Partnering for Shared Mobility:

Recommendations for Upscaling Residential Carsharing in the Netherlands

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Front and back cover image: Stockfoto ID:1295666114

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1   Glossary and Acronyms

SMP	Shared Mobility Provider
SHA	Social Housing Non-profit
Carsharing	A service that provides temporary access to an automobile without transfer of ownership (Susan Shaheen, 2019)
MaaS	Mobility-as-a-Service
The Randstad	The metropolitan area formed by the four largest Dutch cities (Amsterdam, Rotterdam, The Hague and Utrecht)
P2P	Peer-to-Peer
B2C	Business-to-Consumer
B2B	Business-to-Business

2   Summary (EN)

This report presents the findings of research into residential shared mobility in the Netherlands in 2020-2021. **Residential** shared mobility refers here specifically to the use of carsharing and bikesharing as a purposeful replacement for individual car ownership by residents of Dutch urban areas. This report focuses on examples of successful implementation of residential carsharing in the shared mobility services and housing sectors, further broken down into for- and non-profit organisations, and the ways in which municipal actors relate to these successes. This data has been gathered through interviews with stakeholders identified in our sample, supported by relevant policy documents and academic literature on Dutch urban parking policy, shared mobility regulation, mobility platform business models, and public space allocation dynamics. We have also organized a co-creation workshop in June 2021, where challenges were discussed and solutions were co-created with the different stakeholders (shared mobility providers, social housing associations, municipalities). The end product of the project is this report, the main output of which is actionable recommendations to our key stakeholder groups to promote residential shared mobility (see below).

The successes that emerge from our findings are presented in the broader context of drivers and barriers of residential carsharing in the Netherlands. We find, based both on interviews and on grey and academic literature, that for-profit carsharing services continue to develop steadily in the Netherlands, while non-profit carsharing shows great potential but little development to date. Further, despite its growth beyond early adopters to a somewhat broader user base, carsharing continues to depend for profitability on higher-income urban residents with higher educational attainment, overwhelmingly residing in the *Randstad* (Amsterdam, Utrecht, Rotterdam, The Hague and surrounds).

One key contribution of this report is in addressing the knowledge gap around the lack of uptake of residential carsharing by large parts of the urban Dutch population, such as the millions of residents housed in homes owned and managed by social housing associations (SHAs, known in Dutch as *woningcorporaties*). Like the current user base for residential carsharing, SHA tenants would stand to benefit from an alternative to the costs and burdens of private car ownership. As stewards of public goods, of urban liveability and of the public realm, local government actors also have reason to support and promote residential carsharing, if only as a means of reducing the need for on-street car parking, which can then be put to other uses.

We find that, where carsharing or bikesharing is undertaken by commercial or for-profit shared mobility providers (SMPs), it is largely by limiting the user group to the above-mentioned higher income groups in order to maintain profitability. Where carsharing is supported, and often subsidised, by for-profit property developers in commercial property development, is it typically (1) for learning or experimentation purposes, or (2) in order to take advantage of an imposed or negotiated lowering of the parking norm by municipalities, which in turn allows the building of extra residential units and/or more social amenities. All for-profit stakeholders in both mobility and the housing sector agree that the business case for carsharing will become much stronger when it starts to be organised on a larger spatial scale, such as that of the neighbourhood or district rather than that of a single building or housing complex.

For non-profit SMPs, carsharing more often serves as a mechanism to develop neighbourhood social capital and create affordable access to mobility than as a means of developing publicly accessible mobility services. In the non-profit housing sector, study respondents are aware of these potential benefits but have largely hesitated to engage in efforts to secure access to carsharing for their tenants due to an already complex agenda of sustainability imperatives (especially retrofitting of housing stock to meet new objectives in areas such as energy efficiency). Non-profit stakeholders from the mobility and housing sectors agree that the current offer of commercial carsharing services open to the public leave a large unmet need for carsharing, and shared mobility in general, among the rest of the urban population, especially lower-income households.

Municipal actors in contexts where the mobility offering is abundant and diverse have been pro-active in nurturing residential carsharing, primarily in new-build developments but also in some existing neighbourhoods (for example, as part of larger refurbishment and district redevelopment schemes). The policy and implementation capacity of these actors has moved forward quickly, assisted by increasing efforts to bring parking pricing and entitlements (such as cheap resident parking permits) into line with policy objectives and market prices for public space. For municipal actors in relatively car-dependent contexts, progress has been much more haphazard, although there are encouraging signs that encouraging households to give up their second and subsequent cars in favour of a shared mobility offering could be a realistic objective here.

Using our research findings, we derived a set of recommendations to the specific stakeholder groups, which (we contend) would promote the further

development of carsharing. We also identify a responsibility gap, where the actions needed cannot be straightforwardly ascribed to any particular stakeholder:

Responsibility Gap: All residential carsharing stakeholders stand to benefit from a transition towards fairer pricing for the storage of cars on public land, and parking norms that are in line with the imperatives of the climate emergency, as well as other public policy objectives. Two ways to give effect to this transition would be a significant increase in residential parking fees as to better reflect land value and the establishment of a single aggregate shared mobility platform providing user access to all carsharing providers and potentially other shared mobility services (particularly, bikesharing).

For-profit SMPs: These actors should establish a sectoral organisation to advocate carsharing and bikesharing more broadly. Such an organisation could drive standardisation of contracts and compile a knowledge base that would assist SMPs in negotiations with other stakeholders, increasing transparency and predictability while shortening project setup timelines. More innovation in contracts and business models could unlock existing fleets of leased cars and bring them into sharing fleets. The integration and aggregation of non-competitor SMPs into platforms could produce full-service MaaS platforms that improve the carsharing business case. Profitability could also be improved by expansion of user groups to the largest possible extent permitted by insurance and other factors, especially if cars themselves can be optimised for ease of cleaning, maintenance and digital un/locking.

Non-profit SMPs: Non-commercial carsharing providers, such as peer-to-peer (P2P) cooperatives, should advocate for their affordable, socially-oriented models as a weapon against mobility poverty and isolation, and a means of promoting social cohesion and solidarity. Public-sector interventions aimed at similar objectives could reasonably include direct investment in these cooperatives. Non-profit SMPs

should use their track record to lobby for regulatory reform that levels the playing field (in insurance, for example) for commercial and non-commercial carsharing providers.

For-profit property sector: Private-sector property developers should use new-build projects and district-level redevelopment as an opportunity to pioneer a sharing-first community. As the number of successful projects of this kind increase, property developers will find it easier to make the case to municipalities that carsharing should be (1) organised on the widest possible scale, and (2) physically designed into urban open space, thereby liberating street-level space.

Non-profit property sector: SHAs should take up the challenge to view mobility as part of a set of essential needs of their tenants that is best met by shared mobility at the level of the neighbourhood and district. SHAs do not necessarily have to negotiate contracts themselves, but could facilitate this between well-developed tenants' associations and SMPs. For SHAs, there are substantial benefits to be realised through carsharing and bikesharing in the retrieval of parking space, which can be reallocated to serve as social amenities and sustainability and adaptation infrastructure (such as trees and greenery for shade, cooling, and water retention).

Municipal actors: All municipal actors, but especially those in car-dependent contexts, would benefit from an effort to consolidate and rationalise internal processes that relate to carsharing and bikesharing. This would speed up decision-making while making it more consistent. More predictability for SMPs would also enable municipalities to drive a harder bargain and embed certain objectives (like accessibility and affordability) in carsharing concessions, permits and contracts. The reforms mentioned above, supported by the development of a public-sector knowledge base on shared mobility, could obviate the need for municipalities to repeat pilots and experiments, and move to routine provision of carsharing.

The report concludes with reflections on carsharing

and shared mobility in more general terms, focussing on its potential to be governed and developed as a fundamentally public or private form of transport. To date, carsharing especially has been governed as the latter, but realising its potential to mitigate the externalities of mass car ownership may require a vision closer to the former.

3   Samenvatting (NL)

Dit rapport presenteert de bevindingen van het onderzoek naar residentiële deelmobiliteit in Nederland in 2020-2021. Met residentiële deelmobiliteit wordt hier specifiek gedoeld op het gebruik van autodelen en fietsendelen als vervanging van individueel autobezit door bewoners van Nederlandse stedelijke gebieden. Dit rapport richt zich op voorbeelden van succesvolle implementatie van residentiële deelmobiliteit op het snijvlak van de mobiliteitsector en de woningsector, verder uitgesplitst in for- en non-profit organisaties, en de manieren waarop gemeentelijke actoren zich verhouden tot deze successen.

Deze gegevens zijn grotendeels verzameld door middel van interviews met belanghebbenden, gecombineerd met relevante beleidsdocumenten en academische literatuur over het Nederlandse stedelijke parkeerbeleid, regulering van deelmobiliteit, verdienmodellen van mobiliteitsplatforms, en de indeling van openbare ruimte. We hebben ook een co-creatieworkshop georganiseerd in juni 2021, waar uitdagingen werden besproken en oplossingen werden geco-creëerd met de verschillende belanghebbenden waaronder mobiliteitsaanbieders, woningbouwcorporaties en gemeenten. Het eindproduct van het project is dit rapport, met als belangrijkste resultaat de aanbevelingen aan belanghebbenden om residentieel autodelen en fietsendelen te bevorderen.

We presenteren de successen die uit onze bevindingen naar voren komen in de bredere context van drijfveren en belemmeringen van residentiële deelmobiliteit

in Nederland. Op basis van zowel interviews als academische en niet-academische literatuur stellen we vast dat for-profit-autodeeldiensten zich gestaag blijven ontwikkelen in Nederland, terwijl non-profit-autodeeldiensten een groot potentieel hebben, maar tot op heden weinig ontwikkeling laten zien. Verder blijft autodelen, ondanks de groei van de early adopters naar een iets bredere gebruikersbasis, voor zijn winstgevendheid afhankelijk van stedelingen met hogere inkomens en een hoger opleidingsniveau, die voor het overgrote deel wonen in de Randstad.

Een belangrijke bijdrage van dit rapport is het opvullen van de kennislacune aangaande het lage gebruik van residentieel autodelen door de Nederlandse stedelijke bevolking, zoals de miljoenen bewoners van woningen beheerd door woningcorporaties. Net als de huidige gebruikersbasis voor residentieel autodelen, zouden sociale huurders baat hebben bij een alternatief voor de kosten en lasten van particulier autobezit. Als beheerders van publieke goederen, van de leefbaarheid in de stad en van de openbare ruimte, hebben lokale overheidsinstanties veel redenen om residentieel autodelen te steunen en te bevorderen, al was het maar als middel om de behoefte aan parkeerruimte op straat te verminderen, die dan voor andere doeleinden kan worden gebruikt.

