IDDRI

STUDY

N°02/16 JUNE 2016 | NEW PROSPERITY

The new collaborative mobility actors: from promises to challenges for the public authorities

Laura Brimont, Damien Demailly, Mathieu Saujot, Oliver Sartor (IDDRI)

A NEW GENERATION OF ACTORS

Carpooling and peer-to-peer carsharing start-ups have multiplied in recent years. The widespread use of smartphones and digital innovations has made it possible to design new tools and to improve the ergonomics of user interfaces, thereby facilitating transactions between individuals. These "collaborative mobility" actors are renewing the shared use of cars, which emerged in the 2000s with the first generation of actors supported by the public authorities: professional carsharing (Communauto, Autolib', etc.) and carpooling companies (La Roue Verte, Covivo, etc.).

PROMISE FOR SUSTAINABLE MOBILITY

While the first generation of carpooling and carsharing actors is struggling to grow beyond certain areas and population groups, collaborative mobility actors are hoping to win over new users and to extend carsharing and carpooling services into new areas. They would thus contribute to improving the sustainability of travel by reducing its environmental impacts and also its cost, with annual savings for an individual ranging from a few hundred to more than 3,000 euros. These benefits are greater for short-distance than for long-distance mobility, particularly because there is less competition with public transport in the short-distance segment.

DEVELOPMENT CHALLENGES FOR SHORT DISTANCES

However, these goals come up against the challenges inherent in short-distance mobility. First, the development of collaborative mobility depends on users' access to a mix of transport solutions, including public transport. Second, the platforms on which these collaborative mobility solutions are based require a large number of users to be efficient. While it is difficult to reach this threshold in densely populated areas, the challenge is even greater in less densely populated areas: peri-urban and rural areas, small towns, etc.

WHAT ROLE FOR THE PUBLIC AUTHORITIES?

Faced with these difficulties, which are compounded in less densely populated areas, the question of the role of the public authorities arises. A public strategy for collaborative, sustainable mobility could be based on six pillars: communication support; tax clarification; road system planning; experimentation; better governance; and public funding. This final pillar is a contentious issue, but it could prove essential to ensuring new forms of collaborative mobility are developed in some areas, particularly rural ones.

www.iddri.org

Institut du développement durable
et des relations internationales
27, rue Saint-Guillaume
75337 Paris cedex 07 France

SciencesPo

Citation: Brimont, L., Demailly, D., Saujot, M., Sartor, O. (2016). The new collaborative mobility actors: from promises to challenges for the public authorities, *Studies* N°02/16, IDDRI, Paris, France, 36 p.

☆☆☆

This research has received financial support from the French government in the framework of the "Investissements d'avenir" programme managed by ANR (the French National Research Agency) under the reference ANR-10-LABX-01. It has also received financial support from MAIF, Transdev and Renault.

☆☆☆

The authors would like to thank the members of the steering committee for their valuable contribution to this research project. Thanks to Paul de Rosen from Transdev, Nathalie Granes from the Île-de-France Region, Mathieu Chassignet from ADEME, Ghislain Delabie from Ouishare, François Pistre from Renault and Thomas Ollivier from MAIF.

☆☆☆

For more information about this document, please contact:
Laura Brimont – laura.brimont@iddri.org
ISSN 2258-7535

The new collaborative mobility actors: from promises to challenges for the public authorities

Laura Brimont, Damien Demailly, Mathieu Saujot, Oliver Sartor (IDDRI)

LIST OF ACRONYMS

ADEME: Agence de l'Environnement et de la Maîtrise de l'Energie (Environment and Energy Management Agency)

B2B: Business to Business

B2G: Business to Government

CAS: Centre d'Analyse Stratégique (now France Stratégie) (Strategic Analysis Centre)

CESE: Comité Economique, Social et Environnemental (Economic, Social And Environmental Council)

CGDD: Commissariat Général au Développement Durable (Sustainable Development Commission)

C2C: Consumer to Consumer

DGE: Direction Générale des Entreprises (Directorate-General for Enterprise)

EPCI: Établissement Public de Coopération Intercommunale (Public Intermunicipal Cooperation Authority)

GHG: Greenhouse gas

LOTI: Loi d'orientation sur les transports intérieurs (framework act on domestic transport)

MAPAM: Loi de modernisation de l'action publique territoriale et d'affirmation des métropoles (local public action modernisation act)

NOTRe: Loi portant nouvelle organisation territoriale de la République (law on the new regional organisation of the Republic)

PIPAME: Pôle Interministériel de Prospective et d'Anticipation des Mutations Economiques (Interministerial Foresight and Economic Change Centre)

PSD: Public service delegation

SPC: Socio-professional category

TOD: Transport on demand

VTC: Transport vehicle with chauffeur

LIST OF FIGURES AND BOXES

1. INTRODUCTION

For more than 20 years, the traditional combination of cars and public transport has been considered as insufficient to address the challenges of sustainable mobility, which aims to reduce the negative externalities generated by car travel (greenhouse gas emissions, congestion, air pollution), as well as the mobility restrictions related to spatial and socioeconomic factors (age, financial constraints, etc.). Dependence on cars is thus greater in peri-urban and rural areas, where there is little public transport and where the dispersion of living spaces (home, workplace, school, shops, etc.) limits the options of walking or cycling.

Shared cars, whether they are shared over time between several drivers (carsharing) or the journey is shared between a driver and several passengers (carpooling), provide additional solutions to improve the sustainability of travel. With carpooling, car journeys are shared, thereby reducing congestion and emissions of pollutants, whereas carsharing helps to optimise car use: people hire cars when they really need them and use other modes of transport the rest of the time. These two practices help to reduce the environmental impacts and costs associated with mobility.

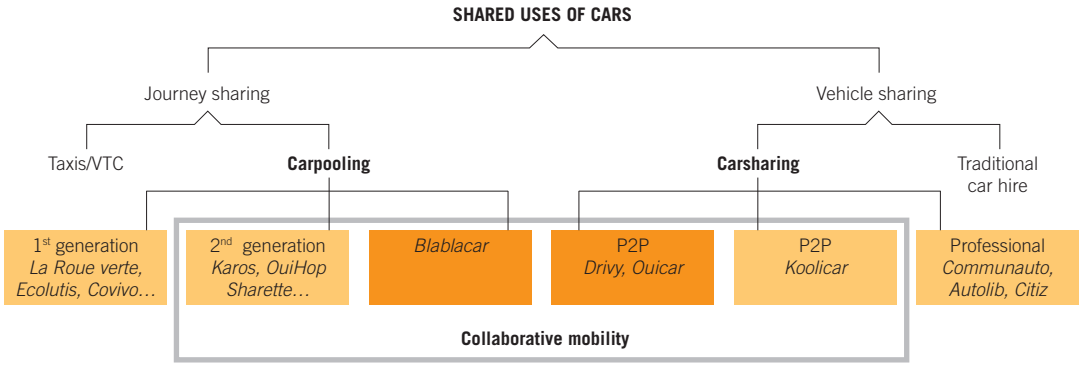
The shared use of cars is not a new practice. Carpooling and carsharing have long been an informal arrangement between friends or colleagues. Since the 2000s, the local authorities have been supporting the development of professional carsharing companies (Communauto, Autolib', Citiz, etc.) and financing carpooling operators (La Roue Verte, Ecolutis, Covivo) in order to provide their constituents with user platforms. These carpooling and carsharing solutions are nevertheless struggling to extend beyond certain types of areas and population categories.

The sector has been experiencing a revival in recent years with the emergence of a number of new actors, such as BlaBlaCar, OuiHop', Karos, WayzUp, Drivy and Koolicar. These carpooling and peer-to-peer carsharing start-ups are using smartphone technologies and digital innovations (platforms, artificial intelligence,[1] open data,[2] etc.) to improve the ergonomics of interfaces and to design new tools for connecting individuals. We call these entrepreneurs "collaborative mobility" actors to distinguish them from the first generation of carpooling and professional carsharing operators (Figures 1 and 2). These new actors are attempting to facilitate the organisation of shared car use, with the goal of attracting new users and extending carsharing and carpooling services into new areas.

Contrary to the first-generation carpooling and professional carsharing operators, collaborative mobility actors get little support from the public authorities, especially the local authorities responsible for transport, which may even be apprehensive about them, by association with the controversy surrounding the company Uber, for example. In this context, this report and the research underpinning it are aimed at analysing:

1. Artificial intelligence refers to machines or software aimed at creating or simulating human intelligence.
2. Open data is digital data produced by public actors (municipalities, delegated public service providers) or private operators (companies, individuals) that is freely accessible and can be reused by anyone.

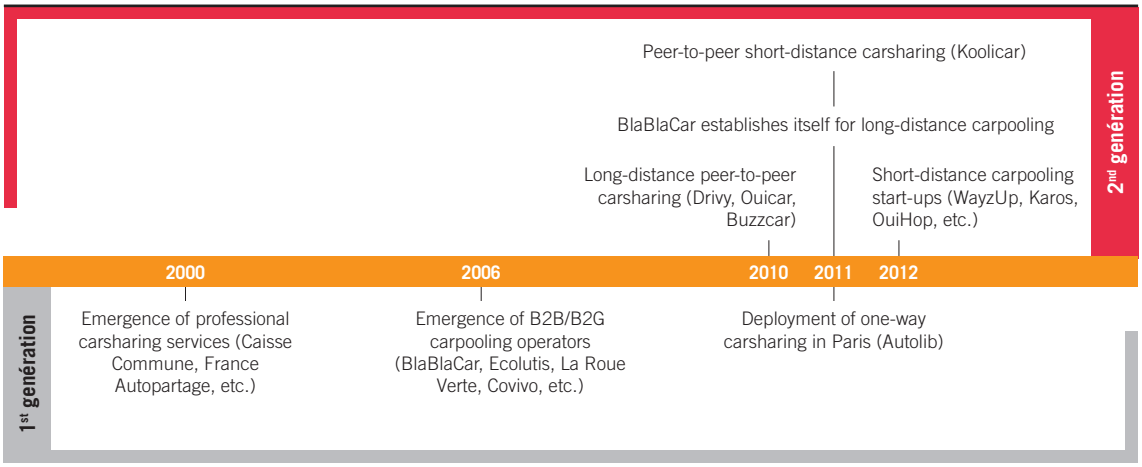
Figure 1. Typology of different shared uses of cars



Source: authors

Note: the practices outside the frame are not studied in this report, although they are part of the shared car "ecosystem". The practices indicated in orange concern short-distance journeys; those in yellow are long-distance.

