Driving Urban Transitions

DREAMS

Driving Equitable and Accessible 15 Minute Neighbourhood Transformations

WP2. Review and comparative analysis

T2.2 Mapping the existing planning and governance practices and business framework

Deliverable D2.2

Mapping the existing planning and governance practices and business frameworks.

Date: 02/19/2025

Responsible partner: L'Institut Paris Region (IPR)

L'INSTITUT PARIS REGION

Authors:

Élie Guitton, L'Institut Paris Region (IPR)

Florian Tedeschi, L'Institut Paris Region (IPR)

Project number: F-DUT-2022-0088

DOCUMENT CHANGE RECORD

Version	Date	Status	Author	Description
0.5	10/31/2024	Draft	Élie Guitton, Florian Tedeschi (IPR)	
1	11/29/2024	Draft	Élie Guitton, Florian Tedeschi (IPR)	
1.9	12/20/2024	Almost final version	Élie Guitton, Florian Tedeschi (IPR)	After review from UT
2	02/19/2025	Final version	Élie Guitton, Florian Tedeschi (IPR)	After review from Mpact and VUB

The DUT Partnership is supported by the European Commission and funded under the Horizon Europe co-funded Partnership scheme (Topic HORIZON-CL5-2021-D2-01-16).

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

SUMMARY

In the urban outskirts of most European cities, low population density, single-use zoning and a car-centric urban environment are at odds with the 15-minute city (15mC) model, which is "based on the idea that city dwellers should be able to cover the vast majority of their daily needs within a 15-minute radius, by walking and cycling, while connecting to further districts and travelling larger distances by other forms of sustainable transport" (DUT, 2023). While this model, which has been adopted by major cities around the world, (Paris, Milan, Dublin, Valencia, Portland, Ottawa, Melbourne, etc.) is often limited to urban centres, it can to some extent be adapted to a peri-urban context. The aim of the DREAMS project is to contribute to creating accessible, sustainable, and inclusive 15mC neighbourhoods, or 15mN (Arias Molinares et al., 2024), in the urban outskirts of European cities and regions. This report describes six types of policies that can help move towards the 15mC model in urban outskirts: car-sharing, shared micromobility, carpooling, demand-responsive services, flexible (pop-up) activity hubs and mobility hubs. Based on a comparative analysis of 15mC lifestyles in various low- to mid-density areas, it focuses on governance frameworks and business models for innovative shared mobility services and flexible activity hubs.

While car-sharing is developing more and more in the centres of major cities, where public transport and alternatives to the car are more plentiful, it is also possible to develop some car-sharing services on the outskirts of cities with a balanced economic model, in certain cases and under certain conditions. These services can be cost-effective if the local authority already has a policy of limiting car use and ownership, if subsidies or tax exemptions are available, etc. Among the different types of car-sharing, round-trip car-sharing is best suited to developing in sparsely populated areas, offering families alternatives to car ownership and encouraging them to adopt a more multimodal and local lifestyle. Round-trip car-sharing in residential buildings, in conjunction with the home-owner associations, is a good way of offering alternatives to cars for residents who don't own one and freeing up public space for a more efficient use of space. This car-sharing model looks promising but is still in an emerging phase. Free-floating operators have no interest in offering their services in these areas and must concentrate on dense areas to be economically viable. It is therefore necessary to allow operators to operate in profitable areas so that they agree to extend their service to the urban outskirts. Combined car-sharing (a car-sharing scheme that offers both round-trip and free-floating services) could be a solution that combines the reliability of round-trip car-sharing with the flexibility of free-floating, satisfying a variety of needs for regular users who don't own a car but need one occasionally. Cooperative, non-profit, and peer-to-peer car-sharing models are less widespread but can be implemented in sparsely populated areas thanks to the willingness and knowledge of citizens. Employer subsidies and tax exemptions can encourage employees to switch to car-sharing. Employers' financial participation can enable operators to find an economic balance in areas where demand is lower, without requiring excessive public funding. A good partnership between the transport authority, municipalities, employers, citizens, and operators is the key to success for a balanced suburban car-sharing system with little or no public subsidy.

Shared micromobility also tends to be concentrated in urban centres. Station-based bike-sharing schemes are the most widespread, but also the most restrictive and the most subsidised by local authorities. Although they may have increased the visibility of these alternatives to the car, systems of this type tried out on the urban outskirts are expensive for limited use. Private free-floating bicycle and e-scooter services generally operate without subsidy, which leads to much higher prices and may exclude an important part of the population from the service if no social tariff is proposed. Good dialogue with local authorities makes it possible to impose rules and controls, but operators deploy their services in the most profitable, densely populated areas, where they are more likely to replace journeys made on foot or by public transport than by car. Some local authorities tend to redirect their funds towards the development of cycle infrastructure and bike parking, which are necessary for active mobilities, whether shared or not. Despite this, lighter or station-free and less expensive micromobility systems such as Fifteen or Fredo, can find their place in urban outskirts. Innovative, low-cost, or community-based business models, such as Pony, might make this possible. On the other hand, if possible, a system deployed on a global basis in the city centre and its outskirts may enable a satisfactory compromise to

be reached, with the high revenues generated in the central areas partly offsetting the lower ridership in the outskirts.

Carpooling is another way of optimising car use, by sharing journeys rather than ownership. Short-distance carpooling can be a commuting solution for residents of urban outskirts with poor public transport, especially for people in precarious situations, on low incomes, who do not have a driving licence or a car, or because they are no longer fit to drive. It can also be a solution for minors or migrants without an exchange driving license possibility. However, it has little relevance to the making of the 15mC, given that this model is based on proximity, walking, and cycling. Nevertheless, certain forms of carpooling, such as organised hitchhiking or carpooling lines, can be of local interest in sparsely populated areas where buses are infrequent at off-peak times. The development of carpooling needs support from different stakeholders: public authorities, transport authorities, road managers, carpooling operators, etc. As for today, the various measures to promote short-distance carpooling are still largely subsidised.

Demand-responsive services, or Demand-Responsive Transport (further: DRT), makes public transport more flexible in sparsely populated areas by providing at the same cost more geographic coverage, a denser network of stops and a reduction in travel times. In this way, it contributes to the 15mC neighbourhood as it provides mobility options for people who do not have access to private cars in car-centric areas. Setting up a DRT system requires the involvement of several partners and funders, such as transport authorities, local authorities, transport operators and even the State. DRT services are non-profit and could incur higher costs than fixed-route services, but it must be considered that they provide benefits in terms of delivering access to education, healthcare, culture, and work opportunities. DRT can also aim specific user groups such as minors, the elderly, precarious people, etc. There are several types of DRT services, involving different combinations of parameters such as vehicle size, flexible route, flexible stops, and flexible schedules. It is important to find a good balance between reliability, flexibility, and low costs. In this regard, hybrid (fixed schedule and stops with additional on-demand off-peak hours stops) and semi-flexible (number of possible pick-up times and locations are limited) DRT schemes seem to be the most suitable for urban outskirts.

The development of flexible (pop-up) activity hubs makes it possible to offer shops and services where the density of an area is not high enough to allow permanent establishments. This may involve existing shops diversifying their services to meet the needs of local residents, as well as mobile services and shops that move around sparsely populated areas. In this way, flexible activity hubs can contribute to transform the urban outskirts following the 15mC model, offering residents new amenities and a more local lifestyle. This can take the form of shopkeepers diversifying their commercial offering (postal or banking services, parcel pick-up points, train tickets sales, etc.) or mobile services (food-trucks, mobile libraries, pop-up markets, etc.) bringing new activities to the area. Initiatives can be private (shops, personal services, etc.) or public (cultural or medical services, etc.). Local authorities can encourage the development of such services by providing easily accessible and visible locations on their territory, by promoting these itinerant shops and services and even subsidizing them if private initiatives struggle to emerge. Other stakeholders include resident and retailers' associations (to respond appropriately to needs and avoid duplicating commercial offer), transport operators such as rail companies and train stations managers to offer shops and services in stations.

Mobility hubs bring together different types of mobility services at a single location. They are being deployed everywhere but are particularly well suited to the peri-urban context as they make alternatives to the private car visible and convenient in car-centred urban environments. By bringing together the policies developed above, they are a powerful tool for implementing the 15mC neighbourhood. Mobility hubs are very diverse in terms of the modes of transport and services they offer, the cost they require for implementation, operation, and maintenance, as well as the user groups they address. They therefore need to be adapted to local contexts. Governance can be complex because it involves public and private partners with sometimes diverging interests. Good planning, coordination and clear leadership enable the authorities to monitor the activities of private operators and ensure that they comply with the rules. Key partners are local authorities (municipalities, provinces, regions), transport authorities, public transport operators and shared mobility operators. Other partners can include business parks owners, real-estate developers and employers, among others. Involving citizens in a participatory process is a good way of offering services that are tailored to their needs as residents

on the urban outskirts will not have the same needs as city centre residents. A tactical approach allows hubs to be prototyped and tested before being implemented on a permanent basis. Infrastructure works are often the responsibility of local authorities for public spaces and parking, but also road network managers for roadworks and sometimes transport operators such as railway companies for the implementation of services in train stations. Communication and branding are fundamental and are the responsibility of local authorities. Finally, there is no business case for mobility hubs, and there is no business model that can be applied to the development of a network of mobility hubs. Mobility hubs are not businesses but infrastructures that public authorities provide and manage. Within mobility hubs, private and public operators organise their own business models, with the possibility of public subsidies if the lack of density in peri-urban areas unable them to achieve economic stability.

Overall, it seems possible to adapt the 15mC model to urban outskirts under certain conditions. There must be strong political will to limit the use of private cars and the space allocated to cars in public spaces. This requires a shared vision and a good coordination between local authorities that have historically rather be car-friendly in these areas. Developing innovative shared mobility services and flexible activity hubs will not be enough if at the same time urban sprawl is not contained, single-use zoning goes on, new road infrastructure is built, and on-street parking remains free and easy. To be efficient, shared mobility services need safe, inclusive, people-centred urban environment with spatially distributed amenities, as well as cycling and walking infrastructure. One difficulty that may arise is that parking restrictions and such policies may face opposition from shopkeepers and employers, as well as from residents of these areas whose lifestyles are centred on the car. It is necessary to promote the benefits that shared mobility services, mobility/flexible hubs and a more local lifestyle can bring them in terms of attractiveness, savings, improved health, and quality of life.

Highlights

- **There is no specific governance framework or business model for the 15mC in urban outskirts as local contexts can be very different from one area to another (population and employment densities, land use, existing transport offer, responsibilities of authorities, etc.).**
- **Some policies are more relevant than others for the 15mC neighbourhood: shared micromobility and flexible activity hubs are at the heart of the concept as they support the development of active mobility and the deployment of new amenities, while car-sharing, DRT and carpooling are more like accompanying measures (enabling people to live without owning a private car but to use one occasionally for certain needs). Mobility hubs are at the interface of these two groups of policies: they provide physical locations to services and mobility systems, link them to public transport, while offering services that make everyday life easier for users and residents.**
- **Most mobility services are offered on a metropolitan scale, not just in the urban outskirts. The presence of a service in a dense area, which is generally more profitable, can make it possible to finance its existence in the urban outskirts.**
- **However, some mobility services with innovative business models (lighter, low-tech, cooperative, etc.) seem capable of developing in the urban outskirts. Good practices exist and provide inspiration for avoiding the pitfalls encountered in previous, unsuccessful experiments.**
- **Public subsidies are sometimes necessary to launch or maintain an economically balanced service offering attractive fares for all types of users in sparsely located areas. The environmental benefits and improved accessibility to services for residents may justify this public funding.**
- **Certain conditions are necessary for the success of mobility services and the creation of 15mC neighbourhoods in the urban outskirts: the political will to support this concept, policies to reduce car use, ownership, and parking, as well as the development of walking and cycling infrastructure and, more generally, a vision of metropolitan planning that links urban and transport planning.**

INTRODUCTION

This report is the deliverable 2.2 (D2.2) of the DREAMS project, which aims to explore, through co-created and user-centric shared mobility services, mobility, and flexible activity hubs, how we can actively contribute to creating accessible, sustainable, and inclusive 15-minute City (15mC) neighbourhoods in the urban outskirts of European cities and regions. It is part of Work Package 2 (WP2), “Review and comparative analysis”, and corresponds to Task 2.2 (T2.2), “Mapping the existing planning and governance practices and business frameworks”.

Six policy levers to implement the 15mC in the urban outskirts have been identified in the DREAMS project proposal: mobility hubs, flexible (pop-up) activity hubs, demand-responsive services, car-sharing, carpooling and shared micromobility (see Figure 1). The aim of this report is to detail good practices that have already been implemented around the world (mainly in Europe), predominantly in medium-density suburban areas. These policies are levers that can be activated to move towards the 15mC.

These policies have been identified in the literature as well as in previous European projects and initiatives such as INTERREG, CIVITAS or EIT Urban Mobility. This document is not exhaustive: there are many examples for each of the policies implemented throughout the world and listing them all would have been an impossible task in the time available. We have selected some good practices from literature and inputs from stakeholders, whether or not they are explicitly labelled “15-minute City”, because in all cases these measures help to improve accessibility in the urban outskirts. We focused on specific areas and made comparisons where we felt this was relevant and could provide insights. This led, for example, to the “deep dives” we carried out on the Belgian and Île-de-France car-sharing systems. We looked at the conditions that make each of these policies as relevant as possible in this specific 15mC context and suggest ways of improving existing systems.

We do not propose a “Guideline” approach, in which we identify which type of measures would be the most appropriate according to certain characteristics of the territories. We believe that each area is a unique combination of multiple factors (land use, distribution of inhabitants and activities, presence of facilities, infrastructure, existing transport supply, topography, socio-economic level, car ownership rate, etc.). As a result, any development of a 15mC policy in a new area needs to be carefully thought through and tailor-made.

In each part of this report, we will return to the background and definition of the policies identified in the DREAMS project, and then discuss their relevance to the 15mC neighbourhood. The aim is to question these policies at an early stage of the project: which of them are relevant? What pitfalls should be avoided when implementing them? What alternatives are there to the systems already in place? We will then describe the different existing planning initiatives, the governance and regulation frameworks and the different business model frameworks. Finally, we will make a series of recommendations for implementing these policies in the urban outskirts. These recommendations are based on existing studies, our analysis of the case studies, and what we consider to be best practices. Each part will be illustrated by presentations of good practices, and a summary table will enable a rapid comparison of these cases.

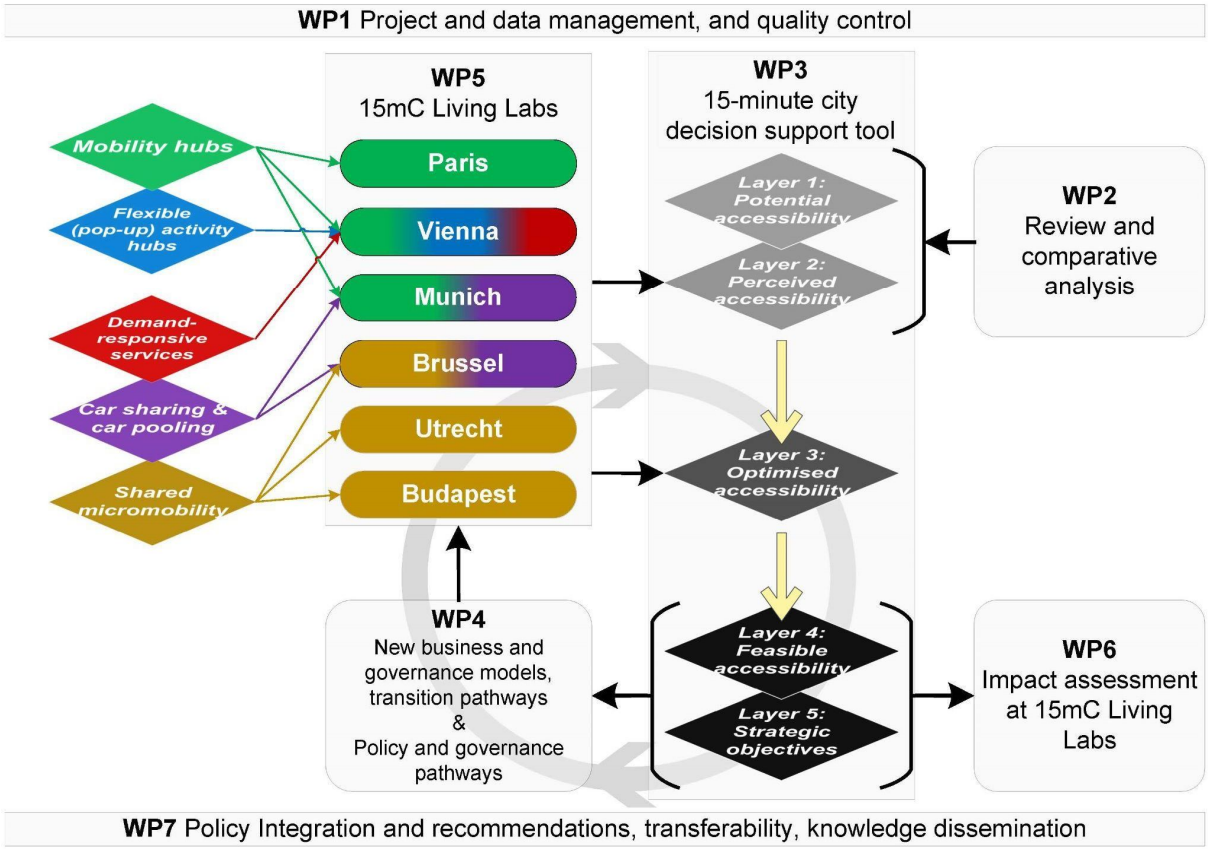


Figure 1: Interactions between seven work packages of the DREAMS project. The six policy levers for the Living Labs (WP5) are shown on the left (car-sharing and carpooling are treated as two different policy levers).

1. CAR-SHARING IN A 15-MINUTE CITY NEIGHBOURHOOD

1.1. Background and definition of car-sharing, and its potential use in a 15mC neighbourhood

Car-sharing is a system that allows people to use locally available cars at any time and for any duration (Münzel et al., 2019). It differs from carpooling, which involves several users sharing journeys in a single vehicle. Car-sharing makes it possible to differentiate between the use and ownership of a car, in order to optimise its use, share costs (fuel, insurance, parking, etc.) and limit the number of vehicles parked on the street. In dense urban areas where space is limited, it frees up surface area for other uses of public space. This may include space for alternative mobility services such as bike parking, but also other services for residents, as street furniture, works of art or greenery. In this sense, car-sharing is a lever for the 15mC, but it can also be deployed in suburban or rural areas.

It is estimated that one car-sharing vehicle can replace 5 to 8 private cars in France (Trauchessec et al., 2022), 3 to 10 in Belgium (Rodenbach et al., 2023) and 16 in Bremen, Germany (Schreier et al., 2018). In France, car-sharing accelerates multimodality, as car-sharing users make greater use of public transport (+18%), trains (+29%), cycling (+22%) and walking (+38%). In Belgium, 35% of car-sharers drive less often since they started car-sharing. 31% cycle more and 16% use public transport more. In Bremen, car-sharers have a higher use of bicycle (between +16 and +28 percentage points in modal split compared to average depending on trip purpose) and public transport (+8 percentage points in modal split compared to average for trips to work). Car-sharing is a source of savings for households: in France, more than 80% of car-sharing subscribers cite economic reasons for their choice. (Trauchessec et al., 2022). In Bremen, 85% of car-sharing users consider not having to pay the costs of maintenance, taxes, and insurance to be a further advantage (Schreier et al., 2018). When households move away from owning a private vehicle, they lose the habit of systematically travelling by car, like they did when they had an already-paid vehicle parked downstairs. This, combined with the budget freed up by the switch to car-sharing, not only changes the mobility practices of households, but also their lifestyle, and therefore their consumption habits, socialisation and use of local amenities, in a true 15mC approach. Car-sharing is therefore just one of the services that can be put in place to encourage the development of a 15mC lifestyle among certain residents. It needs to be combined with other alternative mobility services to the private car to convince some users to do without their own car. The urban context is also a determining factor: in dense urban areas where all the shops and amenities of daily life are concentrated, and where the environment is conducive to the use of active modes of transport and high-quality public transport, it is often not necessary to use a car, even a shared one, or even to have a driving licence. Implementing a car-sharing service in a car-centric environment like the urban outskirts can be challenging but it can be a solution to make inhabitants adopt a less car-intensive lifestyle if it is linked to other policies in favour of multi-modality.

Car-sharing therefore meets certain needs in the urban outskirts, such as taking children by car to their activities, going out at night, exceptional business trips or transporting large items. The typical car-sharing user is male, urban, educated and has a high income (Trauchessec et al., 2022). To meet these occasional car needs, it is necessary for all residents to have access to stations close to home at a fair price. It is considered necessary to deploy a car-sharing station with at least 2 cars every 800 m (500 m in urban centres). In France, the economic model for round-trip car-sharing is found when there are 20 to 30 active users per vehicle who live in the catchment area and 70% of whom no longer own a car (AAA, 2021).

In addition, these occasional motoring needs are also met by other shared uses of the car: taxis and ride-hailing services, car hire, delivery (e-commerce), teleservices and even teleworking. Free-floating car-sharing has higher fares than round-trip car-sharing and is less proven as an alternative to private car use (Leconte et al. 2023). In fact, its economic model remains fragile, free-floating journeys are more likely to replace journeys by public transport or bicycle than round-trip car-sharing (Prédali et al. 2020). Studies are carried out to see how these two types of car-sharing could complement each other. In

several cities in Germany, but also in France (Alpes-Loire, Bordeaux, Lyon, Rennes, Strasbourg, Toulouse) with **Citiz**'s Yea! service, the success of "combined car-sharing" combining round-trip and free-floating in a single offer seems to be worth exploring (Leconte et al. 2023). Free-floating could be a gateway to car-sharing for younger, more digitalised people from more working-class backgrounds. The one-way station-based has not managed to find a stable economic model without significant subsidies. Like Vélib', on which it seems to have been modelled, Autolib' depended heavily on public money (Le Nouvel Obs, 2018). Moreover, the journeys it offered could often be made by public transport or ride-hailing services for the same price (Prédali et al. 2020). It would be interesting to see whether this is also the case in suburban areas. Finally, peer-to-peer car-sharing does not require public money, but it is still a very small market (Leconte et al. 2023, Rodenbach et al., 2023). Furthermore, it does not encourage car owners to take their cars off the road and may even encourage them to keep a car they hardly use to rent it.

1.2. Different types of car-sharing services

There are four types of car-sharing: **round-trip car-sharing**, **one-way car-sharing (free-floating** and **station-based),** and **peer-to-peer car-sharing**.

In "a **Round-trip** system, the cars have to be returned to the same parking spot at the end of the trip as where they were rented from." (Münzel et al., 2019). Vehicles are parked at stations containing one or more cars, usually on the road, but sometimes in public car parks or belonging to housing buildings. Subscribers book a car on a mobile application, website or by telephone for a certain period and return it to the same station at the end of that period. The rate is linked to the length of the hire period and the distance travelled, with the price of fuel included.

"In a **One-Way** system, the cars do not have to be returned to the spot where the trip was started but can be dropped off either anywhere in a designated city area (**free-floating**) or at a different station of the provider (**station-based**)." (Münzel et al., 2019).

- **Free-floating car-sharing** involves distributing a fleet of vehicles in a given area and parking them on the street, without a station. Users can unlock and use a car using a mobile application, simply by registering and usually without a subscription. At the end of its rental period, the car must be parked on the road within the service zone, which is often limited to the dense core of a large conurbation.
- With **station-based** services, users can return the vehicle to a station other than the one they borrowed it from. It is not possible to reserve the vehicle well in advance, and the rate is linked to the time the vehicle is used.

Lastly**,** with **peer-to-peer (P2P) car-sharing**, "consumers rent out their own cars to other consumers on a two-sided platform operated by a coordinating carsharing organization." (Münzel et al., 2019). P2P car-sharing allows car owners to share their cars with certain people, such as neighbours, friends, or to people they don't know. This type of car-sharing can be based on a simple contract between individuals, via companies offering this service or via digital platforms operating like marketplaces. Pricing can be based on covering the owner's actual costs incurred by using his vehicle, or it can be used to make a profit, which can be considered as car rental.

1.3. Governance of car-sharing services

There are a multitude of governance and regulation frameworks for car-sharing, which coexist and sometimes overlap, all in very different urban and administrative contexts. Depending on the area, the differences in terms of governance and the objectives set by the major urban planning and mobility documents lead to variable development of car-sharing services. More locally, the political will of certain regions plays a role in this development. A comparison of Belgian and French car-sharing systems

provides an overview of the various configurations and degrees of progress in the development of car-sharing services and practices. The contexts differ greatly between the Brussels-Capital Region, the Flemish Region and the Paris Region (Île-de-France).

1.3.1. Round-trip car-sharing governance

1.3.1.1. Round-trip car-sharing governance in the Brussels-Capital Region

The Brussels-Capital Region (BCR) is the region of Belgium that includes Brussels, the country's capital. It is one of the three regions that make up Belgium, which is a federal state. It has a population of 1.2 million over an area of 161 km² (a density of 7,700 inhabitants per km²) and is made up of 19 municipalities.

The Region is responsible for several areas, including regional planning, environment and transport. In 2020, it published the Good Move plan, its 2020-2030 Regional Mobility Plan (SUMP). This ambitious, cross-functional plan was developed through a participatory process. It opts for a pleasant and safe city, made up of peaceful neighbourhoods linked by intermodal streets, and centred on efficient public transport and smoother traffic flow (Bruxelles Mobilité, 2021). The main elements of the plan involve the following six dimensions: Good Neighbourhood (to improve the quality of life on the neighbourhood level), Good Network (to organise transport networks and to ensure efficient services) Good Service (to improve the integrated services to the Region by developing the region's MaaS platform), Good Choice (to guide individual and collective choices, without harming individual freedom through changing and challenging mobility behaviour), Good Partner (to ensure partnership governance of the mobility plan between the BCR and federal governments, municipalities and local stakeholders) and Good Knowledge (to update mobility data and regularly assess the Good Move plan) (Esztergár-Kiss, Aba, 2024).

Its action plan proposes several measures that can be linked to the concept of the 15mC. For example, traffic-calmed neighbourhoods have been created with a modified traffic plan that prevents through-traffic, the speed limit has been lowered to 30 km/h and public spaces are being renovated to promote safety, comfort and attractiveness. There is a general objective to link urban development to mobility offer. A low-emission zone has been introduced to improve air quality. The Good Move plan also aims to oversee and support the development of Mobility as a Service (MaaS) and shared mobility services in the Brussels-Capital Region. The MaaS Floya application was launched in 2023. It is important to point out that technical integration into MaaS platforms comes at a significant cost for operators. They may be reluctant to pay for these developments without the guarantee of selling more journeys using the MaaS platform. One way of implementing a MaaS that would bring together all mobility operators would be to set up a financial incentive provided by the government, which would cover (part of) the implementation costs (Baguet, 2024).

The STOP[1] principle, first implemented in Flanders as a region-wide policy, means that, when it comes to public spaces design, priority is given to pedestrians, then cyclists, then public transport and finally cars. Street are specialised to create five structuring networks (pedestrians, cyclists, public transport, cars, and heavy goods vehicles) (see Figure 2).

[1] STOP is a Dutch acronym for Stappers, Trappers, Openbaar vervoer, Privé vervoer (pedestrians, cyclists, public transport, private transport) indicating the order of priority of modes of transport.

Figure 2: Illustration of the STOP principle from the Good Move plan (© Tous à Pied) (see 1.3.1.1)

Car-sharing in Brussels is being developed and encouraged as part of the Good Move plan (Action C.11). The BCR organises and regulates car-sharing, which is implemented by private operators. It introduced the "Bruxell'Air" bonus for residents who deregister their license plate. Under certain conditions, these people can benefit from a bonus (the amount of which is determined according to income) that must be spent on alternative mobility options to the private car, including car-sharing. Three types of car-sharing systems coexist in the Region: round-trip car-sharing, free-floating and, to a lesser extent, peer-to-peer. Brussels Mobility (the region transport authority) is currently conducting a study to assess the complementarity of these different types of car-sharing.

To operate a round-trip car-sharing service, operators must obtain approval from the BCR and meet several conditions. These conditions make it possible to ensure that there is a good network of stations in the Region, so that the shared cars are spread throughout the territory. In fact, a car-sharing service is more profitable for an operator in the densest urban areas, where households are less motorised and where alternatives to the car are more developed, particularly with a better public transport offer. However, it is in the areas furthest from public transport, which are more dependent on the car, that the challenge of getting people out of their cars is greatest, and where car-sharing is more relevant.

Stations are distributed using a rating system based on the public transport accessibility zones set out in the Regional Urban Planning Regulations (RUPR). These regulations distinguish between three types of zones: very good public transport accessibility (A), good accessibility (B) and average accessibility (C) (see Figure 3).

The BCR parking agency, Parking Brussels, assigns each station a score according to the public transport accessibility zone in which it is located: 3 for zone A, 2 for zone B and 0 for zone C. To obtain its five-year approval, a round-trip car-sharing operator must install its stations in such a way as to have an

average score less than or equal to 2. . This means that they can set up stations in profitable areas but must always offer stations in less profitable areas. The operator's score is reassessed every five years when its licence is renewed. The score is re-evaluated based on the stations opened after approval was granted.

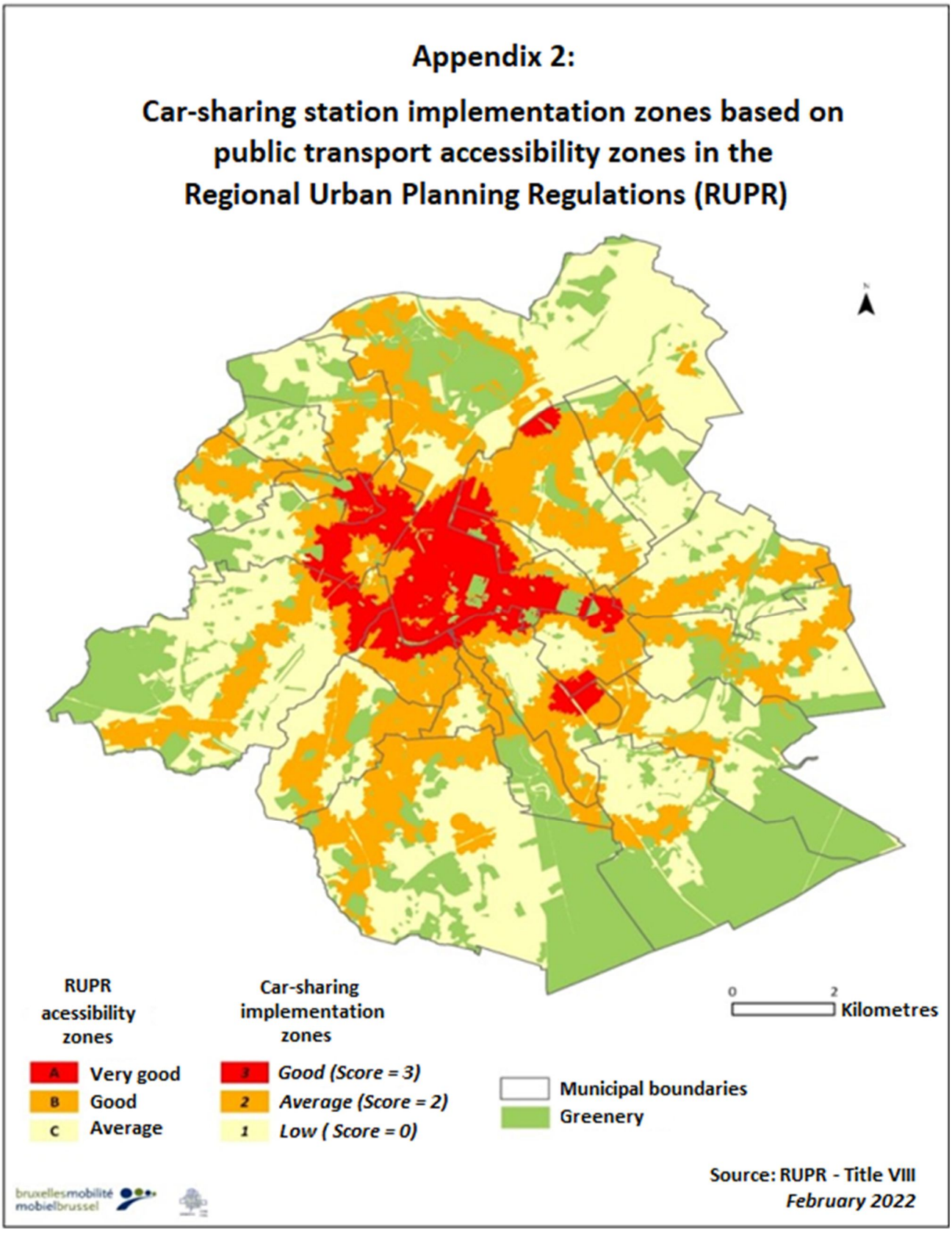


Figure 3: Car-sharing station implementation zones based on public transport accessibility zones (source: Brussels Mobility, Brussels-Capital Region, translation: IPR) (see 1.3.1.1)

To obtain approval, the operator must provide a fleet of vehicles of different types: city, family and commercial. This makes it possible to offer a car-sharing service that meets a range of needs, with different models of vehicle for different target groups. The vehicles must be recent and comply with certain Ecoscore standards (overall score combining air pollutant emissions, greenhouse gases emissions and noise pollution). The operator must ensure a high level of availability: at least 90% of reservation requests made 24 hours in advance must be met. Reservations, operation, and telephone assistance are available 24 hours a day, 7 days a week.

Each year, car-sharing operators must provide Brussels Mobility with operating data on the number of vehicles shared, the number of customers, the number of reservations, the characteristics of the journeys made and the demand coverage rate (difference between demand and supply). Parking.Brussels produces an annual report on car-sharing with this data. Brussels Mobility has set up an observatory which carries out surveys to assess the progress of the Good Move plan. Between 2022 and 2023, the proportion households owning a car will fall from 45.5% to 44.2%, due in part to the increase of alternatives to the private car, such as car-sharing. This decline hides a significant disparity between central and suburban municipalities, with municipalities on the outskirts being more equipped with cars. (Bruxelles Mobilité, 2024). In 2021, car-sharing was the second most popular mode of transport, with a satisfaction score of 7.6/10, behind ride-hailing services (8), but ahead of shared mopeds (7.1), shared bikes (6.9), train (6.6), urban public transport (6.4), walking and cycling (6). Users appreciate the ease of booking journeys, the feeling of safety in relation to the risk of aggression, the cost of use and the journey times (outside rush hour). (Bruxelles Mobilité, 2023).

The BCR's objective was to have 2% of the regional population using car-sharing by 2020. This represents 25,000 users and 800 vehicles, or roughly one car for every 30 people (Parking.Brussels, 2024). To ensure the geographical distribution of the shared cars, these 800 vehicles were distributed among the 19 municipalities according to their population. For example, the municipality of Koekelberg, with its population of 20,000, was to deploy 15 vehicles between 2013 and 2020, while the municipality of Brussels, with its population of 158,000, was to deploy 116 vehicles.

In 2013, each municipality in the BCR had to draw up a car-sharing action plan (CSAP) for 2020, in collaboration with Parking Brussels and in consultation with approved operators. These CSAP include a diagnosis of the existing car-sharing services, a deployment scenario and the locations of the stations and the timetable for bringing them into service. The operators apply to the local authorities for parking spaces in the areas identified for car-sharing stations, which are then made available free of charge. Within five years of receiving approval, an operator must have 30 stations and 75 shared vehicles.

The road authority (the local authority or the BCR, depending on whether it is a local or regional road) is responsible for maintaining the car-sharing stations (Gouvernement de la Région de Bruxelles-Capitale, 2013). They are also responsible for the costs of regulatory signage, in particular the regulatory sign and road markings. The approved operator bears the costs of equipping the car-sharing stations, including installation, maintenance, and replacement of equipment where necessary. Electrical installation costs are always borne by the operator.

It is interesting to note that the rating system makes it possible to create a network of car-sharing stations across the region, but that it is not enough to achieve a number of stations proportional to the municipal population. In some municipalities the targets have been significantly exceeded (161% in Watermael-Boitsfort, 156% in Saint-Gilles, 152% in Etterbeek, etc.), while in others the target has been significantly missed (29% in Molenbeek-Saint-Jean, 42% in Evere, 47% in Koekelberg, etc.). It seems that this is not due to the central nature of the municipality: some municipalities close to the heart of the urban core have fewer car-sharing stations than others with a lower population density, and vice versa. It therefore seems to be a question of political choices made by municipalities that are more or less favourable to car-sharing.

In France, the public using car-sharing tends to be male, middle-aged, urban, educated, in employment, comfortable with digital technology, and relatively well-off (Trauchessec et al. 2022). These characteristics are also found in Belgium, although it should be noted that the proportion of women among P2P car-sharing users (61%) is significantly higher than that of men (Autodelen.net, 2023). In

the BCR, a *Green Deal Inclusive Car-sharing* has been launched to make car-sharing more accessible to vulnerable target groups such as senior citizens, people with reduced mobility, low-income households, single-parent families, etc. The Green Deal Inclusive Car-sharing resulted in a charter, 34 signatories and the formulation of 178 actions. A Green Deal Academy has been set up to organise car-sharing exchange days for vulnerable target groups (Autodelen.net, 2024).