We stellen vast dat, wanneer autodelen wordt toegepast door commerciële deelmobiliteitsaanbieders, dit grotendeels gebeurt ten behoeve van hogere inkomensgroepen om winstgevend te blijven. Wanneer autodelen/fietsendelen wordt gesteund, en vaak ook gesubsidieerd, is dat meestal (1) vanwege leerdoeleinden, of (2) om te profiteren van een gewijzigde parkeernorm, wat op zijn beurt de bouw van extra wooneenheden en/of meer sociale voorzieningen mogelijk maakt. Alle commerciële stakeholders in zowel de mobiliteits- als de woonsector zijn het erover eens dat de businesscase voor autodelen en fietsendelen veel sterker wordt wanneer het op een grotere ruimtelijke schaal wordt georganiseerd, zoals die van de buurt of wijk in plaats van een enkel gebouw of wooncomplex.

Voor deelmobiliteitsaanbieders zonder winstoogmerk is autodelen vaker een mechanisme om sociaal kapitaal in de buurt te bevorderen en om automobiliteit betaalbaar te maken voor lage inkomens, dan een middel om openbaar toegankelijke mobiliteitsdiensten te ontwikkelen in bredere zin. Woningcorporaties zijn zich bewust van deze potentiële voordelen, maar aarzelen zich in te zetten en autodelen voor hun huurders te regelen vanwege een reeds complexe agenda van duurzaamheidsvereisten (met name het aanpassen van de woningvoorraad om te voldoen aan nieuwe doelstellingen zoals energie-efficiëntie). Non-profit-actoren in de mobiliteits- en huisvestingssector zijn het erover eens dat het huidige aanbod van commerciële autodeeldiensten die openstaan voor het publiek, een grote onvervulde behoefte laat voor autodelen, en gedeelde mobiliteit in het algemeen, onder de rest van de stedelijke bevolking, in het bijzonder huishoudens met lagere inkomens.

Gemeentelijke actoren in stedelijke contexten zijn proactief geweest in het stimuleren van residentieel autodelen, in de eerste plaats in nieuwbouwprojecten, maar ook in sommige bestaande buurten (bijvoorbeeld als onderdeel van grotere renovatie- en wijkherinrichtingsprojecten). De beleids- en uitvoeringscapaciteit van deze actoren is snel vooruitgegaan, geholpen door toenemende inspanningen om parkeertarieven en -vergunningen in overeenstemming te brengen met beleidsdoelstellingen en marktprijzen voor de openbare ruimte. Voor gemeentelijke actoren in een relatief autoafhankelijke context is de vooruitgang veel grilliger, hoewel er bemoedigende tekenen zijn dat het aanmoedigen van huishoudens om afstand te doen van hun tweede en volgende auto's ten gunste van een aanbod van gedeelde mobiliteit hier een realistische doelstelling zou kunnen zijn.

Uit het onderzoek volgt een reeks aanbevelingen aan de specifieke groepen belanghebbenden, die (volgens ons) de verdere ontwikkeling van residentieel autodelen en fietsendelen zouden bevorderen. We stellen ook een hiaat vast in de verantwoordelijkheid, waarbij de nodige acties niet zonder meer aan

een bepaalde belanghebbende kunnen worden toegeschreven:

Verantwoordelijkheidskloof: Alle belanghebbenden bij residentieel autodelen hebben baat bij een overgang naar eerlijker tarieven voor parkeren in de openbare ruimte, en naar parkeernormen die in overeenstemming zijn met de eisen van de klimaatverandering en met andere doelstellingen van het overheidsbeleid. Twee pijlers waarlangs deze transitie kan worden bewerkstelligd is een drastische verhoging van residentiele parkeertarieven die beter de grondwaarde weerspiegelen en de oprichting van één platform voor (auto)delen, dat een gebruiker toegang biedt tot alle aanbieders van autodelen en mogelijk andere deelmobiliteitsdiensten (zoals fietsendelen).

Commerciële deelmobiliteitsaanbieders: Deze actoren moeten een sectorale organisatie oprichten om te pleiten voor meer steun en aandacht voor autodelen en fietsendelen. Een dergelijke organisatie kan de standaardisering van contracten bevorderen en een kennisbank samenstellen die aanbieders kan helpen bij onderhandelingen met andere spelers, waardoor de transparantie en handelingssnelheid vergroot worden. Meer innovatie in contracten en bedrijfsmodellen zou bestaande vloten van leaseauto's kunnen ontsluiten en in deelauto-vloten kunnen onderbrengen. De integratie en aggregatie van aanbod van deelmobiliteit in platforms kan leiden tot full-service MaaS-platforms die de businesscase voor autodelen en fietsendelen verbeteren. De winstgevendheid kan ook worden verbeterd door de gebruikersgroepen zoveel mogelijk uit te breiden, voor zover de verzekering en andere factoren dat toelaten, vooral als de auto's zelf kunnen worden geoptimaliseerd op het vlak van schoonmaakgemak, onderhoud en digitale ontgrendeling/vergrendeling.

Niet-commerciële deelmobiliteitsaanbieders: Deelauto-aanbieders zonder winstoogmerk, zoals peer-to-peer-coöperatieven (P2P), moeten pleiten voor hun betaalbare, sociaal georiënteerde modellen als wapen tegen mobiliteitsarmoede en isolement, en als middel om sociale cohesie en solidariteit

te bevorderen. Overheidsinterventies gericht op vergelijkbare doelstellingen zouden redelijkerwijs directe investeringen in deze coöperaties kunnen omvatten. Deze aanbieders zouden hun resultaten moeten gebruiken om te lobbyen voor hervormingen van de regelgeving die het speelveld (bijvoorbeeld op het gebied van verzekeringen) voor commerciële en niet-commerciële aanbieders gelijktrekken.

Commerciële vastgoedsector: Projectontwikkelaars uit de private sector moeten nieuwbouwprojecten en herontwikkeling op wijkniveau aangrijpen als een kans om een 'sharing-first'-community te pionieren. Naarmate het aantal succesvolle projecten van dit type toeneemt, zullen projectontwikkelaars het gemakkelijker vinden om bij gemeenten aan te tonen dat autodelen (1) op een zo groot mogelijke schaal moet worden georganiseerd en (2) fysiek moet worden ontworpen als onderdeel van de stedelijke open ruimte, waardoor ruimte op straatniveau vrijkomt.

Woningcorporaties: Deze actoren moeten "de koe bij de horens vatten" en mobiliteit erkennen als onderdeel van de basisbehoefte van hun bewoners, die het best kan worden geregeld via deelmobiliteit op wijk- en buurtniveau. Woningcorporaties hoeven niet per se zelf over contracten te onderhandelen, maar zouden dit tussen goed ontwikkelde huurdersverenigingen en deelmobiliteitaanbieders kunnen vergemakkelijken. Voor woningcorporaties zijn er aanzienlijke voordelen te behalen door autodelen, namelijk door het terugwinnen van parkeerruimte die kan worden herbestemd om te dienen als sociale voorzieningen en infrastructuur voor duurzaamheid en leefbaarheid (zoals bomen en groen voor schaduw, koeling en waterretentie).

Gemeenten: Alle gemeentelijke actoren, maar vooral die in een autoafhankelijke context, zouden hun interne processen aangaande autodelen en fietsendelen kunnen consolideren en rationaliseren. Dit zou de besluitvorming versnellen en consistenter maken. Meer voorspelbaarheid voor aanbieders zou gemeenten ook in staat stellen steviger te onderhandelen en om bepaalde doelstellingen (zoals toegankelijkheid en betaalbaarheid) te verankeren in autodeelconcessies, vergunningen en contracten. De hierboven genoemde hervormingen, ondersteund door de ontwikkeling van een kennisbasis over deelmobiliteit in de openbare sector, kunnen ervoor zorgen dat gemeenten hun proefprojecten en experimenten niet hoeven te herhalen maar kunnen overgaan tot het routinematig aanbieden van autodelen en fietsendelen.

Het verslag sluit af met reflecties over deelmobiliteit in meer algemene termen, waarbij de nadruk ligt op het potentieel ervan om te worden bestuurd en ontwikkeld als een fundamenteel publiek óf private vorm van mobiliteit. Tot nu toe werd autodelen vooral als het laatste gezien, maar om het potentieel van autodelen en fietsendelen te realiseren (en dus de externe effecten van massaal autobezit te verzachten), is wellicht een visie nodig die dichter bij de eerste ligt.

4   Introduction

Shared mobility is a promising means of making urban transport more sustainable. Bikesharing services can pioneer transport cycling in emerging cycling contexts. Carsharing can allow urban residents to give up car ownership without compromising their mobility (Chen and Kockelman, 2016; Zhang and Mi, 2018). Thus, increased use of shared mobility services could replace a current norm, in developed countries, of mass car ownership and single-occupant vehicles on the roads, potentially reducing carbon and particulate emissions, as well as congestion. However, the upscaling of shared mobility is hindered by the lack of parking spaces in central locations (Münzel, 2020; Münzel et al., 2018). One good way to tackle this issue is residential shared mobility, referring to shared bikes and cars located at the parking lots of residential buildings.

Residential shared mobility requires tripartite partnerships between mobility providers, property developers and municipalities. In theory, all these stakeholders should be incentivized to promote residential carsharing. From the perspective of the mobility providers, the upscaling potential is enormous: in the Netherlands, there are four million people living in dwellings owned by housing associations, while hundreds of new housing projects are to be developed in the coming years. For property developers, parking norms can be dealt with more economically by dedicating parking space for shared cars and bikes, instead of building expensive deep garages (van den Hurk et al., 2021). Municipalities benefit from reduced congestion and carbon emissions, which are aligned with their policy objectives (for example, see Gemeente Amsterdam, 2019; Gemeente Rotterdam, 2019; Gemeente Utrecht, 2019).

Despite the high potential for residential carsharing, there are only a few functioning schemes active in the Netherlands. While both carsharing (Nijland and van Meerkerk, 2017) and bikesharing (Ricci, 2015) have been studied extensively, less is known about the drivers and barriers of residential carsharing. This project, Partnering for Shared Mobility, aims to adress

this research gap. In the project, we have interviewed shared mobility providers, property developers, and municipal actors to create an inventory of challenges in promoting residential carsharing. We have also organized a co-creation workshop, where challenges were discussed and solutions were co-created with the different stakeholders. The end product of the project is this report, the main output of which is actionable recommendations to our key stakeholder groups to promote residential shared mobility.

4.1   Structure of this report

This report is structured as follows. Section **4** presents the context of the study and presents some key findings from former research concerning shared mobility. Section **5** presents the participants of the project (further project notes are provided in section **11**). Section **6** presents the challenges to promoting residential shared mobility. Section **7** presents the recommendations to the different stakeholder groups, followed by concluding remarks in section **8**.

5   Presenting the Stakeholders

This chapter presents the focal stakeholders of this project and prior research on residential shared mobility. First it describes the relevant stakeholders of

residential carsharing – the shared mobility providers, property developers, and municipal actors in the Netherlands. Secondly, it presents and explains the schema by which these actors have been divided in this report (Figure 1).

The main divisions here are between for-profit and non-profit actors in both the shared mobility services and property sectors. This distinction reflects an empirical difference that emerged from our research and is also corroborated by recent government publications (KiM, 2021), namely that what we call for-profit, commercial, or profit-oriented actors in both the property and shared mobility services sectors have progressed significantly in their collaborations.