Figure 2. First and second generation of collaborative mobility actors



Source: authors

- The contribution of collaborative mobility actors to more sustainable mobility;
- Their development challenges, especially in peri-urban and rural areas, where people are most dependent on private cars;
- The way in which the public authorities, especially the local authorities, can benefit from the innovations developed by these new actors.

Section 2 describes the context prior to the emergence of collaborative mobility actors, returning to the sustainable mobility paradigm and the role played by shared car solutions, with the arrival of the first generation of carpooling operators (La Roue Verte, Covivo, Ecolutis, etc.) and professional carsharing operators (Citiz, Communauto, etc.). Based on a review of the existing literature (see Box 1), section 3 discusses the contribution of the different forms of shared cars to sustainable mobility, distinguishing in particular between solutions for short-distance journeys of up to 80 km and those for long-distance journeys. Given the environmental and social importance of short-distance journeys, the remaining sections focus on this market segment. Through 55 semi-structured interviews with numerous mobility actors and a multi-stakeholder workshop (see Box 1), section 4 analyses the development potential and issues for short-distance collaborative mobility actors. Section 5 highlights the challenges to be addressed by the public authorities in order to benefit from these innovations, and section 6 concludes.

Box 1. Methodology

This study is based on a review of the—mainly French[1]—literature, around 50 semi-structured interviews with different mobility actors and the discussions that took place during a workshop.

The academic literature on collaborative mobility is still relatively undeveloped, which is explained first by the fact that these practices are recent and, second, by their still relatively marginal importance in household mobility. The rare academic works identified on carpooling and peer-to-peer carsharing concern the impact of these new practices on the automotive industry (Donada and Fournier, 2015), the psycho-sociological aspects of carpooling practices (Richard, 2011; Dupré, 2014; Créno, 2016), and the potential for developing these practices in rural areas (Huyghe, Baptiste, and Carriere, 2013). The core issue examined in this study, in other words the role of the public authorities towards collaborative mobility actors, is thus rarely addressed in research.

The "grey" literature on collaborative mobility is more extensive: around 10 reports on these issues have been produced in France since 2010. Half of them, commissioned by ADEME (the French Environment and Energy Management Agency), describe user profiles and the nature of journeys made, but also the environmental impacts of these practices.[2] In addition to the ADEME reports, we have identified five studies that directly or indirectly concern collaborative mobility (Table 1). With the exception of a 2016 study produced by CGDD, DGE and PIPAME, this literature remains very precautionary with regard to the role the public authorities could play in the development of these collaborative mobility practices. Our study is thus a first exploration of this field.

The study is also based on 55 semi-structured interviews conducted between June and December 2015. These interviews concern four groups of actors (the detailed list of people interviewed is provided in the annex).

- Experts: academics, research agencies, public research and expertise establishments, etc.
- Public actors: regions, departments, cities, transport management authorities, Caisse des Dépôts et Consignations
- New collaborative mobility actors
- "Traditional" public and private mobility actors: public transport operators, insurance companies, car manufacturers, in-company commuter plan managers, carpooling operators, professional carsharing operators.

In addition to these interviews, we also used the proceedings of a workshop held in Paris on 8 March 2016, attended by 32 people: experts, collaborative mobility actors and public and private mobility actors. Entitled "The role of the public authorities faced with the emergence of the new collaborative mobility actors", the goal of this workshop was to stimulate discussions between these different actors on issues such as tools to support the development of collaborative mobility or experimental partnerships between collaborative mobility actors and the authorities. The list of participants and the issues addressed by the working groups are also provided in the annex.

1. This limitation corresponds mainly to time management constraints. Furthermore, since France has made good progress in the implementation of collaborative mobility, the French academic literature is an important source of information.
2. Short-distance carpooling (INDDIGO SAS, 2015; Dufour, Mercat, and Sucche, 2015a; Dufour, Mercat, and Sucche, 2015b), long-distance carpooling (Chassignet, 2015), and peer-to-peer carsharing (6T, 2015).

Table 1. List of studies addressing the issue of collaborative mobility for the public authorities

Title	Institutions	Year	Comments
Les nouvelles mobilités	France Stratégie, formerly CAS	2010	Collaborative mobility is only part of the focus of these reports, which examine "new mobility" (new vehicles, cycling, digital challenges, etc.). Recommendations on the development of these practices are therefore still very general. It should nevertheless be noted that the authors believe local authority involvement should be limited to communication and multimodal organisation functions: "*The public authorities have neither the legitimacy nor the financial means to develop large-scale mobility solutions such as carsharing or carpooling themselves (…). The role of the authorities is to facilitate the development of these services (when they are in the public interest), in particular by promoting them and ensuring their physical and informational continuity with public transport*" (2012: 62).
Les nouvelles mobilités dans les territoires périurbains et ruraux		2012	
Révolution numérique et évolution des mobilités individuelles et collectives (transport de personnes)	CESE	2015	This report concerning the impacts of digital technologies on mobility highlights challenges linked to the development of collaborative mobility, especially in terms of taxation and competition with public transport. Once again, collaborative mobility is not seen as being part of the public services: "*(…) collaborative mobility is not a public service, nor is it seeking to become one. It does not correspond to the three attributes of the public services: continuity (…); mutability (…); equality (…)*" (2015: 28)
Usages novateurs de la voiture et nouvelles mobilités	CGDD, DGE and PIPAME	2016	Focusing on the impact of these new car uses on the automotive industry, the report makes eight public policy recommendations to manage and support the development of these practices, especially in market segments where private initiatives have more difficulty developing. Among other things, the report encourages the authorities to invest in local experiments, to share their vehicle fleets, and to launch national and local discussions on policies applicable to the new mobility services.

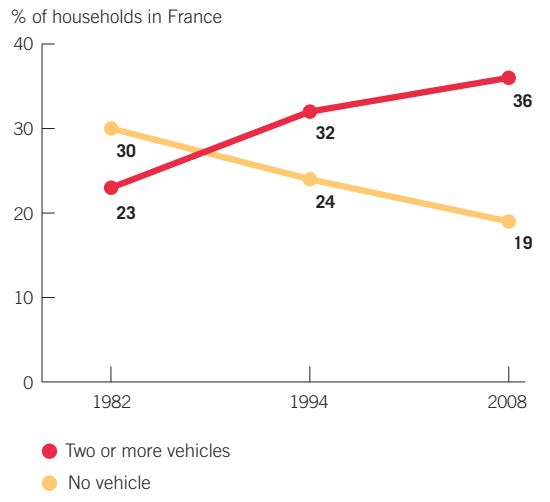
2. SUSTAINABLE MOBILITY: A PARADIGM SHIFT IN FAVOUR OF SHARED CARS

2.1. From the "transport" paradigm to that of "sustainable mobility"

The emergence of the "transport" paradigm

Since the second half of the 20th century, travel has become an increasingly important part of daily life: journeys are more and more frequent and distances longer and longer. The distance travelled per person per day thus increased by 45% between 1982 and 2008 (Le Jeannic, Roussel, and François, 2010). This increase in travel is due to both socio-economic changes (a growing labour force, urban sprawl, the development of the leisure society, etc.) and technological changes, especially the emergence and proliferation of private cars: the proportion of households that do not own a vehicle fell from 30 to 19% between 1982 and 2008. A key component of western lifestyles, cars "shape the areas we live in and format our attitude towards time and distance" (CERTU, 2012: 22).

Figure 3. Household car ownership from 1982 to 2008



Source: authors, data from (Le Jeannic, Roussel, and François, 2010).

The corollary of this increasingly mobile society was the consecration of mobility as a right, or even a "fundamental condition" for the exercise of other basic rights (Limousin and Voisin, 2014 : 4). This understanding of mobility as a "generic right" (Orfeuil, 2011) has led the European countries, including France, to develop public transport services alongside investments made in road infrastructure. Based on a policy of investment in collective transport, this public transport service has made it possible to carry large numbers of passengers on long-distance or inter-urban journeys (high-speed trains, regional trains, coaches) and within urban areas (trams, buses, underground trains, taxis). Within this transport paradigm, public action has consisted in providing transport services to meet the ever-increasing demand for mobility, without questioning the means of influencing this demand.