Two round-trip car-sharing operators are licensed in the BCR: **Cambio** and **Getaround**. Cambio stations and vehicles are available in the BCR as long as in many Belgian cities and rural areas (see Figure 4). Although Getaround mainly is a peer-to-peer car-sharing operator, it also has a licence for round-trip stations, mainly located in the Brussels municipality. Cambio and Getaround users can benefit from the Bruxell'Air bonus that can be spent on alternative mobility options to the private car, including car-sharing (Bruxelles Environnement, 2024) (see 1.3.1.1). Cambio and Getaround have seen significant growth in recent years, bringing the number of subscribers to 33,000 for the two offers combined (+29% between 2021 and 2023), with 309 stations (+33%), 1,007 spaces (+28% and 368,000 reservations (+22%), equivalent to 1,000 per day (Parking.Brussels, 2024).

Figure 4: A Cambio car-sharing station in a street of Brussels (© Cambio) (see 1.3.1.1)

Operator	Users in 2023 (% on 2021)	Stations in 2023 (% on 2021)	Car-sharing spaces in 2023 (% on 2021)	Reservations in 2023 (% on 2021)	Reservations per day in 2023 (% on 2021)
Cambio	31,183 (+28%)	293 (+28 %)	976 (+34%)	364,844 (+22%)	1,000 (+22%)
Getaround	1,747 (+46%)	16 (+25%)	31 (+23%)	3,204 (+59%)	9 (+60%)
TOTAL	33,130 (+29%)	309 (+28%)	1,007 (+33%)	368,048 (+22%)	1,008 (+22%)

Table 1: Use of round-trip car-sharing in the Brussels-Capital Region

Sources: Parking.Brussels, Cambio, Getaround; analyses: IPR, 2024

Car-sharing operator (number of stations)	Conditions of operation	Station locations	Stations urban environment
Cambio (293)	Licence to operate awarded by the transport authority which sets vehicle specifications and operating rules: vehicle availability rate, 24/7 service, obligation to transmit data to the transport authority, etc.	Carsharing station development targets set by the transport authority and allocated by municipality. Municipalities choose the stations' locations to meet their targets. Regional authority defines PT accessibility zones, which depend on the quality of the PT offer. Operators implement stations in locations chosen by municipalities but must maintain a balance between densely populated areas with good PT and outskirts with fewer PT if they want to keep their licence.	BCR city centre, urban outskirts
Getaround (16)			BCR city centre

Table 2: Round-trip car-sharing governance in the Brussels-Capital Region

Sources: Parking.Brussels, Brussels Mobility, Cambio; analyses: IPR, 2024

1.3.1.2. Round-trip car-sharing governance in Flanders

The Flemish Region, or Flanders, has a population of 6.8 million spread over an area of 13,625 km², giving a density of 501 inhabitants per km². Car-sharing began in Flanders in 2003 in Antwerp, Ghent, Bruges and Mechelen, with several private operators starting up there. The service developed gradually until, around 2012-2013, other Flemish municipalities also wanted to set up a car-sharing service.

The Flanders Region is divided into 15 transport regions (“*vervoerregio”* in Dutch language). These transport regions can issue invitations to tender to select car-sharing service operators in the form of a procurement of service, either alone or as part of a consortium. There is no regional policy for the development of car-sharing, but since 2020 there have been 2030 climate targets for mobility. The region has a good communication plan that insist on the benefits of car-sharing for everyone so that residents, businesses, and public authorities make the switch to car-sharing (Matthijs et al., 2021). A good communications campaign has a real impact on the development of this service, which is still not widely known. The Region plans to deploy 2 shared cars per 1,000 inhabitants, or 13,000 car-sharing vehicles for the whole of Flanders. In 2020, there were 3,000 cars in 60% of Flemish municipalities, and by July 2024 there would be 4,600 in 83% of municipalities. Operators include in 2024 **Cambio**, **Claus2you** (see Figure 5), **Stapp.in**, **Mobilize Share**, **BattWatt** and **Coopstroom**.

Figure 5: A Claus2you car-sharing station in Izegem, West Flanders in 2022 (© Stad Izegem) (see 1.3.1.2)

Car-sharing operator (number of stations)	**Conditions of operation**	**Station locations**	**Stations urban environment**
Cambio (935)	Calls for tender from local transport authorities *vervoerregio's*).	Car-sharing station deployment targets set by the region as part of climate objectives of its 2030 strategy. Regional budgets allocated to municipalities for these objectives can be used to develop car-sharing. Municipalities work with *vervoerregio's* to choose station locations, in line with the mobility hubs (*Hoppinpunten*) deployment strategy and in collaboration with operators.	City centres, urban outskirts, rural areas, mobility hubs
Claus2you (77)			City centres, rural areas, mobility hubs
Stapp.in (76)			Urban outskirts, rural areas, mobility hubs
Mobilize Share (222)			Urban outskirts, rural areas
BattMobility (232)			City centres, urban outskirts
Coopstroom (109)			City centre, urban outskirts, rural areas

Table 3: Round-trip car-sharing governance in Flanders

Sources: Cambio, Claus2you, Stapp.in, Autodelen.net, BattWatt, Coopstroom; analyses: IPR, 2024

1.3.1.3. Round-trip car-sharing governance in the Paris Region

The Île-de-France region has a population of 12.3 million and a surface area of 12,011 km², giving a population density of 1,025 inhabitants per km². It has 1,267 communes, including the City of Paris, the capital of France with a population of 2.1 million.

In 2007, a law was passed to promote car-sharing at national level in France. In 2012, a decree defined car-sharing in regulatory terms. Car-sharing has been identified as an important lever for decarbonising mobility by Ademe (the French National Environment Agency) in the 2022 national car-sharing survey (Trauchessec et al. 2022). One shared car can replace 5 to 8 private cars, freeing up space and limiting car journeys by encouraging more multimodal lifestyles. Car-sharing replaces 10,000 vehicles in France, frees up 1,800 road spaces and saves 39 million kilometres of motoring every year. In fact, many car-sharing users are moving away from car use and changing their mobility habits by making greater use of alternatives to the car, in particular public transport, cycling and walking. Car-sharing has more than 460,000 active users and 13,500 shared cars in France. It's a growing practice, even if the number of car-sharing vehicles needs to increase 100-fold to have a real impact on sustainable mobility (Trauchessec et al. 2022).

Paris has a very dense and well-equipped public transport network. Walking is a popular mode of transport, and cycling infrastructure is developing rapidly. Car traffic has been falling for decades as a result of policies such as parking restrictions, traffic calming, shared streets, circulation plan, bike and walking infrastructure, Limited Traffic Zone, Low Emission Zone, etc.

The City of Paris launched its Local Mobility Plan (LMP) in 2024 (Ville de Paris, 2024), based on the 15-minute city concept, in complement of the Île-de-France regional mobility plan, which develops the concept of the 20-minute region (20mR). Paris' LMP proposes solutions in terms of mobility and the development of public space to respond to the urgency of the ecological transition and offer the population a healthy and preserved living environment. Both mobility plans aim to develop car-sharing, and the various car-sharing services in the region need to complement each other if car-sharing is to be developed in a balanced way between the densely populated urban core, the urban outskirts, and the rural areas.

In the Île-de-France region, several round-trip car-sharing systems are being or have been offered by private operators. As early as 1999, **Caisse Commune** implemented its service in Paris. In 2007, it was the turn of **Mobizen** and **Okigo** (provided by Avis and Vincipark) to offer an equivalent service in the capital, and an Autopartage Paris label was created. In 2016, the City of Paris diversified its car-sharing services and launched the "**Service de Véhicules Partagés" (Shared Vehicle Service)**, following a call for tenders**.** 226 on-street parking spaces were allocated to 5 operators: **Communauto** (from the Mobizen-Caisse Commune merger), **Zipcar** (Avis group), **Ubeeqo-Matcha** (Europcar group), **Bluecar-sharing** (Bolloré) and **IER** (Bolloré).

To replace Autolib' on its territory, the city of Paris called for expressions of interest at the end of 2019 to launch a new car-sharing system called **Mobilib'**. The City Hall decided to dedicate 1,000 spaces to round-trip car-sharing: 500 2-space stations at new places, and 500 at former Autolib' stations with 4 to 6-space stations. Four operators were selected: **Ubeeqo** (851 cars, including 713 electric cars in all the Autolib' spaces), **Ada** (56 cars), **Communauto** (152 cars) and **Getaround** (141 cars). In the end, Ubeeqo only deployed 651 cars and Ada left the capital in 2020. Following a trial run by the City of Paris and the Paris Region in conjunction with Ademe and the Paris Île-de-France Chamber of Commerce and Industry, Mobilib' offered **Clem'**, electric utility vehicles for both businesses and private individuals, in new reserved spaces, from 2020. In 2024, Ubeeqo (then Europcar on Demand) had 683 on-street spaces in Paris, Communauto 150, Getaround 154 and Clem' 264. This means that around 1,260 on-street spaces are currently reserved for round-trip car-sharing in Paris. Communauto also has 50 spaces in Paris in public or private underground car parks and 4 "zone stations" where vehicles can be hired and returned in a defined area to an on-street parking space, but without a fixed location. Europcar on Demand service stopped in December 2024. Clem' stopped its shared utility vehicle service in Paris in September 2024 but kept operating its other services in Paris and the Paris Region.

Communauto is also present in 15 municipalities in the Île-de-France region (excluding Paris) and Clem' in 33. Clem' only operates electric vehicles. It also offers vehicles in residential buildings in several municipalities in conjunction with the home-owner associations. It is a good way of offering alternatives to cars for residents who don't own one and freeing up public space for a more efficient use of space. This car-sharing model looks promising but is still in an emerging phase. It has been a project of the SHARE-North Squared (SN²) project and is experimented in Austria with Mo.Point[2]. **Citiz Île-de-France** is another car-sharing operator with 7 stations in 3 municipalities near Paris, but not in the capital. Citiz is a not-for-profit cooperative created by the pioneers of car-sharing in France in 2002. The Citiz network now comprises 14 independent local car-sharing operators, present in over 220 French municipalities and more than 90 SNCF train stations. These services enable 50,000 users to share the use of 2,500 shared cars. By grouping together in a network, it is possible to pool tools and cut costs: for the call centre, insurance, group purchases (particularly for vehicles and their maintenance), communication tools, etc., thus reducing the risks for operators wishing to expand into more uncertain sectors such as sparsely populated areas. The shared technical system (booking software, on-board computers, mobile application, etc.) means that a customer account in one of the local services can access all the cars in the network. Users and local authorities can become members of the cooperative and are involved in decision-making.

Île-de-France Mobilités has created the "*Île-de-France Autopartage*" label in 2019 to provide a framework for car-sharing and facilitate the selection process for operators by local authorities wishing to roll out car-sharing in their area (see **Erreur ! Source du renvoi introuvable.**). Communauto, Clem' and Citiz have been awarded the *Île-de-France Autopartage label*. In total, 3.8 million Île-de-France residents in 51 municipalities will have access to a round-trip car-sharing system in their city by 2024. This corresponds to more than 1,300 vehicles and 500 stations.

Figure 6: The "Île-de-France Autopartage" label sticker (© ÎDFM) (see 1.3.1.3)

[2] https://www.mopoint.at/

Car-sharing operator (number of stations)	Conditions of operation	Station locations	Stations urban environment
Ubeeqo/Europcar on Demand (176) ⚠ *The service stopped in December 2024*	Call for expression of interest from the City of Paris	Station locations decided by the City of Paris and allocated to 4 operators under the Mobilib' brand.	City of Paris
Communauto (132)	Call for expression of interest from the City of Paris. Permits with other municipalities. *Île-de-France Autopartage* label awarded by the region.	Station locations decided by the City of Paris and allocated to 4 operators under the Mobilib' brand. Other stations implemented with private parking lot operators. Extra on-street "zone" stations submitted to the City of Paris and operated without physical station. Stations outside Paris implemented with municipalities.	City of Paris, urban outskirts
Getaround (102)	Call for expression of interest from the City of Paris. Permits with other municipalities.	Station locations decided by the City of Paris and allocated to 4 operators under the Mobilib' brand. Stations outside Paris implemented with municipalities.	City of Paris, urban outskirts
Clem' (110) ⚠ *The shared utility vehicle service stopped in September 2024*	Trial run by the City of Paris/region, then permit to operate by the City of Paris. Permits with other municipalities. *Île-de-France Autopartage* label awarded by the region.	Station locations decided by the City of Paris, operation under the Mobilib' brand. Stations outside Paris implemented with municipalities. Clem' offers vehicles in residential buildings in several municipalities in conjunction with the home-owner associations.	City of Paris, urban outskirts, rural areas
Citiz (7)	Permit from the municipality. *Île-de-France Autopartage* label awarded by the region. Users and local authorities can become members of the cooperative and be involved in decision-making.	Stations implemented with the municipalities.	Urban outskirt

Table 4: Governance of round-trip car-sharing in the Paris Region

Sources: Europcar, Communauto, Getaround, Clem', Citiz, City of Paris; analyses: IPR, 2024

1.3.2. Free-floating and one-way station-based car-sharing governances

1.3.2.1. Free-floating car-sharing governance in the Brussels-Capital Region

Free-floating car-sharing is a form of "car-sharing that enables members to pick up a vehicle at one location and drop it off at another." (Shaheen et al., 2015). Practically, users can hire a car in a zone defined by the operator and then return it to the same zone. The vehicles are parked in public parking spaces. To obtain approval from Brussels Mobility to operate a free-floating car-sharing service, an operator must provide each vehicle with a subscription entitling it to unlimited parking in at least ten public or private car parks, located in at least four municipalities in the Brussels-Capital Region. The service must be open to everyone and easily accessible 24 hours a day, 7 days a week. The vehicle fleet must include different types of vehicles: city, family, and utility vehicles, and must comply with Ecoscore thresholds. Combined offers including car-sharing and public transport must also be promoted. Within five years of being granted approval, the operator must have reached the 75-vehicle mark for car-sharing. As with round-trip car-sharing, the operator must submit data to Brussels Mobility and carry out a user survey.

Two free-floating car-sharing operators are licensed in the Brussels-Capital Region: **Poppy** and **Miles**. The service area of Poppy covers a large part of the BCR, except for certain outlying areas (see Figure 7). Miles also operates in several Belgian cities. The service area covers a slightly smaller part of the BCR than Poppy. Both services combined cover 85% of the BCR's territory. Miles and Poppy have seen significant growth in recent years, bringing the number of subscribers to 31,000 for the two offers combined (+65% between 2021 and 2023). However, a distinction must be made between the number of registered users and the number of active users. As these services do not require a monthly or annual subscription, it is possible to register for a free-floating system without using it. Many users also subscribe to both Poppy and Miles to take advantage of discounts and offers and have access to a greater number of vehicles. Nevertheless, the fleet and use of these services have continued to grow: there were 3,800 Poppy and Miles vehicles in the BCR in 2023 (+91% on 2021) and 1,067,000 journeys were made that same year (+84%), which is equivalent to 2,900 a day.

Figure 7: A Poppy free-floating car in a street of Brussels (© Poppy) (see 1.3.2.1)

Operator	Users in 2023 (% on 2021)	Vehicles in 2023 (% on 2021)	Journeys in 2023 (% on 2021)	Journeys per day in 2023 (% on 2021)
Poppy & Miles (combined)	31,056 (+65%)	3,783 (+91%)	1,067,465 (+84%)	2,925 (+84%)

Table 5: Use of free-floating car-sharing in the Brussels-Capital Region

Sources: Parking.Brussels, Poppy, Miles; analyses: IPR, 2024

Car-sharing operator	Conditions of operation	Stations urban environment
Poppy	Licence to operate awarded by the transport authority which sets vehicle specifications and operating rules: minimum number of vehicles, minimum number of municipalities covered by the service, vehicle availability rate, 24/7 service, obligation to transmit data to the transport authority, etc.	BCR city centre, urban outskirts
Miles		BCR city centre

Table 6: Governance of free-floating car-sharing in the Brussels-Capital Region

Source: Brussels Mobility; analyses: IPR, 2024

1.3.2.2. Free-floating car-sharing governance in Flanders

*In addition to Brussels, **Poppy** operates in the core area of Antwerp, **Miles** operates in Antwerp and Ghent.*

Car-sharing operator	Conditions of operation	Stations urban environment
Poppy	Municipalities provide operators with authorisations to operate their services.	City centres, urban outskirts
Miles		City centres, urban outskirts

Table 7: Governance of free-floating car-sharing in Flanders

Source: Poppy, Miles; analyses: IPR, 2024

1.3.2.3. One-way station-based car-sharing governance in the Paris Region

The most important and well-known car-sharing service in the Paris Region was **Autolib'**, a one-way station-based car-sharing system operating between 2011 and 2018. The service had been imagined in Paris as early as 2003, but the Autolib' project really got underway in 2008. Autolib' offered up to 4,000 Bluecar electric vehicles (including 250 “Utilib’” vans) and 1,100 stations spread across 102 municipalities in the Paris conurbation (see Figure 8). The design of the Bluecars used and the operation

of the service were entrusted to the Bolloré group under a public service delegation contract by the "*Syndicat Mixte Autolib' et Vélib' Métropole*" (SAVM) joint association, which comprises 103 municipalities, two départements, the Île-de-France region and the Greater Paris metropolitan area. As the number of users increased, the service was rolled out to 150,000 subscribers. In 2018, 11,000 journeys were made every day, which is relatively few for an area with a population of 6.5 million. After the end of the Autolib' service in 2018, 1,000 charging points at Autolib' stations were reused in Paris, but some of the charging points in other SAVM municipalities were abandoned (Varoquier, 2019).

Figure 8: An Autolib' station in Paris in 2012 (CC BY-SA 3.0 Mariordo) (see 1.3.2.3)

Car-sharing operator	Conditions of operation	Station locations	Stations urban environment
Autolib' (operating 2011-2018)	Call for tender with specifications from the SAVM joint association (103 municipalities + region +2 départements + Greater Paris authority), then public service delegation to a private operator. Electric vehicles only.	Station locations chosen by the SAVM and municipalities.	City of Paris, urban outskirts

Table 8: Governance of one-way station-based car-sharing in the Paris Region

Sources: SAVM, City of Paris; analyses: IPR, 2024

1.3.2.4. Free-floating car-sharing governance in the Paris Region

In 2018, Zipcar launched the first free-floating car-sharing service in Paris. When Autolib' came to an end, Zipcar left Paris and three free-floating car-sharing operators set up shop: the Stellantis Group launched **Free2Move** (see Figure 9), Ada and Renault set up **Moov'In Paris** and Daimler and BMW offered **Share Now**. By 2019, these three operators together will be offering 1,500 shared cars. The free-floating car-sharing sector evolved rapidly: in 2020, Ada withdrew from Moov'In Paris and Renault transformed the service, which became **Zity**; in 2022, Free2Move bought Share Now, which was then in difficulty; and in 2024, Zity stopped its service due to major damage to its fleet. Even so, free-floating car-sharing remains very marginal, with fewer than 1,000 journeys made each day in 2024 (L'Institut Paris Region & Fluctuo, 2024). Since 2020, the rules for operating a car-sharing service in Paris have changed.

Operators must submit their services to the City of Paris, which issues them with occupancy permits after consultation with the transport authority and the police prefecture. The City of Paris sets specifications for vehicles, all of which must be electric and awarded with the "*Île-de-France autopartage*" label *(see p.23)*. Operators must offer a service that is evenly distributed across all the Paris arrondissements (districts). They also must declare how many vehicles they operate and transmit their data to the City of Paris.

The particularity of free-floating car-sharing in the capital is that the City of Paris only authorises 100% electric vehicles. This limits the use of these vehicles to short, urban journeys. The service areas where users can hire and drop off vehicles are restricted to Paris, although a few neighbouring municipalities in western Paris were able to benefit from the Free2Move and Zity services in their early days. In 2024, only Paris is covered by Free2Move, the last remaining free-floating car-sharing operator in the Île-de-France region.

Figure 9: Free2Move vehicles in Paris in 2018 (CC BY-SA 4.0 Tiraden) (see 1.3.2.4)

One might think that the plethora of mobility options available in the capital and the constraints on car traffic would make it possible to travel within the city without having to use a car, even a shared one. Indeed, the alternatives of public transport, shared bikes, mopeds and scooters, ride-hailing services

and taxis make it possible to travel within Paris for a comparable price and without the constraints associated with driving and parking. What's more, the strong growth in e-commerce, deliveries, and cargo bikes (shared or otherwise) means that you don't have to use a car to buy something bulky.

Car-sharing operator	Conditions of operation	Stations urban environment
Free2Move	The operators submit their services to the City of Paris, which issues them with occupancy permits after consultation with the transport authority and the police prefecture. The City of Paris sets specifications for vehicles, all of which must be electric and awarded with the "*Île-de-France autopartage*" label. Operators pay a street occupation charge to the City of Paris. Operators must offer a service that is evenly distributed across all the Paris arrondissements (districts). They must declare how many vehicles they operate and transmit their data to the City of Paris. Electric vehicles only.	City of Paris

Table 9: Governance of free-floating car-sharing in the Paris Region

Source: City of Paris; analyses: IPR, 2024

1.3.3. Peer-to-peer car-sharing governance

1.3.3.1. Peer-to-peer car-sharing governance in the Brussels-Capital Region

Only one peer-to-peer car-sharing operator is accredited in the BCR: **Cozywheels**. It is part of the non-profit organisation Mpact. It offers private individuals and businesses the opportunity to share their car if they own one, and others access to it if they do not. Cozywheels offers tools to make sharing easier: booking calendar, insurance, rate calculator, automatic billing, customer service, etc. It is possible to create a neighbourhood or co-ownership community for each vehicle so that it can be shared only with the people of your choice. This aspect makes this service a creator of social links in phase with the concept of 15mC. It is also possible to share bicycles, cargo bikes, vans or cars adapted for people with reduced mobility. Business includes internal fleet management or fleet sharing. This enables small and medium-sized businesses to share their vehicles with other organisations. Cozywheels' accreditation enables it to issue vehicle-sharing certificates, which are used to obtain several residents' parking permits (possibly for separate sectors) for a single vehicle. To obtain the licence, at least 10 car-sharing groups must be affiliated to the car-sharing system. The operator must transmit its data to Brussels Mobility and conduct a survey every year (Brussels-Capital Region, 2017). Cozywheels users can benefit from the Bruxell'Air bonus (Bruxelles Environnement, 2024).

Wibee, Dégage and **Getaround** are three other peer-to-peer car-sharing operators, but they do not have a license. These operators can still operate their service, but they do not have the parking arrangements from Parking.Brussels and users cannot claim the Bruxell'Air bonus. Dégage is a non-profit organisation that does not seek profit, but social and liveable neighbourhoods that are more local and multimodal. In this respect, its model is favourable to the 15mC neighbourhood. The organisation is a common and is run from the bottom up by volunteers and citizens. Dégage users are automatically members of the General Meeting and can raise ideas, problems, or questions with the Board of Directors. This way, everyone has a say in how the organisation works, the rates charged, etc. Dégage also allows users to share bikes. In addition to its round-trip car-sharing stations, Getaround offers a platform

enabling private individuals and companies to share their cars, on or off the road, but without a parking exemption card supplied by Parking Brussels.

<table>
<tr><th>Car-sharing operator</th><th>Conditions of operation</th><th>Stations urban environment</th></tr>
<tr><td>Cozywheels</td><td>Licence to operate awarded by the transport authority which sets conditions, like providing standard contracts, keep a minimum of car-sharing groups affiliated to the car-sharing system, and a minimum of persons in each group, etc. Accreditation enables the operator to issue vehicle-sharing certificates, which are used to obtain several residents' parking permits for a single vehicle. The operator must transmit its data to the transport authority and conduct a survey for users every year. Users can benefit from the Bruxell'Air bonus.</td><td rowspan="4">City centre, urban outskirts, rural areas</td></tr>
<tr><td>Wibee</td><td rowspan="3">No licence delivered by the transport authority. These operators can still operate their service, but they do not have the parking arrangements from Parking.Brussels and users cannot claim the Bruxell'Air bonus.</td></tr>
<tr><td>Dégage</td></tr>
<tr><td>Getaround</td></tr>
</table>

Table 10: Peer-to-peer car-sharing governance in the Brussels-Capital Region

Sources: Parking.Brussels, Brussels Mobility, Cozywheels, Wibee, Dégage; analyses: IPR, 2024

1.3.3.2. Peer-to-peer car-sharing governance in Flanders

Two peer-to-peer car-sharing operators operate in Flanders: **Cozywheels** and **Dégage**. Dégage operates in the Flemish and Brussels-Capital Regions and Cozywheels operates in all Belgium. No permit is required by the Flemish Region from operators to provide their services.

<table>
<tr><th>Car-sharing operator</th><th>Conditions of operation</th><th>Stations urban environment</th></tr>
<tr><td>Cozywheels</td><td rowspan="2">Operators can provide their services without a permit from the Flemish Region.</td><td>City centre, urban outskirts, rural areas</td></tr>
<tr><td>Dégage</td><td>City centre, urban outskirts, rural areas</td></tr>
</table>

Table 11: Peer-to-peer car-sharing governance in Flanders

Source: Autodelen.net; analyses: IPR, 2024

1.3.3.3. Peer-to-peer car-sharing governance in the Paris Region

Peer-to-peer car-sharing is possible in the Paris Region thanks to three private operators: **Getaround**, **Turo** and **RoadstR** (the latter specialising in top-of-the-range cars). In France, car-sharing between private individuals is considered to be a loan between private individuals, where the terms of agreement and negotiation are of a private nature. There is therefore no government intervention in this type of car-sharing. No permit is intended by the Paris Region from operators to provide their services.

Car-sharing operator	Conditions of operation	Stations urban environment
Getaround	Operators can provide their services without a permit from the Paris Region.	City centre, urban outskirts, rural areas
Turo		City centre, urban outskirts, rural areas
RoadstR		City centre, urban outskirts, rural areas

Table 12: Peer-to-peer car-sharing governance in the Paris Region

Source: Leconte et al., 2023; analyses: IPR, 2024

1.4. Business models of car-sharing services

1.4.1. Round-trip car-sharing business models

1.4.1.1. Round-trip car-sharing business models in the Brussels-Capital Region

There are a number of factors involved in creating a viable business model for a car-sharing service, such as pricing (by time, by distance, etc.), occupancy rate, purchase costs (mostly for vehicles), fuel and energy costs, commissions (for peer-to-peer car-sharing), subscription fees, parking fees and overhead costs (staff, replacing vehicles, maintenance, cleaning, etc.) (Autodelen.net, 2022). For example, a round-trip car-sharing service needs at least an occupancy rate of 25-30% to be profitable (Seeuws, 2022), electric vehicles (EV) are more expensive than fossil-fuelled vehicles and ensuring that vehicles are in good condition at all times has a cost, so it is more difficult to be profitable in a low-density area with widespread stations and only EVs. The three main differences in business models between dense and sparsely populated areas are occupancy rates, overhead costs and parking fees (often lower in the outskirts). This is particularly important when developing a car-sharing service in peri-urban areas (Autodelen.net, 2022).

In accordance with the rules set by Brussels Mobility, round-trip car-sharing rates includes all service costs: fuel, maintenance, repairs, insurance, etc. No subsidies are granted to operators by the BCR. However, Brussels Mobility offers the Bruxell'Air bonus for residents who deregister their number plate. Under certain conditions, these people can benefit from a bonus (the amount of which is determined according to income) that must be spent on alternative mobility options to the private car, including car-sharing. Moreover, Parking.Brussels offers operators exemption cards for free parking in public spaces (outside zones where parking is limited to 2 hours). The price of the exemption card is

€25/year/vehicle. To encourage multimodality, the operators and the STIB (the Brussels public transport company) developed a combined offer of car-sharing + public transport and promote it to their users.

Cambio is a project initiated by Mpact in 2000 together with Cambio Mobilitätsservice gmbh VAB and NMBS-SNCB2022. To access the service, Cambio users must pay a fee (between €150 and €500) which is used to develop the system, and take out a monthly subscription, after which journeys are billed according to rental time and distance travelled. There also is a one-off €35 activation fee. There is a reduced rate for night-time hours and kilometres travelled in excess of 100 kilometres. There is a maximum rate per day and per week. Three types of subscription are available, with sliding scale rates for the most comprehensive subscriptions. It is possible to choose to add a supplement to the subscription to obtain a reduced franchise in case of damage. It meets different needs with different vehicle models: from small city cars to utility vehicles. A special “campus” subscription is available for under-25s with less than 2 years' driving experience. Partnerships with driving schools allow future car sharers to take their driving lessons in a Cambio car. The vehicles are unlocked using an application or a badge (it is possible to load a Cambio subscription onto the Mobib pass which is used for public transport). There is a combined STIB + Cambio offer which allows regular public transport users to benefit from a reduction on Cambio fares. In order to make the service accessible to people who are less at ease with digital tools, it is possible to book a journey by telephone 24/7 for €1. There is also a call centre (managed by Mpact) that can be used to call in the event of damage, accidents, etc. Cambio is available on the Floya and Olympus MaaS platforms that include several mobility operators. The E-cargo bike service also lets users hire cargo bikes via the Cambio application. This service is piloted by Brussels Mobility as part of the Cairgo Bike European project (Urban Innovative Actions, 2024).

No subscription is required for **Getaround**. Rates are charged by the hour or by the day, with a maximum number of kilometres to be paid in advance, depending on the user's needs. The vehicles are unlocked using an application. Different access rules and insurance excesses apply depending on how old the driver's licence is. Users under 25 pay a supplement. It is possible to pay extra for better cover in the event of damage. A deposit is required on payment of the hire charge.

Car-sharing operator	Pricing	Public/private subsidy	Stations urban environment
Cambio	By hour, day or week, and km depending on the type of vehicle. All service costs included. Different subscription offers for reduced costs. Participation fee to develop the system.	Parking.Brussels offers operators exemption cards for free parking in public spaces for €25/year/vehicle. Residents who part with their car can benefit from the BCR Bruxell'Air bonus that can be spent on car-sharing services. Travel costs may be partly covered by employers as part of the mobility budget.	BCR city centre, urban outskirts
Getaround	By hour or day, and km depending on the type of vehicle. All service costs included. No subscription fees.		BCR city centre

Table 13: Round-trip car-sharing business models in the Brussels-Capital Region

Sources: Parking.Brussels, Brussels Mobility; analyses: IPR, 2024

1.4.1.2. Round-trip car-sharing business models in Flanders

In the Flemish Region, the budgets allocated to municipalities for the 2030 climate targets can be used to develop car-sharing. Solva, for instance, is an intermunicipal organization of 16 municipalities in the South of the East-Flanders province (South of Ghent). As part of its climate plan, it launched a call for tenders and selected a car-sharing operator. Solva supports the operator financially with a monthly income called “purchase guarantee” which covers the operators’ costs, in order to create a business model on a long term. The service has been able to grow, and the number of journeys has risen steadily. This gave the operator the opportunity to create a profitable car-sharing service within three or four years, which would not have been possible without public funding. Once it had reached the break-even point, Solva had the option of stopping its financial support, but decided to continue it to help the operator expand its fleet of shared vehicles (Autodelen.net, 2022). In the municipality of Glabbeek, in the province of Flemish Brabant, there is a similar system, but the municipality can reduce its financial support as the car-sharing operator works with local companies to put advertising on shared cars (Autodelen.net, 2022). In other parts of Flanders, authorities called on operators to install round-trip car-sharing vehicles in their areas, some of which were suburban or rural areas, as well as small train or bus stations. The operators agreed on one condition: to share the risk of losses resulting from a smaller number of potential users than in dense urban areas (Autodelen.net, 2024). The system, known as “cashback” or “minimum revenue guarantee”, is an agreement between the car-sharing operator and the municipality, which stipulates that a minimum turnover must be achieved per car each month (around €800, Rodenbach, 2024). If this minimum amount is not reached by the operator, the municipality must pay the difference to the operator to enable it to break even. To reach this amount, local authorities encourage their staff to use car-sharing vehicles rather than service cars. Employers located in business parks can be encouraged to replace their fleets and employees’ company cars with car-sharing services. By combining the journeys made by residents, train and bus users, municipal staff, associations, and local businesses, it is possible to reach the minimum threshold and operate car-sharing in rural areas without public subsidies (Autodelen.net, 2024). **Cambio**, **Claus2you**, **Stapp.in**, **Mobilize Share**, **BattMobility** and **Coopstroom** also propose business offers.

Coopstroom is a car-sharing operator in the form of a non-profit cooperative company. To become a user, the first step is to buy a share in the cooperative. Shared cars are equipped with an on-board computer that automatically records journeys. Users locate the car using the app, and open and lock the car using their smartphone. In Bruges, cars can be left anywhere in a designated area. Otherwise, cars have a designated parking space. Coopstroom offers various formulas based on pre-paid driving credit. Users pay according to time of use and per kilometre. On request, Coopstroom can fit a child seat in the car, which is ideal for families living in peri-urban areas. In West Flanders, if a group of people can guarantee 4 COOP formulas or 6 Prepaid Comfort formulas per month, Coopstroom will place a shared electric car in their neighbourhood. This makes it possible to develop carsharing in sparsely populated areas where there is a demand from local residents. To become a member, users must hold a driving licence for at least 6 months. In addition, only people aged 20 or over are allowed to become cooperators. To become a member, drivers must not have been disqualified from driving for at least 5 years. All vehicles are electric. The cooperative invests in renewable energy. Anyone who is a Coopstroom shareholder can also sign a green energy contract with the Ecopower cooperative, which supplies electricity from Belgian solar, wind and hydro power. Coopstroom is part of the Coop CEDAN network. Members of this network of green energy cooperatives can use the Coopstroom shared cars without having to buy a share.

If you and your neighbourhood can guarantee a certain level of usage per month, BattMobility will consider placing a car near you. BattMobility also has a private leasing formula (BattMaxx). In this case, you lease an electric car through the company and make it available to other people when you don't need it. Instead of getting money, you get a discount on your monthly charges for the time you share your car. Various types of vehicles are available.

Car-sharing operator	Pricing	Public/private subsidy	Stations urban environment
Cambio	By hour, day or week, and km depending on the type of vehicle. All service costs included. Different subscription offers for reduced costs. Participation fee to develop the system.	Municipalities can spend some of the budget the region allocate them for its climate policy to car-sharing services. "Cashback" or "minimum revenue guarantee" is an agreement between the operator and the municipality, which stipulates that a minimum turnover must be achieved per car each month (around €800). If this minimum amount is not reached by the operator, the municipality must pay the difference to the operator to enable it to break even. "Purchase guarantee" is another financial arrangement for balancing the car-sharing economy: local authorities guarantee a regular monthly income to the operator so that it can break even. Travel costs may be partly covered by employers as part of the mobility budget.	City centres, urban outskirts, rural areas, mobility hubs
Claus2you	By hour or day and km depending on the type of vehicle. All service costs included. No subscription fees.		City centres, rural areas, mobility hubs
Stapp.in	By hour or day and km depending on the type of vehicle. All service costs included. No subscription fees.		Urban outskirts, rural areas, mobility hubs
Mobilize Share	By hour or day and km depending on the type of vehicle. All service costs included. No subscription fees.		Urban outskirts, rural areas
BattMobility	By hour or day and km depending on the type of vehicle. All service costs included. Different subscription offers for reduced costs.		City centres, urban outskirts
Coopstroom	By km. All service costs included. Prepaid formulas. Possible subscription fee for reduced cost.		City centres, rural areas, mobility hubs

Table 14: Round-trip car-sharing business models in Flanders

Sources: Cambio, Claus2you, Stapp.in, Autodelen.net, BattWatt, Coopstroom; analyses: IPR, 2024

1.4.1.3. Round-trip car-sharing business models in the Paris Region

In the Paris Region, round-trip car-sharing services charge per hour, day and kilometre. It is possible to choose to add a supplement to the subscription to obtain a reduced excess. Vehicles are unlocked 24/7 using an application or a badge. Operators propose business offers. In the City of Paris, operators pay a street occupation charge to the municipality: €200-390 per year depending on type and number of vehicles (City of Paris, 2020). There is a €100 grant from the City of Paris to encourage Parisians to try car-sharing. **Ubeeqo/Europcar on Demand**, **Communauto**, **Getaround**, **Clem'** and **Citiz**. also propose

business offers. Various types of vehicles are available. Clem' proposes offers for local authorities and home-owner associations.

In France, the "*Forfait Mobilités Durables*" (sustainable mobility aid, FMD) is a voluntary scheme whereby employers pay for employees' personal transport costs between home and work. It could one day be made compulsory for employers, but for the moment it is optional. To a certain extent, the FMD is exempt from social security contributions and income tax. The means of transport covered by this scheme are personal bicycles, carpooling, public transport, and shared mobility (including car-sharing).

