Coping with uncertainties in MaaS implementation: an adaptive approach

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Content

• MaaS and challenges in its planning
• Dynamic Adaptive Policymaking (DAP)
• Application of DAP to MaaS in Nijmegen
• Next steps

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Mobility-as-a-Service (MaaS)

Mobility-as-a-Service MaaS:
- integration of different modes through a single interface
- in exchange with a pay-as-you-go or a monthly subscription
- digitalisation, personalisation, and business dimensions
(See Jittrapirom et al., 2017 for a review on definitions)

Promise a shift from an ownership-based to a usage-based transport system
Some potential benefits of MaaS

• Improved accessibility through provision of customised personal transport

• Reduction of car use and ownership

• Increased use of public transport

• Increase efficiency of public transport service

• Increased level of sustainability for transport system

Source: MaaS Finland & UBIGO
Current status of MaaS implementation

• Business, industry, national government, local authority, public transport providers are becoming increasingly interested in MaaS

• Some large investments are being made (e.g. MaaS Global raised €10m)

• Several new MaaS projects (or pilots) are emerging

• Given these prospects, there are issues...

New MaaS projects
• Birmingham (Oct 2017)
• Amsterdam and Nijmegen (Oct 2017)
• Singapore (end of 2017/2018)
• Ghent and Antwerp (TBC)
Uncertainties surrounding MaaS

Governance and organisation of public transport system:
• Roles of actors?
• Who should be platform operator?
• First to the pole?
• Contractual arrangements?
• Liability and insurance?
• Cooperation from PT operators?

Operational aspects:
• Fare & revenue distribution?
• Level of service (Planned vs Demand responsive)?
• Data security & asymmetry?

Outcomes:
• Level of sustainability?
• Resource efficiency?
• Equity and Just?
• Level of convenience?

How to develop MaaS policies, knowing these uncertainties exist?
Dynamic Adaptive Policymaking (Walker et al., 2010)

• Grounded on Assumption Based Planning (ABP)

• Accept that there are deep uncertainties associated with MaaS policymaking that cannot be handled by a ‘predict and act’ approach

• Move away from predictions and, instead, search for policies that are robust across a wide range of future conditions, i.e.:
  • Start with a promising basic plan
  • Protect the basic plan and adjust if needed (monitor and prepare)
  • Most robust and effective in case of deep uncertainty

• Previous applications:
  • Airport strategy planning (Kwakkel et al., 2008)
  • Innovative urban transport solutions (Marchau et al., 2008)
  • Climate change (Rahman et al., 2008)
  • Road pricing (Marchau et al., 2010).
Benefits and Challenges in applying DAP

Benefits:
• Get started right away
• Better protected against vulnerabilities
• Ready for opportunities
• An enhancement from forecasting or scenario planning to better deal with uncertainty
• Can be used as a ex-post planning to increase plan’s robustness

Challenges:
• Apply DAP in practice with real world decisionmakers (Bosomworth et al., 2017)
  - Difficulties in using DAP to deal with complex (uncertainty about system structure) and contested (uncertainty about preferences) issues
  - How to establish signposts and triggers within a complex system,
  - How to take into account the institutional and governance issues

How can DAP be improved to deal with a complex & contested issue like MaaS?
Research design: Application of DAP in MaaS

1. **Desktop DAP**: Derive an initial DAP plan from desktop study, literature review, and discussion among a limited group of experts.

2. **Delphi Survey**: Gaining a broader perspective by involving global experts.

3. **Participatory Planning Sessions**: Contextualize plan through local actors and stakeholders participation.

4. **Future of MaaS Global experts panel**

5. **Decision lab**
Dynamic Adaptive Planning (DAP) Framework

Stage 1 – Stage setting
- Set objectives
- Definitions of success
- Constrains
- Available option

Stage 2 – Assembling a Basic Policy
- Condition for success
- Preferred policy action

Stage 3 - Increasing the robustness of the basic policy
- Id. Vulnerability and opportunities and associated likelihood
- Actions

Stage 4 – Setting up the monitoring system
- Setting up signposts and Trigger

Stage 5 - Preparing the trigger responses
- Prepare trigger responses
Case study: MaaS for Nijmegen city

- 170,000 inhabitants (a twin city with Arhnem - 150,000 inhabitants)
- Travelers: commuters, students, business people, visitors
- Three universities and industrial estates
- Increasing transport congestion during rush-hour
- Example of how DAP can be utilised, not exhaustive
Case study: MaaS for Nijmegen city (cont.)

Stage 1 – Stage setting
Objective:
to maintain the levels of accessibility, reliability, and safety of its transport system from the perspectives of visitors, residents and economic vitality of the inner city (city of Nijmegen, 2017)

Definition of success:
1) Increase accessibility and flow, 2) Increase quality and quantity of parking facilities, 3) Increase road safety, 4) Stimulate participation public transport, and 5) Stimulate bicycle use (city of Nijmegen, 2017)

Alternative policies:
• Improving the existing public transport service,
• Improve bicycle infrastructure
• Introducing an innovative transport service (a MaaS service)
• Implementing a MaaS scheme

Constraints:
• Users’ acceptance
• A Lack of transport operators’ willingness to support the implementation, because
  - lack of trust,
  - potential loss or control over their operation, and
  - the need to adjust their business model
Case study: MaaS for Nijmegen city (cont.)

Stage 2 - Assemble a basic policy

Basic Policy:
Implementing an innovative demand-responsive shared-ride service, Brengflex

Condition for Success:
Sufficient support by crucial actors, such as public transport operator, and stakeholders, such as taxi operator.

Step 3 – Increase the robustness of the basic plan

Certain Vulnerability:
Lack of willingness to collaborate due to lack of trust, efforts required to adjust services, or potential loss of operation control. Strong opposition from competing services, such as taxi.

Action taken to increase robustness:
(Shaping action) Lobby supports from critical actors and actively involve relevant stakeholders and competitor from the design phase to ensure service acceptability and support
(Mitigation action) Secure funding to subsidise service.
Case study: MaaS for Nijmegen city (cont.)

Stage 4 – Setting up a monitoring system

Sign-post:
Level of Stakeholders’ interest and corporation, feedback and comments

Trigger:
Level of participation drop below expected

Step 5 – Preparing trigger responses

Adaptive action:
(Corrective Action) Intensify and actively engaged stakeholders to reduce conflict
(Defensive Action) Reduce scope of service to necessary minimal
(Reassessment) If support is in sufficient reassess basic policy
Research design: Application of DAP in MaaS

**Desktop DAP**
Derive an initial DAP plan from desktop study, literature review, and discussion among a limited group of experts
Completed (Jittrapirom et al. 2018. Forthcoming)

**Delphi Survey**
Gaining a broader perspective by involving global experts
Aug 2017 - April 2018

**Future of MaaS Global experts panel**

**Decision lab**

**Participatory Planning Sessions**
Contextualize plan through local actors and stakeholders participation
May 2018 – Winter 2018
Next steps: Development of participatory DAP (pDAP) workshop

Timeline:

March 2018
Complete Delphi Survey & Report

April - June 2018
Development of Participatory session

June – Nov 2018
Participatory Planning Sessions

Dec – June 2019
Solidify developed method & findings
SD model or Serious Game
Summaries

• We utilize Dynamic Adaptive Policymaking (DAP) to cope with uncertainties surrounding planning for MaaS implementation

• We enhanced the DAP by including the Delphi Method to collect experts’ view on implementation of MaaS

• A full report on the Delphi study is expected in April 2018.

• We will develop a participatory method to contextualize this DAP to our case study (May 2018 – Winter 2018)

Thank you.
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