Questioning this paradigm

This transport paradigm based on private cars with public transport revolving around them is nevertheless showing its limitations, for three fundamental reasons:

Car journeys are generating more and more negative externalities

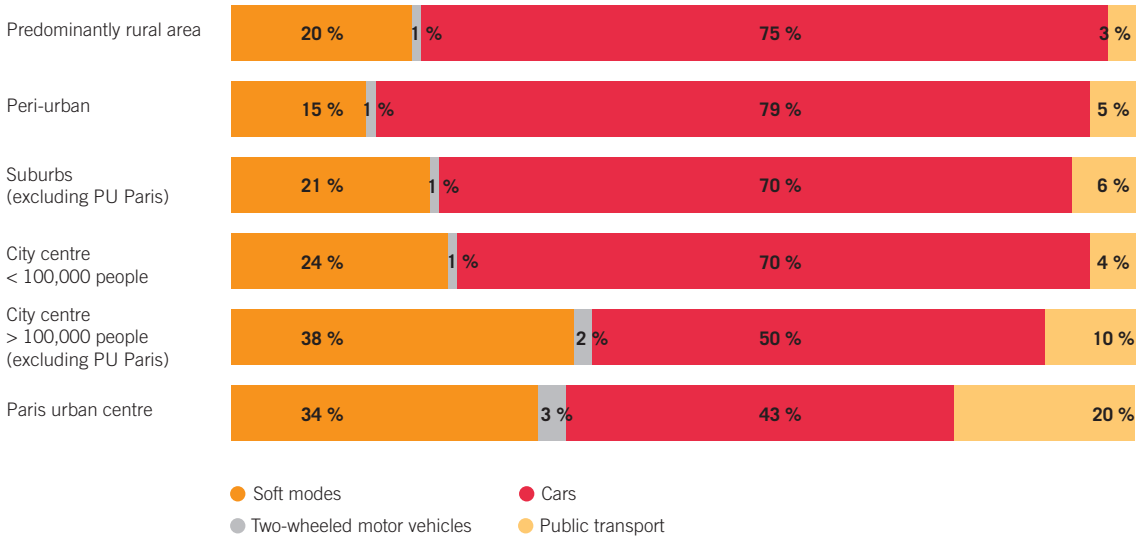
Road infrastructure is sometimes insufficient to handle vehicles flows during peak hours, with traffic congestion thus becoming a problem for many cities. For example, the cost of congestion on the Paris ring road was estimated to be between 130 and 160 million euros in 2007 (Koning, 2014); other studies estimate that the cost of congestion in France eats up between 0.1 and 0.3% of French GDP (Prud'homme and Sun, 2000; Breteau, 2011).

Another problem caused by the increase in the number of cars, but which applies more to urban centres, is the cost of parking spaces. This cost increases as cities become more densely populated and space becomes scarce. Parking also raises the cost of building housing, and ultimately the acquisition cost for individuals (in the order of 6%, according to Baraud-Serfaty, 2014).

Finally, the negative externalities are also environmental: the transport sector is one of the biggest contributors to the greenhouse gas (GHG) emissions responsible for global warming. In France, it accounted for 28% of national emissions in 2013, making it the biggest source of emissions. Household car journeys alone account for 15% of these emissions. Over and above the issue of global warming, transport also raises local environmental challenges caused by air pollution. Road transport is thus to blame for a significant proportion of the main air pollutants: fine particles, carbon monoxide, nitrogen oxides, etc.[3] France is regularly criticised by the European Commission for exceeding the pollution limits set by European regulations. This air pollution, which primarily

3. 10% of non-methane volatile organic compounds (NMVOCs), 7% of fine particles smaller than 2.5 microns (PM2.5), 12% of carbon monoxide (CO), 56% of nitrogen oxides (Nox) and 68% of copper (Cu) (CGDD, 2014).

Figure 4. Share of different modes of transport according to area (in number of journeys)



Sources: authors, data from (Le Jeannic, Roussel, and François, 2010 : 37).

concerns the large urban centres, is responsible for many cardiovascular and respiratory diseases, but also generates non-health costs: ecosystem degradation, lower agricultural yields, etc. A 2015 Senate report thus states that the tangible health cost of air pollution can be estimated to be at least 3 billion euros per year in France, while the overall socioeconomic cost could stand at between 20 and 30 billion euros (Husson, 2015).

Access to mobility is becoming a social issue

Urban sprawl and the dissociation of living and working areas have resulted in "transport poverty". In less densely populated areas with little public transport, private cars are the only mode of transport available to people. Yet cars are a burden on household budgets: in 2004, they accounted for 83% of their transport budget, which was itself the second largest source of expenditure after housing (Arthaut, 2005). Some households are thus partially excluded from mobility, while others are experiencing energy vulnerability: INSEE estimates, for example, that for 10% of households in France, their travel costs are too high in relation to their income (energy expenditure limit at 4.5%), forcing them to restrict their travel or to sacrifice other expenses. This poverty linked to mobility typically concerns blue collar workers, employees, farmers and intermediate occupations, and increases the further people live from the urban centres (Cochez, Durieux, and Levy, 2015).

Public transport is not efficient in all areas

Although public transport is an extremely efficient alternative to cars in densely populated urban centres—first, because car use is more restricted there, and second, because the density of public transport networks makes them more attractive to users—the same cannot be said below a certain density limit: the low level of use means the local authorities are obliged to limit the frequency and coverage of networks due to cost considerations,[4] making them less attractive to users. Some local authorities have set up transport on demand (ToD) systems to replace traditional public transport, but these are also very costly for them,[5] raising the question of the financial viability of public transport services.

The sustainable mobility paradigm

Faced with these obstacles, public transport policies have progressively changed their perspective. This shift is reflected in the emergence of the term "mobility", which is gradually taking over from that of "transport". This mobility-based approach is aimed at better integrating the issues of externalities, accessibility and financial sustainability. It also pays more attention to travel demand, which is becoming a variable of change, and is not limited to just the technical provision of transport.

More specifically, the public authorities are attempting to take action regarding the spatial organisation of their territory and city (employment

4. It should be noted that in France, around 75% of the cost of public transport is borne by the public authorities.
5. Contrary to traditional public transport, ToD does not follow specific routes or timetables, but is adapted to the needs of travellers, picking them up and dropping them off at a stop near their home.

basin, location of services and homes) in order to reduce travel needs (Champagne and Negron-Poblete, 2012). Moreover, they are seeking to provide alternatives to cars by developing public transport solutions and soft modes (walking, cycling). But while public transport is still the backbone of a sustainable mobility system, it has its limits: the cost for public finances.

This limitation primarily affects rural and peri-urban areas, and to a lesser extent towns with fewer than 100,000 people and suburbs (Figure 4). Given their cost, traditional public transport solutions cannot be deployed everywhere. Thus, despite efforts made (local trains, coaches, transport on demand), almost two thirds of people living in these areas have no alternatives to cars (Bleuze *et al.*, 2009: 22). Furthermore, this dependence on private cars is accentuated by a wider dispersion of services (shops, schools, healthcare, etc.) and living/working places. Thus, in rural and peri-urban areas, but also in towns with fewer than 100,000 people, the modal share of cars remains ultra dominant. Larger urban centres, on the other hand, provide better public transport coverage: only 28% and 10% of people living in city centres with more than 100,000 inhabitants and in the Paris urban centre have no alternatives to cars (Bleuze *et al.*, 2009: 22).[6] Services and living/working places are also more concentrated and congestion restricts car use. This explains why the modal share of cars is lower in these areas.

Faced with the impossibility of deploying public transport in the least populated areas, especially in a context of reduced state funding for local authorities (Box 2), shared car solutions (carpooling and carsharing) may be crucial elements of a sustainable mobility policy. The sustainable mobility paradigm thus places great emphasis on intermodality, in other words the combination of different modes of transport (walking, cycling, underground trains, trams, trains, buses, taxis, cars, and therefore also carpooling and carsharing) during any one journey, but also on multimodality—the possibility of making a journey using different modes of transport—in order to meet different mobility needs. Evidence of this paradigm shift and of the role shared cars play in it: the Autorités Organisatrices de la Mobilité (AOMs - mobility authorities) were established by the 2014 MAPAM bill to replace the Autorités Organisatrices de Transport (AOTs - transport authorities),[7] and they have new jurisdiction on shared car use in addition to that on public transport. This extension of powers for the AOMs to include shared car use is accompanied by a municipal amalgamation process, which is prompting the AOMs to develop modes of transport that are more suited to the peri-urban and rural areas now included in their constituency.

However, it should be noted that the sustainable mobility paradigm is by no means complete, at least in terms of the indicators the authorities use to evaluate public transport services—for example, in the context of public service delegation. These indicators remain largely financial, whereas sustainable mobility implies launching discussions on indicators that can better evaluate sustainability: the fluidity of mobility, journey time, urban pollution linked to transport, etc.[8]

Box 2. Financing public transport in France

In France, public transport is financed by the local authorities. The LOTI act (framework act on domestic transport) of 30 December 1982 divides jurisdiction between the municipalities or the EPCI (*Etablissement Public de Coopération Intercommunale*—public inter-municipal cooperation authority) in charge of urban public transport; the departments in charge of inter-urban public transport; and the regions in charge of regional rail transport and the planning and management of action by the local authorities within their jurisdiction. This division of competence was nevertheless modified in 2015 by the NOTRe bill, which transferred inter-urban public transport to the authority of the region.[1]

In 2007, the budget for local public transport alone stood at 20 billion euros, 8.2 billion of which were for the Île-de-France region.[2] 40% of this budget is financed by the "versement transport" (transport contribution), a tax for urban transport paid by public and private employers of more than 11 people, and 40% by the regions and departments that have no tax revenue allocated to public transport, but receive state funding. The remaining 20% is paid by users (Krattinger, 2012). In the current context of reduced state funding for the local authorities and declining government revenue, financing public transport services is becoming increasingly problematic (Faivre d'Arcier, 2008).

1. As the texts currently stand, there is still uncertainty about the authority in charge of inter-urban services that are not public transport links, such as carpooling. Indeed, the NOTRe bill removed the general competence clause for the departments and regions, theoretically preventing them from acting in fields that are not included in their scope. However, there was no shift from AOTs to AOMs for inter-urban transport, which means that the regions theoretically have no jurisdiction for shared car use (Olivier Darmon Consultants, 2015).
2. Groupement des Autorités Responsables de Transport (GART). http://www.gart.org/Les-dossiers/Financement, consulted on 3 February 2016.

6. Public transport is also reaching its limits in some large cities: its congestion in peak periods and the cost of developing transport services.
7. This shift from AOTs to AOMs has, however, only been made for urban transport.
8. Personal communication, 2016.

2.2. The emergence of shared car solutions

Another look at carsharing

The sharing of cars between different drivers covers a number of practices: lending between friends or members of the same family; joint purchasing of a car between several people; and hiring cars from operators such as Avis, Hertz or Europcar. Unlike traditional car hire services, which mainly concern occasional long-distance journeys, professional carsharing is developing for more regular uses, and for shorter distance journeys.

