A roadmap for the implementation of mobility hubs to support citizens towards more sustainable travel behaviour

Graduation project | Gaby Ghusen| Strategic product design

2024 | 2026 | 2028

Challenge

Horizon 1
Initial improvements

Horizon 2
Hubs network Amsterdam

Horizon 3
Expand & connect hubs to other Dutch cities

Digital and physical accessibility of the hubs

Major events that influence the accessibility of hubs

Developments MaaS
Developments OV
Data sharing
Spatial development

- RiVier Pilots
- ABT & OVPay
- TOMP-API
- Strategy for hubs design
- Selection location of hubs
- National MaaS approach
- OV as backbone to multimodal travel
- Growth hubs network
- Hubs in G4 with a unified look & feel
- MaaS app in NL
- Eco-system for data sharing
- Hubs in NI with a unified look & feel

Actions to take by the municipality

- Ensure a united look&feel of the hubs in Amsterdam
- Initiate integration hubs in MaaS follow-up plans
- Set up a growth strategy for a hubs network
- Ensure a central role of hubs in national MaaS plans
- Agree with G4 municipalities on a united look&feel
- National agreements between: MaaS, OV, mobility providers and municipalities
- Initiate national agreements on look&feel of the hubs

Availability of modalities in the hubs

Major events that influence the availability of modalities

Agreements mobility providers
Data monitoring

- Local agreements with mobility providers
- CDS-M developments
- Regional agreements with mobility providers
- Mobility dash-board with real-time data
- Back -to -many = norm
- Mobility dash-board NL

Actions to take by the municipality

- Collaborate with mobility providers to ensure availability of modalities in hubs
- Ensure a higher return rate from a user's perspective
- Advice on concession to limit free-floa-ting mobility
- Monitor availability of modalities at the hubs with real-time data
- Make returning modality to hub mandatory for the user

Behavior change towards shared mobility

'push factors'

- Parking permits ristrictions
- Higher parking prices
- 10.000 less parking
- Emission-free zones

Influencing behavior change

Personas

'pull factors'

- Fulfill common needs Investment in customer trust
- Provide a wide range of modalities
- Attractive pricing strategies
- Make receptive before encounter hubs Provide knowledge & experience

Future vision

A future in which mobility hubs are at the center of shared-mobility. A structured and well-integrated service supports the user in the transition towards shared-ownership, allowing all citizens to travel sustainably while enjoying a high-quality public space.

Rivier pilots

Rivier is an initiative of the three major OV-parties in NL: NS, HTM, and RET to develop a national MaaS strategy. Rivier will serve as a central platform to which all MaaS providers and Traffic Operators will be able to connect in order to provide their services.

National MaaS approach

When it comes to MaaS development, there are numerous future scenarios. To achieve the desired outcome, which is a fully integrated service that includes all modality combinations, a national approach is required. The user can use an app to plan, book, and pay for all modes of transportation, including shared modalities and public transportation, with this service.

Mobility hubs, which act as locations where these shared modalities are provided or as nodes for changing mobility modes, must be included in this service.

MaaS app in NL

It is expected that one or a few large MaaS providers will remain in the market in the future. The national MaaS approach introduced in Horizon 2 will result in greater connectivity among Dutch cities. The user will be able to plan, book, and pay for their multimodal travel from one Dutch city to another using a single MaaS app.

ABT & OVPay

The introduction of Account Based Ticketing is one of the developments in the Dutch public transportation sector (ABT). ABT is the follow-up of Card Based Ticketing, which in The Netherlands is known as the OV-chipkaart. With ABT, all of the user's travel data is linked to a specific account. The first practical step of ABT will be the implementation of OVPay in 2023. OVpay allows users to pay (check in and out) for various modes of public transportation using a debit card or smartphone.
The implementation of ABT makes it easier to manage travel data, and it is thus considered as a first step toward integration with MaaS.

https://ovpay.nl/nl/

Integration OV in MaaS

In the Netherlands, public transportation is regarded as one of the most environmentally friendly modes of transportation, and as such, it should be prioritized when it comes to multimodal travel. All public transportation services must be integrated in MaaS apps including attractive pricing strategies. Which is now still an issue as prices for these services are now higher in MaaS apps than when using the OV-chipkaart.

This integration could be beneficial for public transport as it allows for more integrated multimodal travel information. A study done by Grotenhuis (2005), summarizes customers's requirements for this information.

Grotenhuis, J. W., Wiegmans, B. W., & Rietveld, P. (2007). The desired quality of integrated multimodal travel information in public transport: Customer needs for time and effort savings.

TOMP-API

Data sharing is needed for the integration of multiple mobility services when it comes to multimodal travel.

TOMP-API (Transport Operator to Mobility Provider-Application Programming Interface), is a standardized technical interface, between MaaS providers and mobility providers. This interface is developed to make sharing data possible between the different mobility parties.

In Amsterdam, all mobility providers working together with the municipality to provide their modalities in Buurthubs, must agree to the TOMP-API.

https://www.crow.nl/thema-s/mobiliteit/landelijke-maas-standaarden/tomp-api

Eco-system for data sharing

National agreements on data sharing between MaaS providers, mobility providers, and public transportation providers will establish an eco-system.