Car-sharing operator	**Pricing**	**Public/private subsidy**	**Stations urban environment**
Ubeeqo/Europcar on Demand ⚠ *The service stopped in December 2024*	By hour (minimum of 4h) or day and km depending on the type of vehicle. All service costs included. No subscription fees.	In the City of Paris, operators pay a street occupation charge to the municipality depending on type and number of vehicles. €100 grant from the City of Paris to encourage Parisians to try car-sharing. Travel costs may be partly covered by employers as part of the FMD.	City of Paris
Communauto	By hour or day and km depending on the type of vehicle. All service costs included. Different subscription offers for reduced costs.		City of Paris, urban outskirts
Getaround	By hour or day and km depending on the type of vehicle. All service costs included. No subscription fees.		City of Paris, urban outskirts
Clem'	By hour depending on the type of vehicle. All service costs included. Unlocking fee. No subscription fees.		City of Paris, urban outskirts, rural areas
Citiz	By hour, day or week and km depending on the type of vehicle. All service costs included. Possible subscription fee for reduced cost.		Urban outskirts

Table 15: Round-trip car-sharing business models in the Paris Region

Sources: Europcar, Communauto, Getaround, Clem', Citiz; analyses: IPR, 2024

1.4.2. Free-floating and one-way station-based car-sharing business models

1.4.2.1. Free-floating car-sharing business models in the Brussels-Capital Region

The free-floating car-sharing market is volatile and has difficulty consolidating. Operators are struggling to find a profitable business model. In fact, as with free-floating scooter systems, the business model of these companies is closer to a winner-take-all market, with aggressive commercial practices to dominate the market (Wilson, 2020). This means that free-floating operators often lose money by underestimating their costs and charging low prices for a certain period in order to achieve a monopoly or quasi-monopoly before becoming profitable. They often need to raise significant amounts of venture capital, but not all are able to stay in the market. The companies then have to withdraw or are bought out by their competitors. One notable difference with the shared micromobility market is that some free-floating car-sharing operators are strongly supported by carmakers, who are keen to experiment with the business models for new uses of the car (INVERS, 2023). They also see it as an opportunity to showcase their new vehicle models on the streets of major cities (Chodorge, 2019). Most of the time, local authorities regulate the activities of free-floating car-sharing operators by imposing restrictions, but do not seek to attract operators through calls for tender, for example (Gouvernement de la Région de Bruxelles-Capitale, 2013).

There has been a lot of momentum in the free-floating car-sharing market recently. In 2021 GreenMobility, from Denmark, bought the Dutch operator Fetch Mobility, and in 2022 Miles, from Germany, bought WeShare, Volkswagen's free-floating system (INVERS, 2023). In Brussels, operators Zipcar (owned by American car rental company Avis) and Drivenow (a subsidiary of BMW) began offering their services in 2019 but ceased operations in 2022 (Autodelen.net, 2023). GreenMobility, withdrew from the cities of Brussels and Ghent in 2023 after just three years in business. In the same year, Belgian operator Poppy withdrew from Ghent, Mechelen, Leuven (Temmerman et al., 2023) and Lier (radio 2, Snoeys, 2023). The company had been present in Flanders since 2019.

One thing we are seeing in the free-floating car-sharing market today is a trend towards hybrid business models. Free-floating operators such as Miles are starting to rent cars and traditional car hire companies such as Sixt are starting to offer car-sharing services (Sixt Share). In Germany, we find free-floating operators starting up round-trip car-sharing (Share Now) and round-trip car-sharing operators starting up free-floating (Cambio, stadtmobil, teilAuto, and book-n-drive). Another possible combination: the Bolt ride-hailing platform is also starting to offer car-sharing (Bolt.Drive) (INVERS, 2023).

In the Brussels-Capital Region, pricing is based on usage, according to the number of kilometres travelled and the rental time. Unlocking is made with an application. As with round-trip car-sharing, prices must be clear and use must include fuel, maintenance, repairs, insurance, etc. Parking.Brussels offers operators exemption cards for free parking in public spaces (outside zones where parking is limited to 2 hours). The price of the exemption card is €25/year/vehicle. With **Poppy**, subscriptions are available offering discounts on usage in return for a monthly fee. A paying service allows users to have the car delivered if they plan their journey in advance. With **Miles**, there is an unlocking fee. Subscriptions are also available. Miles offers services to local authorities to promote the integration of its car-sharing service into their mobility offerings. If some user obtained its driving licence less than 12 months ago, they would have to pay a "rookie fee" of €9/month. There are services for professionals and businesses for both services. It is possible to use Poppy and Miles for a one-way trip to other areas such as Antwerp, or the airports of Charleroi, Brussels, and Antwerp with an extra fee.

Car-sharing operator	Pricing	Public/private subsidy	Urban environment
Poppy	By hour or day and km depending on the type of vehicle. All service costs included. Possible subscription fee for reduced cost.	Parking.Brussels offers operators exemption cards for free parking in public spaces (outside zones where parking is limited to 2 hours). The price of the exemption card is €25/year/vehicle. Residents who part with their car can benefit from the BCR Bruxell'Air bonus that can be spent on car-sharing services.	BCR city centre, urban outskirts
Miles	By hour or day and km depending on the type of vehicle. All service costs included. No subscription fees.		BCR city centre

Table 1: Free-floating car-sharing business models in the Brussels-Capital Region

Sources: Parking.Brussels, Brussels Mobility, Poppy, Miles, Autodelen.net; analyses: IPR, 2024

1.4.2.2. Free-floating car-sharing business models in Flanders

In addition to Brussels, **Poppy** operates in the core area of Antwerp, **Miles** operates in Antwerp and Ghent. You can use Poppy and Miles for a one-way trip in-between areas such as Antwerp, Brussels or the airports of Charleroi, Brussels, Antwerp, and Liège with an extra fee. Poppy is available on the Floya and Olympus MaaS platforms that include several mobility operators. Miles is available on Olympus only.

Car-sharing operator	Pricing	Public/private subsidy	Urban environment
Poppy	By hour or day and km depending on the type of vehicle. All service costs included. Possible subscription fee for reduced cost.	No public subsidy	City centres, urban outskirts
Miles	By hour or day and km depending on the type of vehicle. All service costs included. No subscription fees.		City centres, urban outskirts

Table 2: Free-floating car-sharing business models in Flanders

Sources: Poppy, Miles, Autodelen.net; analyses: IPR, 2024

1.4.2.3. One-way station-based car-sharing business model in the Paris Region

With **Autolib'**, the aim was to offer an inter-municipal car hire service without costing Paris City Council "a penny". Pricing was by the minute, with an annual subscription formula offering a reduced cost per minute. Despite the growth of the service, the use of Autolib' fell from 2016 onwards, mainly due to the growth in the use of ride-hailing services at the same time, which offer the same type of journeys at a

comparable cost. The lack of profitability can be explained by, among other things, a lack of availability of vehicles, which “discourages” subscribers from using the service, but also by the fact that many charging points are made unavailable on a daily basis following decisions by the public authorities (demonstrations, roadworks, Vigipirate plan against terrorist attacks, etc.). The Bluecars were also increasingly dilapidated and dirty, due to inadequate maintenance as well as incivilities and sometimes even cars squatted by homeless people. In 2018, Autolib' generated annual losses of €50 million, even though the system was supposed to be exempt from public subsidies, and even to generate profits of €56 million a year. The Bolloré group then asked the municipalities served by the service to contribute to repaying the debt, which continued to grow, and to close 20% of the 1,100 stations deemed the least profitable. The SAVM then terminated the contract with Bolloré, which demanded 235 million euros in compensation for the termination of the contract, which was due to end in 2023.

Car-sharing operator	Pricing	Public/private subsidy	Urban environment
Autolib’ (operating 2011-2018)	By minute or day and km. All service costs included. Possible subscription fee for reduced cost.	Strong public subsidy (delegation of public service)	City of Paris, urban outskirts

Table 3: One-way station-based car-sharing business model in the Paris Region

Sources: SAVM, City of Paris*; analyses: IPR, 2024*

1.4.2.4. Free-floating car-sharing business models in the Paris Region

In Paris, **Free2Move** is available by the minute, hour, or day. The first 200 kilometres are included, after which a cost-per-kilometre charge applies. Unlocking is made with an application. As with round-trip car-sharing, prices include fuel, maintenance, repairs, insurance, etc.

Car-sharing operator	Pricing	Public/private subsidy	Urban environment
Free2Move	By minute, hour or day and km depending on the type of vehicle. All service costs included. Possible subscription fee for reduced cost.	In the City of Paris, operators pay a street occupation charge to the municipality depending on type and number of vehicles. €100 grant from the City of Paris to encourage Parisians to try car-sharing. Travel costs may be partly covered by employers as part of the FMD.	City of Paris

Table 4: Free-floating car-sharing business model in the Paris Region

Sources: Free2Move; analyses: IPR, 2024

1.4.3. Peer-to-peer car-sharing business models

1.4.3.1. Peer-to-peer car-sharing business models in the Brussels-Capital Region

Cozywheels is a project initiated by Mpact. It offers tools to make sharing easier for peer-to-peer car-sharing users, like a rate calculator and automatic billing. The annual registration fee is €25, pricing is made by the kilometre. The price of a journey includes fuel, insurance, road tax, annual servicing, roadworthiness tests and, if necessary, a reserve pot for unexpected repairs. The fee covers only the actual cost of the vehicle and is not intended to make a profit. Payment is made at the beginning of the following month, directly between members. For longer bookings (more than 1 day), a daily or hourly charge may be added. Cozywheels works with closed groups, mostly neighbours. Car owners have total control over who uses their cars. Cozywheels also propose business offers. Cozywheels' accreditation enables it to issue vehicle-sharing certificates, which are used to obtain several residents' parking permits (possibly for separate sectors) for a single vehicle. There is also an offer for companies, enabling them to share their commercial vehicles with private individuals, for example.

To use **Wibee**, you need to join a car-sharing group, to share your car or hire one from other members of the group. You pay by the hour, day, and kilometre. There is No subscription fees for car users. When an owner rents their car, 80% of the amount goes to them and 20% is allocated to Wibee as a service commission. Car owners benefit from comprehensive insurance cover negotiated specifically for shared vehicles. The day-to-day operational management of the cars remains the responsibility of the owner (e.g., maintenance, roadworthiness tests, etc.). There are several subscription packages for owners, with benefits such as the installation of on-board technology to unlock vehicles with a badge or smartphone, a platform to put owners in touch with people looking for a car to hire, a fuel card, online revenue payment, etc. Wibee also proposes offers for businesses, associations, and local authorities.

Dégage is a not-for-profit organisation that works with citizens and over 100 volunteers. Shared car users pay the price per kilometre for each kilometre driven. These prices include fuel. Users do not pay an hourly rate, a subscription fee, or any other form of contribution. There is a one-off entry fee of 45 euros and a deposit of 75 euros, which is refundable on departure. Car owners continue to pay all the costs of their car (insurance, tax, maintenance, wear and tear and all other fixed costs). These costs are entered by them into the system. Dégage also charges owners depreciation costs as the cost of their car. This means they know exactly how much their car really costs, expressed as a price per kilometre. For each kilometre travelled by a user in an owner's car, the price per kilometre is reimbursed to the owner. This price is often lower than the fixed price per kilometre for users. Dégage takes a commission on the rides: what the user pays per km is higher than what the owner receives. The user pays Dégage quarterly and Dégage pays the owner quarterly according to the costs incurred. The owner therefore receives a refund rather than a payment. Owners can also use other cars in the Dégage fleet. They pay the same rate as an ordinary car borrower. They then receive an invoice from Dégage for this. It is also possible to share bikes. Since 2022, Dégage has been investing part of its members' deposits in sustainable and ethical initiatives. Dégage is available on the Olympus MaaS platform that includes several mobility operators.

In Belgium, there is a tax exemption system called the *“mobiliteitsbudget*”,”/“*budget mobilité*”, or mobility budget. When an employer chooses to introduce a mobility budget in his company, employees can exchange their entitlement to a company car for a more environmentally friendly company car, sustainable means of transport, accommodation costs or money. Dégage users can benefit from this mobility budget. According to Autodelen.net, “Although the mobility budget has the potential to stimulate (and raise awareness of) car-sharing, there are still significant obstacles. The mobility budget is a construct that still promotes car-sharing's biggest competitor: the company car. Making car mobility free (whether electrified or not) will never encourage sustainable travel behaviour. The company car and, all the more so, the fuel card that goes with it, stimulate reflexive use of the car, which is diametrically opposed to the principle of car-sharing” (Autodelen.net, 2024).

Car-sharing operator	Pricing	Public/private subsidy	Urban environment
Cozywheels	By km, depending on the type of vehicle, with possible price per day or hour for longer bookings. All service costs included. Annual subscription fee.	No public subsidy. Licence from the transport authority allows the operator to obtain several residents' parking permits (possibly for separate sectors) for a single vehicle. Travel costs may be partly covered by employers as part of the mobility budget.	BCR city centre, urban outskirts
Wibee	By hour, day and km, depending on the type of vehicle. All service costs included for the user. Monthly subscription fee for car owners. A commission is charged to the owner on the rental price.	No subsidy	BCR city centre, urban outskirts
Dégage	By km. All service costs included for the user. One-off entry fee of 35 euros and a deposit of 75 euros	Travel costs may be partly covered by employers as part of the mobility budget.	BCR city centre, urban outskirts

Table 5: Peer-to-peer car-sharing business models in the Brussels-Capital Region

Sources: Parking.Brussels, Brussels Mobility, Cozywheels, Wibee, Dégage; analyses: IPR, 2024

1.4.3.2. Peer-to-peer car-sharing business models in Flanders

In the Flemish region, several cities offer benefits to **Cozywheels** users, like free resident parking card, dedicated on-street parking spaces, free on-street parking card, reimbursement of registration fees, or a mobility budget of €500 allocated to users parting with their car or moped, which can be used for the Cozywheels service. **Dégage** operates with the same conditions than in the Brussels-Capital Region. **Getaround** peer-to-peer (P2P) service serves as a marketplace for entrepreneurs wishing to launch a car rental business. The platform offers them the opportunity to equip a vehicle or fleet they own with a reservation and unlocking system, to offer an “Uberised” rental service on which Getaround takes a commission. It seems this model is intended to replace Getaround's original business of car hire between private individuals. As with its service with stations, no subscription is required for the P2P service of Getaround. Rates are charged by the hour or by the day, with a maximum number of kilometres to be paid in advance, depending on the user's needs. The vehicles are unlocked using an application. Different access rules and insurance excesses apply depending on how old the driver's licence is. Users under 25 pay a supplement. It is possible to pay extra for better cover in the event of damage. A deposit is required on payment of the hire charge. Getaround also proposes offers for businesses.

Car-sharing operator	Pricing	Public/private subsidy	Urban environment
Cozywheels	By km, depending on the type of vehicle, with possible price per day or hour for longer bookings. All service costs included. Annual subscription fee.	No public subsidy. Licence from the transport authority allows the operator to obtain several residents' parking permits (possibly for separate sectors) for a single vehicle. Travel costs may be partly covered by employers as part of the mobility budget.	City centres, urban outskirts, rural areas
Dégage	By km. All service costs included for the user. One-off entry fee of 45 euros and a deposit of 75 euros	Travel costs may be partly covered by employers as part of the mobility budget.	City centres, urban outskirts, rural areas
Getaround	By hour or day, and km depending on the type of vehicle. All service costs included. No subscription fees.	No subsidy	City centres, urban outskirts, rural areas

Table 6: Peer-to-peer car-sharing business models in Flanders

Sources: Cozywheels, Dégage, Getaround, Autodelen.net; analyses: IPR, 2024

1.4.3.3. Peer-to-peer car-sharing business models in the Paris Region

As in Belgium, **Getaround** also serves as a marketplace for entrepreneurs wishing to launch a car rental business. The platform offers them the opportunity to equip a vehicle or fleet they own with a reservation and unlocking system, to offer an “Uberised” rental service on which Getaround takes a commission. This is intended to replace Getaround's original business of car hire between private individuals. **Turo** is another peer-to-peer car-sharing operator, which works in a similar way to its competitor Getaround. Several levels of insurance at different prices are available. A car delivery option is available for a fee. **RoadstR** is another P2P car-sharing operator, specialised in luxury vehicles. Fees are charged by the day or for longer periods. A deposit is required. Rental is made in person between the owner and the user. The operator takes a commission of 15% of the owner's income for each rental made. RoadstR offers flexible pick-up and drop-off options in a variety of cities and airports, as well as additional conveniences such as parking solutions at major stations or tourist attractions. Owners can hire their car “with driver”.

Car-sharing operator	Pricing	Public/private subsidy	Urban environment
Getaround	By hour or day, and km depending on the type of vehicle. All service costs included. No subscription fees.	No subsidy	City centre, urban outskirts, rural areas
Turo	By hour or day, and km depending on the type of vehicle. All service costs included. No subscription fees.	No subsidy	City centre, urban outskirts, rural areas
RoadstR	By day and km depending on the type of vehicle. All service costs included. No subscription fees.	No subsidy	City centre, urban outskirts, rural areas

Table 7: Peer-to-peer car-sharing business models in the Paris Region

Sources: Getaround, Turo, RoadstR; analyses: IPR, 2024

1.5.Recommendations for car-sharing services in a 15mC neighbourhood

Recommendations:

- Encourage round-trip car-sharing, which offers better environmental efficiency and an economic model that is better suited to urban outskirts than other forms of carsharing (lower fares, less public subsidy, and better stability of the service over time) (see 1.1).
- While free-floating car-sharing may have a balanced (albeit precarious) business model in major cities (particularly in the form of a combined free-floating + round-trip car-sharing offer), it does not appear to be a viable solution in urban outskirts. (see 1.1).
- Encourage cooperative, not-for-profit, peer-to-peer car-sharing models, which can take root in sparsely populated areas and remain there thanks to the involvement and knowledge of citizens. Authorities can provide bonuses and benefits including dedicated on-street parking spaces for P2P car-sharing, right to obtain several residents' parking permits (possibly for separate sectors) for a single vehicle, free resident parking cards, free on-street parking cards, reimbursement of registration fees, etc. (see 1.3.1.3, 1.4.3.1 & 1.4.3.2)
- Do not impose 100% electric vehicle services, so as not to limit car-sharing to urban centres with good charging infrastructures (see1.4.1.2 1.3.2.3, 1.3.2.4 & 1.4.1.1).
- Offer a car-sharing service that meets a range of needs with different vehicle models: from small city cars to utility vehicles (see 1.3.1.1, 1.4.1.1, 1.4.1.2 & 1.4.1.3).
- In addition to car-sharing, develop other alternatives to the private car: walking, cycling, public transport, micromobility, etc. Creating the possibility of a multimodal lifestyle is essential if households are to do without a private car on a day-to-day basis and only use a shared car for occasional journeys (see 1.1).
- Where relevant, group together alternative mobility offers to the private car, including car-sharing, in mobility hubs to give them greater visibility in car-centric environments (see 6.1).
- Establish a dialogue framework between mobility and parking authorities, local authorities, road managers and car-sharing operators to regulate the sector, coordinate its deployment,

obtain operating data from operators and monitor its development. Provide human resources to monitor the sector, as this is time-consuming (see 1.3.1.1).

- Set clear objectives for the development of car-sharing (number of stations deployed, number of users registered for services, etc.). Include these objectives in regional planning documents such as SUMPs and Climate Plans (see 1.3.1.1 & 1.3.1.2).
- In cooperation with local authorities, introduce rules to spread the deployment of round-trip car-sharing stations in different types of areas, so that operators install their stations not only in dense areas (which often have better alternatives to the car) but also in peri-urban areas (see 1.3.1.1).
- Communicate the benefits of car-sharing for everyone so that residents, businesses and public authorities make the switch to car-sharing. A good communication campaign has a real impact on the development of car-sharing, which is still not widely known, particularly in peri-urban areas where the private car is king. (see 1.3.1.1 & 1.3.1.2).
- The "purchase guarantee" and "minimum revenue guarantee" systems are financial risk-sharing schemes that enable low-density areas authorities to attract car-sharing operators (in connection with a call for tenders, for example). If this system is implemented, encourage local authorities, public administrations, businesses and associations to reduce their vehicle fleet and make maximum use of car-sharing vehicles. Looking for compatible profiles will minimise the risk of expenditure for municipalities (see 1.4.1.21.3.1.2).
- Encourage employers to set up mobility aids for their employees, such as the"*mobiliteits-budget/budget mobilité*" (mobility budget) in Belgium (see 1.4.3.1) or the "*Forfait Mobilités Durables*" (sustainable mobility aid) in France (see 1.4.1.3), which provide a credit to be spent on alternative mobility offers to the car, including car-sharing. This can be a way for car-dependent peri-urban families to try out car-sharing before adopting it.
- Offer a bonus to households wishing to part with their car to pay for alternative mobility services to the private car, including car-sharing, to promote a car-free lifestyle, like in the Brussels-Capital (Bruxell'Air bonus) and Flemish regions (see 1.3.1.1 & 1.4.3.2).
- Create a car-sharing label along the lines of the "*Île-de-France autopartage*" label, which provides a framework for car-sharing and facilitates the selection process of operators by local authorities wishing to roll out car-sharing in their area. It has a set of specifications to help urban outskirts local authorities that are not used to shared mobility offers (see 1.3.1.3). This can reassure peri-urban municipalities about the reliability of car-sharing operators before implementing their services.
- Integrate car-sharing, shared mobility and public transport into a single mobility application, based on the MaaS model (see 1.3.1.1, 1.4.1.1, 1.4.2.2 & 1.4.3.1). Study the creation of a combined ticket offering a range of mobility solutions (see 1.4.1.1).
- Make car-sharing inclusive. Set up initiatives such as the Brussels Green Deal Inclusive Car-sharing (see 1.3.1.1). Communicate on the benefits of car-sharing (particularly its economic advantages to people with lower incomes) to a wide audience, so that it does not only benefit its usual core market: educated, in employment, middle-aged, urban and relatively well-off men (see 1.3.1.1). Examine the possibility of introducing special pricing and offers for other target groups (see 1.4.1.1).
- Think about the development of car-sharing in each area in relation to other policies designed to limit the use of cars in the city (parking restrictions, traffic calming, shared streets, circulation plans, bike and walking infrastructure, Limited Traffic Zones, Low Emission Zones, etc.) (see 1.3.1.1. & 1.3.1.3). While these policies are not common in car-centric peri-urban areas, they can be adapted to the urban periphery to create 15mC neighbourhoods and the 20-minute region (see 1.3.1.3).

1.6. Overview of car-sharing services for the 15mC neighbourhood

	Car-sharing
Relevance	Car-sharing enables households to part with their car and adopt a more local, multimodal lifestyle. Combined with other alternatives to the private car (public transport, cycling and walking infrastructure, shared mobility services) and car restriction policies (parking restrictions, traffic calming, shared streets, circulation plan, Limited Traffic Zones, Low Emission Zones, etc.), car-sharing is a relevant solution for the 15mC in the urban outskirts but must be adapted to this specific context.
Potential	Round-trip car-sharing is suitable for peri-urban zones like residential areas, business parks, train/bus stations neighbourhoods and rural areas. It can provide a solution to families with children, nightlife activities, weekends, exceptional business trips or the transportation of bulky items for households that don't own a car. Free-floating car-sharing is more adapted to densely populated areas. Combined car-sharing can offer a good balance between the reliability of round-trip and the flexibility of free-floating, and thus reach different groups of users (particularly younger people and people from working-class backgrounds), helping them to get rid of their private car, but it is unlikely that an economically balanced service will be able to develop in the urban outskirt. Peer-to-peer car-sharing is currently a niche market, but it is expanding. It can be interesting for peri-urban families with multiple cars who want to optimise the use of their second vehicle but don't want to part with it. Local, community-driven services can be reassuring for residents of areas where car-sharing is not common practice.
Governance / regulation	Coordination, regulation, communication, MaaS integration and monitoring are usually handled by transport authorities and/or the municipalities. Planning of stations by local authorities can ensure that stations are set up not only in urban centres but also in sparsely populated areas. Car-sharing operators can also suggest station locations. There is a possibility of call for tenders or call for expressions of interest for choosing one or several operators. A set of specifications may be drawn up by the authorities to deliver an authorisation for operators to operate their service. Deployment of stations (and possibly charging points for electric vehicles) is mostly implemented by municipalities and road managers. Operation, vehicle replacing, maintenance, cleaning, and data transmission is provided by car-sharing operators.

Business frameworks	Compared to high-density areas, car-sharing services in the urban outskirts have lower vehicle occupancy rates, higher overhead costs (mainly due to wider vehicle spread), but lower parking costs. Operators need to adapt their services to this context to break even. Private operators can possibly benefit from public subsidies to balance the economic model in the least profitable areas ("purchase guarantee" or "minimum revenue guarantee"). Local authorities can also provide bonuses to spend on mobility services (including car-sharing) for residents parting with their car. Aids from employers to their employees using alternatives to the private car (including car-sharing), like the "*Forfait Mobilités Durables*" or "*mobiliteitsbudget/budget mobilité*", can be introduced, or even made compulsory. For round-trip car-sharing, pricing is most of the time based on hire period length (hour, day or week) and travelled distance, with fuel price and all service costs included, with possible unlocking cost. For free-floating, pricing can be by km, by minute, hour, day, or week, with on-street parking fees included. Authorities can grant parking advantages to car-sharing operators. There can be subscription fees and starting costs for both services. For peer-to-peer car-sharing, operators can earn commission on rentals between users. Operators can reduce their costs by forging partnerships with local businesses and placing advertisements on their vehicles. Looking for compatible profiles (companies and municipal employees during the day, families during the nights and weekends) can increase occupancy rate and reduce the cost of municipal fleets.
Issues / points for improvement	Even with appropriate regulation, some operators do not always comply with the rules and tend to concentrate mainly on dense areas. Ensuring compliance with these rules requires human resources from local authorities, which has a cost. Penalties can be introduced. Some operators undertake to share a certain number of vehicles and promise to transmit their data, but do not always respect these commitments. This can reduce the level of service expected by users and undermine the credibility of carsharing as a reliable alternative to the private car. The free-floating car-sharing market is still volatile, with new operators frequently arriving and leaving, as well as bankruptcies and mergers and acquisitions. Local authorities need to be sure of an operator's reliability if a partnership with it is to be lasting, especially in sparsely populated areas where financial profitability is uncertain. The public using car-sharing tends to be male, urban, educated, in employment, comfortable with digital technology, middle-aged, and relatively well-off. Initiatives to make car-sharing more inclusive can be implemented to extend the range of users (including peri-urban residents). The environmental impact of car-sharing (particularly free-floating) is questionable, as car-sharing journeys can replace journeys that would have been made by public transport or bicycle if the service did not exist. This observation is particularly true in dense urban areas and would need to be refined in suburban areas where there are fewer alternatives to the car. To avoid this pitfall, it is important to organise car-sharing as an alternative to the private car and not as a competitor to alternative modes of transport.

Table 8: Overview of car-sharing services for the 15mC in urban outskirts

1.7.Summary of car-sharing good practices for 15mC neighbourhoods

	Car-sharing
Brussels-Capital Region	The Brussels-Capital Region has a framework for developing and coordinating car-sharing within its territory. With its STOP principle, the Good Move plan (SUMP) opts for a quiet city that offer alternatives to the car and discourage car ownership. The Bruxell'Air bonus allows residents who part with their car to benefit from a mobility budget they can spend on mobility services such as car-sharing. The transport authority issues licences to operate, sets rules for operators, and, working closely with the municipalities, grants them parking advantages so that round-trip car-sharing stations can be spread throughout the region. This cooperation enables the transmission of operating data, a good knowledge of car-sharing practices and integration into the region's MaaS. Initiatives such as the "Green Deal Inclusive Car-sharing" enable people who are generally not familiar with car-sharing to switch to shared vehicles (see 1.3.1.1).
Cambio	Cambio is a round-trip car-sharing operator active in Brussels and operating throughout Belgium. By making pragmatic choices and working closely with the authorities, it is developing its service year on year. The number of stations, vehicles, users and journeys made is growing. The service is profitable and not dependent on public subsidies. It is well established, enabling it to provide a balanced service in urban, suburban and rural areas, meeting different needs with different vehicle models: from small city cars to utility vehicles. Cambio offers a car-sharing service that complements other alternatives to the private car. In the Brussels-Capital Region, it is integrated into MaaS and the Mobib transport pass. There is a combined STIB + Cambio offer which allows regular public transport users to benefit from a reduction on Cambio fares. Cambio is working to make car-sharing more inclusive, with subscription offers for young drivers, collaborations with driving schools, the possibility of making reservations by telephone for people less at ease with digital tools and its participation in the "Green Deal Inclusive Car-sharing" (see 1.3.1.1 & 1.4.1.1).
Communauto	Communauto is a round-trip car-sharing operator operating in Paris in on-street stations under the City of Paris Mobilib' brand. It has a long-standing presence in Paris and works closely with the city. But its model has adapted to expand beyond the Mobilib' offer: it offers other types of stations in public or private underground car parks, as well as "zone stations" where vehicles can be hired and returned in a defined area to an on-street parking space, but without a fixed location. Communauto is also present in 15 municipalities in the outskirts of Paris (see 1.3.1.3 & 1.4.1.3).
Clem'	Clem' is a round-trip car-sharing operator operating shared electric cars in 33 municipalities of the outskirts of Paris and rural areas of the Paris Region. Clem' also offers vehicles in residential buildings in several municipalities in conjunction with the home-owner associations. It is a good way of offering alternatives to cars for residents who don't own one and freeing up public space for a more efficient use of space. This car-sharing model looks promising but is still in an emerging phase (see 1.3.1.3 & 1.4.1.3).

Citiz	Citiz is a round-trip car-sharing operator, operating in France in the form of a non-profit cooperative company. Users and local authorities can become members of the cooperative and are involved in decision-making. It operates in 4 municipalities in the Paris' urban outskirts, but also in a network which comprises 14 independent local car-sharing operators, present in over 220 French municipalities and more than 90 SNCF train stations. In several French cities, it provides a combined car-sharing offer. This solution combines the reliability of round-trip car-sharing with the flexibility of free-floating, satisfying a variety of needs for regular users who don't own a car but need one occasionally. It can reach different groups of users (particularly younger people and people from working-class backgrounds), even in the urban outskirts. A user account in one of the local services can access all the cars in the network. By grouping together in a network, it is possible to pool tools and cut costs , thus reducing the risks for operators wishing to expand into more uncertain sectors such as sparsely populated areas (see 1.1, 1.3.3.1, 1.4.1.3 & 1.4.3.1).
Cozywheels	Cozywheels is a not-for-profit peer-to-peer car-sharing operator active throughout Belgium. It offers tools that make car-sharing between private individuals (mostly neighbours) practical and as easy as with a private operator. It works closely with authorities and benefits from parking advantages and bonuses for its users in different types of areas: urban centres, urban outskirts and rural areas (see 1.3.3.1, 1.3.3.2, 1.4.3.1 & 1.4.3.2).
Dégage	Dégage is a peer-to-peer car-sharing operator active in the Brussels-Capital and Flemish Regions. It does not seek profit, but social and liveable neighbourhoods that are more local and multimodal. In this respect, its model is favourable to the 15mC neighbourhood. The organisation is a common and is run from the bottom up by volunteers and citizens. Dégage users are automatically members of the General Meeting and can raise ideas, problems, or questions with the Board of Directors. Since 2022, Dégage has been investing part of its members' deposits in sustainable and ethical initiatives (see 1.3.3.1, 1.3.3.2, 1.4.3.1 & 1.4.3.2).
Coopstroom	Coopstroom is a round-trip car-sharing operator, operating in Flanders in the form of a non-profit cooperative company. To become a user, the first step is to buy a share in the cooperative. All vehicles are electric. Coopstroom is linked to a network of cooperatives, mainly suppliers of green electricity. On request, Coopstroom can fit a child seat in the car, which is ideal for families living in peri-urban areas. In West-Flanders, if a group of people can guarantee 4 COOP formulas or 6 Prepaid Comfort formulas per month, Coopstroom will place a shared electric car in their neighbourhood. This makes it possible to develop carsharing in sparsely populated areas where there is a demand from local residents (see 1.3.1.2 & 1.4.1.2).
"Île-de-France autopartage" label	This label provides a framework for car-sharing and facilitates the selection process of operators by local authorities wishing to roll out car-sharing in their area. It has a set of specifications to help urban outskirts local authorities that are not used to shared mobility offers. This can reassure peri-urban municipalities about the reliability of car-sharing operators before implementing their services (see 1.3.1.3).1.3.1.3).

Public financial support to car-sharing in Flanders	In Flanders, outside the major cities, public subsidy schemes such as the "purchase guarantee" and the "minimum revenue guarantee" make it possible to roll out economically viable car-sharing services in sparsely populated areas where they would not have been able to emerge without financial support. Once the service has been implemented and is viable, financial support can be stopped to relieve local finances, or continued to accelerate its development. Working closely with local municipalities, businesses and organisations makes it possible to find compatible profiles (companies and municipal employees during the day, families during the nights and weekends), increase the vehicle occupancy rate, the car-sharing service profitability and thus reduce the cost of public financial support (see 1.4.1.2).

Table 9: Summary of car-sharing good practices

2. SHARED MICROMOBILITY IN A 15-MINUTE CITY NEIGHBOURHOOD

2.1. Background and definition of shared mobility, and its potential use in a 15mC neighbourhood

Background and definition

In line with report 2.1, we use the definition of shared micromobility as "a *short-term access to shared vehicles, according to user needs and convenience, rather than requiring vehicle ownership"* (Shaheen & Cohen, 2019). With the exception of car-sharing, all other vehicles are for individual use and have low speeds (most up to 30km/h). In this sense, the term micromobility was coined to refer to *small, lightweight and low-speed shared modes as mopeds, bicycles, and scooters* (Shaheen & Cohen, 2019). Thus "traditional" short or long-term rental systems are excluded from the scope.

One of the first well-documented self-service bicycle schemes was an initiative launched by Luud Schimmelplannink in 1965, a Dutch industrialist and politician, in association with the Provo counter-culture group, in Amsterdam. The "White Bicycle Plan" consisted of making 50 bicycles available to the public throughout the city, unattached and accessible to everyone. The main aim was to relieve congestion in the city, at a time when cycling was still far from being the norm in Amsterdam, by offering free access to bikes. Within a month, all the bikes had been stolen or thrown into the city's canals. However, the idea behind the scheme was not to achieve a viable system in the long term, but to try out an initial experiment and draw attention to the problem of cars in the city (O'Sullivan, 2022).

In 1995, the first secure system was introduced in Portsmouth (partly funded by the European ENTRANCE programme), with the installation of docks and magnetic card access. Similar secure systems were then developed in France by urban advertising companies (Clear Channel and JC Decaux), first in Rennes in 1998 and then in Lyon in 2005. However, it is the system developed in Paris in 2007 (Vélib') that is attracting worldwide attention and seems to be one of the starting points for the spread of such systems around the world. An equivalent system had also been developed in parallel in Brussels, also operated by JC Decaux, initially under the name "Cyclocity" (from 2006) and then "Villo!" (from 2009).

Today, depending on the source, between 1,590 (Bikesharemap website**) and 3,000** (O'Sullivan, 2022) **towns around the world are equipped with one or more bike-sharing systems**.

The Bikesharemap website, an individual initiative, provides a regularly updated list of bikeshare schemes. It shows a very high concentration of such systems in Europe (particularly in the UK, Germany, Poland, France, and Italy), China and the east coast of the USA (and to a lesser extent in Latin America) (see Figure 10: Worlwide distribution of bike-sharing system (© Bikesharemap)

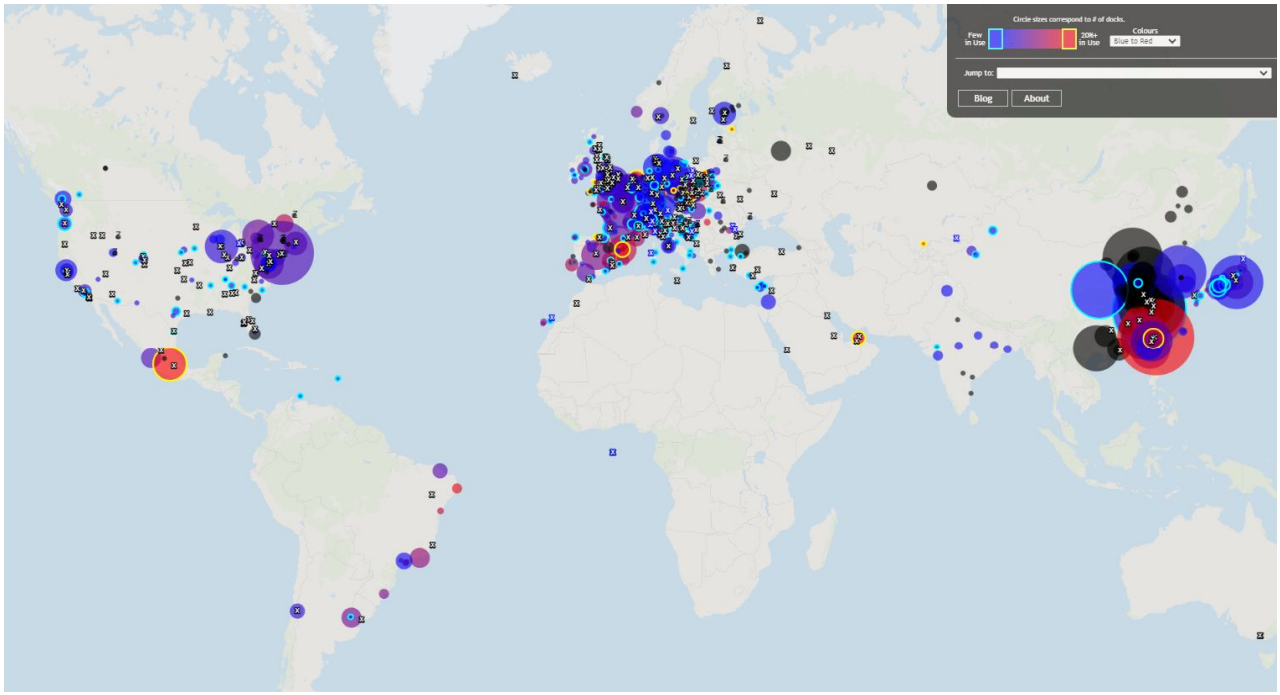


Figure 10: Worlwide distribution of bike-sharing system (© Bikesharemap)

The development of shared scooters is much more recent. In 2016, Neuron Mobility developed a system of scooters with a station in Singapore. In 2017, Bird and Lime set up a system of electric scooters without a station, known as free-floating. The vehicle is unlocked using a smartphone. Virtual docking stations have been set up in some cities (where scooters can be "locked" in geographically defined areas), to limit the amount of public space taken up by scooters. Overall, these shared scooter systems are mainly promoted by the private sector. The average service user is male (2/3 of customers), with an average age of 30-35 and a higher-than-average salary (Christoforou and al., 2021). A meta-analysis of trips made in American, French and Norwegian cities shows that trips are rather short (1.81 km on average for a duration of 13 minutes), with certain exceptions (notably in France), linked to recreational use with much longer times and distances. In these same cities, the reasons for using shared scooters are mainly recreational or leisure-related (over 50% in half the cities), with work-related use mostly below 30%. These results are consistent with fairly low usage rates per user (10% maximum), in line with the limited availability of subscriptions. The use of scooters to get to public transport stations is also very low (less than 10% of use in half the cities). In Europe, in more than 80% of cases, scooter use replaces another ecologically sustainable mode (walking, cycling or public transport), while in the United States the figure is more around 50% (Badia and Jenelius, 2023).

