

Smart connections with hubs lead to super network

The researchers of the 'Synchronizing networks' research programme led by Eric Molin are developing a super network in which travel and transport, major destinations and activity patterns are viewed as an interrelated whole in time, space and 'virtual space'. That way, designers and planners of spatial facilities, mobility and infrastructure can acquire a better understanding of travel patterns. The programme is a collaboration between researchers from Delft University of Technology, Radboud University Nijmegen and Eindhoven University of Technology.

Eric Molin is a sociologist and has always taken a keen interest in research methods and techniques, he says. The term 'choice' is a common thread in his work. 'One of the subjects I worked on at the CBS was parliamentary election studies.' He obtained his PhD with Harry Timmermans at the TUE on a subject within conjunction analysis. 'This concentrates on the modelling of the factors people consider when confronted with hypothetical choices. For instance, if you want to model residential preferences, you describe the homes in terms of various characteristics. Respondents are then asked to assess each type of home, for instance by giving report marks, or to make a choice between different homes. Because of the systematic variations in these descriptions, you are able, with the aid of statistical analysis techniques, to determine how strongly each characteristic counts in the overall residential preference. My PhD research focused less on individual choice behaviour and more on group decisions. Conjunction analysis is also relevant for travel and transport issues. I supervised a PhD student who studied choice behaviour in park & ride car parks. To what extent are people willing to use or pay for these? That was so productive and the outcomes were so interesting – also for society at large – that we wanted to take it further. So we gathered the people of the current consortium together and were basically ready to go when the SAR programme cropped up.'

Eric Molin, Associate Professor in Transport Policy and Logistics, is a member of the Faculty of Technology, Policy & Management of TU Delft.



Also good for social safety

The research programme that Molin and his colleagues are carrying out integrates time, space and 'virtual space' to study people's activity patterns and their associated mobility behaviour. 'Take, for instance, the facilities that are concentrated on the outskirts of the city, such as retail centres and multiplex cinemas. Lots of people go to these destinations by car. So wouldn't it be smart to cluster even more facilities there as well as public transport transfer points? That way, we can achieve all sorts of social improvements, not just in the field of accessibility but in other areas too, such as social safety. But this, of course, also depends on how the public space is designed around these hubs and that's outside the scope of our programme.'

Improving access by concentrating activities

Accessibility is often expressed in terms of how many locations lie within half an hour from your home. The researchers of 'Synchronizing networks' take a different approach. 'We would rather express it in terms of the ease with which you can achieve a full activity pattern. You could improve accessibility by concentrating activities, so that less trips are necessary. A closely related question, incidentally, is finding ways to break through the car owner's automatic tendency to choose the car for every trip.'

'Synchronizing networks', the term used in the title of the programme, means literally connecting car links, public transport links and locations. 'And we add a further two aspects. The first is the time dimension. If you combine facilities and traffic flows, they must be open or available at the same time. The second aspect is ICT. We want to examine the possible role of ICT when there are incidents, such as extremely bad weather or traffic accidents. In that case, people may prefer to stay at home and speak to each other in a tele-meeting – in which case the activity would continue, only the physical mobility will have been replaced with virtual mobility.'

What is the best place to meet?

In the 'super network approach' the researchers go a step further than has been done so far. 'In a recent paper Arentze and Timmermans aired the view that you should not only represent locations or movements in a super network, but also the overall activity patterns. Among other things, that means taking the 'status' of the activity into account. For instance: you can then indicate whether people have already done their shopping or not. Ultimately, we also want to show how activity patterns of different individuals can be connected. This would involve creating a model that can indicate the best place for organising larger events or holding meetings. In short, what activity locations can best be placed together in space?'

Who owns the time and space?

All very well, but who is going to plan and organise this? Who, after all, owns the space and who owns the time/space problem? 'Well, that is a governance question. We also have a PhD student (AIO) project for that in our programme. Obviously, all sorts of different actors are involved in the super network. The most important question is how to get all these actors to look beyond their own self-interest and start feeling involved with the larger whole. If everybody only organises their own small part of the network, the chances are you'll end up with a suboptimal end result for society as a whole.' The other two AIO projects are about calculating the shortest paths - which will be done by someone with an engineering background - and analysing people's behaviour in making choices. 'One aspect that plays a role here is perceptions. For instance, people systematically overestimate the train travel time versus the car travel time. The car is by no means always faster than the train, but people still base their mobility behaviour on that assumption. In this connection we use the Travel Behaviour Simulator, which we fill with activity patterns on the basis of the outcomes of a survey.'

Alongside the three PhD student (AIO) projects, there is also a post-doctoral project. 'This is not so much about knowledge development, but about application, about design. To make sure this is done correctly at the end of the process, the post-doctoral researcher must see to it that the PhD students all use the same conceptual framework at the start.'