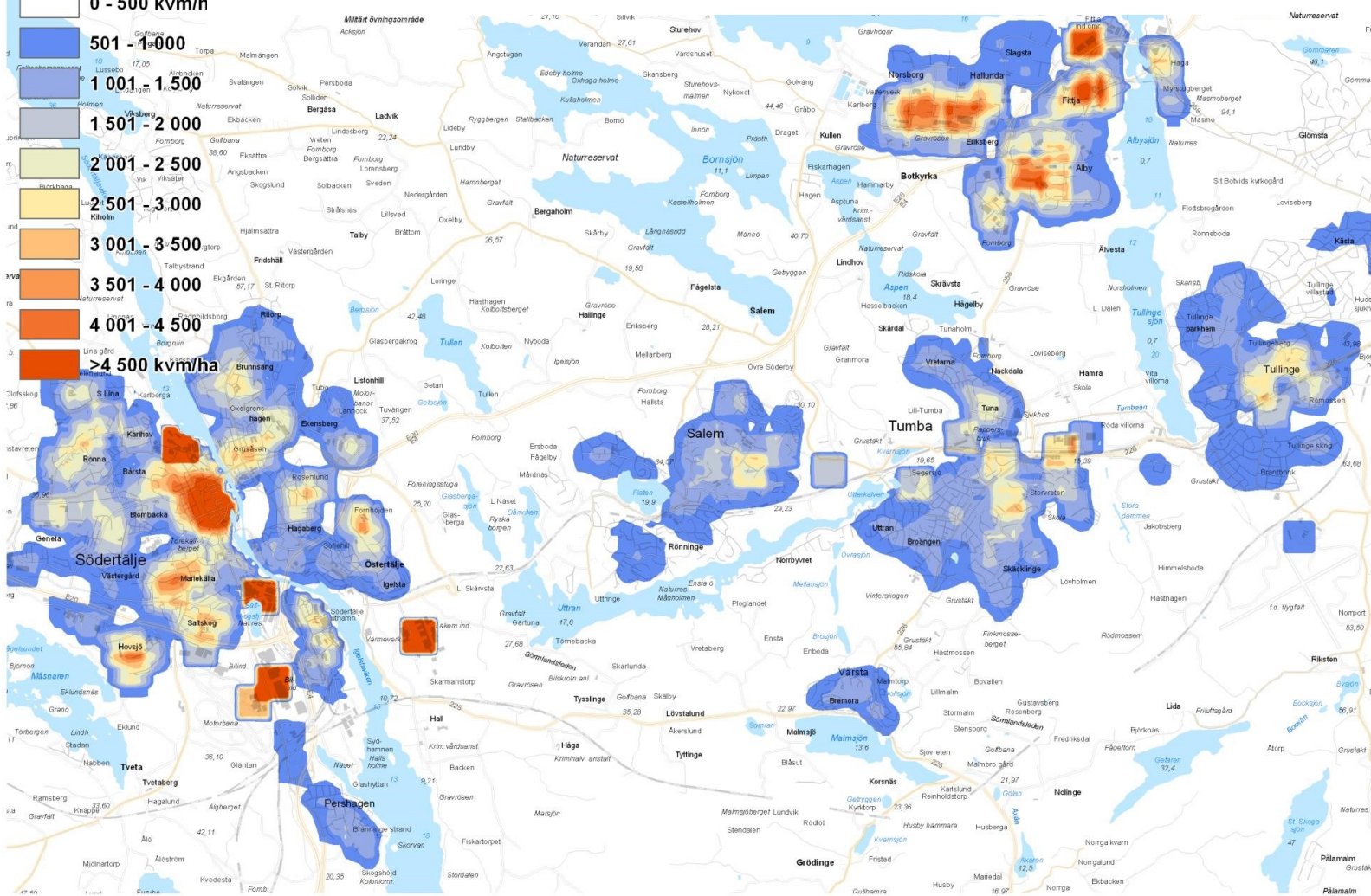


## Work process of a typical land-use model

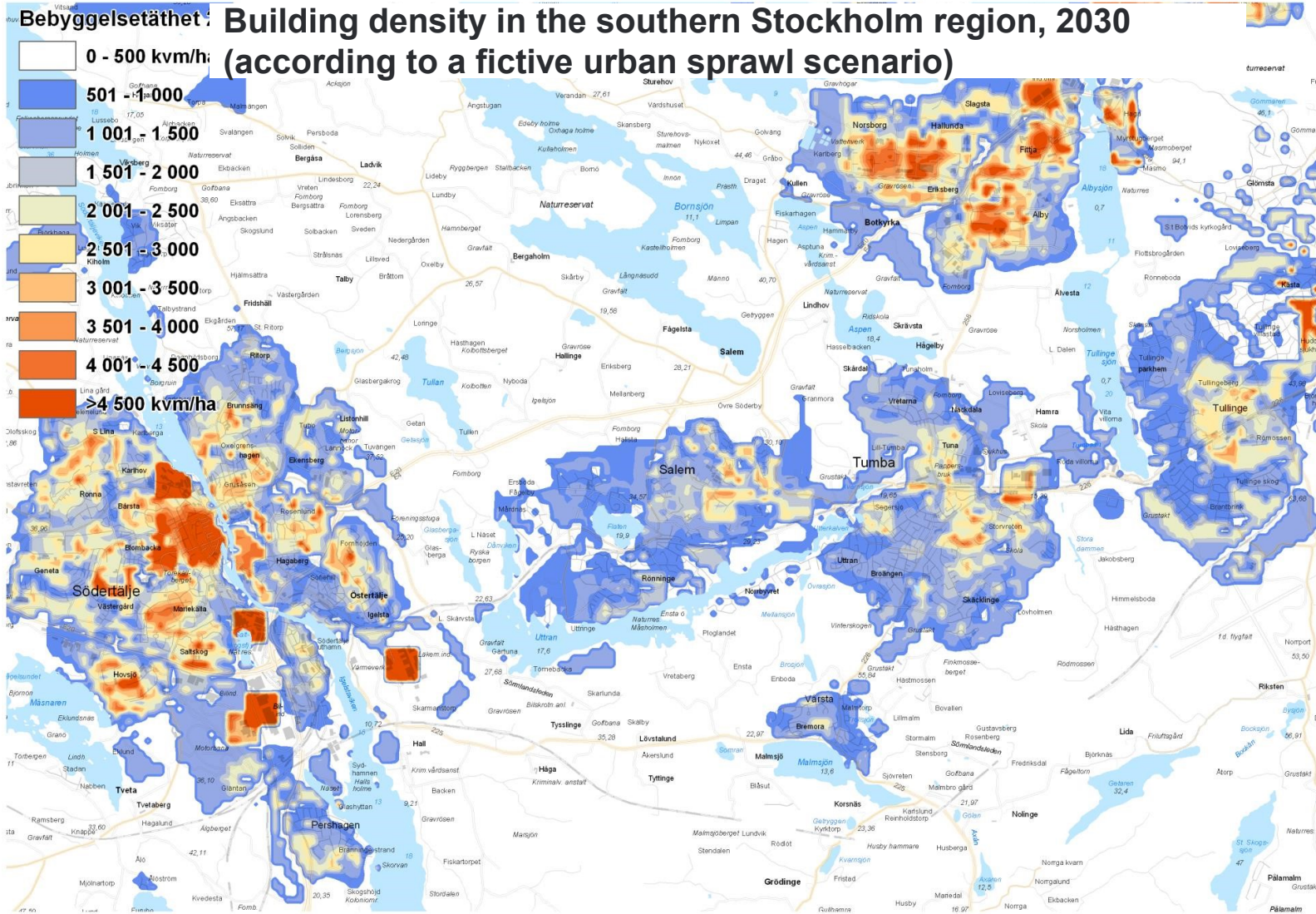


# Bebyggelsetäthet

## Building density in the southern Stockholm region, 2010



Example of spatial representation



Example of spatial representation



## Nordregio's review of land-use modeling tools – A brief summary

### ▪ **Outline:**

- **Inventory (29)**
- **Classification**
- **Assessment (14)**

### ▪ **General findings:**

- **Main fields of application:**
  - » Land-use planning
  - » Transportation
  - » Econometrics
  - » Environment
- **Complex and simple models**
- **Development trends points in different directions**

### ▪ **General modeling challenges:**

- **Ease of use**
- **Flexibility**
- **Transparency**
- **Data availability and quality**
- **Ability to handle uncertainty**



## Conclusions and recommendations

- All models are wrong – Some models are useful
  - Land-use models are particularly useful for strategic long term planning scenarios (e.g. comprehensive planning or regional planning)
  - Land-use models allows for systematical comparison between different policies and planning areas
- Prediction is hard, especially about the future
  - A model-based planning process should not aim to precisely predict an unknowable future
  - Model output is not a “plan” itself, it should be seen as a possible physical imprint of a specific spatial planning policy
  - Planners should prepare a range of forecast scenarios based on different policy choices which describe and evaluate a number of possible futures
- Keep it simple, stupid!
  - Planners (and the public) must understand and trust the models