Finally, the last decade has also seen the emergence of shared moped systems, with a strong acceleration in recent years. (Loudon & al., 2023). E-mopeds are motor scooters "with a seated-design, electric-powered" (Shaheen & Cohen, 2019). They allow longer journeys than bicycles and scooters (Aguilera-Garcia & al., 2020).

<u>Potential use of shared micromobility in outskirts, in a 15mC policy</u>

Today, most shared-micromobility systems are implemented in densely populated cities. As a result, suburban areas rarely have their own system, but are in most (if not all) cases served by the system of the city on which they "depend". **This makes it difficult to design a specific pattern for these sectors when setting up such a system (which is designed on a territory-wide scale), or even to study existing systems by restricting the study perimeter to their suburban areas (with very little literature on this specific scope).**

The deployment of shared mobility systems can encourage the use of softer modes of transport than the car for people who don't have their own "soft" vehicle, or who fear that it may be stolen. In this way, the deployment of such systems can increase accessibility to various services and facilities using soft modes, and thus participate in a 15mC-type policy.

Implementing such shared-vehicle systems raises particular issues in low-density areas: on the one hand, a critical fleet size must be sufficient for the system to be attractive (so that a potential user can easily find a vehicle when he or she needs one), while guaranteeing a sufficient number of daily uses (justifying the very concept of the system and making it possible to increase revenues).

2.2. Different types of services (vehicles, systems)

There are different systems for parking bikes or scooter, from the most secure (stations with one dock per vehicle, making theft more difficult) to the most flexible (full free-floating).

- **Systems with physical stations (common for bicycles, very rare for scooters)**

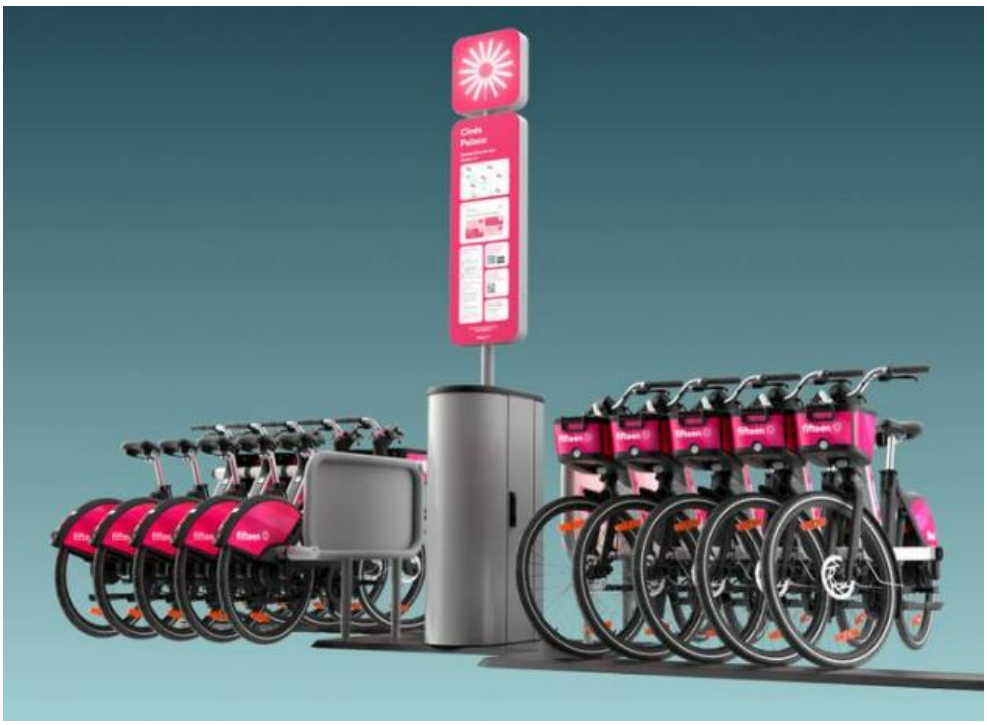
The existence of physical stations makes it possible to limit the theft and vandalism of vehicles. On the other hand, it involves substantial investment and a high level of occupation of public space. Furthermore, adding, extending or removing stations requires civil engineering work and is therefore much less flexible than virtual station systems or full free-floating.

Figure 11: A Velib' station with docks (© Velib')

Some lighter systems exist, such as compact docking systems. The idea is that a dock can accommodate several bicycles, attached to each other. Such systems have been developed, for example, by Fifteen (the name being a reference to the 15mC) (see Figure 12: A Fifteen station that can accommodate several bikes in a single dock (© Fifteen)). The proposed dock can accommodate at least 10 bicycles, saving space in the public space and reducing investment costs. Provision has been made for the eventuality of a bike breaking down in the middle of a queue: a second dock has been installed for storing damaged bikes.

This system has been implemented in medium-sized towns in France, including:

- Avignon (90,000 inhabitants, 1,400 inhabitants/km²) and three neighbouring towns. Installation of 29 stations for 300 bicycles,
- The Communauté d'Agglomération d'Épinal: Épinal (the town centre with 32,000 inhabitants and a population density of 550 inhabitants/km², but also 6 other communes in the agglomeration, some with fewer than 1,000 inhabitants).



1Figure 12: A Fifteen station that can accommodate several bikes in a single dock (© Fifteen)

Another interesting lightweight system has been developed by the start-up Fredo (see Figure 13). It offers an original system of connected locks that can be adapted to all types of bikes and allows them to be attached to existing parking hoops. The local authority can define the areas in which the bikes can be attached, and an application can be used to lock/unlock the bikes, as well as geolocating them via the lock.

In this way, the bicycle fleet can be made up of a variety of bicycles (particularly second-hand ones), and the definition by the local authority of the areas in which the bicycles can be hooked up means that the service can be upgraded very easily, without the need for heavy infrastructure. This system could therefore be a very attractive alternative for less densely populated areas.

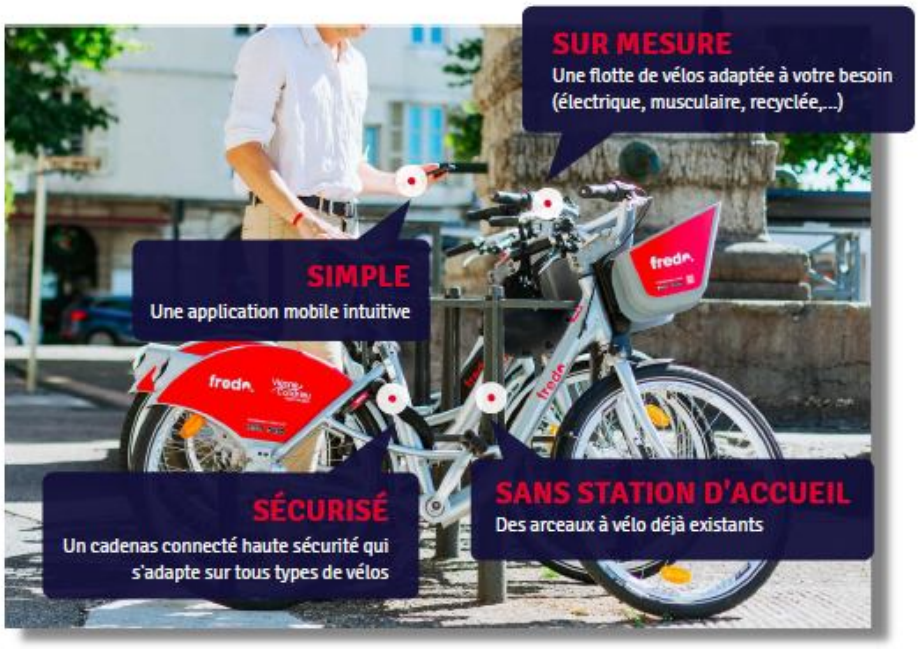


Figure 13: Fredo's lightweight system with connected padlock (© Fredo)

- **Systems with virtual stations (bicycles and scooters)**

An even lighter system consists of setting up virtual stations (very simply marked on the ground, but with no physical structure). Users then have to go to these precise geographical points to be able to lock their bikes (by geolocating them). While this system makes it possible to regulate the location of bicycles (in particular by preventing unauthorised parking on pavements), it does not prevent the theft of bicycles or acts of vandalism (such as throwing them into rivers or canals).

At the end of 2023, the city of Brussels began rolling out drop zones, where users can lock shared electric bikes and scooters. Initially numbering 450, they are expected to grow to around 3,000 across the region.

- **Full free-floating systems (bicycles and scooters)**

Finally, the full free-floating system does not impose any constraints on the areas where bikes can be left and locked. These are the lightest in terms of infrastructure, but also the least secure, and potentially the least legible for users. Such a system can cause problems in terms of the use of public space.

2.3. Governance of shared micromobility services

The system can be set up in various ways, from entirely public to almost entirely private:

- Internal: full public management of the service, with public employees dedicated to running the system (e.g., Saint-Étienne or La Rochelle in France).
- Invitation to tender for the management of the bike-share service. The system is then managed by a service provider paid by the local authority e.g., in the Paris Metropolis). This invitation to tender can be carried out:
    - With or without supply of equipment and related system
    - Linked to a street furniture contract or not
- Public service delegation/concession, integrated into the public transport delegation or not (e.g., Strasbourg or La Rochelle in France).
- Simple authorisation by the public authority to operate a private service on the territory (e.g., Dott or Tier)

For smaller local authorities, it is likely to be more complicated to set up a self-management system, due to the lack of human resources.

Regardless of the local governance chosen for the system deployment, the local authority can impose (to a greater or lesser extent) certain standards for setting up the system (distribution of stations, number of bicycles per inhabitant, etc.), these requests being potentially linked to financial considerations.

In terms of geographical coverage, there are several types of system:

- Systems located in a single city (the case for most systems)
- Systems based in a large city and its suburbs, such as:
    - Velib' in Paris and 64 suburban communes (see Figure 11)
    - Villo Brussels, in 19 different municipalities
    - VélO2, in Cergy-Pontoise (France), in 7 different communes
- Region-wide systems, such as in the Ruhr (12 towns)

It is interesting to note that **most of Europe's major cities have a bike-share system. Of the 65 cities with more than 500,000 inhabitants, only two do not:** Krakow (where the service was discontinued in 2019, but where discussions are underway to create a new service) and Athens (where a pilot site is being studied).

Many medium-sized and even small towns have also developed such systems: Linz (Austria, population 213,000), Namur (Belgium, population 114,000) and even Esztergom (Hungary, population 28,000).

Medium-density towns, whether central cities or suburbs of the central city, are also equipped with such systems.

Finally, other systems are deployed on a national scale. In Belgium, the blue-Bike system is being developed at more than 110 points, covering most of Flanders.

In the Netherlands, the OV-Fiets system, managed by the national railway company, allows train users to borrow a bike from their arrival station to get to their final destination. In 2019, there were 20,500 bicycles at 300 stations, with 890,000 subscribers.

The governance envisaged will have an impact on the spatial equity of the distribution of vehicles. If the city issues a call for tenders, it will have complete freedom to set objectives in terms of equity of service, as well as the desired coverage of the territory. If it authorises a private operator to deploy vehicles on its territory, it will also be able to negotiate certain elements (such as the introduction of social tariffs). A study (Bac, Marquet and Miralles-Guasch, 2023) shows the variety of strategies used by cities to deal with these issues, from completely unregulated approaches to numerus clausus models. Cities are becoming increasingly aware of the need to better regulate the location of vehicles (from a spatial as well as a social point of view), while at the same time ensuring that financial viability does not deteriorate too much (as imposing numerous standards is a burden on revenues, and may therefore require financial participation from the community, with the need for subsidies).

2.4. Business models of shared micromobility services

2.4.1. To subsidize or not to subsidize, that is the question

In terms of the business model, **the main issue is the level of subsidy provided by the local authority.**

For subsidised systems (regardless of the type of governance), fares are generally very affordable, especially for regular users. In addition to daily fares, monthly or annual season tickets are available, with the first half-hour of each journey free of charge. Fares are generally differentiated if there are mechanical and electric bicycles on the same network:

- Cost of annual season ticket: Vienna (€59), Antwerp (€58), Budapest (€20), Milan (€35), Lisbon (€25), Bucharest (€50), Barcelona (€50), London (£120) …
- For systems that include electric bicycles, there may be:
    - An additional subscription fee for access to electric bikes with the first half-hour free: in Paris, for example, the annual “mechanical” subscription costs €37 but €112 for the electric subscription.
    - Or the cost of hiring electric bikes from the first minute: in Barcelona, the first half-hour of electric bike hire costs €0.35, even if you have a season ticket.

These schemes involve a potentially significant contribution from the local authority. A 2019 Ademe report on 45 French shared bike schemes estimated that the local authority would need to spend around €1,500 per bike per year to achieve a financially balanced system. By way of example, for the Vélib' system, in 2023 the fare income came to €28 million, and the subsidies from the various local authorities to €34 million, i.e., almost 55% of the operating budget. These subsidy levels can vary greatly from one system to another, depending on the type of equipment used, vandalism rate, vehicle usage rate, tariff level. Unfortunately, there seem to be no large-scale survey of subsidy rates for shared micromobility systems. However, it should be borne in mind that public transport is also heavily subsidised. In the Île-de-France region, passenger revenue covers only 33% of total costs. This figure is 17% for De Lijn public

transport. Budgetary trade-offs between the different modes of transport must therefore be made by the relevant authorities.

Other types of revenue can be used to reduce the public contribution, particularly advertising: posters on the stations and on the bicycles, or partnerships with private companies (partnerships with Citibank in New York or Santander in London).

Other systems do not benefit from any subsidies, in particular certain free-floating bicycle systems or scooters deployed by operators such as Lime or Tier. Fares are generally much higher (due to the lack of subsidy and the fact that many of the vehicles are electric), **and are therefore aimed**

- In Berlin, the cost of a Lime-bike is €1 to unlock the bike, plus €0.27 per minute, i.e., €9 for a half-hour journey (and therefore much more expensive than a monthly subscription to a traditional public-subsidised bike-share service).
- The TIER scooter service is billed at between €0.15 and €0.20 per minute, depending on the city, with a €1 unlocking fee (free if you take the €4.99 monthly subscription). Even with a season ticket, a 15-minute journey costs between €2 and €3.

However, some private operators offer programmes aimed at certain disadvantaged groups. For example, Lime offers a programme called “Lime” Access, which allows different types of users (unemployed, students, etc.) to benefit from special fares. In the UK, for example, a 50% reduction in fares is applied to these users. Beneficiaries are often defined at national level, but additional beneficiaries may be identified in certain cities (for example, in Bordeaux, students can benefit from the programme, but not those from other cities).

A study (Delbsc & Thigpen, 2024) carried out on members of the “Access” programme (in the United States, New Zealand and Australia) shows, interestingly enough, that they use bicycles and scooters differently (and more virtuously) than other users (non-members of the Access programme). They use shared vehicles more regularly (35% of daily use compared with 7% for the others), and more often to get to a public transport station (44% compared with 23%).

Pony, a French company offering shared bikes and scooters, has developed an innovative financing model. The vehicles are not financed and owned by Pony, but by private individuals, who receive 40% of the revenue generated by journeys made with their vehicle. They also enjoy a number of additional benefits: they can use their vehicle for as long as they like, free of charge (which can be complicated if it's far from where they stay) or rent another one at a preferential rate. Finally, they can allow their relations to use their vehicle at a preferential rate. There are three advantages to this system: the company running the system can deploy it without having to invest too much itself, the average use of the bikes can be boosted by the fact that the owner has access to them whenever they want, and it is to be hoped that, overall, residents will be more respectful of the vehicles if they know that they are financed by other residents (an argument put forward by Pony).

2.4.2. Some key data on system sizing and uses

The Cerema gives the following recommendations for implementing a shared bike system (Cerema, 2019):

- Geographical coverage of at least 10 km².
- Station density: between 10 and 16 stations / km², i.e., **one station within 300 m for each inhabitant**
- Number of bicycles per 1,000 inhabitants: between 10 and 30
- Utilisation rate: between 4 and 8 journeys per day for large towns, fewer for smaller ones. 1 trip per day for every 20 to 40 inhabitants.

However, a more detailed analysis of large systems operating in several municipalities shows that in Paris (Vélib') and Brussels (Villo!), these ratios are far from being achieved, particularly in terms of the

number of bicycles. For each of these two areas, we show the average number of stations and the average number of racks as a function of the density of the municipality.

We can see that the number of stations and racks is very low as the density decreases (outlying towns). However, care should be taken when using these figures, because in outlying towns, it is sometimes only a portion of the area that is covered by the shared bike service (see Figure 14).

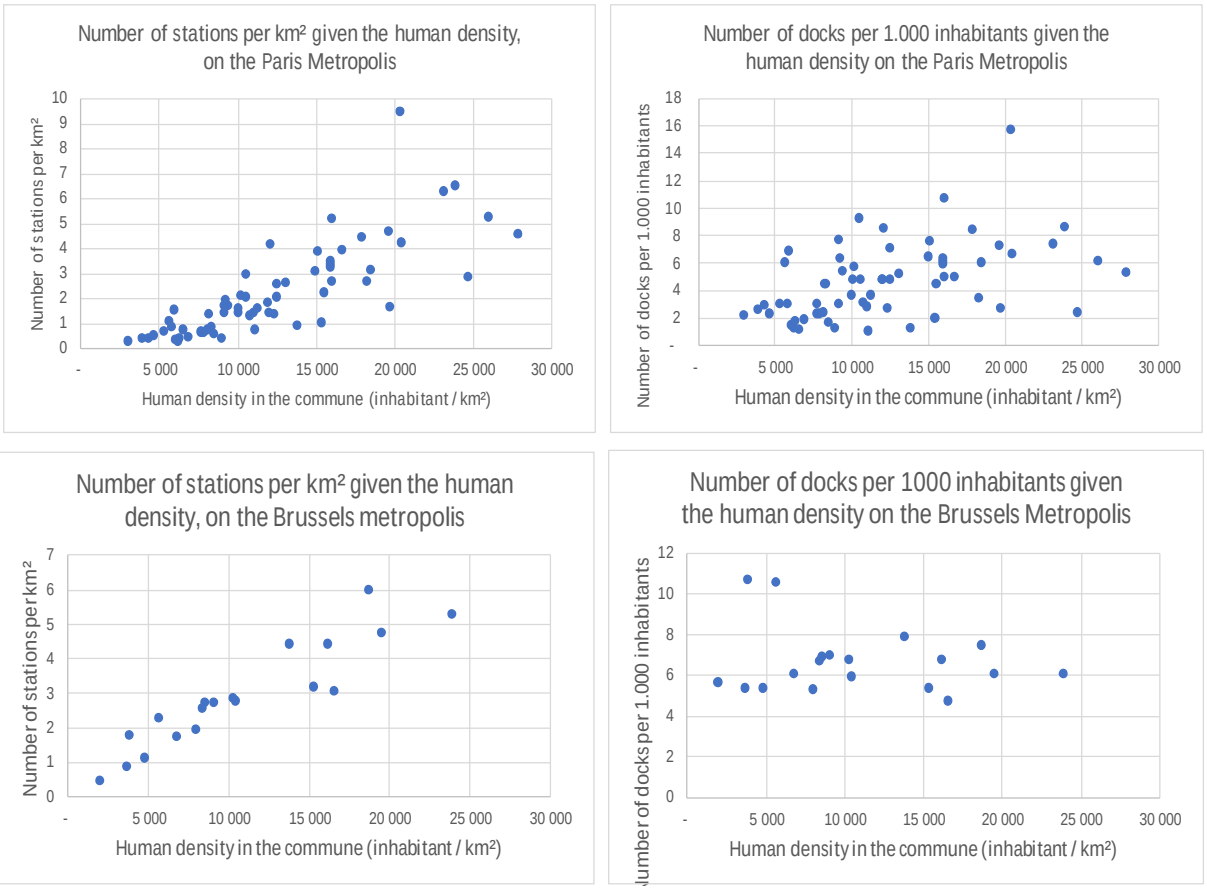


Figure 14: Ratio of number of stations and bicycles according to the density of the area (sources: Velib' and Villo !, analysis: L'Institut Paris Region)

Furthermore, **the overall level of bicycle use seems to be fairly low**. A benchmark carried out in 2024 on behalf of the Brussels-Capital Region details the average number of rentals per day and per bicycle in 18 major cities. Paris, Barcelona and Lyon are in the top 3, with 6 rentals per bicycle per day (it should be noted that these three cities have a very high proportion of electric bicycles in their fleets). 5 cities (Budapest, Antwerp, Luxembourg, Madrid and Lille) have daily usage rates of between 3 and 5.5. The remaining 10 cities have daily usage rates of less than 2.6 (6 of which are below 1.5) (Benchmark international de services de location de vélos en libre-service (VLS) et de vélos longue durée (VLD), Brussels Capital Region, 2024).

These fairly modest usage rates seems to be even lower in small towns : aa study carried out by the Italian National Observatory for Shared Mobility shows that for the vast majority of Italian bike-sharing schemes, the average daily rate of vehicle use in 2019 was below 2, or even 1 (see Figure 15).

It should be borne in mind, however, that these figures are potentially underestimates, insofar as they are calculated on the basis of the entire fleet (some of which is still undergoing maintenance). However, they remain low for the smallest towns. Evidence of low usage on low-dense territories is a crucial issue for the DREAMS project, for two reasons: firstly, one of the main objectives of a shared micromobility system is to enable the same vehicle to be used by different users over the course of a day; secondly, the level of subsidy will depend on the level of use of the vehicles, with low usage requiring greater funding from the community.

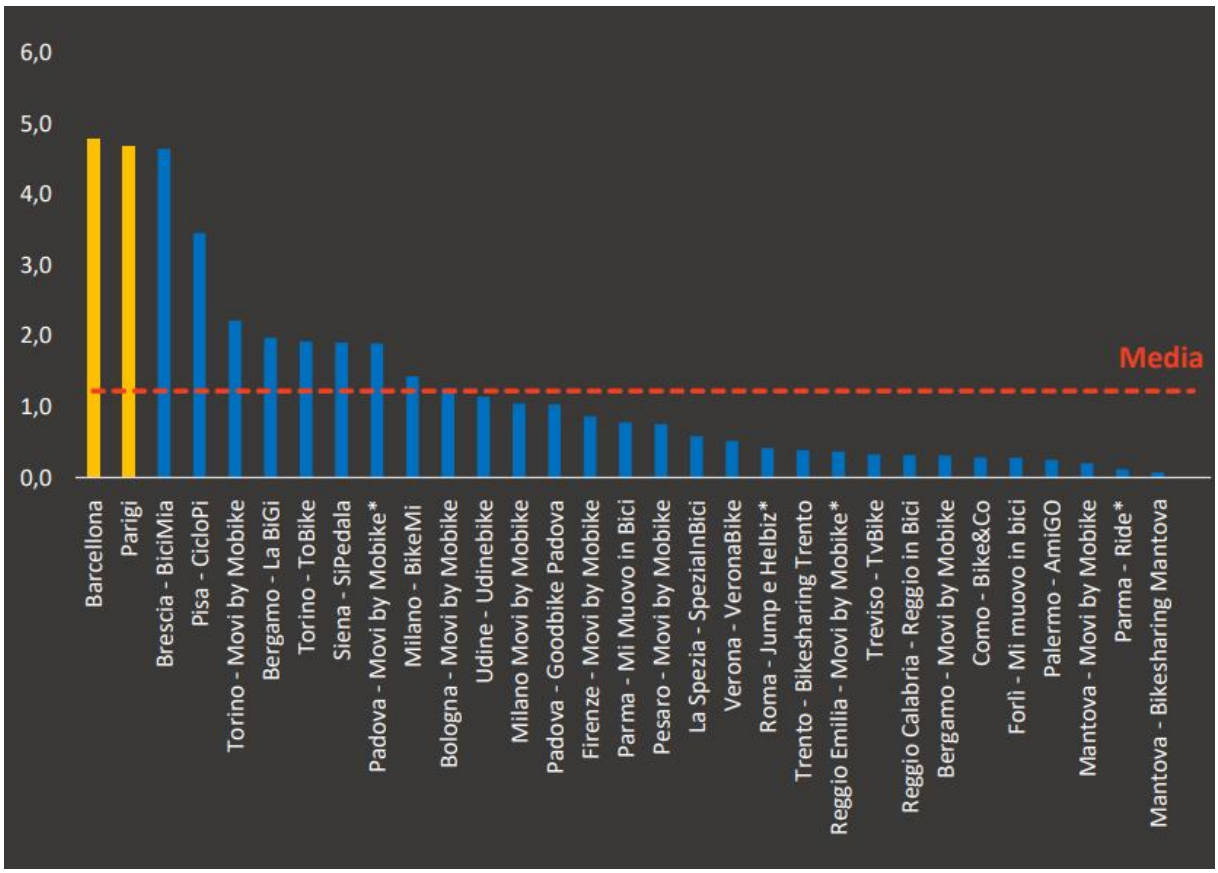


Figure 15: Use of shared bikes in Italy in 2019 (source: Osservatorio Nazionale Sharing Mobility)

2.5. Recommendations for shared micromobility services in a 15mC neighbourhood

The information presented in this chapter reminds us that **a traditional bike-sharing service with docking stations may require a high level of subsidy by the local authority if they want to offer a service that is affordable for users**. However, other systems with **lighter infrastructure** (a terminal for attaching several bikes, a system using locks connected to existing bike racks, or even virtual stations) **can reduce operating costs**. However, other modes of transport are also heavily subsidised, and it is up to the relevant authorities to decide how to allocate public investment.

It should also be remembered that **the intensity of use of bicycles remains fairly low overall (6.5 per day for the most efficient systems in very densely populated cities, much less for less densely populated areas)**. In such areas, particularly if they are mainly residential, the risk is that a shared vehicle will at best be used only twice a day: in the morning to get to the nearest station, and in the evening to get back.

The DREAMS project targets the suburban areas of major cities, with intermediate densities. If a shared bike system already exists in the city centre, it would seem logical to begin by looking at the possibility of extending this service to outlying areas. There are a number of systems around the world that have been deployed in multiple municipalities. If such a system does not exist, or if it is impossible to extend it, it might be worth considering deploying a system only in suburban areas, preferably with light infrastructure.

In addition, depending on whether or not the practice of cycling is already firmly established in the area, the approach may be different. **Many local authorities have decided to develop shared micromobility systems to give these modes a higher visibility in public spaces. However, if the use of these modes is already growing rapidly in a given area, and micromobility is therefore**

visible, other investments may seem preferable: financial assistance for the purchase of a bicycle, development of secure parking facilities at stations, and places where cyclists go (offices, shops, leisure facilities). This was the choice made by the city of Poznan (Poland) in 2022, when it put an end to its bike-sharing scheme after 11 years, noting that the use of personal bikes had risen sharply and that the use of shared bikes had fallen. The city decided to allocate the system's subsidies to the continued deployment of cycling infrastructure in the city.

In any case, it should be remembered that in order for these services to be successful, they need to be deployed in an area served by cycle paths - which are essential if cycling or scootering is to become more popular.

Lastly, it should be noticed that the actual environmental gains can vary greatly from one system to another. Numerous studies have shown that users of shared-vehicle systems mainly switch from walking, then from public transport and finally from the car (Wang & al., 2023). However, the generation of additional journeys (which would not have been made if the shared system did not exist) remains limited, at between 3% and 10% (Laa and Leth, 2020), and is partly linked to journeys made “just for fun”.

Once these general remarks have been made, and if it is desired to develop a shared micro-mobility system on urban outskirts, we propose the following recommendations:

- To ensure that vehicles are used frequently, throughout the day, they should preferably be located in mixed-use areas (and not just residential areas, where the risk is that the vehicle will be used once in the morning and once in the evening, at best). This is a crucial point, as there is often less functional mix on urban outskirts. Railway stations should also be considered as prime locations.

- Given the lower use of vehicles in less densely populated areas, a preference for lightweight systems or drop zones seems desirable, with lower investment costs. On the other hand, if possible, a system deployed on a global basis in the city centre and its outskirts may enable a satisfactory compromise to be reached, with the high revenues generated in the central areas partly offsetting the lower ridership in the outskirts.

- Adapting pricing policies to people's ability to pay. Indeed, a review of existing systems often reveals pricing structures that are ill-suited to capturing different income brackets: either very low overall prices (for subsidized systems, which are unable to charge a segment of the population that would be prepared to pay more to use the system), or quite high prices (particularly for entirely private systems, which exclude the most modest populations).

- Insofar as unsubsidized systems offer fares that can be very high (of the order of €3 for a 10-minute journey), they do not seem to us to be suitable for achieving the DREAMS project objective of accessibility to all populations, even the most modest. To achieve this objective, a proportion of subsidies seems necessary (unless it is possible to design a system with total equalization, with those most able to pay compensating for the reductions granted to the most vulnerable populations).

- As part of an explicit 15mC policy, positioning stations (if a system other than free-floating is adopted) as close as possible to services deemed indispensable is entirely relevant.

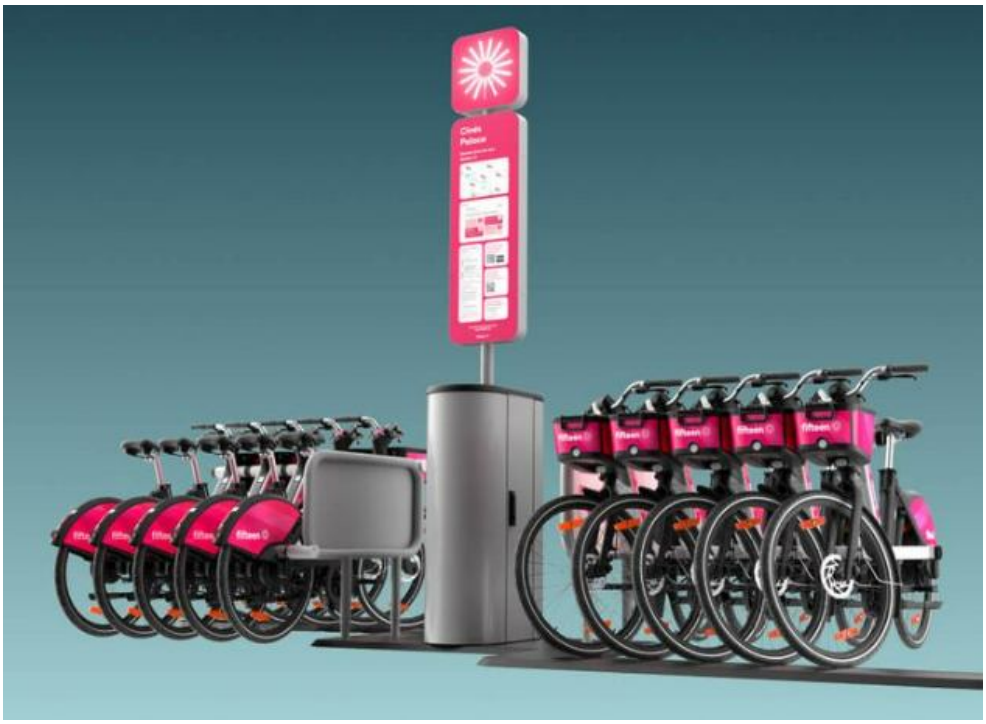
2.6. Overview of shared micromobility services for the 15mC neighbourhood

	Shared Micromobility
Relevance	The deployment of shared micromobility systems enables people who don't have their own bike/scooter/moped to use these modes of transport flexibly. They can also be used by people who want a degree of flexibility in their use of these modes (e.g.: taking a bike to a place, then walking or taking public transport back), or who are worried about having their vehicle stolen when parked in public space while they are carrying out an activity. These modes are perfectly suited to short 15-minute journeys, for a wide range of users.
Potential	While this means of transport can be used for many purposes, some users will find it difficult to switch to this mode of transport for certain reasons (in particular, those requiring the transport of heavy loads, such as shopping, or accompanying people, such as children). On the other hand, the offer of electric vehicles can broaden the potential customer base, particularly among the less sporty. Peri-urban areas are generally less well-equipped with cycling facilities than city centres, so potential users will be less inclined to change their modal habits for safety reasons.
Governance / regulation	Shared micromobility services can be deployed specifically in suburban areas, or across the whole conurbation, including the central city and its suburban areas. This second option allows for better equalization: areas with intense use partly balance out areas with more modest use. The level of regulation by local authorities can be stronger or weaker. If the system is set up as part of a contract or public service delegation, the local authority will have considerable leeway to define requirements in terms of service levels and service balance (particularly with regard to disadvantaged sectors), generally in conjunction with a certain level of subsidy. If the deployment of the system is only authorized by the local authority (without subsidy), the authority will have less leeway to impose a certain number of standards.
Business frameworks	Today, there are two main types of business model. The first concerns subsidized systems, offering very attractive prices to users, but implying a high level of subsidy. The second generally involves systems set up entirely by private operators, with authorization to operate only, and therefore no subsidies. Costs are much higher for users, and the potential clientele is much more limited.

Issues / points for improvement	Use of shared micromobility systems is generally concentrated in the densest areas of conurbations. In less densely populated areas, average vehicle usage is generally very low (on the order of one vehicle use per day, or even less). This observation makes it potentially fragile to set up a system that would be restricted solely to suburban areas (and would rather encourage the implementation of a system for the entire conurbation, to achieve some form of equalization). On the other hand, too little use of each vehicle would call into question the very principle of shared micromobility services, with several users using the same vehicle in the course of a day. One way of ensuring a minimum level of vehicle use is to locate them in functionally mixed urban areas (even if residential areas only need to be served if residents are to have access to the service).

Table 10: Overview of shared micromobility services for the 15mC in urban outskirts

2.7. Summary of shared micromobility good practices for 15mC neighbourhoods

	Shared Micromobility
"Fifteen": light docks for a more flexible and less expensive system	The "Fifteen" System makes it possible to have docks (and thus prevent bikes from being stolen) but offers a more flexible and less costly system. The idea is that a dock can accommodate several bicycles, attached to each other. The proposed dock can accommodate at least 10 bicycles, saving space in the public space and reducing investment costs. Provision has been made for the eventuality of a bike breaking down in the middle of a queue: a second dock has been installed for storing damaged bikes. This system has been implemented in medium-sized towns in France, including: • Avignon (90,000 inhabitants, 1,400 inhabitants/km²) and three neighbouring towns. Installation of 29 stations for 300 bicycles, • The Communauté d'Agglomération d'Épinal: Épinal (the town centre with 32,000 inhabitants and a population density of 550 inhabitants/km², but also 6 other municipalities in the agglomeration, some with fewer than 1,000 inhabitants). 
"Fredo": light system with connected lock	Fredo offers an original system of connected locks that can be adapted to all types of bikes and allows them to be attached to existing parking stands. The local authority can define the areas in which the bikes can be attached, and an application can be used to lock/unlock the bikes, as well as geolocating them via the lock.