It emerged in France in the 2000s with actors such as Caisse Commune (which became Mobizen and is now Communauto) or the France Autopartage network (now Citiz), which are located in the urban centres of large cities. The latter have cars that they provide for public use, in streets or car parks: anybody registered can book a car by internet or smartphone, and can open and drive it without keys using a badge. In France, these professional carsharing services generally operate according to a "return" system, where users are obliged to take the car back to its original space.[9]

These actors are private—some have association status—but generally benefit from support from the municipalities/urban areas in which they are located in the form of subsidies, communication or road system access (reserved parking spaces).[10] In 2011, the Paris metropolitan area[11] launched a public one-way carsharing service, Autolib, operated by the Bolloré group: users can choose different pick-up and drop-off spots, making one-way journeys possible.[12]

Professional carsharing is nevertheless still a niche practice: in 2014, there were around 3 900 vehicles across all the different professional carsharing services for around 153,000 users (Jullien and Rivollet, 2016).

Following on from professional carsharing services, peer-to-peer carsharing emerged in 2010 with actors such as Ouicar, Drivy and Buzzcar (which has now been acquired by Drivy). Contrary to professional carsharing, where cars are owned by a private company, these actors enable people to rent out or hire private cars. They operate through a digital user platform, between people renting out cars (supposedly on an occasional basis) and those hiring them, and are financed through fees charged on transactions.[13] This model can be described as C2C, for consumer to consumer.

Most peer-to-peer carsharing platforms have been developed for long-distance journeys (300 km on average), with car hire generally lasting one weekend. At present, there are around 900,000 members of these platforms for 40,000 vehicles for hire (Jullien and Rivollet, 2016). However, these figures should be put into perspective, since not all members are active users, and not all vehicles available are actually hired: a study in April 2015 thus estimated that only 50% of vehicles available on these platforms have been hired (Bruère and Ged, 2015).

Peer-to-peer carsharing for short-distance journeys was established in 2011 by Koolicar, which is at present the only actor positioned in this niche in France. Koolicar is different because it equips its vehicles with a box that enables remote, keyless access: this means that the owner does not need to meet the person hiring their car to hand over the keys, which reduces organisational costs and facilitates frequent, shorter-term rentals. With this system, the Koolicar service is similar to professional return carsharing (6T, 2014). It is, however, still limited to just a few large cities, and presently has only 400 vehicles for around 3 500 users.[14]

Another look at carpooling

Carpooling is a very common practice: many colleagues carpool to get to work through informal arrangements—made during coffee breaks, for example. Carpooling platforms began to develop from the mid-2000s under the impetus of local authorities and companies. These platforms connect people who do not know each other, which increases the possibility of matches and thereby enhances the potential of short-distance carpooling. These platforms are developed by carpooling operators (La Roue Verte, Covivo, Ecolutis, Greencov, etc.), which grew in number between 2006 and 2009. These operators function

9. With the exception of the carsharing service developed in La Rochelle, which is the first to work as a one-way service.
10. Support from the authorities is not systematic, however: in Rennes, the Cityroule association—now a company—receives very little support from the authorities.
11. The Autolib service is managed by the Autolib' Métropole joint association, which includes local authorities and public establishments.
12. Free-floating carsharing services have recently emerged, enabling users to leave vehicles anywhere (vehicles are tracked by smartphone). But these services are still in their infancy in France.
13. The fee represents an additional cost for people hiring cars of 30 to 40% of the hire cost. Half of this fee covers insurance costs (6T, 2015).
14. The cost of the box (around 600 euros) is a considerable obstacle to the development of Koolicar, which tends to equip cars in city centres—where carsharing is most efficient—in order to ensure returns on the initial investment. There are currently 9,000 pending requests for boxes. Personal communication, 2015.

according to a business to government (B2G) or a business to business (B2B) model, with the aim of developing carpooling among citizens or employees. Carpooling operators' services generally include developing a user platform as well as providing information for drivers and coordination, which are essential to ensure the system runs smoothly (Dufour, Mercat, and Sucche, 2015b).

Today, the modal share of short-distance carpooling is estimated at between 2 and 4% for commutes, and between 7 and 9% when all journeys are included.[15] Around 2 million people carpool every day, taking all journeys into account (Dufour, Mercat, and Sucche, 2015a). Despite the development of carpooling platforms, the vast majority of matches (80 %, according to Dufour, Mercat and Sucche, 2015) are made informally, generally with colleagues or friends.

The carpooling sector made significant progress in 2011, when one of the operators, BlaBlaCar, abandoned the B2G and B2B markets to concentrate on long-distance carpooling, adopting a C2C platform model. This shift to C2C was enabled by improvements in booking services (online payment, cancellation insurance, etc.), but also by reaching a critical mass of users, making the platform more attractive. At present, long-distance carpooling receives the most media attention, although its modal share remains low, at around 1 to 2% of journeys.[16] The success of BlaBlaCar is one of the factors explaining the proliferation of carpooling start-ups from 2012 onwards, such as Karos, WayzUp and OuiHop, which are in turn trying to develop short-distance C2C carpooling models. Other initiatives, such as Ecov, are attempting to develop carpooling solutions without using a C2C platform model; we will return to these different models in chapter 3.

2.3. Conclusion

The "sustainable mobility" paradigm is thus emerging as a reaction to the contradictions created by the explosion in the number of journeys made and the inability of public transport to provide an economically viable alternative to cars in all areas. The key challenge for mobility is no longer providing uniform public transport services, but deploying a range of modes of transport to meet different demands in the context of a more holistic approach to mobility practices.

Sharing cars is nothing new: informal carpooling or carsharing practices have existed for a long time, and sometimes still the predominant forms of shared car use. In the context of a mobility paradigm shift for the public authorities, the shared car actors that emerged in the early 2000s (Communauto, Citiz, La Roue Verte, Ecolutis, etc.) have begun to transform individual mobility by collaborating with the local authorities to ensure their development: they are either fully financed (B2G model) or subsidised by the local authorities, are given reserved parking spaces or have benefited from the construction of carpool parking areas. These "first generation" actors have therefore been more or less integrated into public policies. But is this the case for the actors that have emerged more recently, such as Ouicar, Koolicar, BlaBlaCar and Karos?

Before addressing this issue, which is central to this research project, we will return to the literature focusing on the "real" contribution of shared cars to sustainable mobility, a question that is particularly important given that BlaBlaCar is currently accused of emptying the trains (Steinmann, 2014). How do carpooling and carsharing fit into individual mobility? What modal shifts do they induce, and what are their impacts in terms of environmental issues and access to mobility?

3. THE CONTRIBUTION OF SHARED CARS TO SUSTAINABLE MOBILITY: A LITERATURE REVIEW

3.1. Optimising car use

A car stands idle for 95% of its lifetime, and when driven, the average occupancy rate is 1.22 people,[17] whereas a vehicle can generally carry four or five people (Le Jeannic, Roussel, and François, 2010). Cars therefore appear to be "underused", and there is considerable potential for optimising their use, as carpooling and carsharing advocates are keen to point out. What lies behind this idea of optimisation? What are the expected impacts of shared cars in terms of reducing environmental externalities and improving access to mobility for people who are currently forced to restrict their travel?

When carpooling leads one or more drivers to give up using their own car in order to travel with

15. These figures should be taken with caution, since there are few evaluations of carpooling practices. Previous national transport and journey surveys, the most recent of which is from 2008, do not include these practices.

16. By way of comparison, the modal share of trains is 9% for long-distance journeys, coaches 5%, and aeroplanes 43% (Place, 2013).

17. This rate falls to 1.05 people/vehicle for commutes.

Table 2. Economic, environmental and social benefits of shared cars

	Long-distance		Short-distance	
	Carpooling	Carsharing	Carpooling (based on 1st generation of actors)	Return carsharing (based on professional carsharing
Environmental benefits				
Direct modal shift	≈	≈	++	++
Indirect modal shift (demotorisation)	+	+	≈	++
Reduction in CO_2 emissions	≈	≈	++	++
Accessibility				
Financial benefits for user	Around 450 €/year	?	Around 260€/year	Around 3,000 €/year (in case of demotorisation)
User profile	Young people Above average qualifications	SPC + Above average qualifications	Blue collar Below average qualifications	SPC + Above average qualifications
Area of deployment	Inter-urban between cities > 100,000 people	Inter-urban cities > 100,000 people Tourist areas	Rural and peri-urban areas	City > 100,000 inhabitants

another driver, it helps to reduce fuel consumption and therefore GHG emissions and pollutants, as well as congestion and wear on road infrastructure. In addition to these "direct" effects, carpooling may persuade some users to part with their cars (demotorisation) or to not buy a car (non-motorisation) in favour of alternative modes of transport: carpooling, public transport, carsharing, cycling, walking, etc. We will call these impacts "indirect".

Carsharing, on the other hand, may accompany changes in mobility practices. Indeed, if a household can access a car when it really needs one (for example, to go shopping or for journeys at times or in places where public transport is less available), it may part with its own vehicle (or second vehicle), using public transport the rest of the time and, more generally, different modes of transport. This rationalisation of car use has two positive impacts: first, it reduces the number of cars, which frees up parking spaces, areas that can then be used for other modes of transport; second, it increases the use of alternative modes of transport, including public transport[18].

From the viewpoint of social challenges, especially access to mobility, shared cars can reduce the cost of mobility. This is advantageous to all, and especially those experiencing transport poverty, in other words people for whom the cost of travelling in private cars is highly restrictive, or those who are unable to buy a car. In addition to the financial gain, shared cars—and more specifically carpooling—provide new mobility solutions for people who do not have a driving licence or cannot drive because of their age (too old, too young) or because of health problems (accident or disability, etc.).

Shared cars therefore hold social and environmental promise for sustainable mobility. But what is the reality today?