# The Use of Integrated Urban Models in Nordic Countries

*Survey reflections and ways forward*



Ryan Weber & Veronique Larsson, Nordregio

# Overview

1. Context
2. Survey aims and reach
3. Results
4. Reflections and ways forward



# 1. Context

*“Often, urban sustainability has been characterised by a lack of strategy, documentation, continuity and real involvement from stakeholders. As an example, a study of sustainable projects in Copenhagen showed that there is a very limited evaluation of the projects, and very few useful data on which to base evaluations since mappings and monitoring programmes are not established as part of the projects. Instead too often ‘islands of sustainability’, such as singular projects and events that legitimise the sustainability of a city, have been seen, for instance spectacular eco-buildings and scattered, unco-ordinated green initiatives. Tools can be seen as ways to create more **continuity** and **involvement** in the process of sustainable urban development.”*

*(Jensen and Elle, Indoor and Built Environment 2007, Issue 3)*

While we know that use of GIS and specific models is more or less unanimous, there is no existing research on the extent to which these integrated modelling is in use in the Nordic context

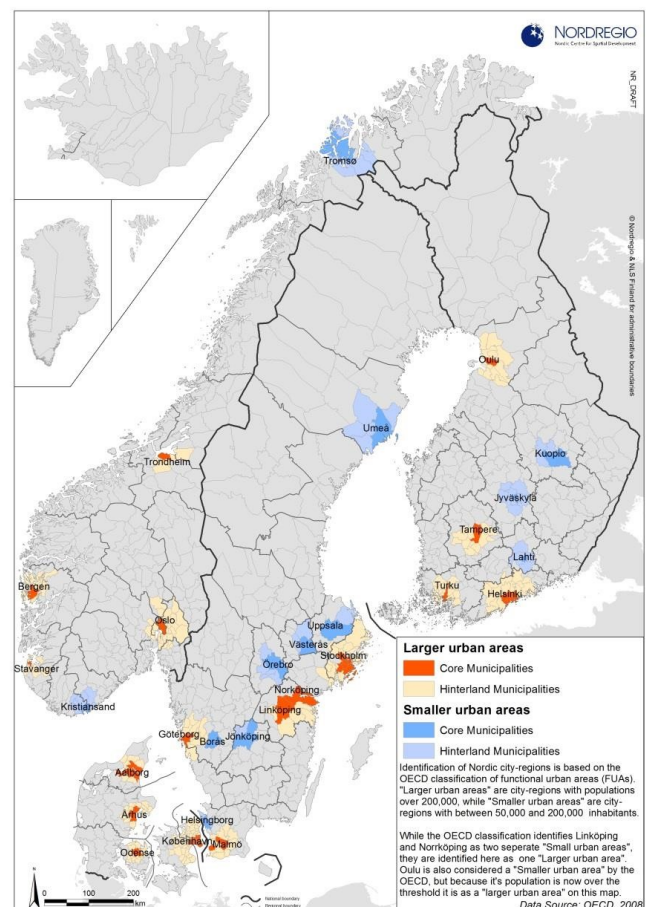
## 2. Survey aims and reach

### Aims:

1. Determine to what extent are IUMs being used in the Nordic countries
2. Understand the basic technical details of IUMs being used in practice
3. Understand the operational details of developing and applying models as decision making tools

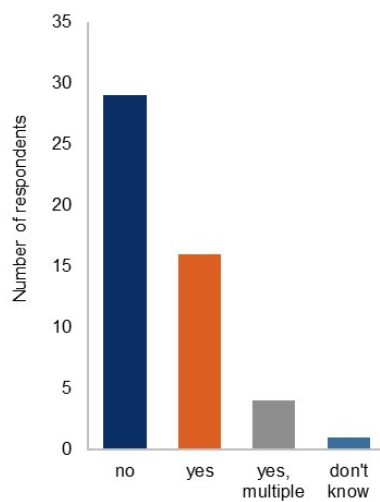
### Reach:

- Sent to 150 regions and municipalities
- 50 responses



### 3. Results: Extent of use

Use of integrated models by the responding authorities



- Correlations with municipal size and transportation network
- 2/10 in Denmark, 4/7 in Finland, 5/8 in Norway, 5/21 in Sweden

What is the name of the preferred model used?  
Remaining questions relate to model specified here

Which of the following terms below best reflect the methodological framework of the model?