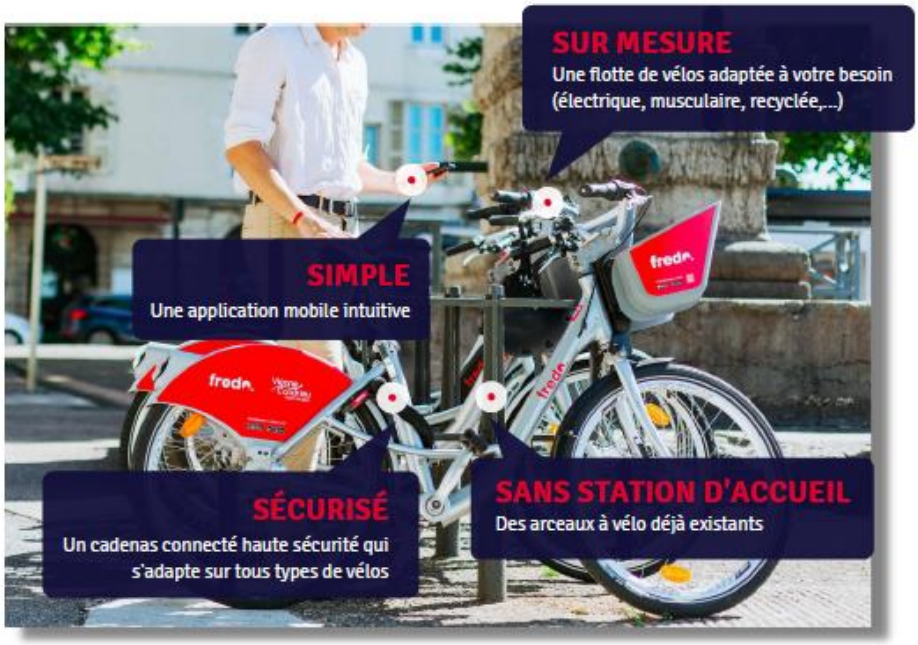
	In this way, the bicycle fleet can be made up of a variety of bicycles (particularly second-hand ones), and the definition by the local authority of the areas in which the bicycles can be hooked up means that the service can be upgraded very easily, without the need for heavy infrastructure. This system could therefore be a very attractive alternative for less densely populated areas. 
Pony: vehicle financing by private individuals	Pony, a French company offering shared bikes and scooters, has developed an original financing model. The vehicles are not financed and owned by Pony, but by private individuals, who receive 40% of the revenue generated by journeys made with their vehicle. They also enjoy a number of additional benefits: they can use their vehicle for as long as they like, free of charge (which can be complicated if it's far from where they stay) or rent another one at a preferential rate. Finally, they can allow their relations to use their vehicle at a preferential rate. There are three advantages to this system: the company running the system can deploy it without having to invest too much itself, the average use of the bikes can be boosted by the fact that the owner has access to them whenever he wants, and it is to be hoped that, overall, residents will be more respectful of the vehicles if they know that they are financed by other residents (an argument put forward by Pony).

Table 16: Summary of good practices for shared micromobility

3. CARPOOLING IN A 15-MINUTE CITY NEIGHBOURHOOD

3.1. Background and definition of carpooling, and its potential use in a 15mC neighbourhood

Carpooling can be conceptualized as an arrangement where two or more people, not belonging to the same household, share the use of a privately owned car for a trip (or part of a trip), and the passengers contribute to the driver's expenses (Ciari & Axhausen, 2012; Rodrigue et al., 2006).). By ensuring better car filling, financial gains can be expected for travellers, and potentially time savings if lanes reserved for carpoolers are set up along the route, on congested stretches of road.

Historically, there have been major surges in carpooling during oil shortages (particularly during the world wars and oil crises), but carpooling has always remained at fairly modest levels.

It is perfectly suited to medium-density suburban areas: in dense urban centres, it is considered irrelevant when compared with other modes that allow greater massification and better speeds (in particular public transport), but its development requires the ability to find a potential carpooler and can therefore only be activated in areas with a minimum of density. Industrial sites and economic sites are also particularly relevant areas for organising carpooling, because of the high density of workers, especially if the work is organised in shifts (employees have common starting and finishing times), as this makes it easier to find a carpooler.

At the same time, there are a number of obstacles to carpooling: in particular, the reluctance to share a car, the difficulty of finding a carpooler who makes the same journey, and the need to use the car for other activities during the day (picking up children, etc.), fears about safety (particularly for women).

The development of carpooling can be encouraged by an ecosystem of measures, implemented by different players and acting at different levels (putting carpoolers in touch with each other, facilities enabling them to meet physically or save time, subsidies, etc.). These levers are described in detail below.

However, carpooling doesn't seem to be one of the major levers to be activated when extending the 15mC concept to suburban areas. It is mainly relevant for longer trips (at least 10 km) and longer journeys (in all cases over 15 minutes). Indeed, it's only on longer journeys that the monetary gains can be substantial (one of the major arguments driving users to carpool), and that potential detours remain acceptable (to pick up a carpooler or to join one). Therefore, like car-sharing, carpooling seems to be an ancillary lever, potentially enabling people to do without a private car (or the household's second car), and to adopt more "virtuous" modal habits for local travels.

In addition, the development of this service can make certain facilities more accessible, particularly for people who do not use a car on their own (because they do not have a driving licence, or they do not have a vehicle or because they are no longer fit to drive). Carpooling can therefore help to increase accessibility to certain services (or to additional jobs) for those populations (often more modest or vulnerable than average population).

3.2. Different types of services of carpooling

To encourage carpooling, many types of levers can be activated, by a wide range of players:

3.2.1. Dedicated carpool lanes

High Occupancy Vehicles Lanes (HOV Lanes) began to be developed in the United States in the 1970s. They can reduce congestion by reducing the number of vehicles on the road (for a constant total number of people transported), and therefore save time for the community. By providing a competitive advantage for carpoolers (HOV lanes are less congested than other routes), they encourage carpooling. While numerous studies have shown the effectiveness of these infrastructures in reducing journey times (particularly during rush hour), some critics regret that the effects are more mixed on certain projects: the under-use of HOV Lanes can lead to excess congestion on the other lanes and the money invested by the community would therefore not be socio-economically profitable overall.

While thousands of kilometres of reserved lanes have now been installed in the United States and Canada, the concept is struggling to catch on elsewhere, particularly in Europe. However, there are some interesting examples:

- At the end of the 1990s, Madrid developed a 16km bus and carpool lane on the A6, a radial motorway running through a rapidly growing urban corridor, at a cost of 57 million euros. It connects directly to a multimodal interchange in the north-west of Madrid. When the lane was opened, time savings for buses were substantial, but then fell back slightly with the rise in carpooling. Time savings for carpoolers fell to 43% at the peak, and the average occupancy rate rose sharply. More recently, the lane has been opened to zero-emission vehicles.
- Much less expensive projects are being developed in Spain in the wake of successive economic crises. For example, Barcelona has created a lane reserved for buses and carpoolers on the C-31, using only paint, at a cost of €30,000. Other intermediate solutions are also being considered (dynamic allocation of lanes, without modifying the heavy infrastructure) (see Figure 16).
- In the UK, some dedicated bus and carpool lanes have been introduced on major non-motorway sections of urban roads, notably in Leeds, Bristol, Birmingham, Portbury and Bradford. They have often evolved over time, taking into account feedback from public consultations.
- In France, Grenoble was a pioneer, creating a dedicated bus lane on the A48 in 2007, and reserving the left lane for carpoolers, taxis and zero-emission vehicles from 2020. In the Île-de-France region, a number of dedicated bus lanes have been created on motorways, and their deployment should continue via the "*Schéma Directeur des Voies Réservées*," (French for Dedicated Lanes Master Plan) with the addition of dedicated carpooling lanes.

Figure 16: Dedicated bus and carpooling lane on the C-31 in Barcelona © Google Street View (2021)

3.2.2. Carpooling parks

Carpooling parks enable carpoolers to meet up: one carpooler leaves their vehicle in a car park, usually close to an expressway, and then gets into the vehicle of the other carpooler. To encourage car- pooling, some local authorities are building car parks throughout their areas (see Figure 17).

For example, the Belgian region of Wallonia has 112 car-sharing car parks, with 3,700 spaces available free of charge. These are either car parks created specifically for this purpose, or portions of pre-existing car parks that have subsequently been reserved for carpoolers, whether public or private (supermarkets, large retail chains, etc.).

In a context where the issue of land artificialisation is becoming increasingly important, it is important to give priority to sharing with existing car parks wherever possible.

the use of such car parks is generally free of charge. The local authority's aim is to encourage the use of a minority mode of transport. There is therefore no business model as such. However, the priority use of existing car parks to develop spaces reserved for carpoolers can significantly limit investment costs.

Figure 17: Carpooling area at l'Isle-Adam, Île-de-France © La gazette du Val-d'Oise

3.2.3. Matchmaking platforms

One of the major challenges for the development of carpooling is the possibility of finding another person making the same journey (or part of the same journey). Internet matchmaking platforms are one way of finding a carpooler. They are offered either by public authorities or by carpooling operators (who may earn a commission from the financial exchanges between car-sharers, particularly for long-distance car-sharing and, to a lesser extent, for daily short-distance car-sharing).

The challenge around the development of the various platforms is to prevent them from multiplying too much (each user having to search on the various platforms and needing to have an account for each operator). Some local authorities (for example : Île-de-de-France Mobilités, the Paris Region transport authority) may choose to integrate short-distance car-sharing services into their public transport route planners.

Some people are reluctant to carpool because they fear for their safety. However, by carpooling regularly with a known colleague, this type of obstacle can be overcome. In this case, a company's internal matchmaking platform is an interesting tool.

3.2.4. Carpooling routes

Carpooling routes operate on the same model as public transport services. Unlike traditional carpooling, where you need to find a carpooler in advance, carpoolers are matched spontaneously on the day of the journey.

Various stops are located in the public space, just like conventional bus stops. On arrival at the station, passengers use a dedicated mobile application to indicate the stop they wish to go to. This request is then relayed to all the drivers who have registered for the service and activated the notifications on their

application. Potential drivers then volunteer to pick up the passenger. If the waiting time is too long, according to a threshold set by the local authority, the latter can offer to pick up the passenger by taxi. This option offers greater security to potential users of these routes.

For example, the city of Grenoble in France has very recently developed a network of 23 stops and 15 lines, some of which benefits from HOV lanes on a portion of their route (8 km, saving 10 minutes at rush hour). The network is organised by SMMAG, Grenoble's transport authority. In 2023, 90,000 seats were offered by drivers, and 2,000 passengers used the service regularly, with an average waiting time of less than three minutes (see Figure 18).

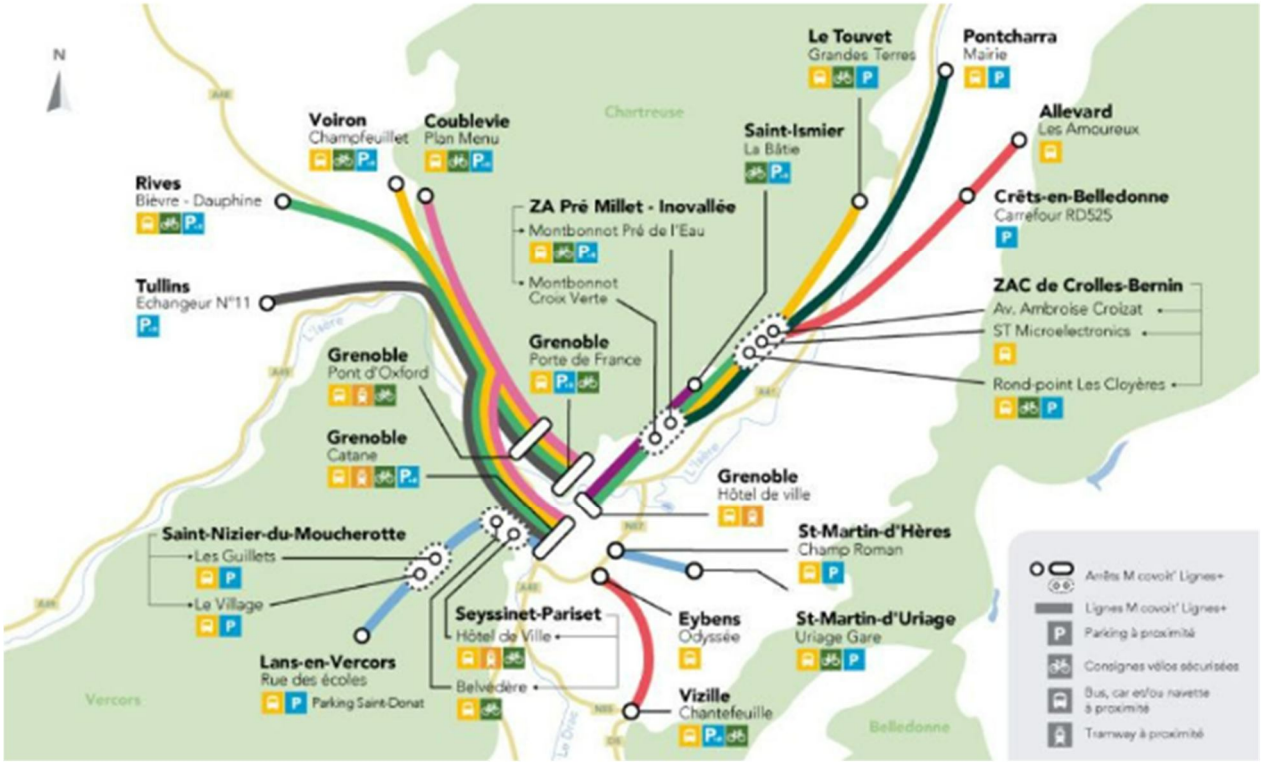


Figure 18: Carpooling routes deployed in the Grenoble conurbation (© Ecov)

The development of such carpooling lines is generally supported by local authorities, in particular the mobility organising authorities. These routes are integrated into the overall mobility offer (metro, rail, bus). These pooling lines are often developed in areas where there is not enough traffic potential to set up a bus route.

An operator is responsible for the smooth running of the application and for ordering taxis if waiting times are too long. Car-sharing services are generally subsidised in the same way as other modes of public transport, according to a subsidy rate specific to each local authority. The driver is generally paid according to the number of journeys made (often with monthly ceilings to avoid this becoming a professional activity). Passengers pay a fare, in the form of a ticket. The service may or may not be included in public transport season tickets.

3.2.5. Other benefits for carpoolers

Other advantages can be offered to carpoolers. In particular, reserved spaces in car parks, as close as possible to facilities (spaces closest to public transport access in park-and-ride facilities, or as close as possible to office access in company car parks).

3.3.Governance of carpooling services

3.3.1. Dedicated carpool lanes

Depending on the local organisation of the area and the division of responsibilities, reserved lanes may be introduced by the motorway operator or concessionaire, either on its own initiative or at the request of and in coordination with local authorities (city, region, mobility authority).

3.3.2. Carpooling parks

Carpooling parks are often developed at the initiative of local authorities. They can build them themselves (or have them built) or enter into agreements with private car park owners to reserve spaces for carpooling. For example, in Wallonia, some carpooling parks are shared with commercial partners like IKEA.

3.3.3. Matchmaking platforms

Carpooling platforms may be developed by car-sharing operators, or at the request of local authorities or large companies (wishing to connect their employees to form matches), which then pay for the deployment of the service (often with carpooling operators).

3.3.4. Carpooling routes

The development of such carpooling lines is generally supported by local authorities, in particular the mobility organising authorities. These routes are integrated into the overall mobility offer (metro, rail, bus). An operator is responsible for the smooth running of the application and for ordering taxis if waiting times are too long.

3.4.Business models of carpooling services

3.4.1. Dedicated carpool lanes

If the reserved lane is installed on a section of road that is not subject to tolls, there will be no impact on road network revenues. But if it is installed on a section of road that is subject to tolls, the change in revenue will be linked to the overall change in the number of vehicles using the section (the latter being linked in particular to the fact that the reserved lane is an additional lane or created in place of a pre-existing lane). In the United States, some operators charge for the use of the reserved lane by people travelling alone in their cars (this generates additional revenue and could potentially increase the use of the lane if it is not very busy).

3.4.2. Carpooling parks

The use of such car parks is generally free of charge. The local authority's aim is to encourage the use of a minority mode of transport. There is therefore no business model as such. However, the priority use of existing car parks to develop spaces reserved for carpoolers can significantly limit investment costs.

3.4.3. Matchmaking platforms

The business model for short-distance car-sharing is still struggling to emerge. Unlike long-distance car-sharing, which often requires a new car-sharer to be found for each journey, short-distance car-sharers often leave the platform once they have made their match (and are therefore no longer a potential source of remuneration). As a result, these platforms are often subsidised by the local authority/company that asked for the service to be set up.

The carpool.be revenues come from selling dedicated carpool platforms and guidance to enterprises, making it possible not to ask commission on the rides.

In France, the "*Registre de Preuves de Covoiturage*" (Carpooling Proof Register, CPR) was created in 2018. This is a national register collecting all journeys made by carpooling via carpooling operators. This anonymised register makes it possible to check whether a journey has actually been made by carpooling and serves as a basis for public authorities to give financial incentives to carpoolers on their territory when they decide to introduce such aid. Carpoolers tend to stop using an application once the daily carpooling crew has been formed (carpoolers usually travel with the same people). They only continue to use the application when financial incentives are offered by local authorities to encourage them to carpool, such as reimbursement of the carpooling journey for passengers or drivers. In the end, these incentives can be very expensive for local authorities, which raises the question of whether these expenses are a drain on the budget that could have been allocated, for example, to developing public transport.

In addition, according to the national observatory for everyday carpooling, analysis of this register shows that only 4% of carpooling journeys are recorded in the CPR, with the vast majority of carpooling taking place informally, often within the same family. The CPR also shows that a significant proportion of carpooling journeys are very short or could theoretically have been made using public transport. Some fraudulent use of the financial incentive is also observed. The public authorities have been able to use the CPR data to adapt their financial incentive mechanisms (minimum and maximum distance for a journey, exclusion of journeys that can be made using public transport, daily and monthly ceilings, etc.) and to combat fraud more effectively, but these analyses have shown the limits of the economic model for carpooling services based on charging commissions and financial incentives per journey. This model is also problematic for the public authorities insofar as the operators' data remains private. For example, the authority does not have access to the databases of people registered for the service, which are carefully kept by the operators for reasons of competition, nor to the databases of journeys, which are often only transmitted to the CPR. For the authorities, the algorithms used by operators to propose matches between carpoolers are also a black box. So, when an operator withdraws from an area, it takes its data and software with it, and the authority cannot capitalise on the data and services it has helped to develop.

In the Paris region, the transport authority Île-de-France Mobilités (ÎDFM) has introduced a policy of financial incentives to encourage carpooling. This policy has been implemented between May 2021 and December 2024, with a total budget of €16,800,000 (€6,500,000 for 2024). It follows on from several experimental measures to subsidise carpooling that had been put in place between 2017 and 2020. The new agreement was signed between ÎDFM and four carpooling operators: Klaxit, BlaBlaCar Daily, Ynstant and Karos (BlaBlaCar Daily acquired Klaxit in April 2023). The scheme subsidises carpooling journeys of between 2 and 30 km made in the Paris region (excluding Paris). The journey is free up to 30 km for passengers who are public transport season ticket holders (up to a limit of two journeys per day) and requires a financial contribution for other types of passengers or for journeys over 30 km for season ticket holders. Depending on the distance travelled, the driver can benefit from €1.5 to €3 per passenger carried, up to a limit of 6 journeys per day and €150 per month. During periods of major transport disturbances (strikes, etc.) or pollution peaks, assistance for drivers is increased and can range from €2.25 to €4.50 per passenger, with no monthly limit. ÎDFM also pays operators a fee based on the number of passenger journeys made through them (€0.5 excluding VAT per journey for the first 100,000 journeys, then degressively by threshold up to €0.15 excluding VAT for journeys made beyond the 2,000,001st journey). This remuneration is used to finance part of the direct production costs of a passenger journey for the operator (matching algorithms, cloud hosting, bank charges for payments to

carpoolers, sending of text messages, etc.). Lastly, ÎDFM offers remuneration to car-sharing operators for the development of technical functionalities for integration into the Île-de-France Mobilités MaaS. The development costs incurred are financed up to 70% of the expenses paid, up to a maximum of €100,000 excluding VAT. In the ÎDFM mobile application, the search for an itinerary includes a suggested journey by public transport, but also by carpooling if a journey has been suggested by a driver on the application of an agreed operator. The journey suggested on the ÎDFM application then redirects the user to the application of the operator. The user can register for the service, book the journey with the driver and benefit from free travel if they have a public transport season ticket (to prove this, he or she must identify himself or herself with his or her ÎDFM account). In December 2023, ÎDFM announced that it would be taking over the task of connecting carpoolers for subsidised short-distance journeys. A call for tenders was launched in early 2024 to select a single platform under the ÎDFM brand, to be operated by a single operator from 2025.

In December 2022, the French government launched a national plan for commute carpooling, with the aim of tripling the number of carpools by 2027 (from 900,000 to 3 million daily carpools). The plan includes a €100 subsidy for drivers registering for the first time on a carpooling application, aid to encourage local authorities to set up financial incentives for carpoolers, and funding for carpooling parks, dedicated carpooling lanes and carpooling routes. It has been allocated 150,000,000 euros for 2023 and has been renewed for 2024. Since 2020, the Forfait Mobilités Durables (Sustainable Mobility Aid) has enabled employers to encourage their employees to use alternatives to the car, including carpooling, by giving them a tax-free bonus of up to €800 per year. Despite these schemes, only 10,000 carpooling journeys per day were recorded by the CPR in Île-de-France in September 2024, out of a total of 42 million daily journeys in the region (14 million of which are by car). This raises questions about the effectiveness of financial incentives for developing carpooling. We might also question the subsidising of private companies with public money for a disappointing service (only 0.04% of the kilometres travelled on daily journeys are covered by carpooling via a platform) and a questionable ecological balance (competition with public transport in particular).

Another possible model for carpooling services is the cooperative model. Mobicoop is a French limited-profit cooperative offering carpooling services for public authorities and businesses. Unlike companies such as Klaxit, Ynstant or BlablaCar Daily, which are paid by taking commission on carpooling journeys made by drivers and passengers, Mobicoop offers a personalised matchmaking platform service for local authorities and, to a lesser extent, businesses. Carpoolers contact each other via the platform and share the cost of their journeys, if they wish, in the way they choose. Mobicoop takes no commission on journeys, and carpoolers do not have to use an application for each journey. The link between the operator and the local authority is a public service delegation established for a defined period, generally a few years. The authority owns the data, and both the platform and the mobile application are developed using open-source software, enabling the authority to maintain the service if the contract is not renewed, but also to develop it as it likes if it wants to. The cooperative form allows all partners to participate in Mobicoop's governance and democratic life. Users, local authorities and employees can become members by taking a share in the cooperative and vote at the general meeting on the basis of one person, one vote. Local authorities are represented on the supervisory board and can therefore influence decisions taken by the cooperative. Mobicoop also offers local authorities a spontaneous carpooling service, or organised hitchhiking, called Rézopouce. People wishing to carpool can stand at these stops to let motorists know that they are looking for a driver and indicate their destination using a simple sign or the Mobicoop mobile application. This low-tech, low-cost solution can, for example, be used to reach a mobility hub from urban outskirts with poor public transport.

3.4.4. Carpooling routes

Carpooling routes are subsidised in the same way as other modes of public transport, according to a subsidy rate specific to each local authority. The driver is generally paid according to the number of journeys made (often with monthly ceilings to avoid this becoming a professional activity). Passengers pay a fare, in the form of a ticket. The service may or may not be included in public transport season tickets.

In the Paris Region, Île-de-France Mobilités will create 12 carpooling routes in 2025, physically marked by stops and equipped with park-and-ride facilities. Three routes will be trialled at the beginning of 2025 in the Essonne and Yvelines departments to link small towns to the Saclay plateau, in areas with fewer public transport. ÎDFM will only fund the driver's share, i.e., between €1.50 and €3 (depending on the distance) per passenger and per journey. For the 12 lines already planned, ÎDFM plans to release €26 million between 2024 and 2027.

Insofar as carpooling is rather an “ancillary” lever of the 15mC concept, and the types of measures that can be put in place are very numerous, we are not proposing any recommendations in this section.

3.5. Overview of carpooling services for the 15mC neighbourhood

	Carpooling
Relevance	Carpooling doesn't seem to be one of the major levers to be activated when extending the 15mC concept to suburban areas. It is mainly relevant for longer trips (at least 10 km) and longer journeys (in all cases over 15 minutes). Indeed, it's only on longer journeys that the monetary gains can be substantial (one of the major arguments driving users to carpool), and that potential detours remain acceptable (to pick up a carpooler or to join one). Therefore, like car-sharing, carpooling seems to be an ancillary policy, potentially enabling people to do without a private car (or the household's second car), and to adopt more “virtuous” modal habits for local travels.
Potential	The development of this service can make certain facilities more accessible, particularly for people who do not use a car on their own (because they do not have a driving licence, or they do not have a vehicle or because they are no longer fit to drive). Carpooling can therefore help to increase accessibility to certain services (or to additional jobs) for those populations (often more modest or vulnerable than average population).
Governance / regulation	Previously mentioned solutions showed that the development of carpooling can be based on a number of levers that can be activated by different players: public authorities, transport authorities, road managers, companies, carpooling operators, etc.
Business frameworks	Insofar as short-distance carpooling is still emerging and in the minority in Europe, the development of business models doesn't seem to be on the agenda. We're still in a situation where local authorities subsidize carpooling to encourage its development.
Issues / points for improvement	The modal share of carpooling is currently low, but subsidising carpooling journeys could lead to a sharp increase in public spending if carpooling takes off. Developing dedicated carpooling lanes on main roads and carpool parks upstream of commutes made mainly by private car can encourage carpooling. These are investments that do not require subsidies linked to the number of journeys made and will therefore not require an increase in public spending if carpooling becomes more widespread. Matchmaking platforms can be useful and have an operating cost that is not directly linked to the number of carpooling journeys. Carpooling routes have potential on certain corridors, but their operating costs may vary according to the level of service provided.

Table 17: Overview of carpooling services for the 15mC in urban outskirts

4. DEMAND-RESPONSIVE TRANSPORT IN A 15-MINUTE CITY NEIGHBOURHOOD

4.1. Background and definition of demand-responsive transport, and its potential use in a 15mC neighbourhood

Demand-responsive services, or "Demand-Responsive Transport (DRT) refer to an adaptable mode of transportation, which can adjust routes and/or schedules based on user requests" (Krell & Hunkin, *Demand-responsive transport, A Policy Brief from the Policy Learning Platform for a more connected Europe*, INTERREG Europe, 2024, p.4). "DRT can be especially useful for rural and sparsely populated areas, helping to provide mobility options which are cheaper than traditional public transport by optimising vehicle use and ensuring that empty vehicles do not run." (Krell & Hunkin, 2024, p.2.) "DRT has also garnered interest for its potential as a first/last mile solution, being integrated into public transport systems to enable multi-modal travel, by connecting users with transport hubs where journeys can then be continued by a traditional public transport service or use of shared vehicles." (Krell & Hunkin, 2024, p.4). In this way, they can answer the need for urban mobility outside the city centres and be part of a 15mC model for the urban outskirts.

First DRT pilots were launched back in the 1970s, but some failed to survive. In recent years, it seems that DRT services are expanding rapidly, notably thanks to advances in ICT and new models of collaboration. Between 2019 and 2021, more than 450 DRT projects worldwide have been launched, mostly in Europe, North America, and Asia (EIT, 2022).

This can sometimes be as simple as a telephone platform but can also include a solid technological framework with sophisticated routing algorithms and accessible mobile platforms. DRT aims to respond to fluctuating demand curves and population surges. It allows efficient use of vehicles and reduces empty trips. DRT simplifies commuting for individuals with disabilities as well as the elderly population and provides them with autonomy. DRT creates an inclusive, responsible, and adaptive transport network. It is a step toward making travel accessible to all layers of a community, not just a necessity but a right (Road XS, 2024).

An interesting DRT best practice is **Flexa** (see Figure 19). Flexa offers demand-responsive transport services for the suburbs of Leipzig (Germany), which are poorly served by public transport, to connect them with transport hubs. Customers use an app to input their current location and destination (based on a list of 120 virtual stops), pick-up time and number of passengers to receive an offer for a customised ride. If there is an existing public transport link that can offer the same route, then no offer is made to the user, who is instead given information on the available public transport route. In this way, Flexa ensures that DRT is truly integrated into the mobility system to fill gaps, and not compete against existing services. The initial pilot project was funded by the German government, as well as the Interreg Central Europe project, Dynaxibility4CE. From this pilot, Flexa is now available throughout the city. Flexa uses e-vehicles and is part of the municipal transport company's offer, accessible through the general public transport app, with ticket prices using the same tariff as other public transport options. As well as setting a novel route, the Flexa system will pool journeys from several users to keep down costs and increase efficiency. Flexa has electric vehicles adapted for people with reduced mobility (Krell & Hunkin, 2024).

Figure 19: The DRT Flexa vehicles operating in the suburbs of Leipzig have electric vehicles adapted for people with reduced mobility (© Anke Brod)

DRT enables people living in areas with poor public transport to change their mobility habits. They can travel less by car, thus reducing congestion. Fewer personal vehicles on the roads contribute to less GHGs and air pollutants emissions, less noise pollution as well as a less car-centric environment.

A number of European projects and programs have studied DRT good practices in Europe, and other projects are underway. These projects have helped to shape this report and are summarized in the table below.

Project program	Project name	Project duration	Partner cities, territories and organisations (country)
Interreg Europe	LAST MILE	2016-2020	Catalonia (Spain), East Tyrol (Austria), Upper Sûre (Luxembourg), West Pomeranian Voivodeship (Poland)
	REGIO-MOB	2016-2020	Bulgaria, Edinburgh (UK), Lazio, (Italy), Ljubljana (Slovenia), Košice (Slovakia), Kraków (Poland), South West Oltenia (Romania), Western Macedonia (Greece)
	INNOVA-SUMP	2017-2021	Devon County (UK), Evosmos, Thessaloniki (Greece), Iasi (Romania), Nicosia (Cyprus), Prague (Czech Republic), Ravenna (Italy), Vilnius (Lithuania), Viseu (Portugal)
	MATCH-UP	2018-2022	Bologna (Italy), Funchal (Portugal), Northeim (Germany), South Western Region (Ireland), Timisoara (Romania)
	DESTI-SMART	2018-2022	Bremerhaven (Germany), Funchal (Portuga), Hastings (UK), Mallorca Island (Spain), Sardinia (Italy), Thessaloniki (Greece)
	Dynaxibility4CE	2020-2022	Graz (Austria), Koprivnica (Croatia), Leipzig (Germany), Budapest, (Hungary), Parma (Italy), Krakow (Poland)
	EMBRACER	2023-2027	Bournemouth (UK), Bucarest (Romania), Cagliari (Italy), Barcelona (Spain), Coimbra (Portugal), Cork (Ireland), Hungary, Latvia, Lazio (Italy), Leipzig (Germany), Ljutomer (Slovenia), Lviv (Ukraine), Pafos Region (Cyprus), Šumadija i zapadna Srbija (Serbia), Tampere (Finland), Viimsi (Estonia), Vilnius (Lithuania)
	Rural Mobility	2024-2028	Hannover (Germany), Hoce-Slivnica (Slovenia), Kalmar County (Sweden), Lisboa (Portugal), Overijssel (The Nederlands)
SMARTA	SMARTA Report on rural Good Practices	2019	Aberdeen (UK), Leuven (Belgium), MeMex (Italy)
EIT Urban Mobility	EIT Urban Mobility report	2022	EIT Urban Mobility, Nemi

Table 18: Summary of European projects and programs related to DRT

Figure 20: DefMobil DRT service in East Tyrol (© Regiotax) (see 4.3)

DRT services have potential in peri-urban and rural areas by:

- Complementing existing mobility offerings, acting as first-last mile services feeding into the regular public transport network (fixed route, fixed schedule)

- Increasing public transport attractiveness and accessibility by providing, at the same cost as regular public transport, more geographic coverage, a denser network of stops and a reduction in travel times.

- Mitigating transport poverty in areas or regions with scarce public transport options, providing mobility options for people who do not have access to private cars

“Having a good algorithm is not enough to have a successful DRT service” (EIT Urban Mobility, 2022, p.34). The flexibility introduced by DRT can be both an advantage and a disadvantage depending on the context as well as on the users. Profound knowledge of local requirements provides precious information on the extent to which a DRT should be flexible and linked to the existing offer of formal and informal shared mobility services (including stop and frequency planning).

4.2. Different type of services of demand-responsive transport

DRT services are varied and do not all work in the same way. Some include stops, others do not. There may or may not be fixed timetables or a set route. Four main flexible features of DRT services can be singled out: vehicle size, flexible route, flexible stops, and flexible schedules. It is important to find a good balance between reliability, flexibility, and low costs (EIT, 2022).

DRT projects can largely fall within four different categories (see Figure 21):

- Hybrid: service similar to regular public transport, with a fixed schedule and stops, in which certain stops or off-peak hours operate solely on-demand
- Semi-flexible: service that is adapted to demand, but the number of possible pick-up times and locations are limited by pre-determined design
- Full-flexible: door-to-door, or point-to-point services, with open schedules and dynamic routing tailored to the demand
- DRT with flexible layout and stops: the stops within this kind of service are fully adapted to the demand (EIT, 2022).

Many different DRT use cases can be developed, including first and last mile services, night services, substitution of underutilised fixed-route buses, point to point, specific user groups, premium services, etc.

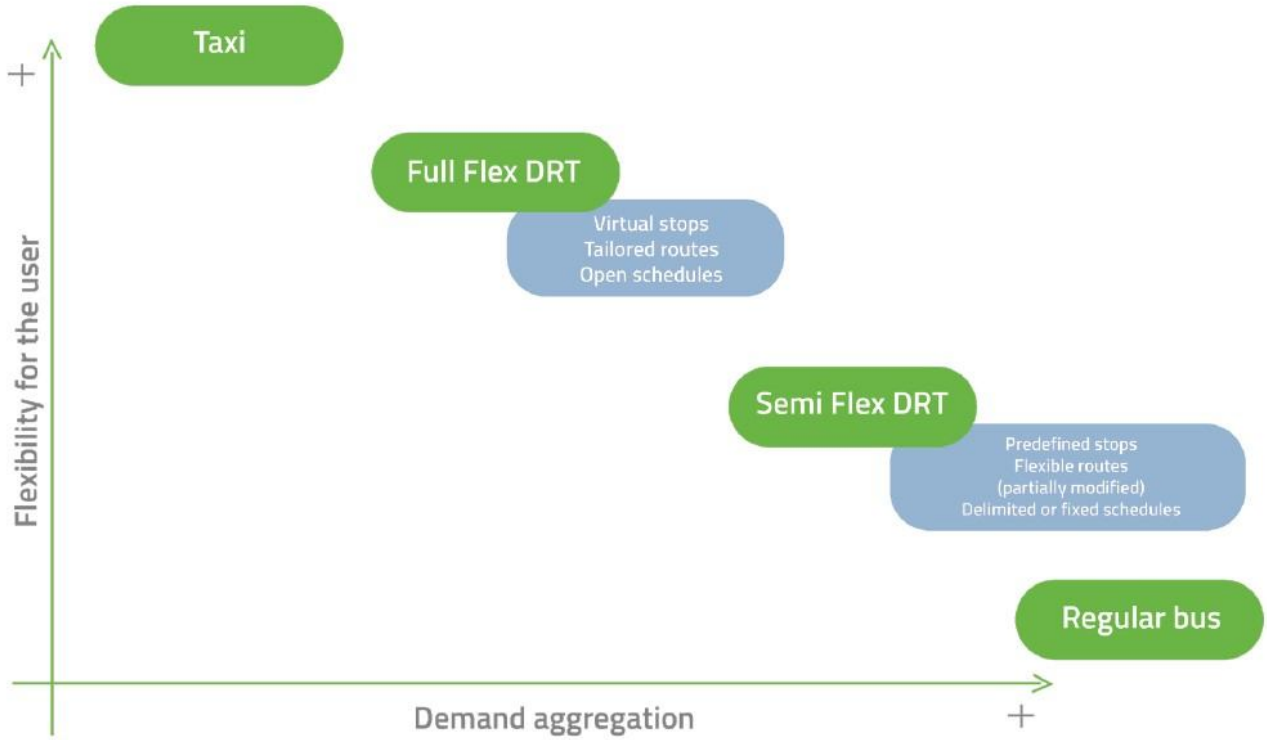


Figure 21: Trade-offs between flexibility and demand aggregation by the various DRT systems (Source: EIT, Nemi)

Full flexible and semi-flexible services reflect two different approaches to the compromise between low costs, high flexibility, and high reliability (i.e., punctuality at pick-up and drop-off locations, ensuring connections are reached) that every DRT service needs to accommodate. In practice, only two of these objectives can be achieved simultaneously, as illustrated on Figure 22.

