Smart Mobility in the Netherlands – from pilot to standard

Marlon Spaans – Royal HaskoningDHV
Geertje Hegeman – Royal HaskoningDHV geertje.hegeman@rhdhv.com

Bijdrage aan het Colloquium Vervoersplanologisch Speurwerk
22 en 23 november 2018, Amersfoort

Samenvatting

De behoefte om bestaande infrastructuur zo efficiënt mogelijk te gebruiken, is groot. Niet alleen voor de bereikbaarheid, maar ook voor de leefbaarheid en veiligheid van Nederlandse steden, regio's en provincies. Smart mobility wordt vaak genoemd als potentiele oplossing voor de groeiende mobiliteit. De visie van Het Ministerie van Infrastructuur en Waterstaat is dat Nederland marktleider is op gebied van Smart Mobility. Dit paper is de samenvatting van afstudeeronderzoek waarin is onderzocht in hoeverre de noodzakelijke transitie van visie naar een gedetailleerde strategie al bestaat. De conclusie is dat er nog geen centraal gedefinieerd implementatie strategie is voor smart mobility.

Verschillende overheden (provincies, regio's, grote steden) zijn zelf bezig met projecten en pilots en geloven dat de noodzakelijke investering goed besteed is. Dit leidt tot een variëteit aan initiatieven, zonder succesgaranties in verschillende situaties.

Wetenschappelijk onderzoek wordt alleen gedaan op de mogelijke effecten van Smart Mobility technologie. Er is nog weinig literatuur over succes- en faalfactoren voor de implementatie van Smart Mobility. Dit paper probeert dit gat enigszins te vullen. Het onderzoek is uitgevoerd aan de hand van enquete-onderzoek onder 14 wegbeheerders.

Alle geïnterviewden benadrukten dat Smart mobility een middel is en niet een doel. Sociale voordelen voor o.a. leefbare steden, kwaliteit van leven, duurzaamheid, gevoel van veiligheid werden door vrijwel iedereen genoemd. Provinciale wegbeheerders verwachten dat Smart Mobility de inclusie van mobiliteit kan vergroten.

Obstakels werden ook genoemd, organisatorische traagheid het vaakst. Ook acceptatie werd vaak genoemd als mogelijk obstakel.

Datamanagement werd het vaakst genoemd als onderdeel van Smart Mobility die binnen de verantwoordelijkheden van de organisatie zelf liggen. Tegelijk denken ze ook dat datamanagement een van de belangrijkste pijlers is voor het welslagen van Smart Mobility: zonder goede datamanagement kan Smart Mobility niet veilig worden geïmplementeerd.

Introduction

There is a need for a more efficient use of existing infrastructure to improve the accessibility, liveability and safety of Dutch cities, metropolitan areas and provinces. A projected solution to growing mobility issues is Smart Mobility. The Ministry of Infrastructure and Water Management stated that the Netherlands aims to become world leader in Smart Mobility, but the transition from a vision to a detailed strategy on the implementation of Smart Mobility is still lacking. Engineering consultancy firm Royal HaskoningDHV has looked into this and concluded that there is still no centrally defined implementation strategy for Smart Mobility in the Netherlands. At this time, governmental institutes allocate their own resources in projects they believe are worth investing in, resulting in a patchwork of initiatives and no guarantee for success is given in any circumstance.

From a scientific perspective, research has only been performed on the possible effects of Smart Mobility technologies. Yet, not much literature exists on the success and failure criteria for the implementation of Smart Mobility. This scientific knowledge gap is the main scientific driver of this thesis.

The main objective of this research is to gain knowledge on obstacles and opportunities for implementing Smart Mobility in the Netherlands in order to fill the knowledge gap for road authorities and science. The social and scientific relevance of the thesis project have been taken into account while constructing the research questions. The main research question is:

What are the obstacles and opportunities for implementing Smart Mobility in the Netherlands in the 2018-2023 time frame from road authorities' perspectives?

