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EDITORIAL

The Role of Transport-Related Models in Urban Planning Practice

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The ways of dealing with transport issues in daily urban planning practice are facing several transitions worldwide: (1) from classical 'predict and provide' and later 'predict and prevent' (Marvin and Guy, 1999; Owens, 1995) to a more balanced view on mobility and accessibility (Banister, 2008); (2) from focusing on transport as a single issue to a more holistic view of mobility in relation to a wide range of issues (Bertolini *et al.*, 2008); (3) from searching for means for a given goal (e.g. solving congestion) to being one of the subjects in the goal-seeking process; and (4) from a relatively simple institutional context to a complex one with multiple participating stakeholders, holding multiple values and having multiple conflicting goals (Willson, 2001). All these transitions set new requirements on transport knowledge to support planning: different types of knowledge are needed (Handy, 2008; Healey, 2007, pp. 235–263), but just as importantly, new ways of generating and employing knowledge. In this respect, a particularly problematic, and yet crucial, transport knowledge domain is that represented by computer-based planning support systems (PSS).

Valuable Knowledge is Not Usable

As has been argued elsewhere, PSS that aim to support planners in dealing with transport-related issues already suffer from a low implementation rate (Te Brömmelstroet, 2010; Vonk, 2006). Many state-of-the-art applications that have been developed in academia or by consultants do not fit the changing characteristics of daily planning practice. Especially, the more strategic planning phases pose serious challenges for such transport-related models. Figure 1 shows the results of a big survey among Dutch land use and transport planners, asking them why they think transport models are not used to support these phases. Note that these are especially related to the soft aspects of modelling.

The knowledge that is produced and available within these PSS, however, could—and should—be very valuable in supporting all kinds of planning actors

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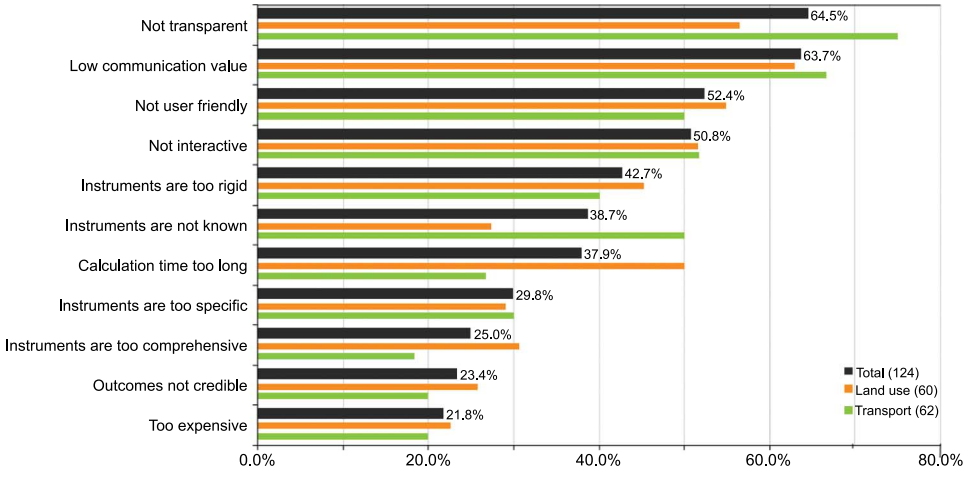

Figure 1. Bottlenecks that block transport models to be used to support integrated strategy-making processes (Marco te Brömmelstroet, 2010, p. 33).

to make knowledgeable choices in these early planning exercises. It is here, that important choices for sustainable futures can be made, where complex interdependencies between issues (e.g. land use and mobility developments) can be grasped and where synergy between many domains can be found (e.g. between land use and transport policies). In the phases of project selection and implementation, where transport knowledge is widely used, it is too late to draw implications from emerging interdependencies and policy synergy options are too often already closed, leading to suboptimal outcomes.

State of the Art Meets State of Practice

With questions as these on the background, in October 2009, a small conference was organized with international scholars that were developing and/or doing research on transportation models to support planning. During this conference, the scholars presented their work to each other and to a group of practitioners from Dutch planning practice. This latter group also presented their view on the usability of transportation modelling for their daily planning tasks. This created a very fruitful environment in which the expected potential of transport-related computer models came in contact with actual wishes and demands from the people that are supposed to use them. The results of this exchange are presented in this theme issue of *Transport Reviews*.

Central Learning Points

While we can do here no justice to all these results (for this the reader is referred to the single papers and—as far as the contribution of the Dutch planning practitioners are concerned—to http://seminar.transport-planning.eu), some of the most striking findings can be highlighted:

- Planning practitioners acknowledge the potentially tremendous contribution of transport models to understanding the complexities of transport issues

and develop more effective strategies. However, they also underline the need for models to more deliberately support the learning process of planners and others involved in the strategy-making process in order to realize that potential.