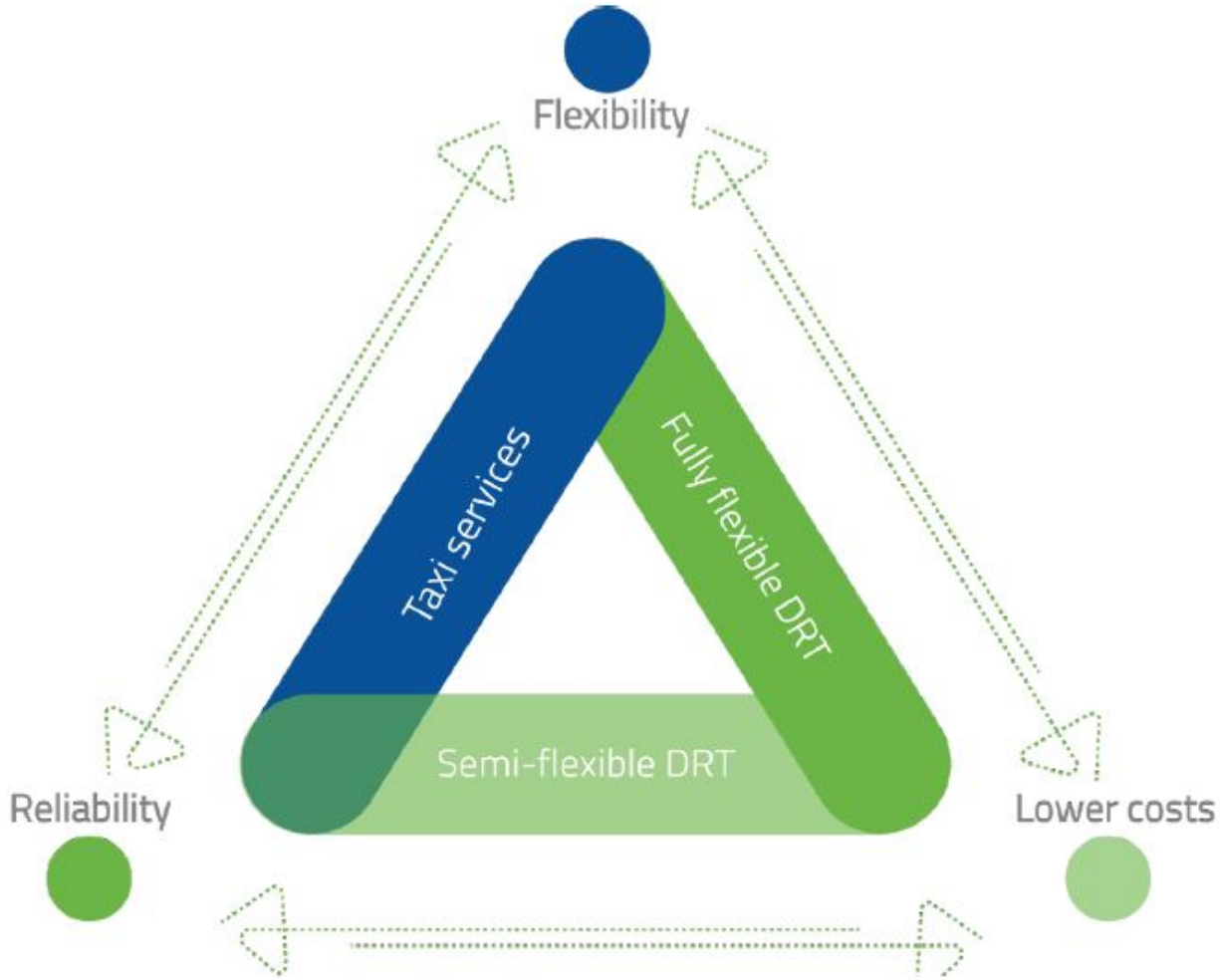


Figure 22: Service compromise between cost efficiency, flexibility, and reliability (EIT, 2022)

Full flexible DRT combines high flexibility at low costs for users by allowing many detours and minimising walking distance for users but has low reliability (e.g., higher probability of cancelled trips or long waiting times). **Mobitwin** is an Mpact service that provides a transport solution for people with limited mobility via a network of volunteers. The service was launched in 1982 and currently operates in more than 200 Flemish municipalities (representing 75% of Flanders) as well as in Brussels. The driving force behind the service is a network of over 3,000 volunteer drivers. They pick up Mobitwin users from their homes, drive them to their destination, and then return them home. While the service is primarily used for transport to medical appointments, Mobitwin was designed to meet the transportation needs for various purposes, including visiting family or friends, going to the day centre, shopping for groceries, etc. The rides take place in the volunteers' own cars. As part of the DREAMS project, Mpact is exploring whether these rides can also be carried out using shared vehicles from the car-sharing operator Cambio (see 1.3.1.1). The volunteers provide a transport solution for around 38,000 users, ensuring over 350,000 rides annually. Through the Mobitwin service, Mpact supports people with limited mobility in meeting their daily or weekly transport needs. It helps reduce social isolation, contributes to mental health, and promotes social equity.

Semi-flexible DRT associates low costs and high reliability but only with limited flexibility where users are picked up and dropped off at pre-defined physical or digital stops that can be activated or not depending on actual demand. A good practice of Semi-flexible DRT can be found in **Viseu**. From 2002 to 2005, twenty-five Portuguese municipalities, working with the General Direction of Land and River Transport, and the Portuguese Association of Electric Vehicles, launched a demonstration programme

for introducing electric buses to Portuguese cities. In this context, the city of Viseu developed and implemented a semi-flex DRT system with three electric minibuses, which follows a set route and operates on demand, primarily for the elderly population of the city to be able to access facilities in the city centre. Passengers could travel for free, but low-cost fares were introduced in 2020 to maintain the sustainability of the scheme. Starting as a demonstration project, it is still running, with around 13,000 users per year. DRT schemes like this could be interesting for other cities with a historic city centre that limits access (for example, a low-emission zone), with many elderly citizens or tourists (Krell & Hunkin, 2024).

Taxi services are both reliable and flexible for users but at a high cost.

Hybrid and semi-flexible DRT services are more convenient and cost-efficient in the urban outskirts, they provide optimal balance between reliability, operational costs, and customer satisfaction, unless there is a large economic contribution from the subsidising public authority in deploying and operating a large fleet of vehicles (EIT, 2022).

4.3. Governance of demand-responsive transport

Public authorities play a leading role in establishing, implementing and monitoring DRT schemes, helping to bring together the necessary actors to run them. (Krell & Hunkin, 2024). Their role covers everything from licencing and safety to funding and community engagement. They set the overall regulatory and licencing framework in which DRT systems operate, including service standards, safety and environmental requirements, driver training obligations, fare structures and accessibility requirements. Licencing can ensure that operators comply with their regulatory requirements and deliver a minimum service quality. Essential partners are local public transport companies, taxi companies or other private companies actively involved in delivering the service, but also local associations and companies that can be helpful in engaging with citizens, informing them and engaging them in service planning.

Mobitwin (see 4.2) desks are always established in collaboration with local municipalities. After all, they are best informed about local mobility needs and can easily reach our target group. In the partnership between Mpact and the local municipality, the division of responsibilities is as follows:

The local municipality is responsible for:

- Dispatching: Users reserve their rides at least 48 hours in advance, and the municipality matches the request with a volunteer.
- Enrolling new users to the service and verifying that they are less mobile and have limited income.
- Recruiting volunteers and organizing small activities for them, such as sharing cake on a volunteer's birthday.

Mpact is responsible for:

- Developing and maintaining the software platform (Mobitwin Office) that enables municipalities to enroll users and volunteers, plan rides, manage invoicing, and store data on the rides.
- Developing and maintaining the application (Mobitwin Calendar) that allows volunteers to check who they need to transport, when, and to/from which locations.
- Following up on accidents that occur during the rides, managing repairs via our collective insurance, and handling the administrative follow-up.
- Organizing study days and webinars on various topics, such as how to use the Mobitwin Office software, what to do in the event of accidents, how to assist users with mental health issues, strategies for recruiting new volunteers, cybersecurity, and more.
- Engaging in political advocacy to defend the interests of people with limited mobility.

- Conducting research and innovation activities, such as exploring the possibility of Mobitwin rides via shared vehicles, conducting satisfaction surveys among users, volunteers, and municipalities, testing new communication initiatives, etc.

In the Île-de-France region, the first public transport service, Allobus, was introduced in 1998 to serve the Roissy Charles de Gaulle airport area. In 2010, the region's single mobility authority, Île-de-France Mobilités, designed a region-wide public transport network under a public service delegation contract with Keolis, and Allobus was renamed Filéo. The partners were the Val-d'Oise departmental council, the Seine-et-Marne departmental council, the former Terres de France community, which is now part of the Paris Terres d'Envol community, the public limited company Aéroports de Paris, Air France and Île-de-France Mobilités. In 2017, the DRT networks were brought together under a single brand, with a single application and a single call centre: "**TàD Île-de-France Mobilités**" (TAD = *Transport à la demand*e, DRT in French language). There are 40 DRT operating zones, all located in the urban outskirts, representing 767 communes, or half of the 1,268 communes in Île-de-France. Some operate as hybrid services, others as semi-flexible services, with variations possible during the day (hybrid services at peak times and semi-flexible services at off-peak times). DRT services are open to competition and operated by various private operators with 161 vehicles, most often minibuses. DRT services are available with a normal ticket, at the same price as a regular bus. Reservations can be made on the TAD website, by telephone or via the mobile application. 133 stations are served, and 1.4 million journeys have been made between 2019 and 2024 (Île-de-France Mobilités, 2024).

DefMobil (see Figure 20) is a DRT system operating in East Tyrol (Austria). It works on a fixed timetable, but the route travelled varies depending on demand. Users can book their journey by telephone, at least one hour in advance of departure. While the municipalities took the lead, the success of the scheme was ensured through co-operation with the local taxi operator, who operate the vehicles, though those vehicles are owned by the Government of Tyrol. In 2017, DefMobil was taken over by the regional public transport association, which provides funding and ensures that the system is integrated into the broader mobility system and is marketed as part of the wider network. Tickets have also been unified and integrated into a single ticketing system.

The **TADEx** DRT system operates in the eastern part of Extremadura (Spain), linking smaller towns (less than 2,000 inhabitants) with the nearest transport network hubs. TADEx aims to increase the cost and energy-efficiency of the transport system, ensure better use of capacity by using appropriate types and sizes of vehicles based on demand, and encourage greater use of public transport. The service is comprised of two intercity bus lines, and users can request and book trips via website, app or phone call. Operating since 2022 as a pilot project funded by the regional government, Extremadura aims to roll the system out to other parts of the region. Switching from traditional bus lines to TADEx saw a monthly reduction of 2,331 km travelled per month by public transport vehicles and an increase of users, demonstrating increased efficiency from optimised vehicle use (Krell & Hunkin, 2024).

It is very important to set clear objectives according to specific use cases and communities to be served, as shown in the circular process of planning and implementation on **Erreur ! Source du renvoi introuvable.**.

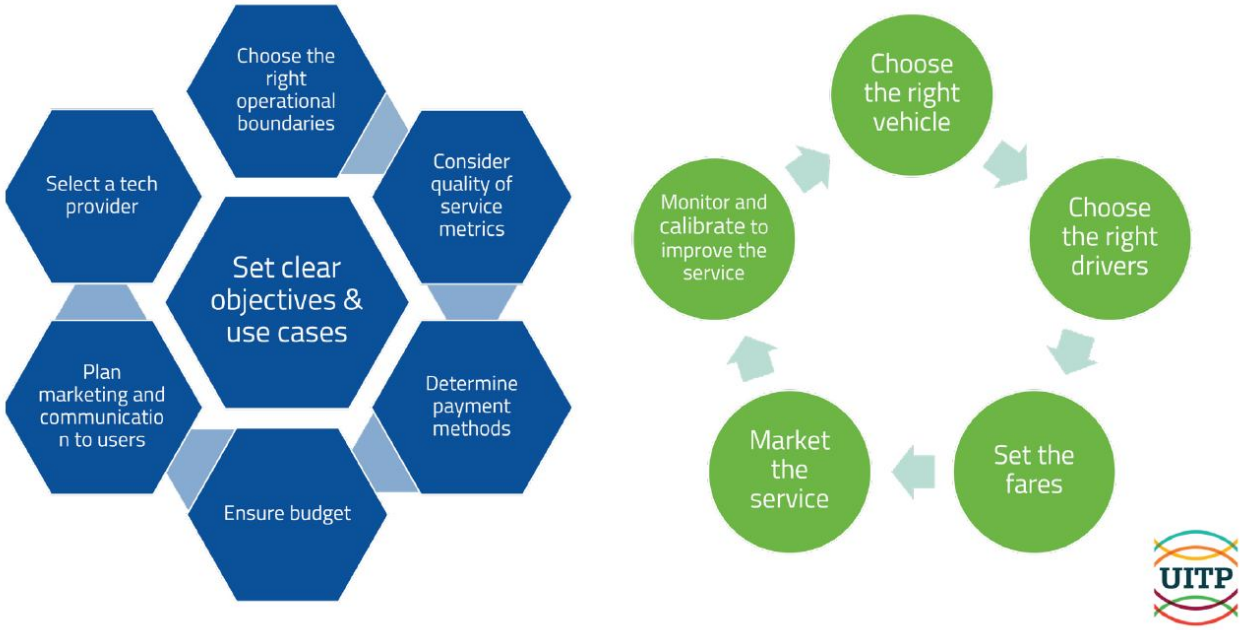


Figure 23: DRT planning and implementation process (source: UITP)

4.4.Business models of demand-responsive services

DRT systems are highly adaptable to regional context. “This can include flexibility of route design, methods of finance, booking channels, types of vehicles and methods of payment, depending on the scale of the scheme, its target audience and the technical complexity of the supporting ICT framework.” (Krell & Hunkin, 2024, p.4)

With so many different DRT set-ups being possible, and with the challenge of ensuring the sustainability of the solution, the business model must be carefully considered. This involves thinking about key partners and resources (human and financial) for success of the scheme, its target audiences, activities, booking and payment options, and revenue streams. It also involves consideration of digital and physical infrastructure.

Similar to traditional public transport services, the economic model of DRT services for users is reliant on public subsidies, although the level of public subsidies varies greatly across geographies and depending on the exact type of DRT service provided (e.g., full flexible or semi-flexible). For example, in the case of the DRT service set up between 2012 and 2015 in Kutsuplus (Helsinki region, Finland), users would pay an estimated average of €7 (compared to the Helsinki public transport standard fare of €2 for one zone tickets and €3,88 for cross-zonal tickets). Still, the subsidy for each trip was €20 (EIT Urban Mobility, 2022).

Not everyone is eligible to use **Mobitwin** (see 4.2 & 4.3): two conditions must be met. First, users must be “less mobile,” for example, having difficulty walking or living in an area with inadequate public transport. Second, the user’s income must not exceed twice the official minimum income threshold (*revenue d’intégration sociale, leefloon*). Both conditions are screened before enrolment in the service. This ensures that we provide transport solutions for people who cannot afford a taxi or who live in areas underserved by public transport. In practice, we find that most Mobitwin users are 65+. The costs to become a Mobitwin user are intentionally kept as low as possible and consist of an annual membership fee of €18 for an individual member and €27 for a family (i.e., all persons living under the same roof). Additionally, the Mobitwin user pays a fixed price per kilometre to the volunteer, which currently stands at a maximum of €0.44. This amount is based on the real costs that the volunteer incurs to provide the

ride using their own vehicle (including fuel, insurance, etc.). Both members and volunteers are insured during the Mobitwin rides via collective insurance.

DRT systems can be funded by local and/or national governments, or set-up as public-private partnerships - the benefit of this model is that they can ensure schemes as public services, reaching citizens most in need. Private companies can organise their own DRT services to attract new employees to locations that are not easy to reach by regular public transport. Setting up a DRT system can be a way of collecting data to determine whether it is appropriate to set up a permanent bus service. Grouping bus routes on a common corridor and providing feeder DRT services to these routes can develop modal shift and improve DRT patronage (EIT Urban Mobility, 2022).

In peri-urban or rural areas where journeys are long, operating a public transport service is expensive and often unattractive to users. This can lead to a reduction or even suppression of bus services. The introduction of a DRT system can stop this vicious circle and maintain a public transport service in areas where social exclusion can be high (EIT Urban Mobility, 2022).

“DRT will remain a niche service, which will not lead to massive replacement of fixed bus lines” (EIT Urban Mobility, 2022, p.33). There is a place for DRT on a feeder level within very localised contexts where DRT services can complement the existing network of regular bus lines. In large cities, DRT use cases are mostly deemed suitable in specific circumstances such as night bus services. Outside urban areas, there is a potential for DRT services to go beyond just the niche in a context of transition toward less car-dependant mobility systems (EIT Urban Mobility, 2022).

In DRT services, there is a question of the right pricing level depending on local condition and transport deprivation: with DRT, vehicles stop closer to users' homes and destinations - it may therefore be acceptable for users to pay a “comfort fee” for being collected and dropped closer to origin or destination. This is the case for the Hubtaxi service in the provinces of Drenthe and Groningen in the Netherlands, which is not included in the local public transport pricing (see below). This however raises a social justice issue in the cases where people do not have any other transport option but would still be forced to pay more than for fixed bus lines because of this “comfort fee” (EIT, 2022, p.13).

Hubtaxi is a service set up in conjunction with the network of mobility hubs in the provinces of Drenthe and Groningen. This service enables residents of these provinces to travel from their home to a mobility hub located within a radius of 20 km, as well as the return journey. It is also possible to travel door-to-door to another address for journeys of 2 to 20 km, but at a higher fare. Hubtaxi is a service operated by transport companies under contract with the provinces of Drenthe and Groningen. Reservations are made by telephone, requesting them at least one hour before the journey. The service operates between 6am and 1am. It is even possible to book earlier or later to take the first or last train or bus journey. Connections with the bus or train are guaranteed if booked at least two hours in advance. An operator can pool several users to optimise Hubtaxi journeys. Fares are lower than those of a conventional taxi: €1.08 entry fee and €0.19 per kilometre to a hub (€1.62 and €0.28 from 2025), and €5.42 entry fee and €0.61 per kilometre for door-to-door travel (Publiek Vervoer Groningen Drenthe, 2024).

There are several key issues to consider here, also related to customer relationships. Booking can be performed through various means, including phone calls, websites or mobile apps, specifying pick-up time and location. It is important to consider the target audience for DRT when considering the booking system, bearing in mind the digital divide. The systems will then aggregate multiple requests and optimise routes to pick-up and drop-off passengers. In some smaller DRT systems this may be done manually, but digital tools are increasingly used. Next comes vehicle dispatch, to fulfil the agreed-upon service. This may be mini-buses, vans or cars depending on number of passengers or vehicle availability.

The region of Catalonia has been integrating its DRT services under a common brand, **Clic.Cat** (see Figure 24). The service now has 235 lines, covering more than 730 villages in Catalonia. Clic.Cat, as a brand, has been rolled out to all vehicles, stops and information services, with a common app and ICT infrastructure. Reservations for journeys can be made by app, 15 minutes ahead of the journey - compared to 24 hours before digitisation. To remain accessible, the service also allows booking by

phone call. A common communication campaign was created to raise awareness of the integrated services. The new approach led to an increase in ridership of on-demand services by 175% between 2021 and 2022 (Krell & Hunkin, 2024).

Figure 24: Catalan DRT service Clic.Cat operates an electric bus (© ACN)

The flexibility introduced by DRT can be both an advantage and a disadvantage depending on the context as well as on the users. Profound knowledge of local requirements provides precious information on the extent to which a DRT should be flexible and linked to the existing offer of formal and informal shared mobility services (including stop and frequency planning). It is important to focus more on travel experience than on average speed and stops to shift from system level to user level and to improve service alignment and user expectations.

Somewhere along this chain, payment must also be taken into account. This can be done at the time of booking or at the time of service, implementing on board the vehicle, or via a digital platform. Fares may be calculated at a flat rate, based on distance, or even through subscription models. For example, Hoppin Flex is a DRT system in Flanders (Belgium) operating between fixed stops for which users pay per ride (max. €2.50 for 60min). With Mobitwin, service is €0.44 per km, with a yearly membership fee of €12.

Nevertheless, as "DRT must adapt to real-time requests, this can lead to demand exceeding the available capacity, particularly during peak hours, causing longer wait times and potential service disruptions. Consequently, this can affect DRT's reliability, a key factor for its users who depend on timely service." (Road XS, 2024). DRT providers must balance the need for data to optimise services while respecting user privacy.

If the service operates in an area where regular bus lines already exist, there's a possibility that some passengers may prefer the convenience of DRT over standard bus or metro services. This could lead to a decline in ridership for traditional public transport, posing a financial challenge (Road XS, 2024). This

is why it is important to think carefully about how the two systems complement each other, and possibly reserve the DRT for certain target groups (people with disabilities, the elderly…) when regular services are available in the area, like it is done in Leipzig with Flexa (see 4.1) and in Flanders with De Lijn Flex.

Bummelbus (see Figure 25) is an on-demand service operating in Ösling region, Luxembourg, co-financed by the Ministry of Labour, Employment, and the Social Economy with an initial dual mission of providing mobility services for the elderly population, as well as bringing long-term unemployed people back into the workforce. Drivers are re-educated and given a two-year contract to gain work experience and make them fit for the job market. The service provides flexible routing to individual destinations (door-to-door), with varying ticket fares depending on the distance travelled. While initially focused on the elderly population, the service is now available for all segments of society, with a potential usership of 82,000 inhabitants in 255 villages. Bookings can be made by telephone but must be booked the day before travel. Since the service also has a social mission, it is 70% funded by the state, with the remaining costs covered by ticketing and municipal budgets. The service now has around fifty vehicles, has reintegrated 370 long-term unemployed people, and serves around 140,000 passengers per year (Krell & Hunkin, 2024).

Figure 25: In Luxembourg, the Bummelbus DRT service helps people who are far from employment to train as bus drivers (© Forum pour l'emploi)

DRT services could incur higher costs than fixed-route services because they are designed for smaller passenger loads and extended trip distances, making it challenging to maintain economic viability. But the DRT value proposition should be considered beyond service costs and revenues. Benefits in terms of delivering access to education, healthcare, culture, work opportunities, should also be considered to assess the performance of DRT services.

In the **Médio Tejo** region (Portugal), a mostly car-dependant rural region with 13 municipalities and low population density (74 people per sq. km), the bus service frequency in the municipality of Sardoal is very low during the summer holiday period and lower in the Christmas and Easter vacations. Some public transport bus lines are not available at all during the weekend. In addition, there are variations in level of service in fixed-time schedules that show large discrepancies during the hours of service (e.g., three peak hours a day: morning, lunchtime, evening). The DRT service in the region has been growing since 2014. From October 2017 passenger numbers have been growing steadily with a minimum of 60 per month, and by July 2019 there were 150 passengers a month. A peak in service usage during the summer months can be observed. “Interestingly, most of the users in this area are older than 51 years

(91%), who use the service mostly for healthcare reasons (50%) or for grocery shopping (30%). Overall, 71% of the trips are going to the municipality centre" (EIT, 2022, p.22).

In **Coimbra**, a region spanning across 19 municipalities (112 people per sq. km), the local DRT service saw a large increase in ridership despite a launch during the Covid-19 pandemic, with a somewhat higher usage in early 2022 (369 passengers in May) compared to December 2021 (269 passengers). Quite similarly to Médio Tejo, the average users' age for the DRT service in the Coimbra region (SIT FLEXI service) is 69,6 years, and the main trip purpose is healthcare (69% of users) (EIT, 2022).

4.5. Recommendations for demand-responsive transport in a 15mC neighbourhood

Recommendations:

- Market research should be performed to identify the areas where transportation needs are not adequately met by existing public transport options, for example by analysing population density, socio-demographic profiles, travel patterns and existing transport infrastructure (often lower in the urban outskirts) (see 4.3).

- Multi-level and multi-actor governance models are needed. The regional or national level should set the framework, provide funds, and establish replicable platforms, while the local level determines objectives, gathers data, designs networks and oversees implementation. In an urban region, serving urban outskirts with a DRT requires governance at transport authority level (see 4.3).

- Hybrid and semi-flexible DRT services are more convenient and cost-efficient in a low demand context, they provide optimal balance between reliability, operational costs, and customer satisfaction, unless there is a large economic contribution from the subsidising public authority in deploying and operating a large fleet of vehicles (see 4.2).

- DRT needs to be as easy as possible to use, ideally with a few booking and payment options that take account of different skills with ICT. DRT services should be integrated into the existing public transport scheme, with unified ticketing and a common application, so users in the urban outskirts can use DRT to go to a city centre and then use regular public transport (see 4.4).

- DRT schemes need to be well promoted to inform citizens about what is available and ensure demand. Communication is essential to build up a use base - find a strong name and identity. In urban outskirts, municipalities are a good partner for promoting a DRT to the relevant target groups (see 4.4).

- Design with the end users in mind - participatory processes and citizen engagement are essential. Test the application in advance, especially with some of the more vulnerable users that DRT serves. In urban outskirts, municipalities are a good partner for organising these tests with residents. (4.4).

- Focus more on travel experience than on average speed and stops to shift from system level to user level and to improve service alignment and user expectations. The service must be adapted to the context: in urban outskirts, users may have different profiles and therefore different expectations than in rural areas. (see 4.4).

- DRT needs to be thought of not only in terms of economic performance, but also the many social benefits it can offer to keep urban outskirts and rural areas connected (see 4.4).

- Constant monitoring is important, making changes and improvements to attract and retain customers. This includes checking cost-effectiveness and efficiency, collecting data on ridership levels, service reliability, user satisfaction, and environmental impacts, which can be used to consistently improve service. In urban outskirts, municipalities are a good partner for collecting data on users' satisfaction (see 4.4).

4.6. Overview of demand-responsive transport for the 15mC neighbourhood

	Demand-responsive transport
Relevance	DRT services are relevant for 15mC neighbourhoods as the provide a quality transport service where conventional bus routes are infrequent and expensive to maintain. It has benefits in terms of delivering access to education, healthcare, culture, work opportunities, etc. (see 4.1).
Potential	DRT has potential in sparsely populated peri-urban and rural areas. It can be used as a feeder service to a station or a mobility hub in the urban outskirts. It can also be used as a last-mile solution to get to a Point of Interest or tourist attraction. Other uses include night services, substitution of underutilised fixed-route buses, premium services, or transporting specific groups of users (e.g., the elderly, people with reduced mobility, etc.) (see 4.1).
Governance / regulation	Public authorities play a leading role in establishing, implementing, and monitoring DRT schemes, helping to bring together the necessary actors to run them. Their role covers everything from licencing and safety to funding and community engagement. They set the overall regulatory and licencing framework in which DRT systems operate, including service standards, safety and environmental requirements, driver training obligations, fare structures and accessibility requirements. Licencing can ensure that operators comply with their regulatory requirements and deliver a minimum service quality. Essential partners are local public transport companies, taxi companies or other private companies actively involved in delivering the service, but also local associations and companies that can be helpful in engaging with citizens, informing them, and engaging them in service planning (see 4.3).
Business frameworks	Many service offerings and business models exist (hybrid, Semi-Flexible, Full-Flexible, DRT with flexible layouts and stops), making it a highly adaptable solution to suit different urban environments. This can include flexibility in route, stops and schedule designs, financing methods, booking channels (phone calls, websites, or mobile apps), vehicle types and payment methods, etc. The business model must be carefully considered. This means thinking about the partners and resources (human and financial) that are key to the project's success, its target audiences, its activities, its booking and payment options, and its sources of revenue. Digital and physical infrastructures must also be considered. DRT services are reliant on public subsidies, the amount of which depending on geographies and the type of service provided. DRT systems can be funded by local and/or national governments, or set-up as public-private partnerships. Private companies can organise their own DRT services to attract new employees. Hybrid and semi-flexible DRT services are more convenient and cost-efficient in a low demand context, they provide optimal balance between reliability, operational costs, and customer satisfaction, unless there is a large economic contribution from the subsidising public authority in deploying and operating a large fleet of vehicles (see 4.4).

Issues / points for improvement	DRT will remain a niche service and will not replace all regular bus routes. It is possible that some passengers will prefer the convenience of DRT to conventional public transport services where they exist. This could lead to a drop in ridership on traditional public transport and a fall in revenue. Where possible, route planner apps should suggest a conventional bus route rather than the DRT. The two systems must complement each other, DRT can be reserved for certain target groups (disabled people, the elderly, etc.) (see 4.4).

Table 19: Overview of demand-responsive transport for the 15mC in urban outskirts

4.7. Summary of demand-responsive transport good practices for 15mC neighbourhoods

	Demand-responsive transport (DRT)
Flexa (Leipzig, Germany)	Flexa offers demand-responsive transport services for the suburbs of Leipzig (Germany), which are poorly served by public transport, to connect them with transport hubs. Customers use an app to input their current location and destination (based on a list of 120 virtual stops), pick-up time and number of passengers to receive an offer for a customised ride. (see 4.1)
Mobitwin (Flanders, Belgium)	Mobitwin is a DRT service that provides a transport solution for people with limited mobility via a network of volunteers. The service was launched in 1982 and currently operates in more than 200 Flemish municipalities (representing 75% of Flanders) as well as in Brussels. Together, our volunteers provide a transport solution for around 38,000 users, ensuring over 350,000 rides annually (see 4.2, 4.3 & 4.4).
Viseu (Portugal)	The city of Viseu developed and implemented a semi-flex DRT system with three electric minibuses, which follows a set route and operates on demand, primarily for the elderly population of the city to be able to access facilities in the city centre. Starting as a demonstration project, it has been running for more than fifteen years, with around 13,000 users per year. (see 4.2)
TàD Île-de-France Mobilités (Paris region, France)	In 2017, the Paris region DRT networks were brought together under a single brand, with a single application and a single call centre: "TàD Île-de-France Mobilités". There are 40 operating zones, all located in the urban outskirts. Some operate as hybrid services, others as semi-flexible services, with variations possible during the day. 133 stations are served, and 1.4 million trips were made between 2019 and 2024. (see 4.3)
Hubtaxi (provinces of Drenthe and Groningen, The Nederlands)	Hubtaxi is a service set up in conjunction with the network of mobility hubs in the provinces of Drenthe and Groningen. This service enables residents of these provinces to travel from their home to a mobility hub located within a radius of 20 km, as well as the return journey. It is also possible to travel door-to-door to another address for journeys of 2 to 20 km, but at a higher fare. Fares are lower than those of a conventional taxi. (see 4.4)

Table 20: Summary of demand-responsive transport good practices

5. FLEXIBLE (POP-UP) ACTIVITY HUBS IN A 15-MINUTE CITY NEIGHBOURHOOD

5.1. Background and definition of flexible (pop-up) activity hubs, and their potential use in a 15mC neighbourhood

In outlying areas, the lower population and employment densities can make it difficult to locate certain facilities, shops or services, because they are not frequented enough, and it is therefore difficult to find a satisfactory business model. The flexible activity hub concept offers a solution to this problem: the facility or business is only present part-time and can therefore be deployed in different locations throughout the week, enabling it to attract sufficient customers and thus achieve acceptable profitability (the notion of profitability will be assessed differently depending on whether it is a commercial service developed by private players or a public service). By bringing these services closer to local residents, more possibilities will be accessible within 15 minutes. If such activity hubs are located at railway stations, transport users will be able to benefit from the services on offer before or after their journey.

This type of operation can involve many types of business (food, clothing, etc.) or services (postal services, but also medical services, etc.).

Deliverable 2.1 of the European DREAMS project proposes the following definition: “Flexible activity hubs (or pop-up stores) are temporary retail uses that occupy a site for an intentionally temporary period of time. Their presence could help the users fulfil their everyday needs without additional vehicular trips, while boosting the local economy and encouraging social gatherings and participation.”

5.2. Different types of flexible activity hubs

5.2.1. Diversification of services offered in locations that already have a fine territorial network

One of the problems faced by some outlying areas with declining populations is the disappearance of certain services, particularly public services. One of the challenges is to maintain these services by bringing them together in the same place.

In France, for example, many villages have a “*bureau de tabac*”, traditionally dedicated to selling newspapers and tobacco. With the recent decline in cigarette sales, these shopkeepers have sought to diversify their commercial offering. They have started to offer the following services:

- Postal services: stamp sales, registered mail management
- Banking services: opening an account
- Parcel pick-up points
- Other services including the sale of train tickets in partnership with SNCF, the rail operator, in return for a fee. It's a partnership with benefits for both parties : it increases the income of tobacconists, and allows SNCF to maintain the ticket sales service, without necessarily having to maintain a dedicated open ticket office (when most people now buy their ticket online).

This type of operation could be replicated in many countries, based on the types of shops that already exist and are already dotted around the country (tobacconists, bakers, cafés, etc.).

5.2.2. Mobile shops and services

Another way of looking at flexible services is to deploy mobile services. The most emblematic example is the food-truck. While some are fixed (some restaurateurs are unable to find premises, and others prefer to run a small-scale business), others are mobile, changing location throughout the week.

A wide variety of products and services can be offered under this model. Moreover, some of these services can sometimes be grouped together on one site, as is often the case with pop-up markets dedicated to the sale of fresh produce (fruit, vegetables, meat, fish, cheese, and other local products).

In the Australian town of West Torrens, a mobile library visits 39 different locations over a period of 15 days, enabling residents to borrow books on a regular basis just outside their homes (see Figure 26).

Figure 26: West Torrens Mobile Library (© City of West Torrens)

In the Île-de-France region, a bus has been deployed to carry out breast cancer screening, particularly for women who have difficulty accessing healthcare for geographical, economic, or social reasons. The bus travels not only to rural areas, but also to neighbourhoods with poor public transport and few medical facilities (see Figure 27, where the bus can be seen, with a sticker reading “breast cancer screening, mammography and ultrasound”).

Figure 27: The Mammobus in Île-de-France (© Agence Régionale de la Santé en Île-de-France)

These various mobile shops and services can be deployed in different locations, whether or not they are mobility hubs.

For example, since 2004, the SNCF (the French rail operator) has been selling baskets of vegetables from local producers at stations, in partnership with the Paris region Chamber of Agriculture. The baskets are sold once a week at the station, at the end of the day, over a period of around 3 to 4 hours (public transport users can then collect their baskets as they arrive at the station before heading home). The contracts with the farmers are for 3 years, and they have to pay a small rent for the right to occupy the station forecourt (see Figure 28).

Figure 28: A fresh produce seller on the forecourt of an SNCF station (© SNCF)

A wide range of other services and businesses can be deployed, including hairdressing (e.g., Mobile Hair Salon in San Diego, USA), clothing sales (e.g., Fashion Mobile Truck in Vancouver, Canada) or a gym (e.g., the “fit truck” in Paris) (see).

Figure 29: The "fit truck", a mobile gym in Paris. This type of installation takes up public space and can obstruct pedestrian circulation. (© Élie Guitton – L'Institut Paris Region, 2024)

5.3. Governance of flexible activity hubs

Initiatives can come from both the private sector (particularly when it comes to itinerant shops selling food or other products, or services such as hairdressing) and the public sector (when it comes to public services such as libraries or medical services).

Local authorities can encourage the development of such services by providing easily accessible and visible locations on their territory, and by promoting these itinerant shops and services via posters, announcements on their website, etc. In the French village of Gabian there are even loudspeaker announcements, such as when the fishmonger arrives in the village square (see Figure 30). This creates a good synergy between the municipality, which is short of shops, and the vendors, who benefit from more customers and are encouraged to come back and offer their stalls in the village.

Figure 30: The pop-up market in Gabian (France) is announced by loudspeakers throughout the village (© Élie Guitton – L'Institut Paris Region, 2024)

5.4. Business models of flexible activity hubs

The profitability of such shops or services must be studied on a case-by-case basis, depending on the potential customer base (which depends in particular on the number and density of the different spots served during the week).

These shops and services generally have to pay a fee to the local authority or transport provider for occupying the public space, but if the local authority wishes to encourage the development of business in its area, it can reduce this fee to a minimum, symbolic amount.

In order to ensure the profitability of the service (and therefore its development), it is in the interests of local authorities to coordinate their efforts, in order to offer different locations close to each other.

5.5. Recommendations for flexible activity hubs in a 15mC neighbourhood

The development of such services should be considered where the density of the area is not sufficient for a permanent shop or service to be established.

Involving local residents in identifying the services and shops that need to be developed could be a crucial point, possibly guiding the implementation of public subsidies if private initiatives struggle to emerge.

To encourage the development of services, the provision of visible and accessible locations for these services is crucial, and the level of charges must be as appropriate as possible.

5.6. Overview of flexible activity hubs for the 15mC neighbourhood

	Flexible activity hubs
Relevance	In outlying areas, the lower population and employment densities can make it difficult to locate certain facilities, shops or services, because they are not frequented enough, and it is therefore difficult to find a satisfactory business model. The flexible activity hub concept offers a solution to this problem: the facility or business is only present part-time and can therefore be deployed in different locations throughout the week, enabling it to attract sufficient customers and thus achieve acceptable profitability (the notion of profitability will be assessed differently depending on whether it is a commercial service developed by private players or a public service). By bringing these services closer to local residents, more possibilities will be accessible within 15 minutes.
Potential	Flexible activity hubs can take the form of shopkeepers diversifying their commercial offering (postal or banking services, parcel pick-up points, train tickets sales, etc.) or mobile services (food-trucks, mobile libraries, pop-up markets, etc.) bringing new activities to the area.
Governance / regulation	Initiatives can come from both the private sector (particularly when it comes to itinerant shops selling food or other products, or services such as hairdressing) and the public sector (when it comes to public services such as libraries or medical services). Local authorities can encourage the development of such services by providing easily accessible and visible locations on their territory, by promoting these itinerant shops and services and by limiting rent.
Business frameworks	The profitability of such shops or services must be studied on a case-by-case basis, depending on the potential customer base (which depends in particular on the number and density of the different spots served during the week). These shops and services generally have to pay a fee to the local authority for occupying the public space, but if the local authority wishes to encourage the development of business in its area, it can reduce this fee to a minimum, symbolic amount. In order to ensure the profitability of the service (and therefore its development), it is in the interests of local authorities to coordinate their efforts, in order to offer different locations close to each other.
Issues / points for improvement	The creation of a flexible activity hub in a given area could constitute a commercial offering that would compete with existing businesses. It is important to ensure complementarity between existing shops and services and those that could be provided by flexible activity hubs.