When it comes to multimodal travel, this data is required to integrate all mobility services, including public transportation, shared-mobility providers, MaaS providers, and public authorities.

Travel information such as travel time, locations of hubs, crowdedness, delays, and prices can be communicated between mobility parties and, finally, to the user.

Strategy for hubs design

The Buurthubs team has been experimenting with the spatial occupation of Buurthubs as a replacement for private car parking spots.

The municipality is developing a standard design for Buurthubs. This is still work in progress. Within this design, guidelines for hub placement, materialization, signage, and so on have been developed.

Document PvE Buurthubs

Selection location of hubs

Buurthubs must be comparable in terms of comfort to private cars in order to be a viable alternative. This is why a 400-meter (5-minute) walk is the maximum distance for a user to travel to reach a Buurthub. This is the same walking distance as to each bus-stop in NL.

The density of the hubs must become very high in order to cover the entire city. The municipality must invest in more research to determine whether this level of density is feasible.

Document PvE Buurthubs

Growth hubs network

A network of mobility hubs must be established for mobility hubs to function and have a significant impact on sustainable travel in Amsterdam. A large number of hubs are required to generate such a figure. The municipality must find a balance between the right density of hubs that meet the needs of users while not crowding the public space.

Hubs in G4 with a unified look & feel

Dutch municipalities are working to connect their mobility hubs. One of these initiatives is a collaboration between the G4 (Amsterdam, Rotterdam, The Hague, and Utrecht) to develop a national identity for mobility hubs in the Netherlands.

There are many uncertainties about the outcome of this initiative, but it is expected that each municipality will still have enough flexibility within this identity to design their own mobility hubs.

Document: Mijksenaar, identieit hubs.

Hubs in NL with unified look & feel

The outcomes of the G4 initiative to create a unified identity for hubs should pave the way for a national approach. These hubs must be easily identifiable by users in each city.

Some municipalities may now be resistant to the idea because this single identity may conflict with the municipality's branding for the city. However, designs like the one initiated by the G4 still allow municipalities to design their own hubs or choose their own color while maintaining a unified identity for the hubs.

Local agreements with mobility providers

In 2024 it is expected that most mobility providers will still operate according to the free-floating concept. These commercial providers now offer their modalities in Buurthubs. From the perspective of Buurthubs these modalities need to be returned to the hubs after use. Up until now the Buurthubs team has been working with various mobility providers on the terms of 'soft agreements', for the providers to return the modalities to Buurthubs.
The municipality must introduce local agreements that obligues the providers to ensure availability of modalities in Buurthubs.

Regional agreements with mobility providers

Agreements with mobility providers must be established on a national scale (or at least regionally) to ensure the availability of modalities in mobility hubs . The central point of these agreements is whether these providers operate on a free-floating or back-to-many basis.

A hybrid system, with an alternation of back-to-many and free-floating between the city center and the city outskirts, is a probable outcome.

In all possible scenarios, for mobility hubs to function the free-floating concept must be limited to a certain level.

Back-to-many

Returning modalities to mobility hubs after use will become more convenient for users as the number of mobility hubs increases.

When a complete network of mobility hubs is realized, a back-to-many system with mobility providers could be agreed upon. After using the modalities, users must return them to the hubs. This system is expected to be implemented earlier and to have the upper hand by 2028.

CDS-M developments

To be able to monitor the availability of modalities in mobility hubs, data must be exchanged between the different mobility parties. This data must also be shared with public authoirities. City Data Standard Mobility (CDS-M) is being developed to create a uniform standard for exchanging data on mobility between mobility providers and public authorities. CDS-M provides a better understanding of the use of shared mobility and the possible effects on public spaces.

With the gathered data from mobility providers, the municipality can monitor the use and availability of modalities offe-red in the hubs .

https://www.amsterdam.nl/innovatie/mobiliteit/city-data-standaard-mobili-teit-(cds-)/

Mobility dash-board with real-time data

In order for public authorities to manage mobility data, a mobility dashboard must be created.

In terms of mobility hubs, a dashboard with real-time data on various modes of transportation will aid in monitoring these hubs and ensuring the availability of modalities.
Standardizations such as CDS-M are important steps toward enabling data sharing between mobility providers and public authorities.

Mobility dash-board NL

A mobility dash-board with real-time data on a national level allow cities to connect with each other. Connecting and exchanging this data with MaaS providers will have significant advantages for multi-modal travel between different cities. Travel time changes or delays, as well as the availability of a modality in a mobility hub at a specific time, can be combined and communicated to the user.

Parking permits ristrictions

From 2019 to 2025, the maximum number of new parking permits will be reduced every half year by the municipality.