3.2. Literature review

We have reviewed the studies on the social and environmental benefits of carpooling (INDDIGO SAS, 2015; Dufour, Mercat, and Suche, 2015; Chassignet, 2015), professional carsharing (Louvet and Godillon, 2013) and peer-to-peer carsharing (6T, 2015). It should be noted that although there are many studies on "first-generation" carpooling and carsharing, the solutions provided by the new collaborative mobility actors have received far less attention. This is explained by the fact that they are still recent and also by the limited local deployment of most of these new solutions: for example, the short-distance peer-to-peer carsharing niche, on which Koolicar is focusing, has not been the subject of any in-depth studies.[19] The results presented here therefore concern only the impacts of first-generation actors. These are current impacts, a snapshot of a given moment, which is inevitably conservative in a society in which practices are rapidly evolving, and could be very

18. Assuming that demand for cars declines, both in terms of the number of kilometres travelled and the number of cars to be produced, carsharing may also have an indirect effect on the consumption of resources and grey energy needed for automobile production, especially if progress is made in terms of the robustness and life expectancy of carsharing vehicles.

19. However, a study is currently underway at ADEME and should be published in late 2016.

different in a few years' time. Moreover, this literature evaluates the short-term impacts of shared car systems, and it is likely that other impacts will emerge in the longer term.

Concerning the financial gains of carpooling and carsharing, we present our own estimations here, resulting from scenarios combining both carpooling and carsharing solutions. These scenarios represent different "packages of travel modes" that could be envisaged for an individual who works full time and has no children.

The findings of our literature review are summarised in Table 2. The benefits for sustainable mobility are divided into two categories:

- environmental benefits: the modal shift, whether direct (use of an alternative to private car travel) or indirect (demotorisation and an increase in the use of other modes of transport), and impacts on CO_2 emissions reductions;
- social benefits: in addition to the financial gains for users calculated according to our own methodology, we use the socioeconomic profile of users and the areas in which they live (large cities or less densely populated areas) to determine whether these services are used by the people at the greatest risk of mobility poverty.

3.3. Environmental impacts

To analyse the modal shifts and environmental impacts of shared cars, it is important to distinguish between long-distance services (BlaBlaCar, Drivy, etc.) and short-distance services (Grand Lyon carpooling, Communauto, etc.).

Long-distance services

With regard to long-distance carpooling, the ADEME study (Chassignet, 2015) conducted among BlaBlaCar users reveals fierce competition with trains (inter-city, high-speed): 24% of drivers and 67% of passengers would have taken the train without the option of a carpooling alternative. This substitution effect tends to reduce the environmental benefits: they do exist (emissions reductions are on average 12% per carpool), but are much lower than in the hypothetical case in which two or three car drivers decide to join together to use only one car. Moreover, again according to ADEME, long-distance carpooling creates a "rebound effect" for travel: 21% of drivers say they would travel less frequently without carpooling. In terms of demotorisation or non-motorisation, 13% of users say that using BlaBlaCar has encouraged them to delay purchasing their first car. These evaluations concern average long-distance carpooling users, who generally live in relatively densely populated cities. They do not differentiate impacts according to the type of area, but it can be assumed that there is less competition with public transport in areas with little or poor coverage.

If we disregard car hire operators such as Hertz, long-distance carsharing is now being proposed by new actors such as Drivy and Ouicar; professional carsharing focuses on short-distance journeys. The ADEME study analyses modal shifts and concludes that "*carsharing does not appear to impact on the mobility of its users, whether they are owners or people hiring cars. The only notable change is a decrease in the use of traditional car hire services*" (6T, 2015: 100). However, the same study notes that the use of peer-to-peer carsharing encourages 17% of users to delay purchasing a vehicle. Competition with trains does exist, but is ambiguous: 10% of long-distance carsharers use trains more (car hire at destination) and 10% use carsharing for journeys they would previously have made by train (6T, 2015: 64).

Short-distance services

Dufour, Mercat, and Sucche (2015) reveal that the short-distance carpooling systems implemented in the Arc Jurassien and Grand Lyon areas have resulted in a decrease in emissions linked to commutes of between 10 and 30% in the employment basins where these systems have been set up, with an average emissions reduction of 60% per carpool. Competition with public transport is in fact far lower than for long-distance journeys—80% of carpoolers formerly drove alone—in particular because public transport, when accessible, is inexpensive: it should be noted that employers are obliged to reimburse 50% of their employees' travel passes, and that users only pay around two thirds of the real cost of public transport, since the rest is financed by the public authorities (Cour des Comptes, 2015). However, trade-offs in favour of carpooling may also be determined by reasons of convenience—when the journey takes longer by public transport, for example—or by reasons of comfort: in the case of the Grand Lyon area, 51% of carpooling platform members previously used public transport, which was congested[20]. Competition between carpooling and local public transport therefore depends on trade-offs between accessibility, price and the level of comfort.

As regards indirect impacts, the literature says nothing about the effects in terms of demotorisation or non-motorisation: it can nevertheless be assumed that these effects are still limited, given

20. One of the metropolitan area's objectives with the implementation of the carpooling platform was precisely to reduce congestion on their saturated public transport links (personal communication, 2015).

that existing carpooling platforms are generally aimed at certain types of journeys (commutes, events), but do not provide a carpooling alternative for all journeys, which forces carpoolers to keep their cars for other types of journeys. Moreover, for short distances, the predominant practice consists in alternating car use between the different carpool members, which encourages carpoolers to keep their own vehicles.

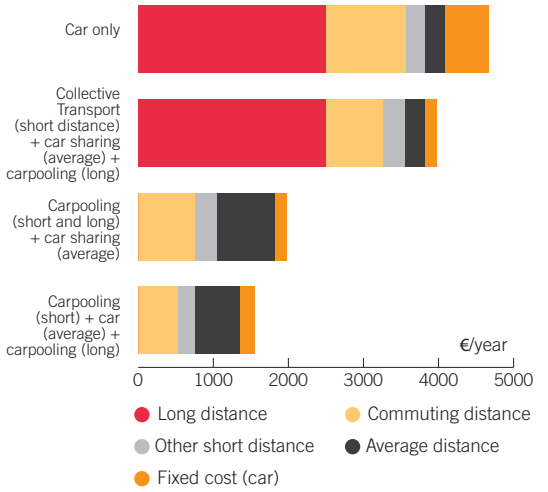
Where carsharing is concerned, the environmental impacts have been evaluated for professional systems. The literature thus considers that return carsharing has significant indirect impacts, since it enables users to radically change their travel modes: 6T (2014) observed a demotorisation rate of 67% and a 41% reduction in the number of kilometres travelled by car, with carsharers making greater use of alternative modes of transport, including public transport, for the most frequent journeys. The impact of one-way carsharing is lower, given that substitution for public transport is higher: some Autolib members use this service for journeys they previously made using public transport. The existing studies concentrate on densely populated areas, the large cities where carsharing is currently developing. Finally, for peer-to-peer carsharing, the only data available at present is from the *"Sans ma voiture"* (Without my car) operation conducted by Koolicar in partnership with MAIF in Niort and Bordeaux: at the end of the experiment, 36 of the 46 participants were considering selling their car.

3.4. Accessibility

Financial gains for users

Figure 5 presents the cost of different mobility packages for an individual who works full-time and has no children. In the first scenario, the individual uses his car for all journeys. In the carpooling/private car scenario, carpooling is used for short- and long-distance journeys and the private car is only used for occasional medium-distance journeys. Annual gains are 264 euros and 424 euros respectively for short and long distances, for a total annual gain of 688 euros. In the carpooling/carsharing scenario, the individual uses carpooling for short- and long-distance journeys and carsharing for medium-distance journeys; he therefore gives up his private car, enabling him to make far greater savings, in the order of 2,700 euros. Finally, in the last scenario, the individual uses public transport for short-distance journeys and continues to use carsharing for medium-distance journeys and carpooling for long-distance journeys. The total financial gain is then around 3,100 euros.

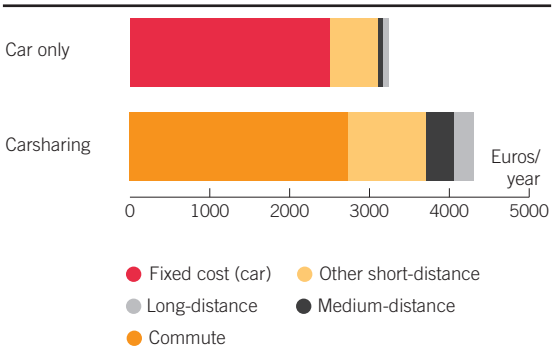
Figure 5. Comparison of the costs of different mobility packages for an individual



Note: For more information on the methodology, see Annexe 3.

The financial gain for shared cars therefore depends on people's capacity to demotorise, which is itself determined by access to alternatives to cars: car travel is limited to specific situations (going shopping, visiting friends at the weekend, etc.), with the most frequent daily journeys being made using other modes of transport, especially soft modes (walking, cycling, electric bikes), public transport (when available), and also carpooling. Using a carsharing vehicle in the same way as a private car would be more expensive than using one's own car (Figure 6).

Figure 6. Comparison of the cost of using a private car and a carsharing car in the same way



Source: authors

Note: The costs are divided according to the type of journey (short-distance < 50 km; medium-distance [50 km-150 km]; long-distance > 150 km). The cost of carsharing is that of the current market rate. The fixed costs of the vehicle (insurance, purchase price, maintenance, etc.) have been annualised.

This complementary relationship between carsharing and the other modes of transport raises the question of whether or not individuals living

in less densely populated areas, with limited public transport, have access to enough alternatives to private cars. If there is not sufficient diversity and efficiency for a number of different modes, covering all travel needs, people living in rural or peri-urban areas will continue to own cars and to make marginal use of shared cars, in holiday destinations after taking the train or flying, for example. There is however, potential for developing peer-to-peer carsharing among multi-car households, which only use their second or even third car occasionally, for example to travel at the weekend or when adult children come home. In these cases, households could either rent out one of their cars or sell one and use carsharing when necessary.

User profiles

Currently, carpooling and carsharing concern neither the same types of users nor the same areas. Carsharing, whether for short- or long-distance journeys, is mainly used by higher socio-professional category households with above average qualifications, living in cities with more than 100,000 people. Carsharing is therefore used to accompany demotorisation processes in areas where car use is restricted, rather than as a means of ensuring access to cars for poorer people who do not own a car for financial reasons.