In contrast, what we refer to in this report as non-profit, non-commercial or socially-oriented shared mobility and property sectors are defined by their unfulfilled potential in this area, rather than their track record. Non-profit shared mobility providers (SMPs) are still very few in number in 2021, while the vast property holdings and tenant population of the Netherlands' social housing associations (SHAs), which represent an enormous potential pool of shared mobility users, have yet to make sustained attempts at mainstreaming shared mobility. Lastly, we divide municipal actors into two groups. For convenience, we refer to the first as 'mobility-rich' contexts – in the Netherlands,

Figure 1: Schema of stakeholders as considered in this report
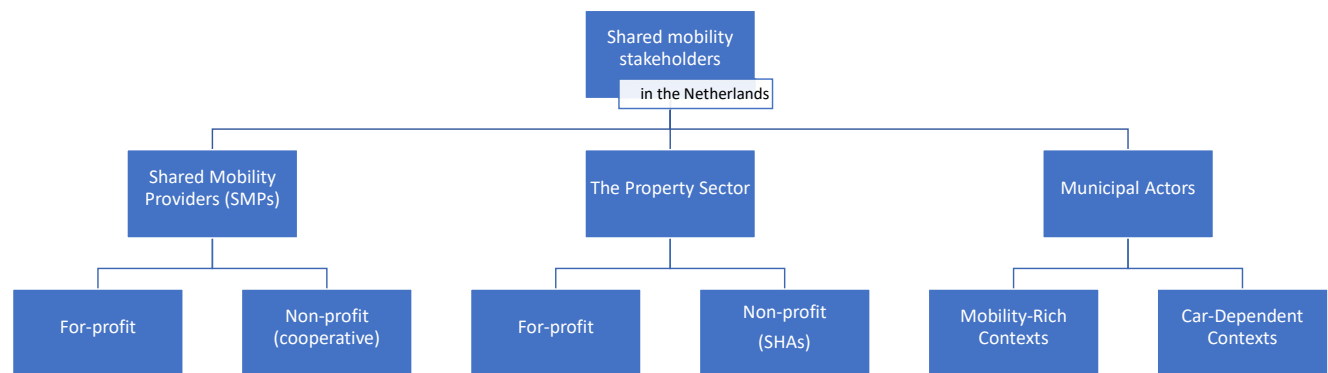
this is essentially a reference to the Randstad (the conurbation that includes Amsterdam, Utrecht, The Hague/Den Haag and Rotterdam). These are highly urbanised contexts in which residents and visitors have access to a varied, consistent and generous mobility offering, and car dependency is low. We refer to all other contexts in the Netherlands as generally more car-dependent.

This sweeping generalisation reflects a recurring emphasis in our interviews and in policy and academic literature on the key distinction between contexts in which shared mobility is a complement to an already-robust mobility offering, and those in which shared mobility itself constitutes most of the alternative to private car use.

5.1   Shared Mobility Providers (SMPs)

5.1.1   Carsharing

The Netherlands is the birthplace of Witkar, one of the first carsharing services and the very first electric carsharing scheme, which operated in Amsterdam from 1974 to 1986 (Bendixson and Richards, 1976). The first commercial carsharing company in the Netherlands was Greenwheels, founded in Rotterdam in 1995, and still in operation today. In 2020, the Dutch carsharing sector as a whole provided 6400 cars to 730,000 carsharing users (Rijkswaterstaat, 2021). In the Netherlands, the dominant carsharing model is peer-to-peer (P2P) carsharing, representing the overwhelming majority of the carsharing fleet (Crow, 2018). This model is based on the round trip (cars are returned to the place from which they were rented). Private individuals own the cars, and the carsharing company works as a market mediator that relays cars from car owners to car users. Other main types of carsharing are the B2C station-based and one-way models. The former is based on the round-trip model, like peer-to-peer carsharing, with cars owned by companies instead of individuals. In the latter, cars are also owned by a private company, but the logistical model is based on one-way trips (i.e., cars can be left anywhere in a designated city area.)

Table 1: A basic carsharing typology

	B2C station-based carsharing	P2P carsharing	One-way carsharing
Owner of the cars	A company or non-profit	Private individuals	A company
Logistical model	Round trip	Round trip	One-way
Billing	By the hour	By the day or by the hour	By the minute
Operators in the Netherlands	Greenwheels, Amber, ConnectCar, Sixt Share, SnappCar, MyWheels, SHARE NOW, StudentCar, and We Drive Solar	DEEL	car2go, ShareNow

The sustainability effects of carsharing depend strongly on how the service is delivered. The effects are strongest in so-called station-based B2C business models (Schreier et al., 2015; Vine et al., 2014). While the P2P model is an effective means of providing users with temporary access to cars, there is as yet no evidence to show that it contributes to car owners giving up their cars, or substantially reducing the total distance they travel by car (Clark et al., 2014; Nijland and van Meerkerk, 2017). This can likely be attributed to the fact that P2P carsharing often requires a key exchange and communication between the owner and the user. While physical keys remain part of conventional driving, it therefore remains cumbersome for mundane trip purposes, and thus seldom offers a real replacement for car ownership.

The station-based B2C model may also be the only one that is viable for residential carsharing. Usually, carsharing cars are put into service in or around residential buildings to replace private cars. As mentioned above, only the station- based B2C model can deliver this promise. The P2P model does not tend to function well for residential carsharing purposes, because carsharing agreements are commonly made over periods of several years, while individual car owners remain free to remove their vehicles from the fleet at any time. One-way carsharing does not work well for residential carsharing because the shared cars must be located at a designated parking spot. Because the other models are not viable for residential carsharing, in the remainder of this report, when we refer to carsharing, we refer to the station-based, B2C model.

5.1.2   Bikeshare

In this project, we have focused on carsharing due to the particularly disproportionate demands that parked automobiles make on public urban space (Petzer et al., 2021). The opportunities and barriers facing the development of carsharing in the Netherlands are also more likely to be relevant and comparable to other countries, while the status and level of development of Dutch cycling is possibly unique in the world, comparable only with Denmark (KiM, 2021). For this reason, bikesharing has been treated as a background factor in this report, and considered alongside other modes and mobility types such as city logistics (freight), and shared (push) scooters.

5.2   The Property Sector – for-profit and non-profit

The lack of research cannot be explained by the lack of empirical material. Even though residential carsharing is not very common anywhere, there are examples of it in the Netherlands, Germany, Finland, and in the USA (Bundesverband carsharing, 2015; Rijksoverheid, 2018;

Lagadic et al., 2019; Raaska, 2020).

Existing anecdotal evidence indicates that most residential carsharing agreements are made in the context of new commercial building construction, whereas there are only few examples of shared mobility schemes within existing residential buildings. This is most likely due to the fact that, in the Netherland, new-build property developers can obtain exemptions on parking norms if they commit to offering shared cars to their residents (Raaska, 2020). This allows them to build fewer parking places, which are expensive and seldom profitable, especially where dense urban settings require the construction of off-street parking facilities. However, we know little of why shared mobility is rare in old building stock, which could be a major diffusion vector for it. Because of the scant knowledge of residential carsharing, our project adopts an exploratory methodology to study the phenomenon. The following chapter describes this project including its motivation, participants, and phasing.

5.3 Municipal Actors – mobility-rich and car-dependent contexts

In recent years, the perception of shared mobility in the Netherlands' largest municipalities has evolved from a private-sector service, perhaps akin to car leasing, to a carrot that must accompany the stick of parking reform. As Barend Jansen of the Province of Zuid-Holland has it, "Shared mobility is becoming more important...as a kind of prerequisite for lower parking norms".

Outside of the few large municipalities which possess the skills base and policy clarity to drive progress in shared mobility experimentation and implementation, most Dutch municipalities still retain parking norms that include relatively high minimum ratios for residential building. Provincial and national government actors are included in our sample as a significant source of pressure that drives these car-dependent municipalities to more actively explore shared mobility.

Image source: Stockfoto ID:1215465246

6 Challenges in creating partnerships for shared mobility

This section summarizes the challenges reported by each stakeholder group, through the lens of partnerships. This is due to the early observation that making shared mobility work is an intensely, and perhaps inherently, collaborative endeavour.

6.1 Shared mobility providers – for-profit

6.1.1 Making commercial shared mobility pay – costs, timelines, and user group size

Our data-collection sample was limited to SMPs that are currently in business, meaning that all have found some level of stability in this fast-changing market. The two major sources of revenue for these SMPs are direct income from end users, and contracts with commercial property developers. In contrast, SMPs have very limited dealings with SHAs, despite the vast market they offer. SMPs also tend to limit their interactions with municipalities as far as possible. There are multiple reasons for this.

A first barrier to partnerships with SHAs is simply that they seek shared mobility at a price far below the current market rate. One interviewee referenced a project in Gouda where a social housing association was interested in shared mobility, but at a price of €10 per resident. The interviewee reported that this price was too low for them to provide any significant shared mobility services.

A second barrier is the question of how the user group for shared mobility will be defined, whether it can or should change over time, and how this impacts the users' willingness to pay, as well as the SMP's competitive position. For SMPs, control over the size and composition of this user group is an important strategic consideration, whereas SHAs tend to be

reluctant to enter into agreements that exclude some of their residents.

These barriers of cost and user group composition and size intersect to produce distinct challenges. One interviewee mentioned that in new-build projects, one key decision is whether to retain shared vehicles for residents only, or to allow outsiders access. The stated issue here was that the "community effect" is necessarily weaker when the user pool expands to include those who have no long-term stake in the anchor community[1], and on whom social pressure cannot easily be exercised (e.g., 'naming and shaming' users who do not leave shared vehicles in a good condition). Moreover, the cost of insurance for a car open to the general public is far higher than for a car limited to a defined user group, such as building residents. There may thus be a minimum and a maximum size for a user group and shared vehicle pool – below the minimum user group size, ensuring an adequate mix and capacity of shared vehicles is too expensive; above the maximum size, insurance costs rise prohibitively.

Lastly, the size of this user group also matters in terms of time. Many mobility services providers, but also property developers, mentioned that a major success factor in new-build projects was whether or not residents were presented with a baseline level of shared mobility for a limited time on a pay-per-use basis. That is, projects are more likely to succeed when new residents are able to use shared mobility services without initially having to pay the full subscription cost individually. One interviewee mentioned a project where residents were able to access a *klusbusje* or 'DIY van' to facilitate their moving in and DIY projects for a time. This met a common (temporary) need, saved money and time, and sparked connections among the newly-arrived residents. When property developers (or SHAs or even cities) are not prepared to guarantee some minimum level of shared mobility for

a limited time and bundle this with the purchase of a property over a period of one or more years, multiple interviewees agreed that it was much harder for any one mobility service provider to get traction and become viable.