- Much of the learning for strategy-making purposes happens during the process of *making* rather than *using* the transport-related models. This is not only the case for model developers but also, and crucially, for their intended users.
- Accordingly, taking the users through some of the central choices in model development is essential for the learning process and for the usability of the models (if at least the basic philosophy and assumptions behind a model are not understood and internalized, the model will not be trusted, and thus not used).
- The above issue is not only limited to the model developer–model user relationship. It appeared already difficult to develop a common language among the different transport modellers to talk about the problem of usability. So, insight in the different model-making and using processes seems useful also for improving the scientific debate.
- Most importantly, if we want to engage with people that are not insiders in the domain of modelling, this requires extra effort and creativity to link to the language that they speak. This is already the case when wanting to engage planners, but even more so when the increasingly diverse and vocal range of stakeholders populating contemporary planning processes comes into the picture.

The Contributions

The different contributions elaborate on these insights from different contexts and perspectives.

Henrik Gudmundsson provides a conceptual frame for the discussion on the use of transport-related models in urban planning. By combining insights from other academic fields he builds up an understanding of what *use of knowledge* actually is. In his article, he provides concepts from knowledge-use literature which help us to understand the gap between modelling efforts and planning needs. The case of the Stockholm congestion charge shows that models play different roles during a planning process (instrumental, symbolic and conceptual), although the weight of this role should be seen relative to many other influences on the planners.

In his article, *Michael Wegener* reflects on the trend of micro-modelling by asking the question 'how much micro is enough?' He provides a short overview of the history of urban transport and land use modelling in which a clear trend towards more micro-simulation can be seen. This has merits but also problems related to data requirements, computing time and stochastic variation. From the perspective of planning practice and the changing planning goals (energy scarcity and climate change), a shift of focus to basic needs and constraints is needed. Multi-level models can support such a shift, when they are as simple as possible but not simpler.

From Perth, Australia, *Carey Curtis* contributes to this issue with a paper on the use of a public transport model as a discursive tool in a large collaborative strategy-making context. The described SNAMUTS model is especially designed

to overcome the problems that models face in multi-stakeholder and more participative planning processes. An assessment of the use of this model in such a setting shows that new measures for public transport accessibility were introduced in the debate. More importantly, practitioners stated that their understanding of the complex land use transport interactions was improved.

A view on the potential role of activity-based models as learning tools for planning practice is given to us by *Harry Timmermans* and *Theo Arentze*. They argue that models should not necessarily be simple to be useful. Instead, they should provide insight in the complexity that was missing before. Activity models are believed to provide such complex insight in an interpretable way. The Albatross model, developed in Eindhoven, is discussed. From the use of the model in practice, it is derived that it supports the generation of ideas and understands possible future scenarios. They end their article with an attempt to find a balance in the important role of models and a more realistic understanding of what they can and cannot provide. They offer a better understanding but do not deliver point predictions. This should be acknowledged in any discussion about the relevance of models for urban planning practice.

Taking the growing academic findings of land use and transport systems to the world of planning practice that also expresses a need for this calls for a widening of the classic criteria for transport-related models. Next to theoretical and methodological validity, reliability, ease of use and good explanation of outcomes are needed. *Paul Waddel* developed and used the transport-related model UrbanSim in many contexts around the world. In his article, he shares his insight on how such an integrated land use and transport simulation model can support planning processes. Also, new lessons to improve the usability of the model are discussed. A summary of a small user assessment reveals that UrbanSim is flexible, but transparency and ease of use still score low. A new graphical user interface is therefore seen as one of the crucial steps forward.

In Denmark, the use of transportation models in large-scale urban projects is discussed by *Petter Naess*. He argues that there is an inherent negative bias in the so-called 'zero alternative'. By not taking induced traffic into account, the models produce knowledge with a serious bias. In concrete decision-making phases like the once discussed here, this is clearly problematic. Even more so, if we take into consideration that—according to Naess—relevant state-of-the-art transport knowledge ended up being dismissed in the political process. This raises questions about all our efforts in bridging the gap between models and planning practice.

Transportation models were also used to provide knowledge in several planning processes in Sweden such as the National Transport Plan, the Stockholm Regional Plan and the discussion on congestion charging in Gothenburg. *Daniel Jonsson* provides us insight in how this has functioned and discusses what we can learn from these experiences. Next to technical improvements, Jonsson also proposes organizational improvements to increase the effectiveness and efficiency of transport model use.

Paul Pfaffenbichler presents and discusses a transport-related model that is based on system dynamics. This model aims to support learning processes in a highly transparent and interpretable way. The MARS tool offers qualitative and quantitative insights in many urban system dynamics. This is easy to understand and supports learning by giving insight into the complexity of cities and regions to all actors involved.

Round-Up

Taken together the papers provide rich of views, they point at specific problems, but also at possible—and sometime even proven—solutions. We should all work to advance these directions for improvement. However, these solutions are often accompanied by—mostly—anecdotal evidence. If we want to move forward, we also need to test these solutions in a rigorous way. One way to do this is testing the central heuristics (how to increase transparency, how to improve flexibility) in highly controlled experiments and see if these interventions have the expected results compared to a control group. Such an approach is already well established in the domains of (group-)psychologists (Cattell and Anderson, 1966) and behavioural economists (Davis and Holt, 1993). It is, however, of crucial importance that such academic endeavours are linked to real applications in real planning practice. Combining high control—low context with low control—high context and observing both rigorously in combination can bring us further in our knowledge about how to bridge the gap between modelling an urban planning practice.

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