As part of the car-shy agenda introduced in 2019, they hope to reduce the number of cars on the road with this regulation. In 2025, the municipality expects to reduce the number of new parking permits issued by 9500.

https://www.amsterdam.nl/parkeren--verkeer/parkeren-straat/amsterdam--geeft-per-1-juli-2019-minder/

Higher parking prices

Raising parking fees is not directly ingrained in Amsterdam's car-shy agenda. It is a politically sensitive subject, as it is difficult to persuade Amsterdam residents to accept higher prices. For visitors, however, the hourly parking rate in Amsterdam is among the highest in the world.

https://www.parool.nl/amsterdam/dit-is--de-duurste-stad-ter-wereld-om-je-auto-op-straat-te-parkeren~b36f5228/?re-

Emission-free zones

Emission-free zones are being established in Amsterdam. The city center will be emission-free for buses and coaches beginning in 2022. These zones are expanding, and more vehicles are being included in this regulation. In 2030, a large portion of Amsterdam will be designated as an emission-free zone for all types of petrol or diesel vehicles.

https://nl.urbanaccessregulations.eu/countries-mainmenu-147/netherlands--mainmenu-88/amsterdam

Common needs and customer trust

Buurthubs are already being used by early adopters of shared mobility in Amsterdam. Investment in meeting the needs of these users is required to maintain their trust. Solving the two major challenges of hub accessibility and availability of the modalities provided in them is already a significant step toward meeting the needs of these users. Aside from these two, investing in high-quality shared modalities, good hygiene, and financial attractiveness are all common user needs that must be met.

https://nl.urbanaccessregulations.eu/countries-mainmenu-147/netherlands--mainmenu-88/amsterdam

A wide range of modalities in hubs

Providing a diverse range of shared modalities in Buurthubs is especially important for users who use shared modalities for incidental trips. They may not use of shared mobility for regular commuting, but they may do for a variety of other purposes such as moving. For the various purposes, a variety of modalities are required.

Attractive pricing strategies

When compared to the use of private cars, attractive pricing strategies for shared mobility must be implemented. Moving from point A to point B must be more financially appealing by multimodal travel than by private car for users who are most concerned with financial advantage. This must include attractive public transportation pricing as well.

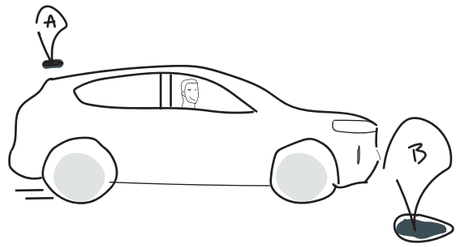
When compared to private cars, the larger cost picture must be clearly communicated to the user. This should include expenses that most users are unaware of, such as car insurance, road tax, and maintenance.

Make receptive & provide knowlegde

According to a study done by Psychology for Sustainable Cities, most car owners in Amsterdam typically do not see the need for an alternative to their personal vehicle.
These car owners are less likely to pay attention to communication about mobility hubs and shared mobility. Because they are already satisfied with their current vehicle, they automatically filter out messages about alternative mobility options.

A pull-factor to use here is to attract these users by trying to break their attentional bias.

Document: Psychological recommendations



The car share'er

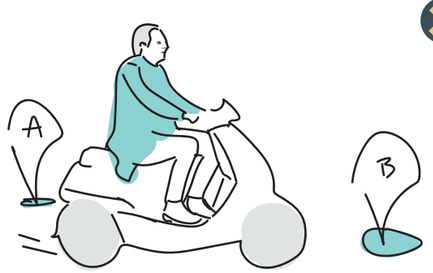
A car focussed user. Uses shared mobility and relies on the convenience of a car. Concerned about the modalities' quality, safety, and hygiene

Quality convenience

Likely to use shared mobility

◉◉◉◉

"I use shared cars for short trips in Amsterdam, sometimes it is just for fun."



The multimodal A to B'er

A multi-modal user frequently makes use of shared mobility, for daily commuting, shopping trips, or just for fun. Is most concerned with getting from point A to point B as quickly as possible.

Quick & easy transition

Likely to use shared mobility

"The closets by, accesability is for me the most important. Doesn't matter whether it's a Felyx or Check."

The money keeper

Makes use of shared mobility for it's finacial advantages. Needs to be provided with an overview of travel expenses to compare prices and select the most profitable option.

Financial advantage

Likely to use shared mobility

◉◉◉○

"It depends on the intensity of use how expensive shared mobility can get, but for us it is a perfect option"

The one in need

Only uses shared mobility when 'out-of-the-ordinary events' occur. Unless external factors force him to use shared modalities, he prefers to use his own/public transportation modes.

Tailored convenience

Likely to use shared mobility

"I would only change my current mobility pattern if the requirements change"

The holder

Open to the idea of shared mobility, but has never tried it. Satisfied with her current mobility options (bicycle, own car or public transportation). In need to take the first step towards shared mobility

Knowlegde & experience

Likely to use shared mobility

◉○○○

The refuser

Satisfied with his/her regular trip and prefers to use existing mobility options (own car, public transportation, bicycle). Shows very low intention to use shared vehicles.

Convencing

Likely to use shared mobility

Less parking space

The city of Amsterdam is investing in reducing the number of parking spaces. The ambition is to have 7,000 to 10,000 fewer parking spaces in Amsterdam by 2025. The free space created is used for a variety of sustainable purposes, including greening the streets, increasing walking space, and reserving spots for shared mobility. Buurthubs are now only used to replace parking spaces.