Figure 1 shows this thesis' research strategy. Relevant semi-structured interview topics and questions on Smart Mobility were constructed based on expert opinions, preliminary desk research and the literature review. Fourteen road authorities divided in three scale levels of government were interviewed. Two interviews were held with national road authorities, six interviews with regional road authorities, and six interviews with municipal road authorities. The interviews were transcribed as clean-read transcripts. The transcripts were coded with word-based and scrutiny-based coding techniques.
During the content analysis, seven themes and 27 underlying categories were constructed. The national and regional road authorities are clustered as frequency group 1, while frequency group 2 consists solely of municipal road authorities. The four obstacle themes and eighteen underlying obstacle categories are posed in Table 1. The three opportunity themes and nine opportunity categories are posed in Table 2. The reliability of the results was checked with a intercoder reliability check ($\kappa = 0.528$, $p < 0.001$) and the validity of the research is checked by a validation workshop with experts. Figure 2 shows a frequency chart of addressed obstacle categories per frequency group and Figure 3 shows a frequency chart of addressed opportunity categories per frequency group.

Six themes were observed in total during the analysis of the coded interview transcripts. After that, eighteen obstacle and nine opportunity categories were constructed. Three obstacle categories, one obstacle theme, one opportunity category and one opportunity theme for implementing Smart Mobility in the Netherlands were found to be crucial factors for implementing Smart Mobility in the Netherlands. The obstacle categories are (1) organisational inertia, (2) the changing role of governments, (3) cooperation with other governmental institutions and market parties and (4) the theme obstacles related to execution. The opportunity category is (1) (social) benefits and the theme is (2) cooperation and knowledge sharing.