6.1.2 Adapting for-profit models to users from non-profit housing

Some interviewees indicated that SHA residents were associated with a lack of care and cleanliness in the handover of a shared car to the next user. We can find no academic evidence of this, as yet, and reproduce these claims here as evidence of a stated belief that is held by at least some actors in the for-profit shared mobility sector, and which may thus shape their choices, strategies and actions.

6.1.3 The pace and price of collaboration with the public sector

One interviewee mentioned that they do not entertain requests to intervene on projects for which there is no mobility plan (*mobiliteitsplan*). This is because shared mobility, in the view of this interviewee, must be designed to meet a known need and to fit into a known "mobility offering"[2]. The lack of such a plan, or a plan that does not meet the mobility provider's standards or match the provider's capacity, has been identified as a leading cause of failure in shared mobility projects. Partnerships, at least for one mobility provider in our sample, cannot be created unless there is a meaningful and sufficiently detailed mobility plan that has buy-in from residents, the city, and property developers (for new-builds) or SHAs.

Even where mobility plans are present, however, the very nature (and pace) of collaboration with the public sector can create risks in a fast-changing and volatile market such as shared mobility. One SMP provides an example of a profitable model in which it partners with

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1   Anchor community: the community that formally receives shared mobility services (whether this be a housing complex, a neighbourhood, or an organisation), especially through a contract. Access to these services can potentially be extended to outsiders.

2   The total availability of mobility in a given place and to a given user group, including public, shared and private transport, across all modes.

municipalities and new-build commercial property developers to provide a multimodal shared mobility offering. However, the targeted profile of the residents in these projects is explicitly highly educated, higher-income people in their late 20s and 30s – a financial elite who already enjoy a high level of mobility. Moreover, this SMP only moves forward on projects in fairly dense urban areas where on-street parking is paid and also relatively expensive. This model allows SMPs to build viable and profitable shared mobility offerings that do not depend on public subsidy. In these cases, SMPs will not pursue partnerships with municipal actors unless they have to. This is because, as one interviewee listed, when it comes to shared mobility, municipalities are prone to slow decision-making and prevarication. Further, according to the interviewee, they are inclined to frame projects as 'pilots' and 'experiments' for political ends, or to mask a lack of substantive policy and vision about shared mobility. The process of engaging with municipalities was also costly in terms of company time. Their focus on mobility elites gives SMPs of this kind little incentive to build up partnerships with the non-profit property sector, as the latter is defined by its inclusive social mission.

Some actors have always depended on close cooperation with municipal actors as the basis of their business model, such as station-based carsharing, which operates from on-street parking spaces designed for sharing by the municipality. Greenwheels, a pioneer in the Dutch shared mobility sector for over 25 years, is one such actor (Münzel, 2020). Greenwheels noted that in recent years, due in part to the pace of municipal approvals, demand for their service in major cities has grown much faster than they have been able to expand their fleet or service area.

6.1.4 The lack of a single mobility services platform

Multiple interviewees mentioned the lack of a single platform (through which the public can access all forms of car-sharing in the Netherlands) as a major barrier to partnerships with other actors, both

within and beyond the shared mobility sector. Within the sector, a common platform would also imply common standards to govern sensitive areas such as data sharing, payment, insurance and liability, and competition between shared mobility providers. Without these standards, it is harder for actors to partner on projects, because any such partnership is likely to require time and effort to develop a bespoke agreement covering these sensitive issues. Beyond the shared mobility sector, actors such as municipalities and property developers are faced with the limitation of making service agreements with just one provider. For users, who may have given up their private cars, this may mean that their shared cars have limits on how car they can be driven and how long they can be kept, and, more importantly, that their given service provider is not present in neighbouring cities or regions (for example, in Belgium or Germany) where they might want to travel, or to use shared mobility services. The lack of reciprocity agreements between mobility service providers raises the complexity and risk for municipalities, property developers and users, as it becomes more important to make a single choice about which individual provider best matches the user group's current and projected future needs.

6.2 Shared mobility providers – non-profit

The non-profit SMP sector in the Netherlands, defined as SMPs with an explicit not-for-profit mission, is very limited in size. However, the country has a sizeable C2C/P2P carsharing offering, in which profit (as opposed to the saving of costs through cooperation and co-ownership with neighbours) may not always play a predominant role in individuals' motivation for participating. In 2020, 1% of Dutch adults had used these forms of carsharing services (KiM, 2021). Non-profit SMPs are also split between very established, neighbourhood models of car-sharing that predate smartphones and geolocalisation, and a new generation of schemes that retain the emphasis on community ownership and mutual benefit while incorporating apps, mobile payments and remote un/locking. The new schemes are small in number, and

like the older schemes, they face significant barriers to growth in the form of a regulatory regime that is designed around, and for, for-profit operators. These barriers mean that, where non-profit SMPs have succeeded in establishing themselves, it is mostly with some degree of public-sector support, albeit limited to the start-up phase. These schemes also show sustained growth, although the social infrastructure, neighbourly bonds and mutual trust they depend on means that this growth is slow in comparison with commercial SMPs.

6.2.1 Making non-profit shared mobility work in a for-profit regulatory context

Partnership-building between shared mobility non-profits and other actors, especially local government but also SHAs, is greatly constrained by the fact that the administrative processes by which access to parking spaces is governed in Dutch cities remain heavily premised on traditional, commercial, for-profit business models. For non-profit SMPs, this difference is felt in everything from dealing with documentation and regulations to insurance. Non-profit ownership and governance structures differ sufficiently from the assumptions embedded in these administrative systems to make the process of 'fitting in' to all-sizes-fit-one policy a heavy burden for non-profits.

Crucially, the degrowth and anti-consumption ethic that permeates organisations such as DEEL (wijzijndeel.nl) limits their accumulation of capital, making public-sector support essential for upscaling. In the case of DEEL, initial support from the Province of Zuid-Holland was decisive in seeing the organisation survive and thrive, especially since its non-profit model involves a great investment of time in creating equitable and inclusive structures and robust relationships between neighbours. And, of course, non-profit SMPs are not alone in facing a regulation gap between themselves and the forms and structures recognised by existing regulations. However, while commercial SMPs also face this challenge to an extent, the resources they can bring to bear to resolve it are far greater.

6.2.2   Lack of public-sector support for the preservation of public goods

One claim made in marketing, our interviews, and in the press by non-profit SMPs is that they create, but do not capture, public value, and that it is therefore right that municipalities, who represent the beneficiaries of this increase in value, should provide some form of financial, logistical or administrative support to them. This claim is borne out by the success of DEEL, which received public-sector support in its initial phases, and perhaps also by the relative scarcity of successful non-profit SMPs in the rest of the Netherlands. As one non-profit SMP interviewee argued, neighbours are better stewards of the space outside their own front doors than a distant commercial operator, and when parking spaces and cars themselves are managed and maintained by neighbours for their mutual benefit, both the physical and social infrastructure of that neighbourhood are enriched. However, as our interviewee contends, municipalities are far more enthusiastic about supporting and enabling commercial SMPs to access these public goods, even if they privatise the profits, due to a wider shared belief in creating Dutch national champions – such as, for example, a shared mobility services giant. Whether this can be scientifically supported or not, it is a claim that has surfaced from more than one participant in our research, and which perhaps exemplifies the broader question of whether shared mobility will evolve to be regulated, managed and funded as a fundamentally public or private mode of transport.

6.3   Property sector – for-profit

6.3.1   When the business case for replacing parking with shared mobility is unclear

Commercial property developers are aware that the cost of developing on-street or open-air parking spaces for cars can range from €10k to €30k per space. The financial calculation in which shared mobility services can obviate the need for a given number of parking spaces should then be straightforward.

However, municipalities may not always accept this argument, agree with the calculation, or be willing to allow real and permanent concessions in exchange for a guarantee of shared mobility over a particular timeframe. When municipalities do not share this view, and when they cannot come to an agreement with developers, shared mobility no longer offers a real savings to developers. In this case, it proceeds (if at all) only on a limited scale, out of a developer's interest in projecting a certain kind of sustainable image, or out of an ambition to learn about shared mobility through a pilot.

6.3.2   When managers of existing buildings assume that sharing will provide a significant revenue stream in itself

SMPs relate anecdotally that car-sharing in particular is often viewed as a potential source of income by actors charged with the management of existing or new buildings. However, outside of very central urban districts with good car accessibility from major connecting roads, this is seldom the case. In fact, a majority of our interviewees indicated that their parking facilities, even in many dense city centres, have low occupancy, and are usually not a significant source of revenue, except where a building also has retail or commercial land uses.

The picture is a mixed one, and where parking that was originally built to serve adjacent housing can be profitably managed as public parking, the income from this can be significant. However, for residential developments, in most parts of the Netherlands, including cities, parking is a service that house-builders are compelled by law to provide, rather than one that is lucrative in itself. This is likely to remain so for as long as Dutch cities continue to offer residents and visitors an abundance of free and subsidised parking immediately outside of city centres. At present, there is a lack of recognition among property actors that, excluding new-builds, the value created by (especially car-)sharing is indirect, albeit significant. When property managers add a margin onto carsharing

services, it becomes far less likely that the shared vehicles will see sufficient use. Without these add-ons, however, sharing can become an amenity that extends residents' mobility offering while freeing up parking spaces for conversion to other uses that could increase the appeal and financial value of the property.

6.3.3   The need to fund mobility services in new-builds adds risk and cost

For commercial property developers, the decision to build new developments at parking ratios that are lower than the surrounding norm, or that have been newly revised downwards by municipalities, opens up major opportunities to add high-value amenities, like green spaces, play areas, and leisure facilities. However, this immediate benefit, which can boost sale prices and rents, brings with it an open-ended responsibility to guarantee some level of shared mobility service to the residents. This forces developers to confront three important unknowns: the commercial viability of future shared mobility services on site, which is a decision for SMPs; the optimal length of time for which developers should subsidise or guarantee shared mobility services to residents; and the possible effect on house prices or rentals if and when on-site shared mobility services end. These unknowns may inhibit developers from partnering with other parties, and from embracing sharing in the first place. The level of risk inherent in these unknowns may also affect negotiations between parties concerning parking norms, especially where municipalities have little direct control over public transport services that could complement or reinforce shared mobility. Multiple commercial developers have revealed in interviews that, because of these three unknowns, the business case for shared mobility as a permanent change to the layout and physical planning of housing developments remains weak in many places. As a result, interviewees often attest that they have invested in sharing on a pilot or experimental basis, in order to learn-by-doing, and not systematically or generally. This finding is reflected in national Dutch statistics, which show that the overall provision of parking spaces and the size of the car fleet continue to

grow (CBS, 2020).

6.3.4 When arriving residents in new-builds already have cars

One interviewee referred to the challenge faced by users who arrive in new-build properties with existing cars, or company leased cars. These cars, if leased, are bound up in contracts with a plethora of different institutions. A very great investment of time and effort is then required to contact each of these institutions and negotiate a way of bringing these leased cars into the sharing pool of the new-build. If the institutions agree to this, there are costs involved in converting their cars to shared use, especially with fossil-fuelled cars, where some mechanical intervention is needed to enable smart monitoring of use and remote un/locking. The cost of insurance for shared cars is also far higher than for private leasing, meaning that converting and insuring a fossil-fuelled car may become more expensive than supplying a new electric car. These costs, added to those of the personnel hours involved, are a significant factor that must be addressed when signing new commercial tenants and communicating with residential buyers or investors in a new-build.