For long-distance carpooling, BlaBlaCar users are mainly young professionals, with above average qualifications, travelling from one city to another (Chassignet, 2015). On the contrary, for short distances, carpooling is more commonly used by less qualified people, especially blue collar workers, whereas senior executives are the least likely to use these services (Dufour, Mercat, and Sucche, 2015a). This specificity is due to both work schedule constraints, with blue collar workers having set hours, which facilitates carpooling, and also being more likely to work late shifts when there are no public transport alternatives, but also to financial constraints, since these low-skilled workers are more likely to experience transport poverty. Contrary to carsharing, short-distance carpooling therefore seems to be a mode of transport chosen by poorer people to improve their mobility.

3.5. Conclusion

Although shared cars unquestionably have a role to play in developing a more sustainable kind of mobility, the promise they hold should nevertheless be put into perspective: the impacts observed are very different for carpooling than for carsharing, for short- or long-distance journeys, and for densely populated areas with good public transport or less densely populated areas.

Where long-distance journeys are concerned, the benefits of shared cars are relatively low, especially from an environmental viewpoint. Competition with public transport or traditional car hire operators is high, and occasional use of these modes of transport has not produced any radical change in the mobility package, at least so far. Moreover, these practices concern urban populations, often with above average qualifications, in particular because these are the people who make the most long-distance journeys. The development of long-distance carpooling and carsharing services is nevertheless helping to change people's attitudes towards cars and to raise awareness about these new mobility practices. This is an interesting component of sustainable mobility, but it needs the other short-distance options to produce more radical behavioural changes.

As regards short-distance carpooling and carsharing, the overall picture for sustainable mobility is positive, whether for carpooling or carsharing. Given that short-distance mobility is the core challenge for sustainable mobility—it accounts for 60% of emissions linked to mobility, determines household access to employment and services and influences car ownership decisions—we will focus on collaborative mobility for short-distance journeys in the rest of this report.

4. NEW SHORT-DISTANCE ACTORS, NEW DEPLOYMENT POTENTIAL?

For short-distance journeys, the deployment of shared cars remains limited in terms of areas and population categories: carsharing is used mostly by city dwellers in higher socio-professional categories, while the modal share of carpooling is struggling to extend beyond groups of people under financial constraints. Faced with this limited deployment, what contribution can the new collaborative mobility actors make? What solutions are they implementing to overcome the limitations of the first generation of short-distance actors? And what are their major development challenges?

4.1. Carpooling

While humankind cannot be reduced to *homo economicus*, it is clear that the cost-benefit ratio plays an important role in mobility choices. Socio-psychological studies on reasons for carpooling show, for example, that the financial factor is the main criterion, ahead of the conviviality factor (Dupré, 2014). There are real savings to be made from carpooling, as we have seen, even for people

who continue to own a car. However, the deployment of short-distance carpooling is problematic, and the momentum is currently far lower than for long-distance journeys.

Several factors explain these difficulties. During trade-offs on transport choices, the financial gain is compared with the organisational costs incurred by carpooling, in other words, the time spent organising the journey: contact, travel and/or detours, etc. Although these costs depend on household mobility profiles (whether or not there are any children, the variability of work schedules, etc.), they are generally far higher for short-distance journeys since they increase according to the number of journeys.

In addition to the organisational costs, carpooling may generate "psychological" costs. Sharing one's car with other people results in the adoption of specific behaviours (the "obligation" to talk to other passengers, following the rules of etiquette, etc.), which may be considered as a constraint. Private cars may be perceived as "islands", as a sort of "decompression chamber", especially after work (drivers can make calls or listen to music, etc.), and people may feel that in sharing this space, they are depriving themselves of a source of pleasure. Fearing that they may find themselves in an overly invasive carpooling match, some people prefer not to carpool at all (Créno, 2016).[21] There is less risk of being trapped in a "relationship" with fellow carpoolers with long-distance carpooling, where matches are made for one-off journeys.

Finally, in addition to the organisational and psychological costs, short-distance carpooling may be hampered by the lack of journey predictability: potential passengers have no certainty of making the journey within the scheduled time. This constraint is particularly high for commutes, where the risk of arriving late is far less acceptable.

These different constraints evolve according to population categories, the type of area and the necessity of the journey. For example, fixed working hours like those of blue collar workers help to reduce organisational costs, since journeys are made systematically at the same time and with the same people. Likewise, people living in rural areas will perhaps be less likely to feel trapped in a relationship, especially if they already know the other carpoolers; however, they will undoubtedly be very sensitive to journey predictability due to the lack of any alternatives to carpooling. Finally, people making non-compulsory journeys (going shopping, visiting friends, etc.) will probably be more flexible when it comes to their schedules than those making compulsory journeys.

The new collaborative mobility actors are attempting to reduce the organisational and psychological costs in different ways. In the box below, we describe three strategies adopted by these new actors (dynamic carpooling, predictive carpooling and organised hitchhiking), and evaluate them according to:

- the ease of organisation, reflecting in particular the time and energy spent organising journeys;
- the flexibility of carpools, which determines the perception of commitment constraints linked to carpooling (the "relationship");
- and the predictability of journeys, reflecting passengers' certainty of arriving at their destination at the agreed time.

Box 3. Description of three solutions developed by the new short-distance carpooling actors

Dynamic carpooling: A number of dynamic carpooling solutions have been developed in recent years with actors such as Ouihop', Coovia, Fleetme and Sharette (which no longer exists). These carpooling solutions are based on a platform system, but contrary to the "traditional" carpooling platforms, bookings can be made almost instantaneously through GPS tracking tools and smartphone applications.

Predictive carpooling: Also based on a platform system, the predictive carpooling services proposed by Karos use artificial intelligence technology that records users' travel patterns and spontaneously suggests matches, taking into account variations in schedules and organising door-to-door journeys (the application determines the optimal meeting point between carpoolers and provides directions for getting there).

Organised hitchhiking: Organised hitchhiking is a solution that differs somewhat from the other collaborative mobility solutions we address in this study, since it is not based on a digital platform. Users contact each other directly, without going through an intermediary. Organise hitchhiking is different from traditional hitchhiking in that carpoolers make contact at dedicated stops. With Rezo Pouce, these are simple pick-up/drop-off points, whereas for Ecov, these points have ticket machines similar to those for underground trains or trams. These machines enable passengers to choose a destination and to purchase a carpooling "ticket". The desired destination is then displayed on a screen so that drivers can see carpoolers present and their destinations. For both Ecov and Rezo Pouce, drivers can choose whether or not to stop for carpoolers.

21. Conversely, when carpoolers get on well, "the interpersonal relationship between carpool members and the pleasure of being together are the cornerstone of the sustainability of carpooling" (Vincent, 2008: 245).

Table 3. Comparison of organisational constraints and predictability of three short-distance carpooling solutions

	Dynamic carpooling	Predictive carpooling	Organised hitchhiking
Examples	Fleetme, Coovia, Ouihop, Sharette	Karos	Ecov, Rezo Pouce
Ease of organisation	+	++	+++
Flexibility of carpoolers	+	+	+
Predictability of journeys	-	+	-

Source: authors

Note: the solutions presented here are implicitly compared with first-generation carpooling platforms.

Contrary to traditional carpooling platforms, which do not encourage carpoolers to switch according their different schedules, especially because the organisational costs are high,[22] these new carpooling solutions make it easier to organise flexible carpools and therefore limit the psychological costs (relationship). The organisational costs are also substantially reduced. Organised hitchhiking requires no prior organisation other than getting to a stopping point. The downside to this greater ease of organisation is that passengers have no certainty about the predictability of their journey.[23] Where dynamic carpooling is concerned, the ease of organisation is also high, since people can book journeys at the last minute, but there is less journey predictability, given that passengers are not certain of finding a match immediately. Finally, in the case of predictive carpooling, the ease of organisation is high, since users are no longer obliged to look for matches themselves. The predictability of journeys is higher than for dynamic carpooling, since the application optimises and predicts possible matches in advance, so that users can book journeys the day before.

4.2. Carsharing

In relation to professional carsharing, the (theoretical) main advantage of peer-to-peer carsharing is the lower cost of car hire, since individuals rent out their cars in order to share the costs rather than to ensure a return on investment, as is the case with professional carsharing. In theory, this paves the way for its development in less densely populated areas, where professional operators cannot deploy their services, since their cars would not be used enough to make the model profitable. A study conducted in the United States has shown that peer-to-peer carsharing business models are profitable for platforms from 10 users per vehicle, while this rate stands at around 20 users per vehicle for professional return carsharing operators (Hampshire and Gaites, 2011). Moreover, private cars are more widely distributed throughout an area—covering it fully—enabling people looking for a car to hire near their home to find one more easily. Finally, they offer a far wider range of vehicles (small city cars, saloon cars, vans, electric cars) than professional carsharing systems.

Table 4. Comparison of professional and peer-to-peer carsharing rates in different French cities

Base city	Professional carsharing rates	Koolicar rate	Difference
Lille	[28-42 €]	[25-36 €]	-11 to -14%
Paris	24 €		+4 to +50%
Rennes	[34-48 €]		-25%
Bordeaux	[30-35 €]		-17 to +3%

Source: https://www.koolicar.com/tarifs; http://www.lilas-autopartage.fr/les-tarifs-de-location/; https://www.communauto.paris/combien.html#forfaits; http://www.cityroul.com/nos-tarifs/; http://bordeaux.citiz.coop/

Note: these rates are estimated for rentals of five hours and 40 km, which is the average duration and distance of professional return carsharing rentals. We have also assumed that users hire cars on average four times per month (to include in estimations the fixed cost of membership). The rates in square brackets represent the minimum and maximum rates depending on car models.

The main advantage of peer-to-peer carsharing should nevertheless be questioned. If we compare the cost of professional and peer-to-peer (Koolicar) carsharing services, we see that the latter are not necessarily cheaper than the former (Table 4). The financial gain from using peer-to-peer carsharing is high in a city like Rennes, where car hire with Koolicar is around 25% cheaper than professional services (City'Roul), but the opposite is true in Paris, where hiring a car through Koolicar is 4 to 50% more expensive than hiring one on Communauto.