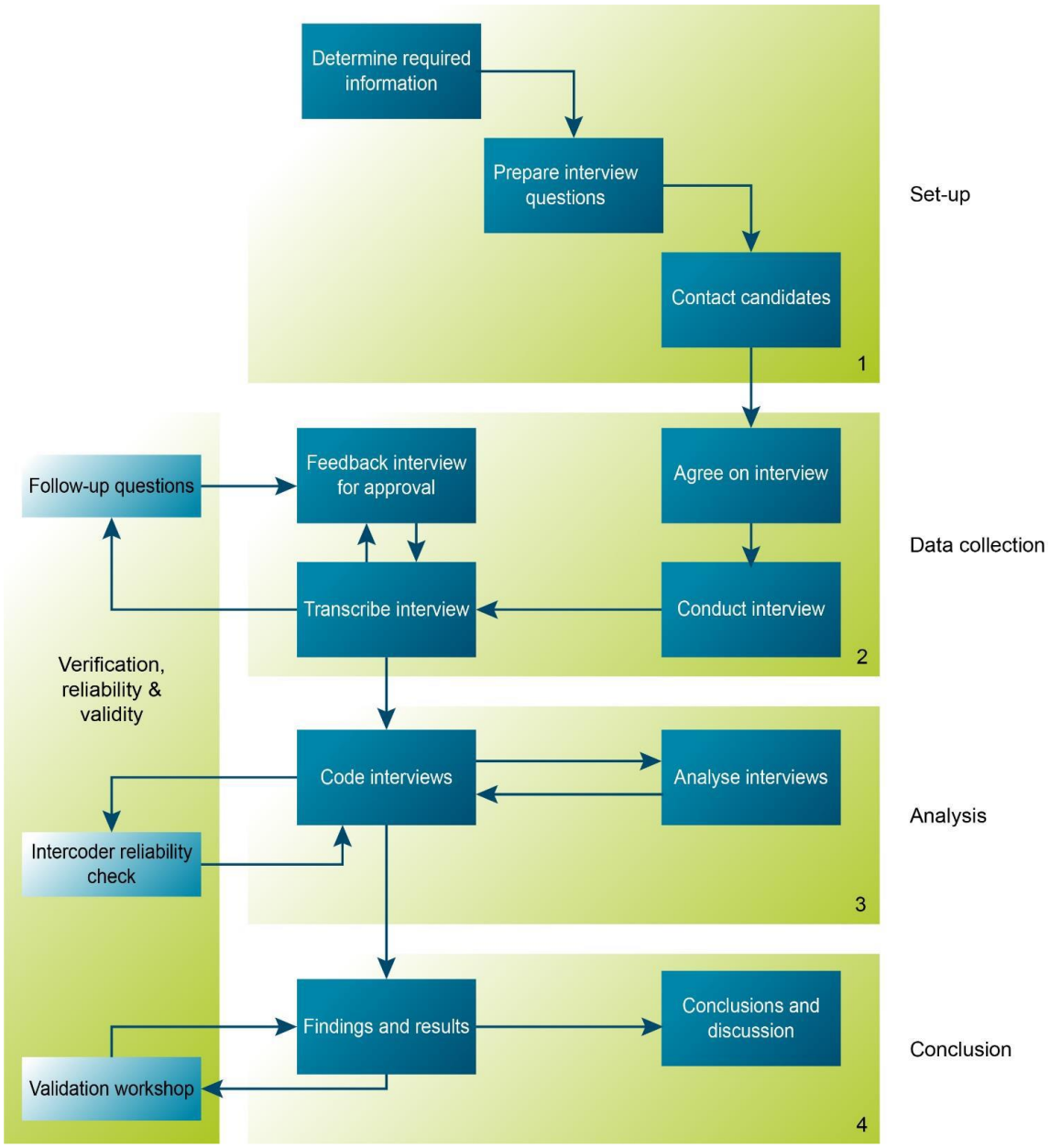

Figure 1 - Research Strategy

Obstacle categories	Theme code	Frequency group 1: National and Regional RAs (8 total)	Frequency group 2: Municipal RAs (6 total)	Total Frequency (14 total)
Theme 1: Obstacles related to cooperation and knowledge sharing				
Cooperation within the organisation	C1	5	4	9
Cooperation between governmental institutions	C2	1	6	7
Cooperation with market parties	C3	2	6	8
Learning by doing	C4	6	2	8
Theme 2: Obstacles related to inertia				
Organisational Inertia	I1	7	6	13
Social Inertia	I2	6	5	11
Political Inertia	I3	4	3	7
Economic Inertia	I4	6	4	10
Theme 3: Obstacles related to governance				
Changing role of governments	G1	4	0	4
Uncertainties	G2	6	3	9
Policy and regulations	G3	5	4	10
Privacy	G4	3	3	6
(Digital) Security	G5	3	1	4
Safety	G6	4	1	5
Theme 4: Obstacles related to execution				
Practical obstacles	E1	5	6	11
Governance obstacles	E2	6	6	12
Implementation obstacles	E3	6	5	11
Obstacles due to scale	E4	5	5	10

Table 1 - Absolute frequencies of addressed obstacle categories per frequency group

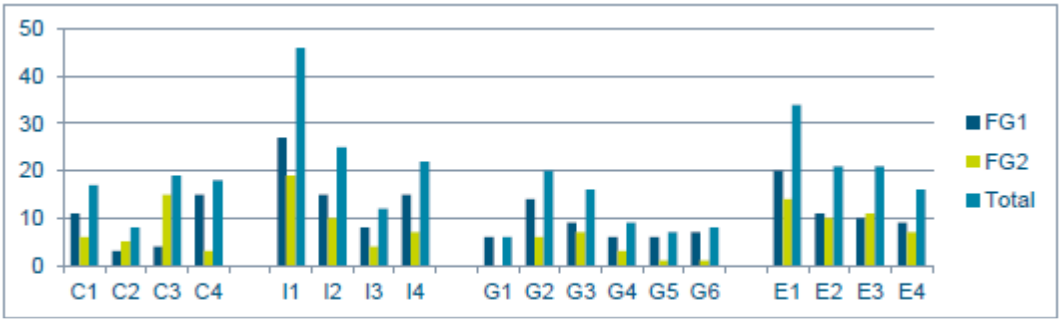

Figure 2 - Frequency chart of addressed obstacle categories per frequency group

Opportunity categories	Theme code	Frequency group 1: National and Regional RAs (8 total)	Frequency group 2: Municipal RAs (6 total)	Total Frequency (14 total)
Theme 1: Opportunities related to cooperation and knowledge sharing				
Research, innovating and knowledge sharing	K1	8	5	13
Cooperation between governmental institutions	K2	7	5	12
Cooperation with external parties	K3	6	4	10
Theme 2: Opportunities related to benefits				
Social benefits	B1	7	5	13
Economic benefits	B2	5	4	9
Environmental benefits	B3	5	1	6
Theme 3: Opportunities related to policy, governance and execution				
Political and managerial opportunities	P1	4	5	9
Implementation opportunities	P2	8	3	11
Managing expectations	P3	5	4	9

Table 2 - Absolute frequencies of addressed opportunity categories per frequency group