Table 21: Overview of flexible activity hubs for the 15mC in urban outskirts

6. MOBILITY HUBS IN A 15-MINUTE CITY NEIGHBOURHOOD

6.1. Background and definition of mobility hubs, and their potential use in a 15mC neighbourhood

The concept of a mobility hub emerged in Bremen in 2003. “A shared mobility hub is a physical location where different shared transport options are offered at a dedicated, non-temporary and recognisable location, and public transport is available within walking distance” (Geurs et al., 2024). “A hub maximises access to mobility and other resources, while ensuring a transfer between modes for first- and last-mile connectivity” (UITP, 2023). The aim of mobility hubs is to reduce the ownership and use of cars, and therefore the emissions associated with them. Mobility hubs can meet the mobility needs of a wide range of people in different types of area: cities, rural areas, and urban outskirts. The flexibility of their design and their adaptability to the local context allows them to limit car ownership and car use outside dense urban centres. By facilitating travel and concentrating in one place the services sought by people living in outlying areas, mobility hubs make it possible to limit car travel and are a tool for implementing the 15mC in urban outskirts.

Mobility hubs are recognisable and accessible intermodal locations where travellers can easily transit and/or choose between different modes of public and shared transport. For an optimal travel experience, maximum coordination of public transport modes is necessary. In this way, mobility hubs are an important tool for modal shift. In addition to mobility options, mobility hubs also offer complementary services that increase comfort, accessibility, and attractiveness. Access to mobility services can be optimised using a MaaS system. The hubs also feature physical information media with easily accessible information, such as timetables and relevant information about the surrounding area (Aono, 2019).

In 2019, Saki Aono of Translink highlighted 7 main common objectives of mobility hubs (Aono, 2019):

- Integration of sustainable transportation options.
- Improving user experience
- Ensures safety and security
- Creates a sense of place through effective and meaningful placemaking strategies
- Flexibility to embrace technological innovations and foster resilience
- Equity by considering accessibility to and availability of transportation options in different neighbourhoods.
- Opportunities to form effective partnerships

The Bremen hubs, or mobil.punkten (see Figure 31) have influenced a number of cities and countries, and have been studied and tested in several European projects dealing with shared mobility. These projects are summarised in the table below and were used in drafting this part of the report.

Project program	Project name	Project duration	Partner cities, territories, and organisations (country)
Interreg North Sea	SHARE-North	2016-2022	Bruges, De Panne, Diksmuide, Ghent, Leiedal, Zedelgem inter-municipal organisation (Belgium), Copenhagen (Denmark), Bremen (Germany), Bergen, Hordaland County (Norway), Helsingborg, Lund (Sweden), Edinburgh, West Yorkshire (UK)
	ShareDiMobiHub	2023-2025	Leuven (Belgium), Capital Region of Denmark (Denmark), Amsterdam, Utrecht Province, Rotterdam (The Nederlands), Tønsberg, Vestfold County, Grenland district, Skien, Porsgrunn (Norway)
Interreg 2 Seas	MOBI-MIX	2020-2022	Antwerpen, Brussels, Ghent, Mechelen (Belgium), Valenciennes (France), Bremen, Hannover (Germany), Lisboa (Portugal), Madrid (Spain), Oregon (USA), Cambridge, Norwich, Plymouth (UK)
Interreg North West Europe	eHubs	2019-2023	Leuven, Walloon Region (Belgium), Dreux (France), Kempten (Allgäu) (Germany), Amsterdam, Arnhem, Nijmegen (The Netherlands), Region Manchester, Inverness (UK)
Horizon Europe	SPINE	2023-2026	Šibenik (Croatia), Talinn (Estonia), Rouen (France), Heraklion (Greece), Bologna (Italy), Gdynia (Poland), Barreiro (Portugal), Žilina (Slovakia), Las Palmas de Gran Canaria, Valladolid (Spain)

Table 22: Summary of European projects and programs related to mobility hubs

In the Paris region, mobility hubs have been set up in Grand Paris Seine & Oise (Grand Paris Seine & Oise, 2024), Yvelines (Département des Yvelines, 2023) and Seine-et-Marne (Département de Seine-et-Marne, 2020). Multimodal Road Interchange Centres (*Pôles d'Échanges Multimodaux Routiers*, PEMR in French language) in the Île-de-France region can also be thought as mobility hubs (Guitton, Riou, Tedeschi, 2024), as at Longvilliers (Vinci Autoroutes, 2024) and Briis-sous-Forges (Département de l'Essonne, 2023). Other examples include Vienna, with its network of WienMobil stations (City of Vienna, 2022).

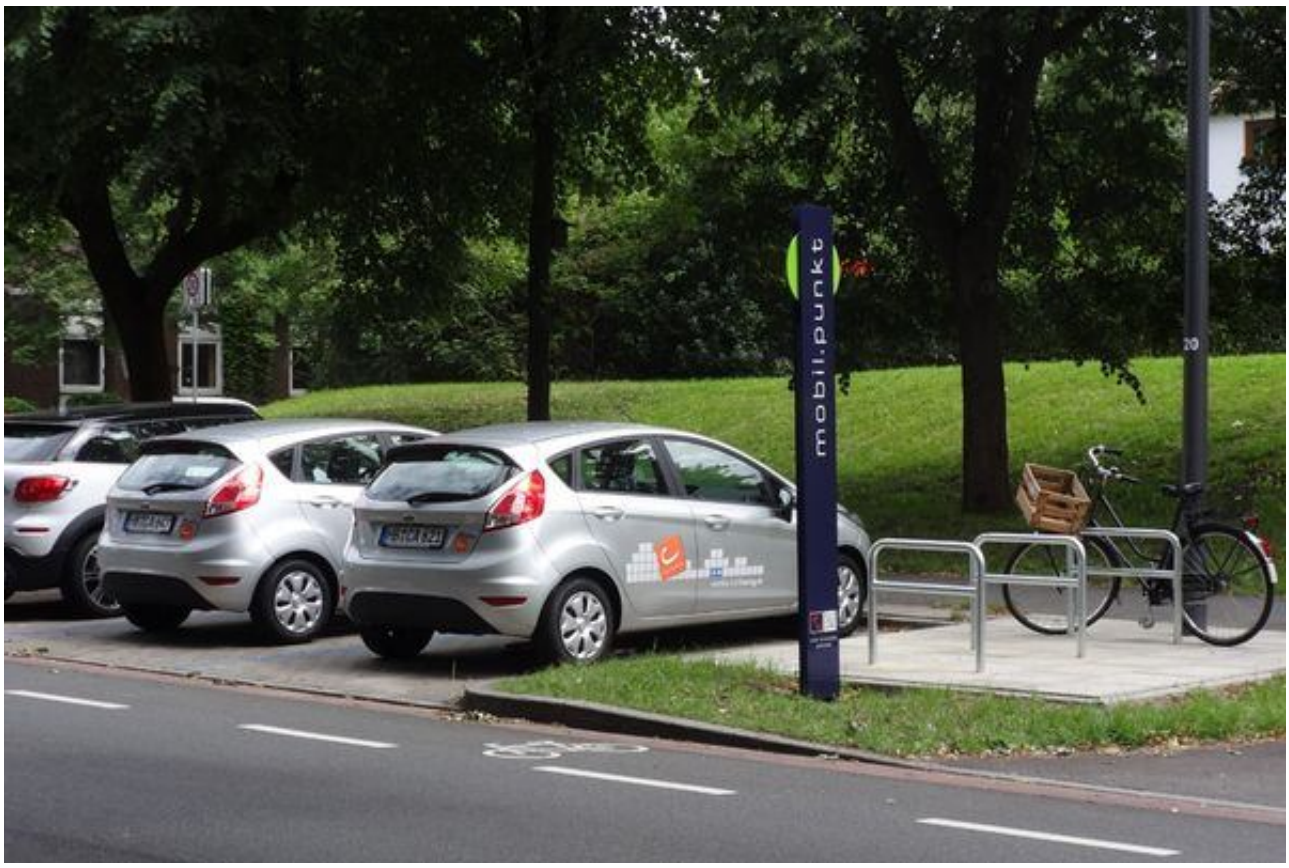


Figure 31: A mobil.punkt in Bremen with its typical column (© Freie Hansestadt Bremen)

6.2.Different types of mobility hubs

The equipment and design of mobility hubs depend very much on the type of mobility hub and are always adapted to the local context. There are urban hubs, station hubs, hubs in residential areas, peri-urban or rural hubs, among other examples. While the main principles remain the same (offering intermodal and multimodal facilities to reduce the use of private cars), the way in which they are designed, planned, and implemented differs.

In Bremen (population 563,000 inhabitants), 100 mobility hubs have been planned in strategic areas since 2003. The mobil.punkten are the largest mobility hubs located in the city centre and around stations, while the mobil.pünktchen are smaller and located in residential areas. In Bergen (286,000 inhabitants), since 2018, 14 mobility hubs (Mobilpunkter) have been designed for urban residential areas, with a second phase of 5 additional hubs planned for the urban periphery. In Stavanger (145,000 inhabitants), since 2020, 5 mobility hubs (Mobilitetspunkter) are planned for urban residential areas. In Amsterdam (921,000 inhabitants), 17 mobility hubs (BuurtHubs) have been planned for dense urban areas since 2021. Since 2017, in the provinces of Groningen and Drenthe (1.1 million inhabitants), in the Netherlands, 55 mobility hubs are planned in rural and urban areas and around railway stations. In the Belgian region of Flanders (6.6 million inhabitants), 1,000 mobility hubs (Hoppinpunten, or Hoppin points) have been planned since 2017, with four types of hubs: inter-regional, regional, local and neighbourhood hubs. In Flanders, the city of Leuven (population 102,000) has developed 50 Hoppin points located in the city centre, in residential areas and around railway stations.

City (Country)	Population	Hubs network's name	Year of implementation	Number of hubs
Bremen (Germany)	563,000	mobil.punkten / mobil.pünktchen	2003	100
Bergen (Norway)	286,000	Mobilpunkter	2018	19
Stavanger (Norway)	145,000	Mobilitetspunkter	2020	5
Amsterdam (The Netherlands)	921,000	BuurtHubs	2021	17
Groningen & Drenthe provinces (The Netherlands)	1,100,000	Hubs	2017	55
Flanders Region (Belgium)	6,600,000	Hoppinpunten	2017	1,000
Leuven (Flanders, Belgium)	102,000	Hoppinpunten	2017	50

Table 23: Summary of the hub networks studied in this report

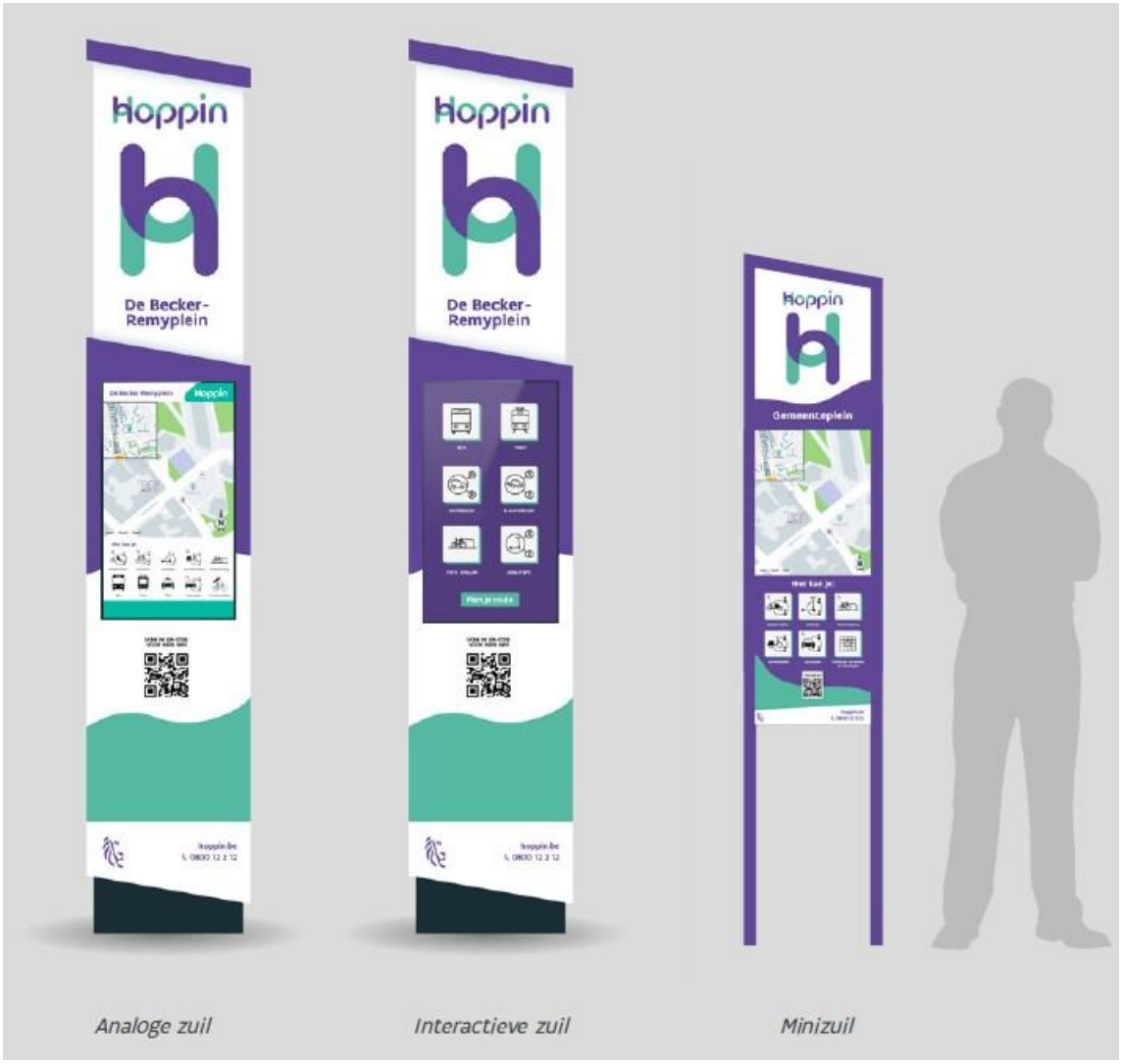
Figure 32: A Hoppin point with its column in Temse, Flanders (© Vlaams Gewest)

Some services are available in all mobility hubs, such as public transport, car-sharing, electric vehicle charging stations and cycle parking. In most cases, there is good access for active modes of transport, with cycling and pedestrian links encouraged. However, shared micromobility is not systematically provided, nor are carpooling, kiss-and-ride (drop-off) or taxi services: hubs must be tailored to local needs. Mobility hubs are sometimes combined with voluntary waste drop-off points. Some cities stand out for the large number of services available in their mobility hubs, which make it much easier for users to get around in a seamless experience, because “activities around a hub can enable trip chaining connected to the hub” (Geurs et al., p.5, 2024). For example, Dutch hubs often offer water taps, toilets and Wi-Fi, as well as other services such as bicycle repair points, picnic tables, parcel machines, luggage lockers, ATM, fitness equipment and even the loan of pushchairs and cycle trailers for children. Shops and public services may also be available, such as fast-food outlets, a grocery stores, a public library or a medical centre. In the provinces of Drenthe and Groningen, walks and hikes start at mobility hubs that are easily accessible by bus and/or train. The walks take in nature reserves or special landscapes.

Mobility hubs in Bremen were historically centred around car-sharing, while those in Norway place greater emphasis on micro-mobility and recharging for electric vehicles. In the Netherlands, the car is less important (Hached & L’Hostis, 2022). In Amsterdam, the emphasis is more on bicycle services, cargo-bikes, micro-mobility and car-sharing, while in the provinces of Groningen and Drenthe, greater intermodality is sought between cycling and public transport, as well as the creation of living spaces. In Flanders, the very large number of mobility hubs means that there is a wide variety of services on offer, which differ according to the type of hub. The integration of mobility hubs into the MaaS system is a strong desire in Bergen. It is also an objective for the hubs in the Flanders region.

The creation of a logo and visual identity means that users can easily recognise the mobility hubs (Baguet, 2024). Bremen's mobil.punkten are identified by columns with a logo. In Flanders, the Hoppin points also have a column to help them be clearly identified (Vlaamse Gewest, 2022). A visual identity guide with a graphic charter has been developed, containing all the logos, pictograms, colour codes and furniture to be used for the Hoppin points. Signage is codified and explained, and accessibility guidelines are laid down (see **Erreur ! Source du renvoi introuvable.**). Dutch mobility hubs also have their own signage (Mijksenaar, 2022), as do those in Bergen (City of Bergen, 2021).

Generally, it is important to consider the specific needs of vulnerable to exclusion groups, as “people with physical impairments and low digital skills rarely use shared mobility services because the services are not adapted to their needs” (Geurs et al., p.5, 2024).



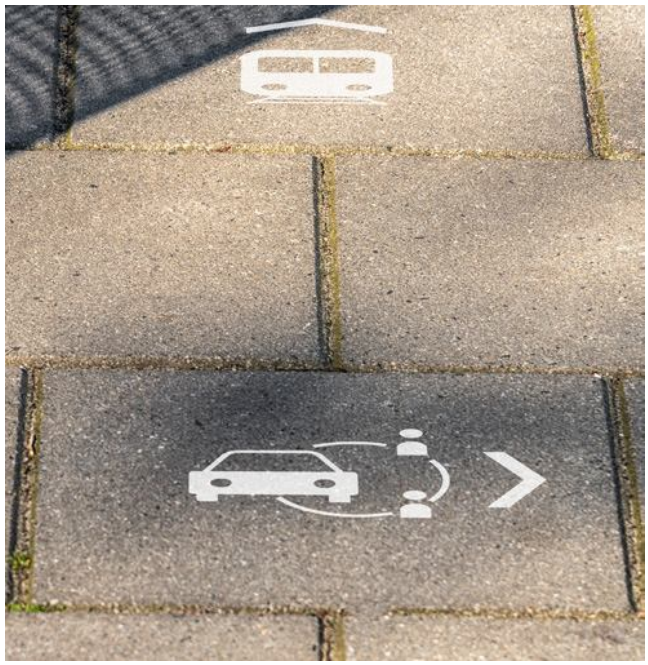


Figure 33: The columns of Hoppin points with their standardised horizontal and vertical signs (© Hoppin.be)

6.3.Governance of mobility hubs

It is often the city, as manager of the urban space and project owner, that assumes responsibility for creating mobility hubs. It has the leading role, initiates contacts with the various actors and brings them together around the same project. But in some mobility hub networks, the involvement of citizens is more developed. The target customer groups may be different: residents, commuters, tourists, people on low incomes, senior citizens, etc. Some mobility hubs are set up on a neighbourhood or city scale, others on a provincial or regional scale. In Belgium, regions took the lead for mobility hub networks implementation. In Flanders, when a local authority wants to implement a Hoppin points, even when implemented on its own land, they must comply with regulations (branding, accessibility, typology) set by the Region. The Region has leverage to do so, as they provide most or all the funding for the development and maintenance of hubs. They are now present in the Flanders and are being considered in the Brussels-Capital region, which is currently developing a small network of 20 test-hubs, which will be evaluated to know if a more extensive network will be rolled out (Borzęcka et al., 2023). As governance models differ from one city to another, mobility hubs are sometimes included in urban planning documents (as in Stavanger, Bremen, Groningen, and Drenthe) and other times in mobility plans (Amsterdam, Flemish Region, Bremen, Groningen) or climate, air, and energy plans (as in Bergen, Amsterdam and Leuven) (Geurs et al., 2024). Hubs can also be included in several documents at different levels. Mobility hubs are set up by municipalities in Norway, Bremen, and Amsterdam, by provinces in Groningen and Drenthe and by regions in Belgium.

Involved stakeholders are not always the same, with varying degrees of involvement by local authorities, transport operators, local public services, nearby businesses, or private service providers. Other partners may include business park owners or real-estate developers, local community groups including residents and businesses, other government agencies and transport authorities, not-for-profit organisations including disability and other community groups, technology providers, major employment sites and other key trip generators, assets, infrastructure and utility companies, other established mobility hubs (GO SEStran et al., 2020). In the province of Groningen, a mobility hub has been set up at Delfzijl station (population 25,000) with funding from the province, the municipality, and the involvement of the national rail operator NS. Two focus groups were involved in developing the project, made up of shopkeepers and users, including people with reduced mobility. The aim was to create a place to live in a small, ageing community in economic decline. A restaurant has been created, and the station square has been given a facelift with greenery, benches, a water tap and Wi-Fi. In Siddeburen (population 3,000), a former church and community centre have been converted into a village hall following a consultation with residents. Doctors moved in, followed by homecare organisations and the local library. A mobility hub project was added to a range of community projects already underway, including a public transport stop and bicycle parking. In Gieten (population 5,000), a local and express bus interchange has been transformed into a mobility hub by adding secure cycle parking, a kiss-and-ride, a park-and-ride facility, a taxi stand, picnic tables, a café, a water tap, toilets, a parcel machine, Wi-Fi, and fitness facilities (see **Erreur ! Source du renvoi introuvable.**).

Figure 34: The hub of Gieten in the Groningen Province (© Miranda Drenth, OV-bureau Groningen Drenthe)

In Bergen (Norway), the city has developed an internal software that allows the authority to communicate in a fluid way with private partners. It allows them to locate each of the shared e-scooters on their territory, to display the information on the identity of the private partner who manages them, the level of their battery charge, the last time they were used, etc. This system makes it possible for the city to immediately inform the private partner to for example, dispatch the vehicles in a more harmonious manner. The partner then has limited time to meet this request and if he fails to do so, he may be subject to financial sanctions (or even suspension of the partner's license and therefore a ban from operating). The particularity of the system developed by the city of Bergen is that it is a collaborative one. City agents and every citizen can report problems with shared e-scooters (such as parking problems) via a dedicated application.

Citizen involvement is not considered in the same way in the cities that have set up mobility hubs. In Stavanger, the aim was to build on user experience to gain a better understanding of citizens' needs. Prototype hubs were created and tested by users so that they could be developed further. In Amsterdam, the hubs were co-constructed with residents based on their needs, using a bottom-up approach. After a test phase, a neighbourhood survey was carried out to determine whether the hub should be retained or abandoned. The hub was retained when 50% of voters in the neighbourhood were in favour of keeping it (see Figure 35). However, it seems that today the top-down method has become the dominant approach (Baguet, 2025). Another participatory process was carried out in Leuven on four hubs.

Figure 35: A buurthub in Amsterdam. These hubs were co-constructed and validated by residents as part of a bottom-up approach (© Gemeente Amsterdam)

In practice, setting up mobility hubs can run into difficulties. Sometimes, the objectives of the authorities do not coincide with the services provided by their network of hubs. For example, if the authorities want to offer commuters an alternative to the car, it is necessary to create a very dense network of hubs with a substantial range of services. If only a few experimental hubs are set up, they will not meet the needs of the numerous commuters.

Stakeholder (politicians and policymakers, public interest groups, or shared mobility operators) engagement and communication over a longer period are essential to implement shared mobility measures and to attract target groups to use mobility hubs (Karbaumer and Metz, 2020). The authority's aim is to demonstrate to businesses that the use of shared mobility can be used during working hours and could be an alternative to the company fleet. It is important to stress the possible savings, including savings on parking space. Communication and discourse on emission reduction or health or savings is not very effective for private users. There are three communication priorities in particular: strengthen motivations (convenience, comfort, safety, emotions of travel), remove barriers (perceived cost, complicated, loss of freedom...) and provide triggers (provision of free car-sharing membership or a travel budget for shared mobility and public transport) (Karbaumer and Metz, 2020).

A common difficulty is also to integrate stakeholders like real-estate developers, business park owners and employers, that are often key to the success and attractiveness of mobility hubs. These stakeholders are also important because they can provide resources to implement the hubs.

Difficulties linked to the incomprehension or opposition of residents may arise, especially if a future mobility hub intends to occupy/reduce parking spaces that are already highly coveted. It is important to present the mobility hub services as a serious alternative to their private cars. A bottom-up,

participative approach that takes account of users' needs avoids this difficulty. It allows citizens to be included in the design of mobility hubs and to help them evolve.

It can also be difficult to align the objectives of a mobility hubs network with the business models of shared mobility service providers. For example, a dense network of mobility hubs requires a lot of rebalancing efforts and asset investments that could be too high for a shared mobility provider, and the authorities would have to compensate for these expenses. When creating mobility hubs, cities/regions should ensure the reliability and resilience of the partners with whom they collaborate (strong business models), as well as the flexibility of the infrastructure and its ease of adaptation to future technologies and compatibility with older technologies (Aono, 2019).

Public transport authorities are also sometimes hard to involve in mobility hubs projects, while public transport should be the backbone of a network of mobility hubs.

6.4. Business models of mobility hubs

As mobility hubs offer a wide variety of services, several stakeholders and business models overlap. The business models for mobility services present in mobility hubs such as car-sharing, shared micromobility, carpooling and demand-responsive transport are detailed in their respective sections.

Regarding the business models of mobility hubs themselves, the European eHubs project organised focus groups with a network of relevant actors of the city of Antwerp, consisting of shared mobility providers, local authorities, public transport operators, and MaaS service providers (Coenegrachts et al., 2021). The aim of this exploratory approach was to define which kind of values mobility hubs could provide, for which target groups, and which stakeholders, activities, resources, and risks are involved. The focus groups identified five categories of business model for mobility hubs: first-/last-mile hubs, clustered hubs, hybrid hubs, point-of-interest (POI) hubs and closed hubs (Coenegrachts et al., 2021). These business model blueprints target different end-users and involve different stakeholders, services, pricing models, provided values and involved technologies.

First-/last-mile hubs network's main value proposition is stimulating intermodal travel behaviour by implementing a first/last-mile solution (like shared bikes), that complements public transport. This requires a fine mesh mobility hub network that is integrated within the public transport network, thereby extending the catchment area of public transit and reaching more potential users. This model requires a lot of investment from the public authority or other third parties that could be involved. A MaaS application is useful in this model to provide seamless intermodal travel experience. This model targets more commuters and must be reliable for users that use these mobility hubs every day. This requires a lot of redistribution of vehicles between the hubs to keep a high availability rate.

Clustered hubs network focuses on clustering shared mobility services, enhancing awareness about shared mobility and thereby generating demand for these services. Clustered mobility hubs are mainly located in suburban/residential neighbourhoods or small city centres, centralising the supply of shared mobility modes in that region. This, together with infrastructure provisions such as charging stations, will stimulate shared mobility providers to be active in otherwise underserved areas. These mobility hubs are not focusing on commuters and are more centred on round-trip services. They provide families alternatives to car ownership with shared cars or cargo-bikes to go shopping, visiting relatives or practicing leisure activities.

Hybrid hubs network focuses on the formation of a hybrid network of mobility hubs that provides an extensive range of transportation modes, from free-floating to station-based shared mobility services. The combination of free-floating and station-based schemes increases the services' flexibility and the area covered by them, with a view to enable door-to-door transportation. If free-floating can increase the flexibility of a system, it also comes with problems like cluttering on the streets (numerous e-scooters blocking sidewalks, many free-floating cars parked in the same area using significant street

parking capacity…). A hybrid hubs network reduces costs as it allows operators to combine the rebalancing, charging, and maintaining of station-based vehicles with free-floating vehicles.

Point-of-interest (POI) hubs network establishes a network that connects different point-of-interests like museums or business parks, so that these high demand areas can be more easily reached by alternative modes of transportation. This extends the transportation options visitors have, thereby increasing the attractiveness and accessibility of the POIs, lowering the car dependency, and reducing pressure on public transport. POI owners and real-estate developers can be interested in engaging in these mobility hubs, allowing public authorities to commit less resources in this kind of network. For example, in Antwerp, a highly attractive shopping mall leads to local saturation of the public transport network and could be interested in developing alternative mobilities. Also, a business park away from the city centre with less public transport could be part of the POI hubs network.

Closed mobility hubs network focuses on the formation of a closed network of mobility hubs that is grounded on a demand from residents or private companies (e.g., business park owners, real estate developers). The availability of shared mobility services is ensured at these hubs since they are for the exclusive use of subscribers. This model also enables private companies to provide additional value for residents and employees by expanding their transportation possibilities. In Antwerp, such network could be implemented in the port area, allowing companies to ask their employees to start using the mobility hubs. These companies have insurance of availability of the mobility services as they cannot be used by people not working in the area. It can therefore improve accessibility and attractiveness for employers of the area. This model limits public investment, as employers can be asked to contribute to the financing of the hubs.

Type of mobility hub	Description
First-/last-mile hubs	A fine mesh network of mobility hubs offering commuters (shared) mobility solutions to complement public transport and extend its catchment area
Clustered hubs	Mobility hubs located in suburban areas and small-town centres, clustering round-trip shared mobility services to stimulate the demand (mainly for families' occasional needs)
Hybrid hubs	Mobility hubs offering both round-trip and free-floating shared mobility services to mitigate issues like cluttering of streets by shared vehicles, hight cost of rebalancing for operators, etc.
Point-of-interest (POI) hubs	Mobility hubs located near museums, business parks or other POIs to reach them by shared mobility services, lower car dependency and reduce pressure on public transport
Closed mobility hubs network	A mobility hub network inside a closed area, like a port, a business park, possibly funded by companies who are then assured that the shared mobility services will only be used by their employees

Table 24: Summary of the categories of mobility hubs identified during the focus groups of the eHubs project (source: Seeuws, 2022)

6.5.Recommendations for mobility hubs in a 15mC neighbourhood

Recommendations:

- The aim of a mobility hubs network is to reduce car ownership and use, and it can only be effective if it is part of an area that is already implementing policies to reduce car use with a view to 15mC (traffic calming, strict parking policy, development of public transport, pedestrian and bicycle facilities, pleasant urban environment, transit-oriented development, mixed land use…) (see 6.1).
- One public authority should take the lead in the development of a hub network, make sure there is a budget, create a taskforce with all parties involved, make sure there is clear task division or division of responsibilities, and hold partners accountable when a task has not been carried out (Baguet, 2025).
- An important step to implementing a mobility hubs network is the emergence of the idea of creating such a network and convincing both citizens and politicians of its usefulness. The involvement of all stakeholders and communication are key when implementing mobility hubs (see 6.3). Long-term planning is necessary (Hached & L'Hostis, 2022).
- It is important to clearly define the needs and planning area, identify target groups and set objectives of a mobility hubs network in advance, so that they can be properly located, sized and designed to meet these needs and not disappoint expectations. In this way, a typology of mobility hubs can be established (see 6.2).
- A mobility hub should have coherent branding across the whole region. A clear, recognizable logo associated with the hubs will increase visibility and user's awareness (GO SEStran et al., 2020), (Baguet, 2024) (see 6.2).
- A feasibility study is necessary, including the verification of the correspondence to local regulations (if not, it will be necessary to plan the modification of these regulations). It is also important to consider what funding is already available or can be made available for the implementation of mobility hubs (see 6.3).
- An urban analysis must be made, with a review of existing transportation networks including street connectivity, cycling and pedestrian infrastructure, public transport, but also land use, urban form and redevelopment opportunities, etc. (Aono, 2019).
- Each territory is unique. Each mobility hub will then be unique (size, vehicles offered, number of vehicles, services…). "There is not a perfect solution for mobility hubs, and the approach to planning and implementation of each hub will need to be tailored." (GO SEStran et al., 2020).
- It is important to consider mobility hubs as a network. Mobility hubs should allow the mobility of users throughout the territory of the city and access to any urbanized point of the city. Mobility hubs should be located in areas of differing density and not clustered in city centres (see 6.4).
- The creation of a few mobility hubs in much frequented locations to showcase what a hub is and how it functions may be needed. It is necessary to collect a significant amount of data (indicators related to use, user profiles, environmental impacts, social impacts, economic impacts, accidents, etc.), negotiated in advance with the operators, continuously or regularly. Depending on the results achieved, adjustments may be necessary to better meet the objectives A network of mobility hubs is never finished: continuous adjustments and modifications are recommended (see 6.3).
- Mobility hubs must be functional and provide additional services to meet the needs of residents or users (toilets, Wi-Fi, café, grocery store, parcel machine, lockers, ATM…). It can prevent users from getting bored during a possible wait in addition to offering them a resource located in their path, reducing their daily travel time. On the other hand, residents using the services will discover the mobility hubs and this would encourage them to test them or mimic other users and perhaps change their mobility habits (see 6.2).
- Mobility hubs should also be accessible and inclusive, helping everyone to meet their own mobility needs, regardless of their physical condition, age, gender or income… It must be easy to use for locals and tourists, people who are at ease with digital technology and those who have difficulty with these services (Geurs et al., 2024) (see 6.2)

- To ensure equity, mobility hubs must be affordable. To make mobility services viable for people along the social gradient, fare support programs and initiatives may be necessary (Aono, 2019). Mobility hubs should also be for people who don't have a bank card or cannot afford a smartphone (Geurs et al., 2024).
  Safety and security within the mobility hub itself, and when using the vehicles it provides, is also important (Aono, 2019).
- To compete with private cars and be more attractive, comfort and ease of use are key considerations. Make it simple and convenient to combine regional transit, municipal transit, cycling, taxi, and shared cars in a single trip (Waldron, 2007). Comfort of access to the mobility hub itself, to the vehicles, adaptability, and comfort of the vehicles (ergonomics), easy access to the information of use and technical assistance (clear information and recommendations), easy payment of services (Geurs et al., 2024). Attention must be paid to waiting areas, rain shelters, etc. (Aono, 2019).

6.6. Overview of mobility hubs for the 15mC neighbourhood

	Mobility hubs
Relevance	Residential areas, business parks, train/bus stations neighbourhoods, rural areas.
Potential	Different use cases and target groups: commuters of a residential area, passengers exiting a station, employees of a business park, visitors of a point of interest or shopping centre.
Governance / regulation	Public with possibly private stakeholders. Multiple possible authorities (one being lead): region, province, municipality, transport authority. Other key stakeholders: public transport operators, rail operators, shared mobility operators, business parks owners, real-estate developers, employers, public service providers, as well as potential users and neighbourhood organisations. Different approaches: top-down (planning by authorities) or bottom-up (with citizen participation).
Business frameworks	Mobility hubs can offer a whole range of services depending on the context, location and aimed target groups. Depending on these services, several business models can be applied, with a variable degree of involvement by local authorities (see the business models of the other policy levers presented in this report, chapters 1-5).
Issues / points for improvement	Need for communication. Need for appropriate location. Need other policies to reduce car use to be efficient. It is sometimes hard to bring key stakeholders in the process, like public transport operators. Need to be inclusive, with user-friendly interfaces for citizens with limited digital mobility skills and vulnerable to exclusion groups.

Table 25: Overview of mobility hubs networks for the 15mC in urban outskirts

6.7. Summary of mobility hubs good practices for 15mC neighbourhoods

	Mobility hubs
Bremen (Germany)	In Bremen (population 563,000 inhabitants), 100 mobility hubs have been planned in strategic areas since 2003. They have influenced a number of cities and countries in Europe. The mobil.punkten are the largest mobility hubs located in the city centre and around stations, while the mobil.pünktchen are smaller and located in residential areas. Bremen mobil.punkten offer car-sharing stations, bike parking, public transport and recharging infrastructure for electric vehicles. Bremen's mobil.punkten are identified by columns with a logo. They are set up by municipalities and included in urban planning documents and the Bremen's mobility plan (see 6.1, 6.2 & 6.3).
Bergen (Norway)	In Bergen (286,000 inhabitants), since 2018, 14 mobility hubs (Mobilpunkter) have been designed for urban residential areas, with a second phase of 5 additional hubs planned for the urban periphery. Mobilpunkter are set up by municipalities and included in the Bergen's mobility plan as well as in the climate, air and energy plan. Bergen Mobilpunkter offer bike parking, shared micromobility services and recharging infrastructure for electric vehicles. They have their own specific signage. The mobility hubs are integrated into the Bergen MaaS system. The city has developed an internal software that allows the authority to communicate in a fluid way with private partners like shared micromobility operators. City agents and every citizen can report problems with shared e-scooters (such as parking problems) via a dedicated application (see 6.2 & 6.3).
Stavanger (Norway)	In Stavanger (145,000 inhabitants), since 2020, 5 mobility hubs (Mobilitetspunkter) are planned for urban residential areas. Stavanger Mobilitetspunkter offer bike parking, shared micromobility services and recharging infrastructure for electric vehicles. First, prototype hubs were created and tested by users so that they could be developed further. The aim was to build on user experience to gain a better understanding of citizens' needs. The Mobilitetspunkter are included in Stavanger planning documents (see 6.2 & 6.3).
Amsterdam (The Netherlands)	In Amsterdam (921,000 inhabitants), 17 mobility hubs (BuurtHubs) have been planned for dense urban areas since 2021. They provide bicycle services, shared cargo-bikes, shared micromobility and car-sharing. Mobility hubs are set up by the municipality The hubs were co-constructed with residents based on their needs, using a bottom-up approach. However, it seems that today the top-down method has become the dominant approach (see 6.2 & 6.3).