Three factors explain why the cost of peer-to-peer carsharing for short-distance journeys remains relatively high compared to professional carsharing:

- The first is the cost of investment in the keyless unlocking system (box), which is around 600 euros per car (paid for by Koolicar);
- The second factor is that professional carsharing services are generally subsidised by the local

22. To organise a carpool, people have to consult the list of adverts, email or telephone people likely to be travelling at the same time as them, and agree on times, etc.

23. One of the challenges of the experiment conducted by Ecov since late 2015 in the north-western part of the Ile-de-France region (Covoit'Ici project, see https://covoitici.fr/) is thus to evaluate the average waiting time for users.

authorities, enabling them to offer very competitive rates to their users;
- The third specifically concerns Paris: for several months, Communauto has been pursuing a very aggressive pricing policy aimed at capturing market share from its competitors.[24]

In terms of the greater accessibility of vehicles in all areas, peer-to-peer carsharing has two shortcomings. First, the need for the operator Koolicar to ensure returns on investment for the keyless unlocking system forces it to focus its services on the most potentially profitable vehicles, in other words those located in urban areas. At present, the area of deployment for peer-to-peer short-distance carsharing is therefore very similar to that of professional carsharing. Finally, it is worth noting a challenge specific to peer-to-peer carsharing: household travel needs tend to synchronise (car owners and car hirers need cars on Saturday afternoon, for example, to go shopping or to take their children to a football match), raising problems of vehicle availability in peak periods.

These constraints are likely to diminish in the medium term. The manufacturing cost of keyless systems may be reduced, and new vehicles in the future will probably be fitted as standard with equivalent keyless unlocking systems. Renault, for example, has begun to equip some of its models with a system enabling doors to be opened by smartphone.[25] Thus, as the number of shared cars increases, the quality of peer-to-peer carsharing services will improve.

4.3. A common challenge: the critical mass

The platforms used by most of the collaborative mobility solutions are subject to a network effect, in other words the usefulness of the platform depends on the number of users. Just as the usefulness of owning a telephone depends on the number of people who also have one, the usefulness of carpooling and carsharing platforms increases with the number of users offering and requesting carpooling or carsharing services. Below a certain threshold of users, known as the "critical mass", the usefulness of the platform is virtually nil, since the probability of finding a carpooling match or a car for hire close to home will be low.

The critical mass is more difficult to reach for platforms aimed at short-distance journeys than for those focusing on long distances, for two reasons. First, it is higher for short-distance journeys because people are less willing to lengthen their travel time—compared to if they used their own car—for journeys they make very frequently. Consequently, the possibilities of feeding users towards meeting points – as is the case for BlaBlaCar members, for example, who arrange to meet at a station or a motorway exit – are far lower. People must therefore find carpoolers who live in the same area and work in the same sector as themselves, just as cars for hire need to be available near the homes of potential users. Yet, to maximise the chances of reaching this level of congruence between supply and demand, the number of users needs to be very high. This explains why the development of platform systems is more complicated in less densely populated areas, especially those where journeys are not organised along "corridors", because the probability of finding a car available for hire close to home or somebody making the same journey every morning is lower.

In addition to the fact that the critical mass threshold is high for short-distance journeys, it is also more difficult to reach. First, the financial gains are perceived—and we say "perceived" because our calculations show that they can be very high—as being lower, since they are more dispersed over time. Next, the use of shared car solutions is often determined by the accessibility of other modes of transport, especially public transport, as we saw in the previous section. Thus, people will only turn to carsharing if they have an alternative to cars for their most frequent journeys, with carsharing used only for specific one-off journeys. Likewise, people may be reluctant to carpool if they do not have a backup solution—such as buses—in case they cannot find a suitable match, for example during off-peak periods.

Despite the innovations developed by these new actors, attracting a sufficient number of users to their platforms is proving difficult. One of the problems typically mentioned by these innovators is that of communication: collaborative mobility platforms need to make a name for themselves in order to survive. Partnership strategies with the local authorities, companies and even traditional mobility actors (such as Sharette with RATP) largely address this challenge of communication. Where carpooling is concerned, the critical mass constraint is amplified by the proliferation of actors, which fragments the supply and demand for carpooling. Just as there was a multiplication of carpooling operators on the B2G and B2B markets in 2006-2007 (La Roue Verte, Ecolutis, Greencove,

24. Personal communication, 2016.

25. However, given the increase in the time it takes for fleet renewal—the average age of vehicles increased from 5.9 years in 1990 to 8 years in 2009 (Voisin, 2014)—this innovation is unlikely to become widespread for at least another 10 years.

Covivo, etc.), we are now seeing the multiplication of platforms. Although the wide range of solutions helps to meet the needs of the different areas, as we will see in the following paragraph, there is still a risk that competition between actors will be detrimental to the development of short-distance carpooling.

In addition to communication efforts (cross-cutting solution), carpooling actors are attempting to take a different approach to this critical mass challenge.

- **Dynamic carpooling**: matching supply and demand is complicated by the fact that adverts have a limited duration: drivers and passengers post their offers/requests at the last minute, almost instantaneously. To make it easier to match this "instantaneous" supply and demand in the development phase of dynamic carpooling, they need to be grouped geographically. This is why dynamic carpooling operators attempt to develop their services around "carpooling routes", in other word travel corridors that help to channel supply and demand in the same area.
- **Predictive carpooling**: artificial intelligence helps to aggregate and optimise individual journeys, both in space, since the algorithm proposes meeting points that minimise detours for both drivers and passengers, and in time: the matches suggested by the algorithm are within around half an hour of the usual departure time, enabling users to make marginal adjustments to their schedules. Moreover, the search for carpoolers is "passive"—once the application is downloaded, it will automatically suggest new journeys as new members join—meaning it is more likely that users will remain on the platform, even if they do not immediately find matches: if a user does not find a suitable match, the application will send automatic updates as new members join the platform, with the hope that after a certain time the new offers will be more suited to the user's needs. This function helps to prevent people leaving the platform due to frustration when they are unable to find carpoolers, which also makes it easier to reach a high number of users. Contrary to dynamic carpooling, the initial development of predictive carpooling is not planned along routes, since the predictive algorithm is supposed to optimise matches without the need to concentrate them geographically.
- **Organised hitchhiking**: the critical mass constraint changes: the goal is not to ensure the platform has enough supply and demand, but to have enough drivers ready to stop at the points to be set up. The existence of these stopping points helps to "concentrate" carpooling demand in specific geographical locations, making it easier for drivers to identify passengers, without the need for digital tools such as smartphones. These solutions can now be deployed anywhere, even in rural areas, as long as stopping points are established along busy roads. The organised hitchhiking solution is therefore particularly interesting in terms of improving access to mobility for those people most likely to experience transport poverty in less densely populated areas. Moreover, organised hitchhiking is a "low-tech" solution that does not require a smartphone, which is particularly attractive to elderly and/or low-skilled people, who are traditionally less well-equipped.[26]

These elements of analysis correspond to the current deployment of solutions. Thus, assuming a very high number of people have joined a dynamic carpooling platform, there would no longer be any need to concentrate supply and demand according to carpooling routes, since the probability of finding a match at a given time would increase. Likewise, peer-to-peer carsharing solutions would become more attractive in less densely populated areas as the number of carpoolers grew, which would enable households to part with their cars—or to rent them out—to use alternatives for their most frequent journeys, and to use carsharing occasionally. The strategies, potential and areas of deployment for these different collaborative mobility solutions are therefore likely to evolve over time.

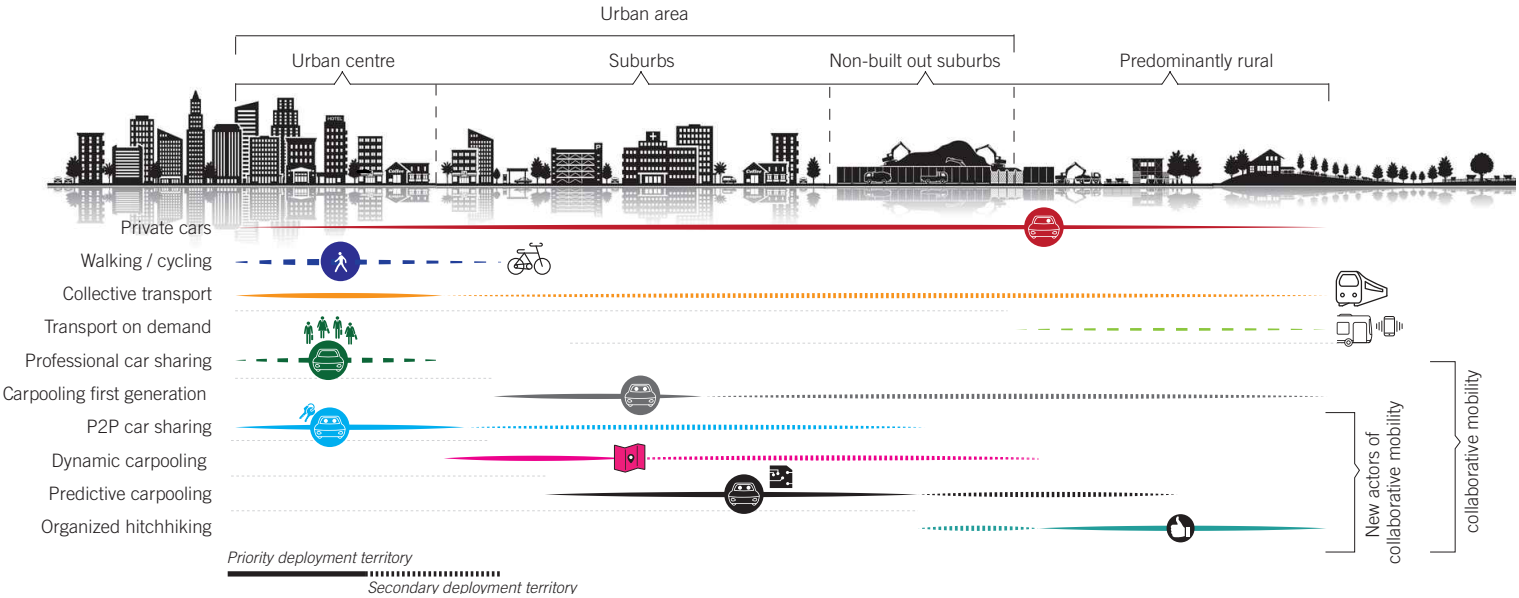
4.4. Conclusion

The collaborative mobility actors are therefore providing new organisational and technological solutions to encourage the use of shared cars for short-distance journeys. Many challenges remain, specific to both carpooling practices (such as predictability) and to carsharing (such as the investment cost for keyless systems), as well as cross-cutting challenges: we have highlighted the issue of the critical mass, along with the strategies adopted by the different actors to address this.