6.4 Property sector – non-profit

6.4.1 Belief that shared mobility can be secured at low cost and on short timelines

A recurring claim from interviewees outside of the non-profit property sector has been that SHAs tend to expect that shared mobility services can be provided by commercial SMPs at a cost that is lower than the market rate. Sometimes, SHAs justify this by pointing to the size of their resident population, its lower-than-average rate of car ownership, and the strength of their existing communications and administrative channels with residents. However, few commercial SMPs have found it worthwhile to seriously test this claim, especially given that car-sharing has until recently been associated with higher-income, highly-educated urban residents (a demographic that is less

likely to live in social housing). However, things are changing. The long-running Dutch housing crisis has increased pressure on all kinds of urban rental housing; along with gentrification, this is bringing a greater mix of incomes into urban social housing stock. Further, the gradual dissemination of sharing beyond early adopters has changed its social image and visibility. The cost of car ownership is also rising, although not uniformly (CBS, 2019). These factors might be expected to increase the appeal of shared mobility in the eyes of SHAs, but they have not yet increased SHAs' willingness to pay for it.

6.4.2 An overloaded sustainability adaptation and retrofitting agenda

Both individual SHAs and their representative body affirm that the sector faces an increasingly complex and challenging set of sustainability requirements. These stem from national legislation and local policies regarding energy and water efficiency, insulation, and greenery (permeable surfaces, shade trees, biodiversity). These mandates are generally unfunded, requiring innovation from SHAs to retrofit older housing stock while maintaining affordability in an oversubscribed urban housing market. This agenda consumes so many personnel and financial resources for SHAs that very few are eager to add a major new portfolio, such as mobility services, to their operations. Until these compliance and refurbishment requirements abate, SHAs are thus unlikely to shoulder the risk involved in establishing shared mobility services.

6.5 Municipal actors – mobility-rich contexts

6.5.1 Imposing 'shared mobility urbanism' – new urban forms to reflect the post-private automobility context

As one provincial official pointed out, shared mobility cannot, in the long term, survive alongside the historical and continuing subsidy given to private automobility. This subsidy must end, meaning that

the provision of housing and the provision of private parking space must be decoupled, if shared mobility is to develop on the basis of a structural and sustained consumer demand. Because the suburban form across the global West has developed on the premise of at least one private household per car (single-family housing on a single lot, individual driveways and garages, car-based commutes), including in the Netherlands, it is thus necessary to develop an urban form that reflects the end of this norm. In much of the Netherlands, this could mean a return to urban forms that predate mass motorisation (which occurred as late as the early 1960s).

This urban form would provide greater housing density and more space for urban amenities on the land reclaimed from parking, and also signal the community's commitment to shared mobility. These factors provide residents with positive inputs to counterweigh the 'loss' of parking spaces. However, municipalities require partnerships in order to pursue such a bold vision, as these neighbourhoods cannot house only those demographic groups that are currently believed to be a good fit with a sharing-first mobility offering (for example, highly-educated young people). Building to a post-private-automobility standard for new-builds, and retrofitting existing pre-1960s neighbourhoods to their original form, would require shared mobility solutions that serve everyone, if municipalities are to justify their imposition of a particular urban form. This means that partners such as property developers (both for- and non-profit) must accept the risk of realising projects without parking in which there can be no going back to private car ownership if, say, a given mobility offering fails, or a given provider cannot meet residents' basic mobility needs.

6.5.2 Risk aversion and too much research

Given the novelty of shared mobility, which is still evolving quickly in the short term, and the relative permanence of the built environment, where parking supply and land use evolve in the medium to long term, it is logical that cities remain risk-averse where

shared mobility is concerned. Interviewees from the SMP sector have noted that this risk aversion can often translate into a focus on research, pilots, experiments and conceptual development at the expense of simply making sharing possible. One interviewee claims that for a project in Rotterdam, residents were incentivised to hand over their cars to the municipality for a limited period (they were parked in storage) in exchange for a shared mobility budget. The former parking space thus freed up was to be temporarily converted into greenery and social amenities. According to our interviewee, the planning and preparation phase of this project ended up taking 12 months, following which the actual pilot ran for 2 months, with the vast majority of the budget spent on research and consultancy fees. Another example is the frequent requirement for SMPs to share data and information with public-sector actors (for example, through the writing of reports), although these labour-intensive activities are often unfunded. If municipal actors more frequently supported open-ended experiments, where shared mobility is provided and then adjusted and revised according to learning-by-doing, the prospect of participation may again start to appeal to more SMPs.

6.6   Municipal actors – car-dependent contexts

6.6.1   Lack of an independent knowledge base

Cities in the Netherlands are routinely described by all parties as lacking independent expertise or in-house skills related to shared mobility. Some mobility providers describe this as an opportunity for cooperation – knowledge can be co-developed through learning by doing. In this scenario, the mobility provider and the city learn about each other's' needs, capacities and constraints through pilot projects or simply through contracted shared mobility projects. However, there is reason to question how cities can ensure that they are getting a fair deal, especially where public land and public goods (such as the allocation of public space) are concerned. In light of an emerging consensus that public parking for cars

has historically been over-provided and under-priced (Shoup, 2017), and that the legacy of this provision is a key barrier to a transition away from fossil-fuelled car dependence, it becomes important to ask whether cities require an independent knowledge base to draw on when they negotiate shared mobility contracts. At present, our sample includes one example of a consultancy firm (*adviesbureau*) who also provide shared mobility services themselves. In this case, the shared mobility expertise is provided by the same party that is bidding to provide the services which must bear the scrutiny of that expertise.

The result of this process may well be that certain forms of shared mobility become stabilised, embedded and legitimised instead of others, as this technology matures, and that the choice of which forms succeed and which are left behind may better reflect the preferences and priorities of private-sector actors than that of the public sector. In simple terms, one challenge to the progress of shared mobility seems to be the lack of a robust knowledge base which is accessible to cities, especially smaller ones, and which articulates a public-sector vision of what shared mobility ought to be. This vision, ideally, would be productively antagonistic to the visions of for-profit shared mobility providers, and would be supported by an evidence base that might allow (even small) cities to drive a hard bargain with providers. More importantly, however, this negotiating process would be guided by an explicit vision of what shared mobility must offer the community as a whole.

6.6.2   Commitment to an instrumental view of shared mobility as a land use tool

The status of shared mobility as private or public transport tends to be a good litmus test of where an actor is situated within the shared mobility ecosystem. For the majority of local government officials in the Netherlands, according to our interviewees, shared mobility is fundamentally a private-sector, for-profit service like any other commercial enterprise. In this view, the main incentive for supporting shared mobility is that it clears the way for reductions to parking norms, which in turn frees up more of the finite commodity

that is urban public space. The result is that officials who take this view are seldom interested in shared mobility in itself, as long as someone is providing enough of it to justify changes to land-use planning. Quoting a local government official:

> "The municipalities say: "OK, then let's reduce parking, but then there has to be shared mobility in its stead...Personally, I don't think it's that important. For me, what matters is that there are simply fewer parking spaces. And I find that shared mobility is all very well as part of that effort, but it's also somewhat of a luxury. Carsharing will never support everyday commuting, because it's way too expensive for that".

Officials who see shared mobility as a service that is inherently a 'luxury', or unsuited to more than occasional use, have little incentive to invest time and public resources into creating new visions for it (such as challenging market-led visions). Actors who take such a view may consequently limit themselves to the quick wins that shared mobility services (in their current form) offer, especially the removal of parking capacity for more than one car per household, with a sharing offer and policies designed to replace the second car.

This strategy facilitates close cooperation between municipalities, who make these policies, and higher levels of government, who advise them and create the relevant regulatory frameworks. But the kind of partnership that these actors then create with SMPs is likely to be limited in scope and ambition by the officials' desire for less car parking, rather than a clear commitment to holistic transformation of Dutch urban mobility systems. Further, absent forward-thinking investment in basic infrastructure like a common platform, it is difficult to see how officials will be able to move from substituting the second household car with a sharing offer, to developing sharing offerings that obviate private car ownership. In very broad terms, this vision still leaves the Netherlands with half as many cars as households, which is an extremely modest departure from the 2020 ownership figure of 528 cars per thousand Dutch adults (CBS, 2020).

6.7 Summary of Challenges

Table 2: Summary of challenges in the creation of partnerships

Stakeholder	Challenge
Shared mobility providers – for-profit	6.1.1 Finding the right user group size and composition to make shared mobility profitable / convincing clients to pay a realistic price
	6.1.2 Trying to adapt for-profit models to the demands and parameters of non-profit housing tenants
	6.1.3 When public-sector decision-making timelines impose cost and risk for firms
	6.1.4 The absence of a single mobility services platform undermines the sector's bargaining position and the legitimacy of claims on public goods
Shared mobility providers – non-profit	6.2.1 Making non-profit shared mobility work in a commercial regulatory context requires innovation, patience and reform
	6.2.2 While the sector creates value for the commons, this is seldom compensated in material terms, creating a disadvantage vis-a-vis private competitor
Property sector – for-profit	6.3.1 Municipalities and other partners do not always accept the financial argument for a quid-pro-quo in negotiations where parking spaces are to be replaced with shared mobility spaces
	6.3.2 When building managers depend on the assumption that sharing will provide a significant revenue stream in itself
	6.3.3 Multiple unknowns surrounding the future of shared mobility add risk, cost and uncertainty to building, in a sector that operates on very long-term timelines
	6.3.4 Arriving residents in new-builds come with their own cars, and are reluctant to part with them
Property sector – non-profit	6.4.1 Some actors believe that shared mobility can be secured at low cost and on short timelines - an optimistic assessment
	6.4.2 Actors in this sector already confront a complex and growing agenda of statutory regulatory burdens, especially in retrofitting of historical housing stock
Municipal actors – mobility-rich contexts	6.5.1 Real testing of shared mobility's potential will ultimately require the creation of a new urban form to match - a complex and long-term task
	6.5.2 Local government actors have a tendency to take refuge in open-ended and ongoing experiments rather than taking the step to routine provision and normal contracts
Municipal actors – car-dependent contexts	6.6.1 Lack of an independent knowledge base leaves many municipalities are apprehensive about carsharing
	6.6.2 Uncertainty regarding carsharing's status as a private service or as a form of public mobility/a tool for public policy.

7 Recommendations to the stakeholders

7.1 All actors – responsibility gaps

7.1.1 Raise the price of parking, lower the cost of sharing

All stakeholders stand to benefit from efforts to rationalise the pricing of public open space for vehicle storage in the Netherlands, and to create fair pricing structures for shared mobility. Parking – the temporary requisition of public open space for the storage of a vehicle – remains under-priced (heavily subsidised) or free (entirely subsidised) by the taxpayer in the Netherlands, especially for local residents as opposed to visitors (Groote et al., 2016; Mingardo et al., 2015; van Bemmel-Misrachi, 2015; van Ommeren et al., 2014, 2011). This remains true even in Amsterdam, the first city in Europe to introduce paid parking in 1965, where in 2019 one day's on-street car parking would cost a permit-holder €1.40 and a visitor €45 (Ostermeijer et al., 2019, p. 278).