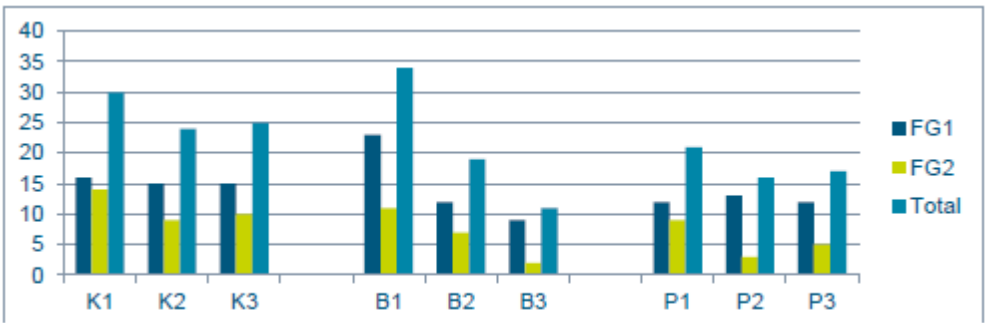

Figure 3 - Frequency chart of addressed opportunity categories per frequency group

The most frequently addressed opportunity category was social benefits. Interviewees stressed that Smart Mobility is a mean, not a goal. Social benefits were named in all sorts and shapes: social benefits for the liveability of cities, quality of life, sustainability, sense of safety, and social prosperity. Also better emergency response, parking administration and reduced pressure on the existing infrastructure are considered to be social benefits by the interviewed road authorities. The majority of the municipal road authorities claimed that Smart Mobility could enhance the inclusivity of mobility. New technologies and innovations could alter human behaviour; Smart Mobility is also letting citizens re-evaluate their travel behaviour or driving style.

Despite the various potential benefits of Smart Mobility, all road authorities named more obstacles than opportunities during their interviews. The most frequently addressed obstacle category was organisational inertia. On top of that, many interviewees had doubts whether people will accept Smart Mobility innovations and technologies in their daily lives. Concerns were shared whether Smart Mobility innovations and technologies would be fully accepted by the Dutch people in general, bearing in mind that people could have a tendency of being reluctant to change.

Data (management) was the most frequently named theme when interviewees were asked which Smart Mobility themes were within the scope of their organisation. Data (management) is viewed as the cornerstone of Smart Mobility. In other words, if the data is not properly managed, then Smart Mobility cannot be implemented with full safety and security. Organisational inertia and data management are potentially hampering factors that should be taken into account when implementing Smart Mobility in the Netherlands. Opportunities were mentioned less than obstacles. Obstacles were more 'top of mind' for the interviewees than opportunities. Policy-makers and civil servants are more used to dealing with inert organisations and are subconsciously more aware of negative factors than positive factors. The opportunities could be limited due to the scope and resources of many road authorities, while obstacles could subsurface and be hard to detect. In the end, 'show-stoppers' are more easily recognisable than 'no-regret' measures and activities. As one interviewee said: 'There are a thousand reasons not to do something. But only one reason is needed to start something.'

The scientific literature on Smart Mobility is far from conclusive. This thesis research is a thin cross-section of Smart Mobility efforts of road authorities in the Netherlands. However, it does give a rich image of the efforts and heuristics on Smart Mobility in the Netherlands. To provide structure for future development, there is a clear need for a broadly supported and robust "Smart Mobility Roadmap" that defines transitional aspects and provides an adaptive strategic skeleton for weighing and structuring current and future initiatives, thereby reducing the number of uncertainties for decision makers at different levels.

One of the needs for future research is the evaluation of market penetrations of the most frequent Smart Mobility innovations. Thereby, more research should be done into (dynamic) adaptive policy planning regarding break-through technologies and innovations. For instance, research on dynamic policy pathways has been done on fairly static and long-term infrastructure projects such as water management and bridges. Deep uncertainties related to the effects on policy planning of Smart Mobility have not yet been researched.

Data and privacy ownership is also topic gaining importance. In a swiftly digitalising world, legislation and protocols do not evolve as fast as the subjected technologies. Research is required in order to provide a standardised framework for safe and secure (digital) systems. Research on Smart Mobility contingency planning is suggested in order to cope with external events that hamper the data management infrastructure. A standardised contingency framework could be helpful for governmental institutions and private firms in order to provide a robust and resilient Smart Mobility system. Implementing new Smart Mobility technologies might lead to a point of no return. In that scenario, certain path dependent trajectories have been created which steer the future scenarios of Smart Mobility. Combining the theory of (deep) uncertainties, dynamic adaptive policy planning and a Delphi study on the future scenarios of Smart Mobility in different countries could lead to a better understanding of factors for successful implementation, show-stoppers and no-regret measures in a wider context.