

Results of Synchronizing Networks

Current policy with respect to improving accessibility is typically focused on extending the road network. If accessibility is defined as the ease with which individuals conduct their activity program, other policy options become of interest. For example, policies that focus on improving connections between different transport networks and the placement of activity locations with respect to transport networks. As methods to evaluate such synchronization policies are largely missing, the goal of this program is to develop methods that support the development of this type of policies.

In the heart of the program an activity-based Supernetwork has been developed. This model predicts for the inhabitants of a certain (metropolitan) region all the trips they make to conduct their daily activities. More precisely, the model predicts 1) when they travel; 2) to which locations; 3) the chosen mode of transport; 4) the route; 5) where they park their bicycle or car; or 6) at which stop they board, alight or transfer a public transport vehicle.

This model enables predicting the effect of policy measures on travel behavior by comparing predictions for a particular transport-land use system with those of system in which changes have been made. Examples of such changes are: 1) adding or removing a road, station, P&R facility, or a PT service; 2) changing the frequency of a PT service; 3) changing parking costs; 4) increasing or removing activity locations, for example developing work places, shops or sports facilities close to railway stations (Transit Oriented Development).

In the Rotterdam case study this model has been applied to examine the effects of transport and land use measures on travel behavior. Some interesting results are the following:

- If land use developments are concentrated around Intercity stations (TOD), the total travel time and number of traveled kilometers is lower compared to locating these developments on their planned locations, which are scattered around the city and also lower compared to concentrating these developments in the city center.
- The total effects of combined transport and land use measures on P&R use are larger than the sum of the effects of the separate measures. This suggests that transport and land use measures reinforce each other if well integrated.

The models that predict travel behaviour are based on a series of advanced multimodal choice experiment. In addition, the program paid attention to improving the behavioural realism of choice models. In an innovative activity travel simulator specifically designed for this purpose, we examined to what extent task complexity and time pressure affect the choices travellers make in multimodal networks. The results indicate that in those conditions randomness in choices increases. From this research can be concluded that focused and limited extensions and modifications of conventional models suffice to model those effects, which improves the prediction power of the models.

Finally, attention is paid to the coordination mechanisms of different actors related to synchronization policy. To study the behaviour of actors in their mutual relations, different agent-based models have been developed that build upon each other. The first models have been applied to analyse the effects of different archetypical modes of governance (hierarchy, market, network) on the spatial pattern of investments and thus on the emergence of particular land use structures. These simulations provide insight in the extent to which spatial dynamics and structures within each of these modalities respond to the improvements in accessibility and under which governance conditions these responses hold. In addition, work has been done on more extensive models that allow explicit simulation of the relationships between governance settings and the behaviour of actors.