Undoing the norm of under-priced and free car parking created by decades of mandatory parking provision can only proceed through a progressive decoupling of automobility from building regulations (ECF, 2018; Shoup, 2017). This is a broader transition that is already underway, but needs to accelerate in the Netherlands, where private car ownership continues to grow faster than the population (CBS, 2020) at a time when the country's climate and sustainability commitments require a rapid fall in private car ownership and use. There is promising progress in this direction from cities, especially in the Randstad, as well as provinces. For example, the Province of Zuid-Holland is working to codify and standardise parking maximums of 0.7 spaces per residential unit in high-accessibility areas and for social housing.

7.1.2 Work towards the goal of a single (car) sharing platform

The idea of a single aggregate carsharing platform was mentioned by interviewees from every stakeholder group as a future milestone that would make it much easier to present carsharing as a legitimate, stable, mature mobility mode. Such a platform, which would ideally present a wide range of carsharing services to a user with a single account and payment system, has a great symbolic value in giving carsharing visibility and solidity, especially with the public. These symbolic aspects matter because they help to balance the private benefit of reliability and constant access that private car ownership offers. This overarching theme of standardisation, interoperability and integration between shared mobility providers and their services is repeated in more detail through this section. It is a very complex goal, because it depends inherently on the cooperation of direct competitors, who may compete in the same locations. Public-sector actors may structure and facilitate this process through delineating and managing competition, for example, through concessions and geo-fencing, although the questions of control, coordination, and the distribution of benefits and burdens are both wide-ranging and profound (Frenken et al., 2017; van den Hurk et al., 2021).

7.1.3 Foster mixed-use, parking-light urbanism to foster a mobility mix

Participants in our sample shared a wide recognition that the urban form of contemporary Dutch residential suburbs, especially those built in the late 20th century, are premised on the norm of ownership of (at least) one private car per household (Ostermeijer et al., 2019). Limiting the production of more residential parking space is way of fostering shared mobility on the supply side, and at trip origins. What is far less common is that participants in our study considered the demand for certain kinds of trips on the trip destination side. Concretely, adults in the Netherlands continue to travel ever further to their daytime occupations, especially by car (KiM, 2019). It is precisely this kind of trip – a work commute from home to a destination that is only easily accessible by car – which is extremely difficult to accommodate with shared mobility. Shared mobility stakeholders could articulate the benefits of the kind of urban planning that fosters mixed land uses and decreases the public subsidy to private car mobility, and make their voice heard in the Dutch public debate over sprawl, freeway expansion, and the affordability of public transport.

7.2 Shared mobility providers – for-profit

7.2.1 Establish a sectoral organisation to advocate for shared mobility service providers

SMPs are well placed to establish a neutral body that advocates for the interests of providers of shared mobility services. Such a body could be based on the German umbrella organisation, carsharing.de, and take inspiration from Autodelen.info. However, its remit would be broader than disseminating information and raising awareness of (the benefits of) shared mobility. With time, it could develop a knowledge base that member SMPs could draw on when structuring projects, negotiating fees and contracts, and advocating for particular kinds of support. Further, such an organisation (called, for example, Deelmobiliteit Nederland / Shared Mobility Netherlands) could become a trusted broker and mediator of negotiations or disputes. It could perform a valuable role in consolidating and presenting evidence regarding the state of shared mobility as a sector, in a way that no individual SMP is incentivised to do (due to the risk of exposing sensitive or valuable information). Efforts in this direction could mitigate the great variations in processes between one municipality and the next. Deelmobiliteit Nederland could also support SMPs' claims that municipal actors are increasingly likely to demand that SMPs shoulder an open-ended set of responsibilities and risks, while accepting a very finite set of potential profits and benefits.

7.2.2 Design services for scalability as well as integration potential

Building on the development of an umbrella organisation for the sector, but potentially possible without it, SMPs could collaborate to develop standardised elements of carsharing contracts, insurance products, data standards, and benchmarks. These standardisation efforts may come at the price of reduced strategic or competitive advantages, but in exchange they offer the prospect of increased uptake of sharing by municipalities, reduced timelines for contract development, and greater predictability of financial and performance outcomes for all parties. Further, progress towards standardisation would help SMPs to scale up their services.

7.2.3 Work towards integration with non-competitors as stepping stone to full-service MaaS platforms

Separate from the goal of a platform that allows a user access to many SMPs across the car-sharing mode, many SMPs have successfully integrated with non-competitors to become the carsharing provider to a multimodal mobility offering. For example, Greenwheels used its position as a pioneer in the sector to negotiate a position as the sole carsharing provider for Hely, which itself came about through a partnership between NEXT (owned by Pon Holdings, B.V.) and Hely, originally owned by the NS (the Dutch national railways). Hely aims to provide access to multiple mobility modes on a single platform, both to public users and to user communities defined by specific precincts (such as a property development project). The resulting multimodal platform offers users their choice of vehicle, but usually not of provider: if they want to use a shared car, it has to be from Greenwheels.

This strategy can benefit SMPs who seek a stronger negotiating position with commercial property developers, as it simplifies and consolidates the mobility offering that can be presented to (new) residents and tenants. Where overall planning on an area basis is undertaken by the actor in charge of the multimodal platform, that actor is also able to plan to meet area residents' needs in a way that integrates and considers all mobility modes, and incentivises and supports modal substitution. This should facilitate closer alignment and partnerships with municipalities, who must reconcile the short-term imperative to meeting residents' automobility needs with the longer-term sustainable mobility goal of reducing private automobility. This strategy as a whole has clear advantages; however, it does not advance the goal of working towards a single platform that makes carsharing services inter-operable.

7.2.4 Incorporate traditional leasing models into a sharing offering

A project in Zuidas provides a positive example of a partnership between users, traditional mobility services companies, and shared mobility providers that offers a hybrid between private leasing and sharing. The SMP made its own arrangements with a car leasing firm, separate to the traditional leasing agreement between particular users and the leasing firm. The revenue from shared use of the leased car is then shared between the private leaser, the shared mobility provider, and the leasing firm. Presuming that the SMP can agree insurance and liability issues with a given leasing firm, this removes a barrier faced by companies wanting to move to the new-build which already have their own corporate leased fleet of cars. For these companies, buying out their leases would typically be very costly – through a hybrid leasing-sharing agreement, these costs are avoided and replaced by potential extra revenue.

7.2.5 Expand the user community to the maximum extent to produce the greatest social benefit

Greenwheels has developed a model that explicitly seeks to serve everyone – *'We zijn een auto voor iedereen'*. They have done so through progressively lowering the minimum age from that demanded by insurers (25) to 18, so that anyone with a driving licence can use the service without restriction. This allowed students, a group traditionally underserved by shared mobility for this very reason, to benefit. Greenwheels' introduction of reduced day, weekend and week rates and a business offering also greatly expanded the community of potential users. This maximalist approach to the user group may serve as a strategic asset in partnerships with the public sector and social housing. Municipalities may find it easier to justify directing resources and entering contracts with SMPs that prioritise accessibility to a wide public. Social housing non-profits may also find that this approach implies a certain robustness through the service, from car interiors that hold up better to wear and tear to payment options that do not require a credit card or other administrative or financial barriers that are likely to exclude some tenants of social housing. As discussed in this section, open user group strategies bring higher insurance costs with them, but SMPs can successfully offset these against a higher frequency of use. And, in contexts where the potential removal of parking is especially contested by local car-owners, this inclusive model may render projects less vulnerable to charges that sharing is elitist, or that its imposition disadvantages lower income groups.

7.3 Shared mobility providers – non-profit

7.3.1 Emphasise this model as a weapon against mobility poverty in partnership with SHAs

Non-profit SMPs are a small part of carsharing in the Netherlands, but they represent arguably the only shared mobility services that are already affordable to people on low incomes. This is a strategic advantage which could be pressed further in messaging and marketing, especially through non-traditional channels like activist organisations and political platforms. Successful contemporary models in this sector grow and multiply slowly, but faster growth ought to be possible without jeopardising the deliberate process of relationship-building at neighbourhood level that is foundational to many non-profit SMP models.

7.3.2 Leverage success in combatting mobility poverty to secure regulatory reforms

The most important barriers to the success of non-profit shared mobility being regulatory and administrative, this sector may benefit from more open advocacy for these kinds of reforms. This advocacy or lobbying could be justified by arguments and an evidence base that is shared across the non-profit sector, and built on two arguments. Firstly, the non-profit SMPs have had demonstrable success in combatting mobility poverty, and that they enrich and deepen social bonds and neighbourhood social networks. For actors such as DEEL, the social and decision-making infrastructure at the heart of their model is also closely linked to a defined physical perimeter, with an important role for unpaid volunteer work and notions of mutual aid and solidarity. This sector will not see the growth it could while it faces regulatory, insurance and administrative constraints that were developed for and around commercial firms.

7.4 Property Sector – for-profit

7.4.1 Use newbuilds and redevelopment as opportunity to pioneer a sharing-first community

Multiple interviewees confirm that new-build projects have been an opportunity to not only provide shared mobility to a "captive" user group who have (almost) no private parking whatsoever, but also to pioneer social norms and organisational forms that build up in a community in which no cars are private property. This comes at a time when institutional investors and clients (such as pension funds) no longer demand that private parking spaces accompany every new residential unit, and are even starting to demand that their own ethical and sustainability commitments be reflected in lower parking norms, or residential units decoupled from parking supply.

In one example in the Zuidas, residents and businesses moving into a new-build were given a choice between a shared car subscription or a private lease on a car

which can then be sub-leased or shared with other residents or resident businesses. In the Zuidas case, the physical parking spaces for these shared vehicles have remained the property of the developer, who created a certain number of spaces in agreement with the municipality and on condition of certain performance criteria.

Another example in Scheveningen is a new-build project in an area that the municipality has declared car-light or *autoluw*. Here, residents are offered compulsory membership of a multimodal shared mobility platform with different monthly budgets to spend on any form of shared mobility according to the size of their apartment. These budgets, which are set by the developer but paid in part by the developer and in part by residents, are mandatory for a period of some years. It is expected that, when this period ends, users will continue on the platform or find their own shared mobility solution, especially for the smaller apartments which have zero parking spaces.

7.4.2 Implement shared mobility at the largest feasible project scale

SMPs cite the high costs and personnel hours involved in negotiating shared mobility schemes on a building-by-building basis as the main incentive to pursue schemes defined at the precinct or district level. De Bijlmerbajes in Amsterdam is a vast renovation project in which private parking spaces, formerly abundant, have been designed out. Here, sharing will be implemented on the largest feasible scale, making the largest possible multi-modal fleet available to the largest possible user group. This claim has been repeated by all interviewees from this sector – namely, that shared mobility is only marginally attractive when organised and provided for at the level of individual buildings (*objectniveau*), but becomes increasingly attractive, feasible and low-risk at neighbourhood (*buurtniveau*) and district level (*wijkniveau*).