- Cellular Automata
- Equilibrium principles
- Agent based models

Other:

Spatial resolution of land within the model

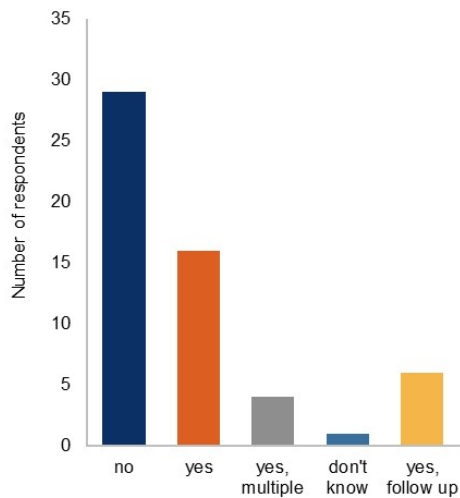
- Land lots (property structure)
- Cells
- Land use zones

Other:

What type of software is used to process the model?  
e.g. ARC GIS Spatial Analyst, Mapinfo...

### 3. Results: Extent of use

Use of integrated models by the responding authorities



What are the names of the different model(s) that you use?

- “ArcGIS analysis on planning and land use”
- “We use ArcGIS from ESRI...”
- “We use GIS-programmes to integrate different types of information on maps, for example public transport stops, or flooding risks crossed with property databases. We use MapInfo for this”

3 models were identified that likely meet our understanding of IUMs

- 2 x IPM
- 2 x ATP (at least 14 users)
- 2 x YKR-aineistot

### 3. Results: Technical details

#### Data requirements:

- 7/11- free, 4/11- purchased
- Out of the four who using external data, three are users of the IPM and ATP-models

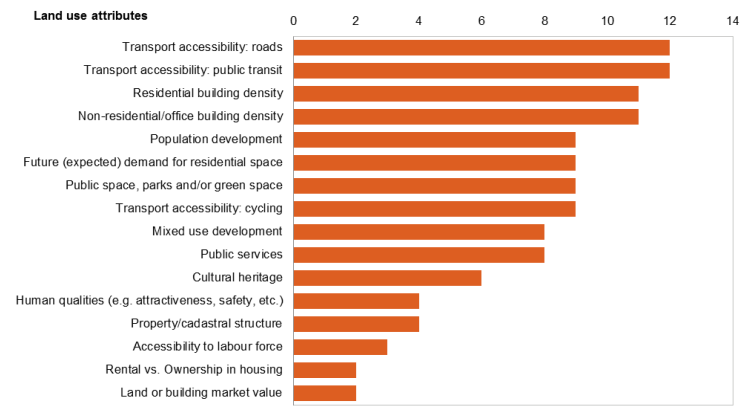
#### Land use aspects included in IUM's:

- mobility infrastructure / building density
- population growth
- future demand for residential space
- public space and green space

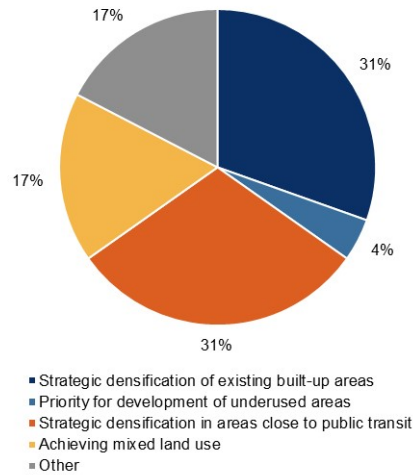
#### Themes of Urban Sustainability:

- Strategic densification of existing built up areas and areas close to public transit
- 'other' "It emphasises whatever we want it to."