Groningen & Drenthe provinces (The Netherlands)	Since 2017, in the provinces of Groningen and Drenthe (1.1 million inhabitants), in the Netherlands, 55 mobility hubs are planned in rural areas, urban outskirts, urban areas and around railway stations. Particular attention is paid to intermodality between cycling and public transport, and to the creation of living spaces. The mobility hubs are set up by the provinces with funding from the municipalities and involvement of the national rail operator NS when a mobility hub is in a train station. Mobility hubs are included in urban planning documents and mobility plans. Shopkeepers and users, including people with reduced mobility, designed mobility hubs. Mobility services include public transport, bike parking, kiss-and-rides, park-and-rides, taxi stands, etc. Services include Wi-Fi, restaurants, cafés, picnic tables, greenery, benches, water taps, health centres, toilets, fitness facilities, parcel machines, homecare organisations, libraries, etc. (see 6.2 & 6.3).
Flemish Region (Belgium)	In the Belgian region of Flanders (6.6 million inhabitants), 1,000 mobility hubs (Hoppinpunten, or Hoppin points) have been planned since 2017, with four types of hubs: inter-regional, regional, local and neighbourhood hubs. The very large number of mobility hubs means that there is a wide variety of services on offer, which differ according to the type of hub. Hoppin points are integrated in the mobility plan of the Flemish Region. The integration of mobility hubs into the MaaS system is a strong desire in Flanders. The Hoppin points have a column to help them be clearly identified. A visual identity guide with a graphic charter has been developed, containing all the logos, pictograms, colour codes and furniture to be used for the Hoppin points. Signage is codified and explained, and accessibility guidelines are laid down (see 6.2 & 6.3).
Leuven (Belgium)	In Flanders, the city of Leuven (population 102,000) has developed 50 Hoppin points located in the city centre, in residential areas and around railway stations. As in the rest of the Flanders region, a wide range of services for users and mobility options are available at Hoppin points. The Hoppin points are included in the city's climate, air and energy plan. A participatory process was carried out on four Hoppin points: a citizen consultation was organised to get a better understanding on what services were needed at these locations (see 6.2 & 6.3).

Table 26: Summary of mobility hubs good practices

CONCLUSION

In this report, we have explored six policy levers that can be used to extend the 15mC concept to the urban outskirts, the different typologies that already exist for each of these policies, and information on the forms of governance and business models that can be implemented.

Addressing these policy levers from the specific angle of medium- and low-density areas is not easy: many systems (car-sharing, shared micromobility or even mobility hubs) are designed as metropolitan networks including a range of dense and less dense areas. Consequently, there are few specific analyses of such systems located exclusively in urban outskirts. However, metropolitan scale systems remain interesting from a functional point of view (the transport system being designed as a whole, with a relationship between the outskirts and the centre) but also from an economic point of view (the systems being generally the most profitable in the densest areas due to a higher density of use, the income generated in the centre helping to balance out the low income generated in the outskirts, with a form of equalisation). It is also possible to implement these policies in sparsely populated areas that are less connected to an urban centre, such as small towns, urban outskirts, or rural areas, but in these cases the profitability will depend more on the contribution of public funds, at least at the beginning to initiate the service and allow it to be sustained. Innovative, lightweight, low-tech services are also beginning to emerge to meet the specific needs of sparsely populated areas. In this regard, cooperative, community-based, peer-to-peer services seem promising and should be encouraged. Finally, some services such as DRT will never become profitable, and like public transport, should be considered for the benefits they bring in terms of access to education, health, culture, employment and all the amenities that make up 15mC.

With a view to good management of public funds, it is legitimate to question, when one of these policies is put in place, whether the money spent could not be spent on other policies that could benefit a greater number of people (as, for example, when a city decides to stop paying for the operation of a shared micromobility system that is little used and has a questionable environmental record, in order to invest in cycling infrastructure).

Of the six policy levers studied identified, two seem to us to be at the heart of the 15mC concept: shared micromobility systems (because they involve lightweight vehicles such as bikes and scooters, which are generally highlighted in 15mC policies) and flexible activity hubs (making it possible to strengthen the supply of facilities and services in areas where a permanent service could not be set up due to a lack of customer potential).

DRT, carpooling and car-sharing seem to us to be more about accompanying the 15mC concept, enabling residents to get around without a car in sparsely populated areas, but to be able to use one on an occasional basis when they need to, thanks to car-sharing. Car-sharing gives people access to a vehicle when they need to carry bulky items, have nightlife activities, visit friends living in areas with poor public transport, or take a family weekend trip to the countryside.

Finally, mobility hubs are at the interface of these two groups of policies: they provide physical locations to mobility services that enable people to move around locally without blocking sidewalks and link them to the rest of the region by public transport, while offering services that make everyday life easier for users and residents (including some services that had sometimes disappeared from the neighbourhood). When integrated into bigger infrastructure projects, mobility hubs can be a leveller for placemaking. For example, they can add greenery and benches when a street is refurbished.

However, even with a relevant economic model, the effectiveness of the policies studied in this report will be limited if they are not carried out in parallel with a general policy to reduce car use and to develop safe, pleasant, and inclusive cycling and walking infrastructures that encourage people to pursue their daily activities close to their homes. In fact, the ultimate aim of the 15mC neighbourhoods is to create an urban environment that enables a car-free lifestyle in the urban outskirts. To achieve this, we believe

it is necessary to focus on lifestyles rather than mobility supply and practices alone. This means to offer urban outskirts quality public spaces and quiet streets, free at last from excessive parking and the nuisance of motorised traffic, with the same high standards as those found in city centres. It is also necessary to have an overall coherence in the development of an area: transforming a car-centred suburban area into a peaceful, people-centred area will show disappointing results if, at the same time, a large shopping centre with a vast free car park and an expressway serving it is built nearby. The 15mC neighbourhood is not an island, but part of an urban system of territorial interdependencies.

We have seen in this report that a good governance framework is needed to set up shared mobility services, DRTs, flexible hubs, and mobility hubs. It is often the same authorities that are responsible for implementing these policies and for urban planning. The search for coherence between urban planning and mobility policies must therefore be considered upstream, jointly in the master plans for urban planning, mobility, and climate.

REFERENCES

6t-bureau de recherche, Ademe, *Étude sur les impacts des services de vélos en free-floating sur les mobilités actives*, 2019.

Ademe, *Vélos en libre-service avec station : de l'étude de faisabilité à sa mise en œuvre*, 2019.

AGUILERA-GARCIA, Á., GOMEZ, J., & SOBRINO, N. (2020). *Exploring the adoption of moped scooter-sharing systems in Spanish urban areas.* In Cities (Vol. 96, p. 102424). Elsevier BV. https://doi.org/10.1016/j.cities.2019.102424

AONO Saki, *Identifying Best Practices for Mobility Hubs*, Intertraffic.com, 2021.

AONO Saki, *Mobility hubs - The multimodal stations at the centre of everything*, TransLink, 2019.

Apur, *L'autopartage et autres modes alternatifs à la possession de la voiture particulière – Expériences à Paris, En France et à l'étranger*, 2008.

ARIAS MOLINARES Daniela, GEURS Karst, GRIGOLON Anna, ULAK Baran (University of Twente), DURAN David, McCORMICK Bartosz (Technical University Munich) BAGUET Jelten (Mpact), van VESSEM Charlotte (Vrije Universiteit Brussel), ADJEROUD Heythem (Université Gustave Eiffel), ESZTERGÁR-KISS Domokos (Budapest University of Technology and Economics), DÖRRZAPF Linda (Vienna University of Technology), CHARALAMPIDOU Georgia, (Universität für Bodenkultur Wien), *Exploring the 15-minute city concept for urban outskirts : a systematic literature review.*, DREAMS, Deliverable 2.1, Horizon Europe, 2024, https://www.dreams15mc.eu/_files/ugd/c54b12_4567f53190a44f8b9bb6ae054d8b1359.pdf

Association des Acteurs de l'Autopartage, LAET, *Baromètre national autopartage*, 2023.

Association des Acteurs de l'Autopartage, *Le guide de l'autopartage pour les territoires*, 2021.

Autodelen.net, *Budget mobilité*, 2024, https://www.autodelen.net/fr/themes/budget-mobilite/https://www.autodelen.net/fr/themes/budget-mobilite/

Autodelen.net, *Le lancement du Green Deal Inclusive Carsharing en 4 chiffres*, 03/21/2024, https://www.autodelen.net/fr/actualites/le-lancement-du-green-deal-inclusive-carsharing-en-4-chiffres/https://www.autodelen.net/fr/actualites/le-lancement-du-green-deal-inclusive-carsharing-en-4-chiffres/

BACH, X., MARQUET, O., & MIRALLES-GUASCH, C. (2023). *Assessing social and spatial access equity in regulatory frameworks for moped-style scooter sharing services.* In Transport Policy (Vol. 132, pp. 154–162). Elsevier BV. https://doi.org/10.1016/j.tranpol.2023.01.002

BADIA, H., & Jenelius, E. (2023). *Shared e-scooter micromobility: review of use patterns, perceptions and environmental impacts*. In Transport Reviews (Vol. 43, Issue 5, pp. 811–837). Informa UK Limited. https://doi.org/10.1080/01441647.2023.2171500https://doi.org/10.1080/01441647.2023.2171500

BAGUET Jelten (Mpact), *Digital integration and signage at mobility hubs*, SmartHubs Deliverable 3.3, Horizon 2020, 2024, https://www.smartmobilityhubs.eu/_files/ugd/c54b12_0b9d9073923a45519a5442760fbf6fa2.pdf

BIARD Nolwenn, La Fabrique écologique, *Y a-t-il un passager dans l'auto ? Que peut-on attendre du covoiturage du quotidien pour la transition écologique*, Forum Vies mobiles, 2023.

BORZĘCKA Karolina, VAN LOOY Johan, HUYSMANS Sven (The New Drive), WYMEERSCH Evelyn, ROELANT Bram, (Mobipunt vzw), MARHOLD Karsten, BAGUET Jelten (Mpact), Bruxelles Mobilité. *Vision pour le développement de hubs de mobilité en Région de Bruxelles-Capitale*, 2023, https://data-mobility.irisnet.be/home/media/filer_public/dd/31/dd31367c-8b19-46bb-b178-4f611f66b03c/mobility_hubs_document_de_vision.pdf

Bruxelles Mobilité, *Good move – Plan régional de mobilité 2020-2030, Plan stratégique et opérationnel*, 2021, https://data-mobility.irisnet.be/home/fr/publications/documents-telecharger-good-move/https://data-mobility.irisnet.be/home/fr/publications/documents-telecharger-good-move/

Bruxelles Mobilité, *Synthèse du Baromètre de la mobilité 2021,* 2023, https://data.mobility.brussels/home/media/filer_public/f8/16/f816f884-b9a6-46af-9927-214ff70b944d/barom2021_synthese-finale_fr.pdf

Bundesverband Carsharing, e.V. (bcs), 2024, https://carsharing.de/carsharing-staedteranking

Cairgo Bike website: https://cairgobike.be/en/what-is-cairgo-bikehttps://cairgobike.be/en/what-is-cairgo-bike

Car Sharing Association, Movmi, *Five Foundational Carsharing Policies for Any City – Lessons from the 2020 Carsharing City Awards*, 2020.

Cerema, *Vélos en libre-service avec station : de l'étude de faisabilité du service à sa mise en œuvre*, 2019.

CHODORGE Simon, (2019 May 29), À Paris, l'autopartage cherche sa voie, *L'Usine Nouvelle*, https://www.usinenouvelle.com/article/a-paris-l-autopartage-cherche-sa-voie.N845340

CHRISTOFOROU, Z., DE BORTOLI, A., GIOLDASIS, C., & SEIDOWSKY, R. (2021). *Who is using e-scooters and how? Evidence from Paris*. In Transportation Research Part D: Transport and Environment (Vol. 92, p. 102708). Elsevier BV. https://doi.org/10.1016/j.trd.2021.102708https://doi.org/10.1016/j.trd.2021.102708

CIARI Francesco, AXHAUSEN Kay, *Choosing carpooling or car sharing as a mode – Swiss stated choice experiments*, 2012, https://doi.org/10.3929/ethz-b-000091515

City of Bergen, *Mobility hubs: pilots, strategies and practicalities*, 2021, https://share-north.eu/wp-content/uploads/2021/10/Bergen-Mobility-Hubs-2021_Lars-Ove-Kvalbein.pdf

Club Sustainable Development of Civil Society, *LAST MILE, Best Practices Analysis, Synopsis*, Interreg Europe, 2018.

COENEGRACHTS Elnert, BECKERS Joris, VANELSLANDER Thierry, Verhetsel Ann, *Business Model Blueprints for the Shared Mobility Hub Network*, Sustainability 2021, 13, 6939, https://doi.org/10.3390/su13126939, 2021.

COHEN, M. C., JACQUILLAT, A., RATZON, A., & SASSON, R. (2022). *The impact of high-occupancy vehicle lanes on carpooling*. In Transportation Research Part A: Policy and Practice (Vol. 165, pp. 186–206). Elsevier BV https://doi.org/10.1016/j.tra.2022.08.021

CoMoUK, *Mobility Hubs Guidance*, Interreg North Sea – NORTH-Share, 2019.

CoMoUK, *What are mobility hubs?*, https://www.como.org.uk/mobility-hubs/overview-and-benefits, 2022.

CoMoUK, WSP, England's Economic Heartland, *Mobility Hubs Business Case Guidance*, 2023.

Conseil de Paris, *Délibération 2020 DVD 49, Véhicules partagés en libre-service sans station d'attache. Fixation des tarifs de redevance d'occupation temporaire du domaine public*, 2020, https://a06-v7.apps.paris.fr/a06/jsp/site/plugins/solr/modules/ods/DoDownload.jsp?id_document=155175&items_per_page=20&sort_name=&sort_order=&terms=autopartage&query=autopartagehttps://a06-v7.apps.paris.fr/a06/jsp/site/plugins/solr/modules/ods/DoDownload.jsp?id_document=155175&items_per_page=20&sort_name=&sort_order=&terms=autopartage&query=autopartage

DELBOSC, A., & THIGPEN, C. (2024). *Who uses subsidized micromobility, and why? Understanding low-income riders in three countries*. In Journal of Cycling and Micromobility Research (Vol. 2, p. 100016). Elsevier BV. https://doi.org/10.1016/j.jcmr.2024.100016

Département de l'Essonne, *La gare autoroutière de Briis-sous-Forges, mieux se déplacer en Essonne*, https://www.youtube.com/watch?v=sqdTcUD2bo0, 2023.

Département de Seine-et-Marne, *Modes de déplacement alternatifs*, https://www.seine-et-marne.fr/fr/modes-de-deplacement-alternatifs, 2020.

Département des Yvelines, *MobilitY' - Un dispositif d'écomobilité solidaire : des bornes et des véhicules électriques en usage partagé dans 13 communes rurales des Yvelines*, https://www.yvelines.fr/cadre-de-vie/deplacements/mobility/, 2023.

DESTI-SMART project website: https://projects2014-2020.interregeurope.eu/desti-smart/

eHubs project website: https://vb.nweurope.eu/projects/project-search/ehubs-smart-shared-green-mobility-hubs/

EIT Urban Mobility, *Mastering mobility: demand responsive transport*, https://www.eiturbanmobility.eu/mastering-mobility-demand-responsive-transport/, 2024.

EIT Urban Mobility, Urban Mobility Next 7, *Demand Responsive Transport: recommendations for successful deployment*, 2022.

EMBRACER project website: https://www.interregeurope.eu/embracer

ESZTERGÁR-KISS Domokos, ABA Attila, BME, *Setup of Living Labs (Brussels, Budapest, Munich, Paris, Utrecht, Vienna)*, DREAMS, Deliverable 5.1, 2024

European Commission, *Sustainable and Smart Mobility Strategy – putting European transport on track for the future*, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020DC0789, 2020.

E-workshop on Green and Inclusive Regional Mobility website: https://www.interregeurope.eu/find-policy-solutions/workshop/green-and-inclusive-regional-mobility-solutions-key-learnings, 2024.

FRENKEN Koen, *Towards a prospective transition framework. A coevolutionary model of socio-technical transitions and an application to car sharing in The Netherlands*, Utrecht University, 2015.

Gemeente Amsterdam, Smart Mobility, Innovatieteam, *Handreiking eHUBS*, Interreg North-West Europe – eHUBS, 2022.

Generalitat de Catalunya, *LAST MILE, State-of-the-Art of regional public transport systems and particularly flexible systems, Synopsis*, Interreg Europe, 2017.

GEURS Karst, GRIGOLON Anna, MÜNZEL Karla, GKIOTSALITIS Konstantinos, DURAN-RODAS David, BÜTTNER Benjamin, KIRCHBERGER Christoph, PAPPERS Jesse, MARTINEZ RAMIREZ Lluis, GRAF Antonia, HANSEL Julia, GKAVRA Roxani, KLEMENTSCHITZ Roman, *The Smarthubs integration ladder: a conceptual model for the categorisation of shared mobility hubs*, Transport Reviews, Volume 44, 2024 - Issue 1, 2024. https://doi.org/10.1080/01441647.2023.2239499https://doi.org/10.1080/01441647.2023.2239499

GO SEStran, steer, *Transport Scotland, Mobility Hubs: A Strategic Study for the South East of Scotland/SEStran region*, 2020.

Gouvernement de la Région de Bruxelles-Capitale, *Arrêté fixant les modalités d'utilisation des places de stationnement par les opérateurs de véhicules à moteur partagés*, 21 mars 2013, https://www.ejustice.just.fgov.be/eli/arrete/2013/03/21/2013031242/justel#Art.4

Grand Paris Seine & Oise, *Les hubs multiservices #çacontinue !*, https://gpseo.fr/article/les-hubs-multiservices-cacontinue, 2024.

GUITTON Élie (L'Institut Paris Region), *Voies réservées sur autoroutes et voies rapides urbaines*, 2022.

GUITTON Élie, RIOU Dominique, TEDESCHI, Florian (L'Institut Paris Region), *Des voies rapides multimodales pour décarboner et décongestionner le réseau routier francilien*, Note rapide Mobilité, n° 1002, 2024.

HACHED Wassim, L'HOSTIS Alain. *Mobility Hubs, a lever for more sustainable mobility?*, Université Gustave Eiffel ; LVMT. Interreg 2 Seas – MOBI-MIX, 2022.

HUNKIN Simon, KRELL Katharina, *Demand-responsive transport, A Policy Brief from the Policy Learning Platform on Low-carbon economy*, INTERREG Europe, 2018.

Île-de-France Mobilités, *Le Plan des mobilités en Île-de-France 2030, Plan d'action*, https://www.iledefrance.fr/sites/default/files/2024-04/Plan_Mobilit%C3%A9s_4_PDMIF_Plan%20d%27action.pdf, 2024.

International Transport Forum (ITF), *Innovations for better rural mobility*, https://www.itf-oecd.org/sites/default/files/docs/innovation-rural-mobility.pdf, 2021.

Interreg Europe, *Zooming in: How shared mobility is organised in Flanders*, Peer review, 2024, https://www.interregeurope.eu/find-policy-solutions/expert-support-reports/zooming-in-how-shared-mobility-is-organised-in-flandershttps://www.interregeurope.eu/find-policy-solutions/expert-support-reports/zooming-in-how-shared-mobility-is-organised-in-flanders

INVERS, *New INVERS Mobility Barometer finding: 50,000 vehicles in free-floating car sharing across Europe*, 2023, https://invers.com/en/press-releases/european-free-floating-carsharing-market-overview/

KARBAUMER Rebecca. *Bremens mobil.punkt Strategy - Reclaiming Street Space and Place Making with Car-Sharing,* Freie Hansestadt Bremen, Interreg North Sea Region – SHARE-North, 2020, https://share-north.eu/wp-content/uploads/2020/04/200422_PART-1_Context-and-Political-Strategies_Bremen.pdf

KASK Õnne, PLAZIER Paul, ARTS Jos, TILLEMA Taede, RONGEN Tibor, *Hub programme Groningen and Drenthe: state of hubs, governance, and future outlook*. (SMiLES research report; No. #2). Rijksuniversiteit Groningen. Faculteit Ruimtelijke Wetenschappen, 2021.

KRELL Katharina, HUNKIN Simon, *Demand-responsive transport, A Policy Brief from the Policy Learning Platform for a more connected Europe*, INTERREG Europe, 2024.

L'Institut Paris Region, *Tableau de bord de la mobilité en Île-de-France*, 2024, https://www.institutparisregion.fr/mobilite-et-transports/deplacements/tableau-de-bord-de-la-mobilite-en-ile-de-france/https://www.institutparisregion.fr/mobilite-et-transports/deplacements/tableau-de-bord-de-la-mobilite-en-ile-de-france/

LAA, B., & LETH, U. (2020). Survey of E-scooter users in Vienna: *Who they are and how they ride.* In Journal of Transport Geography (Vol. 89, p. 102874). Elsevier BV. https://doi.org/10.1016/j.jtrangeo.2020.102874

LAST MILE website: https://projects2014-2020.interregeurope.eu/lastmile/

LAVIOLETTE Jérôme, *Environnement bâti, attitudes et accès à l'automobile*, thèse de doctorat, Polytechnique Montréal, 2023.

Le Nouvel Obs (2018, May 31). Après le fiasco du Velib', la dette catastrophique d'Autolib', *Le Nouvel Obs*, *https://www.nouvelobs.com/societe/20180531.OBS7513/apres-le-fiasco-du-velib-la-dette-catastrophique-d-autolib.html*.

LECONTE Manuel, RIVOALLON PUSTOC'H Catherine, DRUON Stéphanie, Inspection Générale de l'Environnement et du Développement Durable, *Le développement de l'autopartage*, 2023.

LOUDON, E., GERZINIC, N., MOLIN, E., & CATS, O. (2023). *Determinants of shared moped mode choice.* In Journal of Urban Mobility (Vol. 3, p. 100053). Elsevier BV. https://doi.org/10.1016/j.urbmob.2023.100053

MARTINEZ Lluis, PAPPERS Jesse, KESERÜ Imre, VUB Mobilise, *Needs of users and digitally excluded citizens*, SmartHubs deliverable 3.2, Horizon 2020, 2022 https://www.smartmobilityhubs.eu/_files/ugd/c54b12_e1c66f737c2a46ef85f64edb5f60f8d1.pdf

MATCH-UP project website: https://projects2014-2020.interregeurope.eu/match-up/

MATTHIJS Jeffrey, VANSEVENANT Merel, RODENBACH Johannes, RYVERS Suzanne, SEEUWS Bram, Autodelen.net, *Rapport Autodelen 2020*, Interreg North Sea – SHARE-NORTH, Province of East Flanders, 2021, https://www.autodelen.net/wp-content/uploads/2022/01/Rapport-annuel-car-sharing-2020-2021-1.pdfhttps://www.autodelen.net/wp-content/uploads/2022/01/Rapport-annuel-car-sharing-2020-2021-1.pdf

Mijksenaar, *De identiteit voor hubs – Handboek voor inrichting van en wayfinding voor deelmobilitieit- en hublocaties*, 2022, https://www.zeeland.nl/sites/default/files/2022-07/2022-07-11%20Handboek%20identiteit%20hubs%20V1.pdf

Mo.Point website: https://www.mopoint.at/

MOBI-MIX website: https://www.interreg2seas.eu/en/MOBI-MIX

MÜNZEL Karla, FRENKEN Koen, *Explaining carsharing supply across Western European cities*, International Journal of Sustainable Transportation, Volume 14, 2020 - Issue 4, March 2019, Pages 243-254, https://doi.org/10.1080/15568318.2018.1542756

MÜNZEL Karla, PISCICELLI Laura, BOON Wouter, FRENKEN Koen, *Different business models – different users? Uncovering the motives and characteristics of business-to-consumer and peer-to-peer carsharing adopters in The Netherlands*, Transportation Research Part D: Transport and Environment, Volume 73, August 2019, Pages 276-306, https://doi.org/10.1016/j.trd.2019.07.001

Observatoire national du covoiturage du quotidien website: https://observatoire.covoiturage.gouv.fr/https://observatoire.covoiturage.gouv.fr/

O'SULLIVAN Feargus (2022, February 26), The Radical Roots of Bikesharing, *Bloomberg*, *CityLab*, https://www.bloomberg.com/news/features/2022-02-26/the-dutch-anarchists-who-launched-a-bikesharing-revolution

Parking.Brussels, Autopartage 2021 – Évaluation de la couverture en Région Bruxelles Capitale, 2024.

Parking.Brussels, Autopartage 2022 – Évaluation de la couverture en Région Bruxelles Capitale, 2023.

Parking.Brussels, Autopartage 2023 – Évaluation de la couverture en Région Bruxelles Capitale, 2024.

PRÉDALI Frédérique, COUREL Jérémy, GUITTON Élie (L'Institut Paris Region), MICHELOT Nicolas, LEFORESTIER Linda, SENG Jean (DRIEAT), 6t, *Services de mobilité en free-floating – Retours d'usagers*, 2020.

Publiek Vervoer Groningen Drenthe, *Hubtaxi*, https://www.publiekvervoer.nl/reizigers/hubtaxi

Radio 2, SNOEYS Jasper (2023, May 29), Autodeelbedrijf Poppy stopt met deelauto's in Lier, *VRT News*, https://www.vrt.be/vrtnws/nl/2023/05/29/poppy-lier/

REGIO-MOB Consortium, *Guidelines of Best Practices in Sustainable Mobility*, Interreg Europe, 2016.

REGIO-MOB Consortium, *Interregional Learning towards Sustainable Mobility: the REGIO-Mob Experience, 20 good practices for sustainable mobility developed to tackle the Covid-19 crisis*, Interreg Europe, 2021.

Région de Bruxelles-Capitale, *Arrêté du Gouvernement de la Région de Bruxelles-Capitale fixant les modalités d'utilisation des places de stationnement par les opérateurs de véhicules à moteur partagés*, 2013, https://www.ejustice.just.fgov.be/eli/arrete/2013/03/21/2013031242/justel#Art.4https://www.ejustice.just.fgov.be/eli/arrete/2013/03/21/2013031242/justel#Art.4

Région de Bruxelles-Capitale, *Arrêté du Gouvernement de la Région de Bruxelles-Capitale portant un règlement d'agrément des systèmes de partage de voitures pour les particuliers*, 2017, https://etaamb.openjustice.be/fr/arrete-du-gouvernement-de-la-region-de-bruxellescapit_n2017030834.htmlhttps://etaamb.openjustice.be/fr/arrete-du-gouvernement-de-la-region-de-bruxellescapit_n2017030834.html

Région de Bruxelles-Capitale, *Règlement Régional d'Urbanisme (RRU) – Titre VIII*, 2006, https://urbanisme.irisnet.be/pdf/RRU_Titre_8_FR.pdfhttps://urbanisme.irisnet.be/pdf/RRU_Titre_8_FR.pdf

Région de Bruxelles-Capitale, Transport & Mobility Leuven, Mobiped, *Benchmark international de services de location de vélos en libre-service (VLS) et de vélos longue durée (VLD)*, 2024 https://mobilite-mobiliteit.brussels/sites/default/files/2024-09/VLS_BXL_2026-B-Benchmark_international_de_services_VLS_et_VLD.pdf

Région Île-de-France, *SDRIF-E - Île-de-France 2040 : un nouvel équilibre, Plan d'aménagement régional*, https://www.iledefrance.fr/sites/default/files/2024-10/sdrif2024_projet_amenagement_regional.pdf, 2024.

Regional Management East Tyrol, *LAST MILE, National and regional framework conditions and barriers of flexible transport*, 2017.

RENOUVEL Sophie, MOLINIER Marie, Apur, *Les mobilités émergentes, trottinettes, scooters et vélos en partage*, 2020.

Road XS, *How Does Demand Responsive Transport Work? The Technology Explained*, 2023, https://www.roadxs.com/transport/drt/how-does-demand-responsive-transport-work/https://www.roadxs.com/transport/drt/how-does-demand-responsive-transport-work/

Road XS, *The Pros and Cons of Demand Responsive Transport: A Comprehensive Analysis*, 2024, https://www.roadxs.com/transport/drt/pros-and-cons-of-demand-responsive-transport/ https://www.roadxs.com/transport/drt/pros-and-cons-of-demand-responsive-transport/

RODENBACH Johannes, MATTHIJS Jeffrey, SEEUWS Bram, RYVERS Suzanne, DECOMBEL Sarah, Autodelen.net, *Rapport d'impact, l'autopartage en Belgique en 2022*, 2023 https://www.autodelen.net/wp-content/uploads/2023/02/Rapport-dimpact.-Lautopartage-en-Belgique-en-2022.pdf

RODRIGUE Jean-Paul, COMTOIS Claude, SLACK Brian, *The Geography of Transport Systems*, New York, Routledge, 2006.

Rural Mobility project website: https://www.interregeurope.eu/rural-mobility

SCHREIER Hannes, GRIMM Claus, KURZ Uta, SCHWIEGER Bodo, KEßLER Stephanie, MÖSER Guido, Team Red, *Analysis of the impacts of car-sharing in Bremen, Germany*, Interreg North Sea – SHARE-NORTH, 2021.

SEEUWS Bram, COENEGRACHTS, *eHUBS webinar 6: Business models*, Autodelen.net, 2022, https://www.youtube.com/watch?v=eS9S6Mg6LZAhttps://www.youtube.com/watch?v=eS9S6Mg6LZA

SHAHEEN, S., & COHEN, A. (2018). *Shared ride services in North America: definitions, impacts, and the future of pooling*. In Transport Reviews (Vol. 39, Issue 4, pp. 427–442). Informa UK Limited. https://doi.org/10.1080/01441647.2018.1497728https://doi.org/10.1080/01441647.2018.1497728

SHAHEEN, Susan, CHAN, Nelson, BANSAL, Apaar, COHEN, Adam, *Shared Mobility, a Sustainability & Technologies Workshop – Definitions, Industry Developments, and Early Understanding*, TSRC, UC Berkeley, 2015.

ShareDiMobiHub Interreg North Sea website: https://www.interregnorthsea.eu/sharedimobihub/pilotshttps://www.interregnorthsea.eu/sharedimobihub/pilots

SHARE-North Academy, *A Planner's Guide to the Shared Mobility Galaxy*, Interreg North Sea – SHARE-NORTH, 2021, https://share-north.eu/wp-content/uploads/2022/05/Shared-Mobility-Guide_ENGLISH.pdf

SHARE-North Squared (SN²) project website: https://www.interregnorthsea.eu/sn2

SHARE-North website: https://share-north.eu/

SmartHubs, *Making mobility hubs smarter – 10 recommendations for practitioners & policy makers*, 2024, https://www.smartmobilityhubs.eu/_files/ugd/c54b12_eec2ced132d04c158f16c04daa6b8c48.pdf

SPINE project on the CIVITAS website: https://civitas.eu/projects/spine

SPINE project website: https://www.spine-project.eu/

Stadt Wien, *Shared Mobility Concept and Guidelines on Mobility Hubs in Vienna Overview and Objectives for Vienna*, 2022.

TEMMERMAN Marjan, MERCKX Vincent, VERHAEGHE Nina (2023, December 21), Aanbieders van deelwagens Green Mobility en Poppy trekken weg uit grote steden, *VRT News*, https://www.vrt.be/vrtnws/nl/2023/12/21/green-mobility-en-poppy-trekken-weg-uit-grote-steden/#:~:text=Poppy%20stopt%20dan%20weer%20met,dan%20systemen%20met%20vaste%20standplaatsen

Transport for Communities, *What is demand-responsive transport (DRT) - And how does it differ, if at all, to Community Transport?*, https://web.archive.org/web/20190114114414/http://transportforcommunities.co.uk/files/What_is_Demand_Responsive_Transport.pdf, 2019.

TRAUCHESSEC Élodie, Ademe, WESTER Léa, LOUVET Nicolas, COGNEZ Alice, 6t, *Enquête Nationale sur l'Autopartage*, 2022.

UITP, *Mobility hubs: Steering the shift towards integrated sustainable mobility*, Policy Brief, 2023, https://cms.uitp.org/wp/wp-content/uploads/2023/06/Policy-Brief-Mobility-hubs-web.pdf

Urban Innovative Actions, Brussels Capital Region, Cairgo Bike, https://www.uia-initiative.eu/en/uia-cities/brussels-capital-region-0https://www.uia-initiative.eu/en/uia-cities/brussels-capital-region-0

UTPAL Deka, VETHA Varshini, DEEPTHI Mary Dilip, *The journey of demand responsive transportation: Towards sustainable services*, Department of Civil Engineering, BITS Pilani Dubai Campus, 2023.

VAROQUIER Jila, (2019, May 15), Le casse-tête des ex-bornes Autolib en banlieue, *Le Parisien,* https://www.leparisien.fr/info-paris-ile-de-france-oise/transports/le-casse-tete-des-ex-bornes-autolib-en-banlieue-15-05-2019-8072502.php

Ville de Paris, *Plan local de mobilité*, 2024, https://www.paris.fr/pages/paris-lance-son-plan-local-de-mobilite-26709https://www.paris.fr/pages/paris-lance-son-plan-local-de-mobilite-26709

Ville de Paris, *Règlement relatif à la délivrance des titres d'occupation aux opérateurs de véhicules partagés en libre-service sans stations d'attache*, 2021, https://cdn.paris.fr/paris/2021/10/04/ca33473b23f3699c8bb701928cd3a093.pdfhttps://cdn.paris.fr/paris/2021/10/04/ca33473b23f3699c8bb701928cd3a093.pdf

Vinci Autoroutes, *Découvrez le parc multimodal de Longvilliers sur l'autoroute A10*, https://www.vinci-autoroutes.com/fr/conseils/ecomobilite/parc-multimodal-longvilliers-autoroute-A10/, 2024.

Vlaamse Gewest, *Hoppin Huisstijlgids*, 2022, https://its.be/sites/default/files/Hoppin_huisstijlgids_beknopt_v6.pdfhttps://its.be/sites/default/files/Hoppin_huisstijlgids_beknopt_v6.pdf

WALDRON Levi, *Mobility HUBs, Toronto, Ontario,* https://www.crcresearch.org/case-studies-sustainable-infrastructure-library/transportation/mobility-hubs-toronto-ontario, 2007.

WANG, K., QIAN, X., FITCH, D. T., LEE, Y., MALIK, J., & CIRCELLA, G. (2022). *What travel modes do shared e-scooters displace? A review of recent research findings*. In Transport Reviews (Vol. 43, Issue 1, pp. 5–31). Informa UK Limited. https://doi.org/10.1080/01441647.2021.2015639

WienMobil hubs network on Wiener Linien website: https://www.wienerlinien.at/wienmobil/stationen

WILSON Kea (2020 January 20), Why Do Micromobility Companies Keep Losing Money?, *Streetsblog USA*, https://usa.streetsblog.org/2020/01/14/why-do-micromobility-companies-keep-losing-money

Acknowledgements:

Timothé Buen Abad, Brussels Mobility

Nicolas Frasie, Association des Acteurs de l'Autopartage

Johannes Rodenbach, Autodelen.net

Jelten Baguet, Mpact

Daniela Arias Molinares, University of Twente (UT)

Karst Geurs, University of Twente (UT)

Charlotte van Vessem, Vrije Universiteit Brussel (VUB)

LIST OF ACRONYMS

15mC: 15-minute city

15mN: 15-minute neighbourhood

20mR: 20-minute region

AAA: Association des Acteurs de l'Autopartage (Association of Car-Sharing Stakeholders)

ATM: Automated Teller Machine

BCR: Brussels-Capital Region

Cerema : Centre d'Études et d'Expertise sur les Risques, l'Environnement, la Mobilité et l'Aménagement (Centre for studies and expertise on risks, the environment, mobility and planning)

CSAP: Car-Sharing Action Plan

DRT: Demand-responsive transport

DUT: Driving Urban Transitions

EIT: European Institute of Innovation and Technology

EV: Electric Vehicle

FF: Free-Floating

ICT: Information and Communications Technology

ÎDF: Île-de-France

ÎDFM: Île-de-France Mobilités

IPR: Institut Paris Region

LEZ: Low Emission Zones

LMP: Local Mobility Plan

LTZ: Limited Traffic Zones

MaaS: Mobility as a Service

NGO: Non-Governmental Organisation

POI: Point-of-interest

PT: Public Transport

RPC: Registre de Preuves de Covoiturage (Carpooling Proof Register)

RUPR: Regional Urban Planning Regulations

SAVM: Syndicat Mixte Autolib' et Vélib' Métropole (Autolib' and Vélib' joint association)

SMMAG: Syndicat Mixte des Mobilités de l'Aire Grenobloise (Grenoble Metropolitan Area Transport Authority)

SNCF: Société Nationale des Chemins de Fer (French National Rail Company)

STIB/MIVB: Société des Transports Intercommunaux de Bruxelles / Maatschappij voor het Intercommunaal Vervoer te Brussel (Brussels Intercommunal Transport Company)

SUMP: Sustainable Urban Mobility Plan

TAD: Transport À la Demande (demand-responsive transport)

UITP: International Association of Public Transport