7.5 Property sector – non-profit

7.5.1 Leverage size and structure of resident population as bargaining tool

SHAs have hitherto been hesitant to take responsibility for residents' mobility, and to enter the market to negotiate affordable access to sharing services with SMPs. This is partly because, as both a social housing umbrella organisation and social housing representatives have claimed, the agenda of SHAs has rapidly grown more complex in recent years as sustainability and energy efficiency obligations have multiplied. This ambitious and largely top-down agenda, which requires SHAs to retrofit their vast holdings of historic housing stock, has greatly constrained their appetite to enter into the field of mobility services on behalf of their residents. All the same, these attitudes are shifting, not least because it is increasingly possible to make the case that shared mobility can be considered as part of a SHA's sustainability gains. Given that SHAs maintain very robust channels of communication with their residents, including the substantial apparatus that administers rental payments, they are uniquely positioned to bargain for affordable access to SMPs. In the near future, SHAs in cities like Amsterdam, which are already conducting joint information-gathering exercises with residents, could explore the opportunity of bargaining collectively for access to a basket of sharing services.

7.5.2 Explore technological investments in refurbishment that could benefit shared mobility

The ambitious sustainability agenda that SHAs are tasked with carrying out on their (often historic) housing stock offers considerable potential for integration with car- and bikeshare. Bi-directional charging stations for and from electric cars are one example that is already being implemented by partners such as We Drive Solar. Keyless access – requiring smart locks for social housing – has also been mentioned by interviewees as an option for social housing

refurbishment that could also offer, now or in the future, easy access to shared cars (through smart un/locking).

7.5.3 Increasing control and freedom to leverage own on-street parking supply

SHAs would benefit from more control over the on-street parking supply situated adjacent to their property holdings. In most cases, this belongs to the municipality, and would require pro-active agreement from municipal actors who are convinced of the case for supporting the development of carsharing for SHA residents, as a group vulnerable to mobility poverty. If SHAs were able to offer SMPs the use of parking bays situated within social housing developments, SMPs could potentially offer residents their services at a lower price, in exchange for the nuisance factor of outsiders using these services. This could potentially resolve the impasse whereby SHAs remain resistant to paying market prices per resident for shared mobility services.

7.6 Municipal actors - mobility-rich contexts

7.6.1 Consolidation of decision-making and liaison about shared mobility at city level

According to our interviews with SMPs, everywhere outside of the Netherlands' four largest cities, decision-making and everyday liaison for shared mobility tends to be distributed and fragmented between multiple actors. This is usually along modal lines – one person is responsible for shared cars, another for shared bicycles, etc. Greenwheels, a respondent with more than two decades of experience in close cooperation with municipalities, notes that even in Amsterdam, a forerunner in shared mobility on a national but also European and international level, administrative processes have not kept pace with the increasing demand for shared mobility.

One example of this is a lack of integration between the systems that govern electricity infrastructure, such as charging stations for electric vehicles, and that for parking management. These systems could be better integrated as part of a holistic reconsideration of the material requirements of shared mobility in the streetscape. This process may be helped or hindered by the transition underway in urban electrical grids to accommodate the increasing complexity of proliferating sources of energy generation and storage. Actors such as We Drive Solar are well positioned to advise and co-develop knowledge in this area, but the future question of considering cars as part of a city's electrical grid concerns all electric vehicles.

7.6.2 Hubs for central parking and mobility – public mobility but not public transport?

Mobility-rich cities are also at the lead of developing in-house skills and institutional knowledge to manage but also to steer shared mobility. Ultimately, as much as the on-street private parking space adjacent to a single family home is the physical expression of the 20th-century model of automobility, these cities should continue to explore spatial forms that could give expression to shared mobility. Shared mobility hubs, such as those being pioneered in Amsterdam, are a positive example of this. According to interviewees from the property sector, bolder thinking is required at all government levels about the possibilities of mobility hubs as physical buildings or facilities, which ultimately require a single (possibly public) owner and operator. An important gain offered by the hub model is the opportunity to centralise the storage of shared and private vehicles, of many kinds, in one place, a short distance from surrounding (medium- to high-density) residential buildings. This centralisation could remove some significant remaining constraints on urban planning, and move it closer to the spatial relationship between housing and public transport.

7.7 Municipal actors - car-dependent contexts

7.7.1 Consolidate a knowledge and skills base and standardise policy

Parking policies and pricing diverge very widely in the Netherlands, including within cities and city-regions. These disparities raise the cost of compliance and the complexity of expansion for SMPs, to be sure, but they also make it more difficult for municipal actors to compare findings with other municipalities, to assess what pilots and outcomes elsewhere could mean in their context, and to adopt successful policies or regulations from other cities.

Local government actors can provide clear signals and demonstrate their stable commitment to new post-automobility urban forms by moving from a piecemeal project-by-project basis to setting common standards that apply everywhere (for example, the provincial standards in development by Zuid-Holland).

7.7.2 Administrative and regulatory reform to create parity for shared mobility

A commercial SMP noted that, especially outside of the major cities, it was often perceived by municipalities as a business like any other, and accordingly it paid for parking permits (*parkeervergunningen*) at business rates. Recognising that the activity of SMPs reduces parking demand could justify a reduction in the parking fees they are charged, perhaps leading to a new tier of parking permit fees for sharing providers (Münzel, 2020). Greenwheels claims in its marketing, based on independent research, that each one of its cars removes an average of 11 private cars from the street. In this case, the activity of a private company, at its own risk and cost, produces a significant and demonstrable public benefit which is not captured by that company. This disparity between Greenwheels and the use of urban space for private parking could justify certain forms of support or subsidy for Greenwheels, at least insofar as the creation of a cheaper regime of parking permits.

Municipalities in car-dependent contexts could build on the presence of shared mobility to develop low-cost and occasional means of providing supplementary public transport, for example, where volunteer drivers transport vulnerable or disabled people for medical check-ups or outings. Investment in carsharing contracts can thus include a creative array of top-up services that enable savings on municipal car fleets. These efforts could run in tandem with broader reforms that 'open up' institutional forms of transport, especially in outlying areas where public transport services are declining in frequency, service times and reach.

7.7.3 Create strategic clarity and set a time limit on experiments and pilots- then convert them to normal provision

More standardisation, transparency and consistency in shared mobility could reassure car-dependent municipalities in the refinement of shared mobility's place in their own mobility plans. Potentially, these developments could empower municipalities to be pro-active in steering shared mobility. The most important change requested by our interviewees from both the property and shared mobility sectors in this area is that municipal actors set time limits on pilots and experimentation. Interviewees feel that pilots and experiments can often, in reality, serve as a time-consuming and expensive exercise in replicating

existing knowledge, especially given the timelines and reporting requirements they tend to involve. A further improvement could be a mechanism whereby pilots and experiments that are broadly successful, may simply continue as normal carsharing provision on a rolling contract.

Further, municipal actors could work to define a distinct form of carsharing suited to their context – this may focus on the replacement of second and subsequent cars for each household, rather than a replacement for the first car. Sometimes, municipalities reject a formal commitment to car sharing because they believe their residents to be car-dependent by virtue of a limited public transport offering, or distance from other destinations. In these contexts, SMPs advocate for themselves as a replacement for second cars only. Municipalities should explore the costs and benefits of designing shared mobility schemes on this starting assumption (for example, granting only one car permit per household), rather than aiming to design in a minimum level of mobility for a hypothetical household who go car-free. Mobility service providers we have interviewed indicate that, in contexts where private car ownership is high, partnerships are likely to require some local actor, such as the municipality or an SHA, to step in as anchor client and pay upfront for a certain baseline shared mobility offering.

7.8 Summary

See overleaf for summary table

Table 3: Summary of recommendations to actors

Stakeholder	Challenge	Recommendation
Responsibility Gap		7.1.1 Raise the price of parking, lower the (regulatory) cost of shared mobility
		7.1.2 Work towards the goal of a single (car)sharing platform
		7.1.3 Foster mixed-use, parking-light urbanism to promote a mobility mix suited to sharing
Shared mobility providers – for-profit	6.1.1 Finding the right user group size and composition to make shared mobility profitable / convincing clients to pay a realistic price	7.2.1 Establish a sectoral organisation to advocate for shared mobility service providers
	6.1.2 Trying to adapt for-profit models to the demands and parameters of non-profit housing tenants	7.2.2 Design services for scalability as well as integration potential
	6.1.3 When public-sector decision-making timelines impose cost and risk for firms	7.2.3 Work towards integration with non-competitors as stepping stone to full-service MaaS platforms
	6.1.4 The absence of a single mobility services platform undermines the sector's bargaining position and the legitimacy of claims on public goods	7.2.4 Incorporate traditional leasing models into a sharing offering
		7.2.5 Expand the user community to the maximum extent to produce the greatest social benefit
Shared mobility providers – non-profit	6.2.1 Making non-profit shared mobility work in a commercial regulatory context requires innovation, patience and reform	7.3.1 Emphasise this model as a weapon against mobility poverty in partnership with SHAs
	6.2.2 While the sector creates value for the commons, this is seldom compensated in material terms, creating disadvantage vis-a-vis private competitor	7.3.2 Leverage success in combatting mobility poverty to secure regulatory reforms
Property sector – for-profit	6.3.1 Municipalities and other partners do not always accept the financial argument for a quid-pro-quo in negotiations where parking spaces are to be replaced with shared mobility spaces	7.4.1 Use newbuilds and redevelopment as opportunity to pioneer a sharing-first community
	6.3.2 When building managers depend on the assumption that sharing will provide a significant revenue stream in itself	7.4.2 Implement shared mobility at the largest feasible project scale
	6.3.3 Multiple unknowns surrounding the future of shared mobility add risk, cost and uncertainty to building, in a sector that operates on very long-term timelines	
	6.3.4 Arriving residents in new-builds come with their own cars, and are reluctant to part with them	
Property sector – non-profit	6.4.1 Some actors believe that shared mobility can be secured at low cost and on short timelines - an optimistic assessment	7.5.1 Leverage size and structure of resident population as bargaining tool
	6.4.2 Actors in this sector already confront a complex and growing agenda of statutory regulatory burdens, especially in retrofitting of historical housing stock	7.5.2 Explore technological investments in refurbishment that could benefit shared mobility
Municipal actors – mobility-rich contexts	6.5.1 Real testing of shared mobility's potential will ultimately require the creation of a new urban form to match - a complex and long-term task	7.6.1 Consolidation of decision-making and liaison about shared mobility at city level
	6.5.2 Local government actors have a tendency to take refuge in open-ended and ongoing experiments rather than taking the step to routine provision and normal contracts	7.6.2 Hubs for central parking and mobility – public mobility but not public transport?
Municipal actors – car-dependent contexts	6.6.1 Lack of an independent knowledge base leaves many municipalities are apprehensive about carsharing	7.7.1 Consolidate a knowledge and skills base and standardise policy
	6.6.2 Uncertainty regarding carsharing's status as a private service or as a form of public mobility/a tool for public policy.	7.7.2 Administrative and regulatory reform to create parity for shared mobility Create strategic clarity and set a time limit on experiments and pilots - then convert them to normal provision

8   Conclusion

Among participants in this research project, and many academic and policy sources, there is a general consensus that the potential of shared mobility in the Netherlands is very great (Münzel, 2020): it is a densely settled, highly networked nation with a substantial infrastructure base for intermodal mobility, particular strengths in cycling and walking provision and modal share, and a history of successful experimentation in large-scale mobility services (for example, the OV-fiets).