Land use attributes considered as development opportunities by the models



Land use development outcomes emphasised by the preferred model



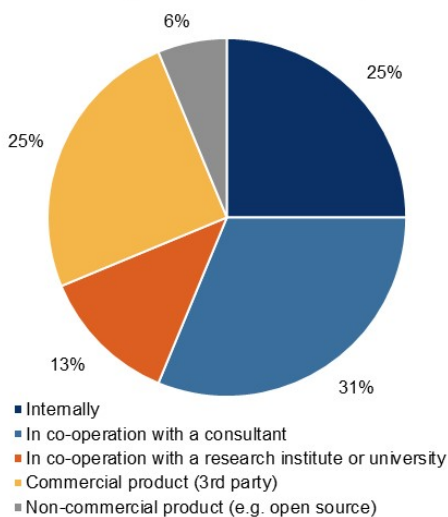


### 3. Results: Development and application

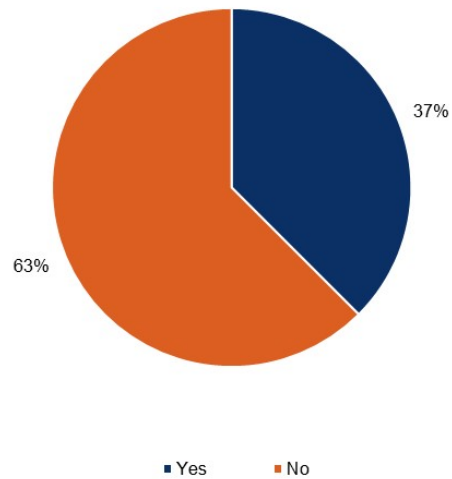
#### Internal / external relations

- The use of outside knowledge and resources for development
- In a majority of cases staff at the respective authorities cannot augment or update the model

How was the preferred model developed?



Are staff in the authority's planning department able to augment or update the model?



### 3. Results: Development and application

Co-operation: Sharing costs & emphasis on the city-region:

- 1/3 of the municipalities applied their model only for their municipal area (or parts of it)
- 2/3 applied it in collaboration with neighbouring municipalities or respective regional authority

Cost:

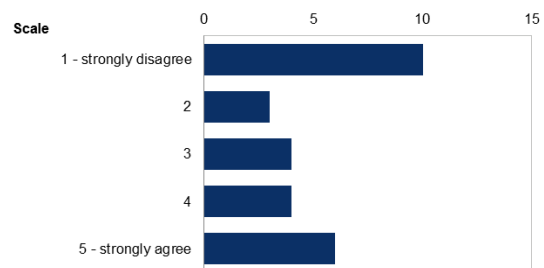
- Only two respondents were provided an approximation - both users of the same model. One noted a cost of 150,000 SEK for **implementing** the model, while one suggested the cost was 1.45 million SEK for **developing** the model

## 4. Reflections and ways forward

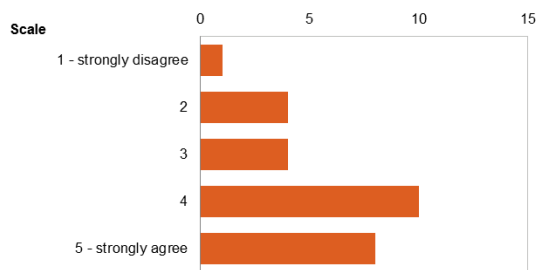
Would you consider using an IUM in the future?

- 16 provided feedback:
  - 7: yes
  - 5: maybe
  - 4: no

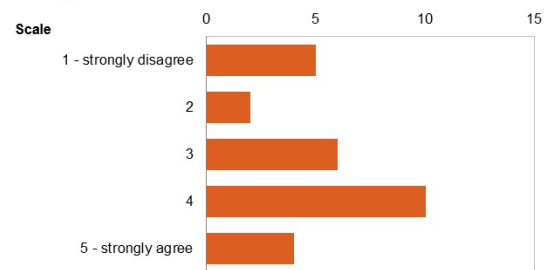
**Our municipality/region is too small to justify the use of integrated urban models**



**We are not familiar with integrated land use models or their benefits**



**Our staff does not have the technical skills to use the modelling tools**



## 4. Reflections and ways forward

- Significant interest was shown by the respondents:
  - A majority seemed to value the opportunity to reflect on processes within their organisation
  - Lack of knowledge about what tools other departments were working with, the gap between planners and IT-departments or even the lack of support from above to invest in these tools
- Clearly the use is quite low:
  - No clear patterns of use
- Barriers:
  - The overall lack of knowledge, both in terms of implementation and benefits;
  - Also, training, data access, cost and information
- Value in providing additional information, especially if the benefits can be effectively communicated. It's not like practitioners have all made an informed decision to say no:
  - Deeper studies with practitioners in the process of applying or have successfully applied models
- Improve the visual interface of IUMs
- A relatively simple, rule-based model would be most appropriate as a next step to widen the use of IUMs in the Nordic countries.

*Thank-you for your attention!*  
*Questions?*