However, as a major recent report from the national infrastructure ministry concludes, carsharing is far from fulfilling this potential. Nationally, although the carsharing fleet is growing, carsharing has not diffused very far across Dutch society: 2% of the adult population used B2C or P2P carsharing in 2021, while their share of passenger-kilometres has not grown since 2014 (KiM, 2021, p. 3). B2B carsharing is larger, used by 6.4% of the population, but has a far more indirect relationship with questions of parking reform and residential development, which have been a focus of this project.

8.1   Low-cost carsharing for low-income users?

This project has particularly sought to address the shortfall of potential, and the relative scarcity of active experimentation, in carsharing that involves the non-profit housing sector (SHAs). This was motivated by the observation that little is known about why this sector has engaged so little in shared mobility schemes, while what progress has been made in carsharing in the Netherlands is essentially due to commercial property developers' new-build schemes, plus B2C and P2P schemes targeted as higher-income users residing in existing buildings.

The millions of residents of Dutch SHAs stand to benefit from a mobility mode that is potentially more cost-effective than private car ownership, and which could serve as a basis for a reorganisation of public spaces in social housing complexes away from the storage of private automobiles towards a greater proportion of green spaces, social amenities, and more housing. However, for this to happen, shared mobility, and carsharing in particular, must become affordable to those on low incomes.

8.2   Regulating carsharing as private transport entitled to public goods

While shared mobility, and carsharing in particular, is governed and regulated as private services, this remains unlikely. That is to say, until regulatory innovation at local government level creates an administrative approach that can articulate and resolve the relationship between public and private interests in carsharing, it is likely to remain a relative luxury that is only affordable for occasional use. This may be sufficient in car-dependent contexts, where space is relatively abundant and the objective of carsharing is to replace a household's second and subsequent cars. But it does not offer a bright prospect of change in mobility-rich contexts, where space is scarce and the gains from removing and reallocating parking space are greater.

Here, regulation that treats carsharing as similar to any other commercial service fails to capture the dynamic between, on one hand, long-term decision-making around public goods (amenities, green space) and public land and how it is allocated; and on the other hand, the short-term, contract-based appointment of a particular carsharing operator or platform. This dynamic appears to hold the key to more affordable carsharing that can serve millions of SHA residents, because the implementation of carsharing creates social value that is not captured by the shared mobility provider. This social value could be measured and used to offset the cost of shared mobility services, such as when the removal of parking spaces (enabled by a long-term SMP contract) allows for the creation of new social housing.

8.3   Carsharing's potential in a transition away from household car ownership

The prospect of affordable carsharing that could potentially replace a household's first car, in mobility-rich contexts, therefore seems to require a bold new vision for shared mobility that is run on a social or non-profit basis, or on a commercial basis (but with offsetting of costs through land value capture). This vision will depend on a greater skills base in Dutch municipalities, complemented by a national knowledge base, and a clear vision for carsharing that is matched by adequate funding from the national level down. The success of some shared mobility providers run on a non-profit basis is the exception that proves this rule: the non-profit SMPs that have broken through with P2P or neighbourhood sharing models tend to have enjoyed some public financial and/or technical support, but also tend to grow very slowly compared to commercial (B2B and B2C) carsharing. For example, despite decades of development starting in the pre-smartphone era, P2P carsharing of all kinds in the Netherlands counts 1% of Dutch adults as participants (KiM, 2021).

This challenge is magnified when solutions like shared mobility hubs are considered. If the 'conversion of private car parking *to* shared mobility parking *plus* amenities' pipeline is ever to scale up from the building and street level (that is, individual residential buildings and on-street parking) to planning for mobility at a neighbourhood (*wijk*) and district (*buurt*) level, someone must step into the responsibility gap. Many parties we have interviewed agree that the business case for shared mobility will only start to become interesting when planned at the level of neighbourhoods and districts, but there is no agreement about which party should take on this task, especially if it involves responsibility for mobility hub facilities that incorporate private parking, shared mobility services, and perhaps city logistics and goods deliveries.

8.4 Does successful residential carsharing imply a different kind of urban public space?

On the ground, far below this grand vision, carsharing in the Netherlands is characterised by many green shoots of innovation, collaboration, and experimentation. These processes have hitherto followed a market logic, driven by early adopters who are primarily higher-income and/or highly-educated households buying market-rate new-build housing in mobility-rich contexts. Even for this group, however, most commercial property developers and SMPs in our sample indicated that their investments in residential carsharing were often motivated by a desire to learn and experiment, rather than the belief that it would be profitable or break even. This is not a stable basis for a large-scale transition away from private car ownership towards shared mobility and mobility-as-a-service (MaaS).

From a land-use and urban-planning perspective, this commercial trajectory for carsharing also brings possible long-term complications with it. In Dutch cities, especially but not only within the Randstad, new-build developments and substantial redevelopments have deployed carsharing as a means of revising parking norms downwards, sometimes radically. This revision creates a relatively permanent allocation of public space, into which private car parking cannot easily be retrofitted later.

Yet the provision of shared mobility in these schemes is often left to the free market, once an initial developer-backed SMP contract of 3-5 years expires. In these schemes, there is a degree of inherent uncertainty as to whether the business case for an SMP to offer affordable services to local residents will be attractive after 3-5 years. If not, local residents who have given up their cars to move in may find themselves captive to SMPs, since they can no longer easily revert to ownership of a private car, parked nearby. Again, this outcome may not be very disruptive to higher-income residents, but could very well exclude lower-income

residents in these areas, especially given the relatively very high and rising cost of Dutch public transport versus car ownership (CBS, 2019).

8.5 Innovation and experimentation in the absence of a grand carsharing vision

On a positive note, this report surveys many examples of creativity and ingenuity in making carsharing work. DEEL is an example of a successful non-profit SMP that is bringing affordable carsharing to a spatially defined, socially mixed group of neighbours, relying on volunteer labour and the community effect to unlock private goods for mutual benefit. Commercial property developers have found a wide variety of ways to trade parking space for shared mobility, and continue to innovate in terms of new contractual forms and business models to make carsharing more commercially robust.

The social housing non-profits have shown interest in shared mobility and commenced with knowledge-gathering and limited experiments, despite their complex and growing compliance burden with sustainability targets for housing. Commercial SMPs have also made progress towards consolidating their offer to users, especially by creating platforms that bundle various modes into a single payment and booking system. While the advent of a single, interoperable platform for carsharing (or bikeshare) remains a distant prospect at present, especially absent public-sector intervention, the Randstad cities have shown enterprise and boldness in structuring the shared mobility sector, providing as much clarity as possible, and working to simplify and rationalise their internal liaison with SMPs and the property sector.

These positive developments, together with the modest but steady advance of commercial shared mobility based on, and in, communities of higher-income individuals, suggest that carsharing may continue to grow in the Netherlands. In mobility-rich cities with the knowledge and willingness of negotiate socially advantageous contracts, carsharing (and, to a lesser extent, bikesharing) may start to exert a visible

influence on Dutch urban open space. Whether this shift will be inclusive of people on lower incomes, people with disabilities, people with low digital literacy and those without credit cards is a more open question, especially if shared mobility continues to be governed as a fundamentally private form of transport. This report has tried, alongside an overview of current practices, to outline the potential that shared mobility holds for upscaling across the Netherlands, if this is informed by an ambitious social vision, matched by regulatory reform and material support.

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10 Project Description

This project is financed by the top up round of NWO Sustainable Business Model project 438.V.19.901, which examined the possibilities for upscaling carsharing. Residential carsharing emerged as one high-potential upscaling vectors, and thus, this top-up project set off to discover how this potential could be exploited. In line with NWO goals on the top-up round, this project aims valorise research knowledge, and thus, its main goal is to publish actionable recommendations to the stakeholders involved in the project.

This project consists of three phases, which are presented in Figure 2. The first two phases of the project consist of interviews with the different stakeholders. At this stage, we focus on challenges and solutions for them from the stakeholders´ point of view and gathered experiences on the existing residential shared mobility projects. To reach relevant interviewees, we first inventoried existing residential shared mobility projects and charted who are involved in them and requested a time for an interview. We also asked our interviewees for additional people to include in the data collection to ensure we would not miss relevant stakeholders. We aimed to discuss with the CEOs in the shared mobility companies, senior managers in charge of shared mobility projects in the property developing companies and mobility directors in municipalities. In the end, we managed to contact most of relevant shared mobility provides and many of the relevant property developers and municipal actors.
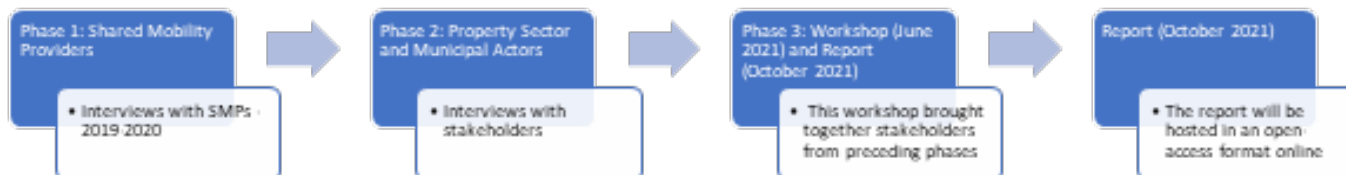
In the third phase of the project, we co-create solutions for the observed challenges with the stakeholders in an online workshop. To prepare for it, we draft a short summary presenting the challenges and different stakeholders´ interests in residential carsharing. The workshop was organized on June 22, 2021 in Teams and consisted of three parts: introduction, two breakout rooms and a plenary. Eight people representing different stakeholder groups took part in the workshop. The participants taking part in the interviews and on the workshop are described in Table 4.

The fourth phase of the project consists of drafting the report on the findings and disseminating it to the stakeholders. The main deliverable is written in English and a short summary including the most important parts (e.g., the recommendations) is also written in Dutch. The report is published online in the university newsfeed and disseminated to the stakeholders that have taken part or expressed their interest in the interviews or the workshops.

Table 4: Interviews per stakeholders type

	Shared mobility providers	Property Developers	Local government actors	Independent Experts
Interviews	6	4	2	
Workshop	3	3	1	1

Figure 2: Project Phases, 2019-2021

11 Colophon