We would also like to return to two cross-cutting issues that emerge from this chapter. First, the complementarity between shared car practices and the other modes of transport, especially public transport. Some of the solutions developed by these new shared car actors are based on their complementarity with public transport. For example,

26. In 2015, the smartphone ownership rate for low-skilled people was only 21%, compared to 73% for university graduates; it stood at 15% for people over 70 years of age (Brice *et al.*, 2015).

Figure 7. Shared mobility solutions as a link in the mobility chain in different areas



Sources : auteurs.

the potential for developing carsharing depends on users' access to other modes of transport for their daily travel. Shared mobility solutions must therefore be seen as links in the mobility chain—links that may or may not be attractive depending on the area (Figure 7).

Second, these new actors all face the challenge of finding a business model. Local transport is traditionally an unprofitable sector, and therefore of little interest to private actors. This explains why the first carpooling platforms and the first professional carsharing services were developed with the support of the public authorities. Will the new short-distance collaborative mobility actors be able to escape from this dependence on public support? The high turnover of carpooling start-ups and the lack of momentum in the peer-to-peer carsharing sector (only Koolicar operates in this niche) show just how difficult it is to break into these markets. This difficulty is also reflected in the instability of the business models adopted by these new collaborative mobility actors which, with just a few exceptions,[27] swing between C2C, B2B and B2G models.

In spite of their innovations, the new collaborative mobility actors positioned in this short-distance niche are still having difficulty developing. This challenge is even greater in less densely populated areas, where the critical mass is more difficult to reach and where there are fewer alternatives to private cars. Will they succeed in deploying their services? In particular, will they provide new solutions in peri-urban and rural areas? We are currently unable to answer this question and in this section we have chosen instead to analyse the challenges for their development, the conditions for their success and the different development strategies currently implemented by collaborative entrepreneurs (areas, articulation with public transport, etc.). In the following section, we will study the challenges these new actors pose for the public authorities.

5. WHAT CHALLENGES DO THESE NEW ACTORS POSE FOR THE PUBLIC AUTHORITIES?

Shared cars are a key element of sustainable mobility: the short-distance carsharing and carpooling services implemented by public and private actors over the last 15 years are encouraging a modal shift, helping to reduce GHG emissions linked to individual transport and improving access to mobility. This first generation of solutions is nevertheless struggling to extend beyond certain types of areas and certain population categories. The new digital tools (platforms, GPS tracking, artificial intelligence) are renewing the potential of shared cars, which has encouraged a number of private entrepreneurs to develop collaborative

27. The organised hitchhiking solution developed by Ecov has thus been planned exclusively in the context of a B2G market similar to that of public transport operators.

mobility solutions in the short-distance segment, whether for carpooling (Karos, Ouihop, WayzUp, etc.) or carsharing (Koolicar). These new actors nevertheless face considerable development challenges, such as reaching a critical mass of users and ensuring the sustainability of their business models. These difficulties are even greater in less densely populated areas, which have the highest levels of car dependency and use.

In this section, we explore how the public authorities, and in particular the local authorities responsible for transport, can benefit from these new carpooling and peer-to-peer carsharing actors in the context of a transition to a more sustainable mobility system. What are the challenges they face? What kind of support can they provide? What partnerships need to be developed between the authorities and these private actors, following on from the partnerships that already exist with "first-generation" carpooling and professional carsharing actors? In order to answer these questions, we interviewed around 20 representatives of the public authorities (cities, departments, regions, transport authorities, municipal groupings, etc.)[28] and six collaborative mobility entrepreneurs. These interviews were supplemented with material from the workshop of 8 March 2016.

These questions correspond to the context previously described. Until recently, the transport paradigm was organised between two separate spheres: on the one hand, the public service, provided by public transport, under the responsibility of the public authorities; and on the other, the private service, based on private cars. However, this separation between the public and private spheres tends to blur with the emergence of the sustainable mobility paradigm: the public transport service is no longer responsible for ensuring just the provision of public transport, but also the sustainability and equality of the right of access to mobility. In particular, this new approach to public transport services implies working on the development and intermodality of different modes of transport, whether public (trams, underground trains, buses, taxis), private (cars, walking, cycling), or shared (carpooling, carsharing). The development of collaborative mobility solutions is therefore important in the new sustainable mobility paradigm, but it also disrupts this paradigm with the arrival of new actors.

28. See annex 1 for the list of people interviewed.

5.1. The relationship between the authorities and the new actors

The authorities' hopes and fears for these new actors

What representations do the authorities have of these new actors? Most of the people we interviewed acknowledged that the traditional combination of public transport/private cars is insufficient to address the needs of sustainable mobility. Shared car practices are considered as key elements of public mobility policies, first because public transport alone cannot provide an alternative to private cars in all areas, and second because the reduction in state funding limits local authorities' financial resources and obliges them to turn to solutions that are less costly than public transport. The discourse in favour of shared cars is therefore guided not only by pragmatic spatial planning considerations, but also by a more opportunistic agenda linked to financial restrictions.

The fact that shared car solutions have been placed on the policy agenda is also linked to an administrative factor: the division of transport jurisdiction between the different territorial levels has encouraged the departments and authorities responsible for urban transport to invest in these new modes of transport, whereas the regions have remained more withdrawn.[29] However, the NOTRe bill is likely to alter the hierarchy of policy priorities for the different administrative levels.[30]

Although the authorities have integrated "first-generation" shared car uses into their cognitive framework (B2G carpooling operators such as La Roue Verte and Covivo, and professional carsharing services such as Citiz), their transport policies integrate these modes to varying degrees. Several factors explain this gap between the rhetoric and the actual implementation of public policies. First, interest in shared solutions grows as areas are increasingly faced with the negative externalities generated by transport (congestion, air pollution, etc.). Highly urbanised areas therefore invest more in carpooling and/or professional carsharing policies. This investment is also dependent on political factors: a local political culture in favour of alternatives to cars, or the election of a—usually young—representative committed to the shared car cause, for example.

With regard to the new short-distance shared car actors (Ouihop', Karos, Koolicar, etc.), the

29. The Association des Régions de France (ARF – association of the French regions) "transport" commission does not currently have a working group on carpooling and carsharing issues. Personal communication, 2015.

30. See footnote page 11.

local authorities' perception of them is rather more ambiguous. First, some local authority representatives are unaware of these actors, revealing a gap between private sector innovations in terms of mobility and their assimilation by the public sector. When the people interviewed are aware of these new actors, they often adopt a wait-and-see or cautious attitude. Different arguments are then used to justify this position, which are just some of the political challenges to be addressed.

- The first is that of a lack of information about these solutions and their real contribution to achieving a more sustainable kind of mobility: some of our interviewees had been approached by different entrepreneurs and were somewhat confused about these solutions, each being hailed as "more miraculous than the last".
- Another problem is that of the financial sustainability of these actors. Although a large number of start-ups have appeared in recent years, most have since gone out of business, reflecting their financial fragility. The limited lifetime of some start-ups does not inspire confidence or encourage investment from the public authorities, which are supposed to guarantee the sustainability of public services.
- Moreover, the authorities doubt the sustainability of the "social and environmental values" of collaborative mobility actors. The latter often have a discourse focusing on the prevention of transport poverty, then on their complementarity with public transport, or even the integration of their systems into public mobility services. But will these "good intentions" stand the test of time? Blablacar's shift from a B2G business model aimed at short-distance carpooling to a fully private C2C model for long-distance journeys, in competition with trains, has made an impression on the authorities.
- The issue of competition from these new modes of transport with public transport or professional carsharing is still a problem. Although local authority representatives acknowledge complementarity between the different modes of transport, they often argue that this complementarity should not be detrimental to public transport: collaborative mobility solutions should only be deployed in the absence of public transport or as part of a multimodal feeder system towards public transport, in other words typically at the end of the mobility chain. Despite the multimodality approach, collective transport is often still seen as the backbone of public transport, structuring the cognitive framework of many public policy makers.
- The final argument used to justify this wait-and-see attitude is that of uncertainty about the way in which (potential) support from the public authorities should be organised. The standard contracting procedures with private actors, especially to implement experimental systems, are seen as unsuitable. However, this argument is based more on risk aversion than on any real inadequacy of the regulatory and legal framework, given that some authorities have implemented experimental systems with these new collaborative mobility actors.

The viewpoint of entrepreneurs

Many local authorities are adopting a wait-and-see attitude or may even be wary of these new collaborative mobility actors, but what is the position of these actors themselves? Do they intend to become public service actors, or do they see themselves as wholly private, without any desire to work with and for the public service? What do they expect from the public authorities?

With the exception of Ecov, whose solution has been designed exclusively in the context of a B2G market similar to that of public transport operators, the answer is not clear. The previous chapter showed that the business models adopted by the new collaborative mobility actors are unstable, and swing between C2C, B2B and B2G models. This instability is linked to the difficulty these actors have developing on their own, with the pursuit of partnerships with the authorities, public transport operators and companies being motivated by the desire to ensure communication channels with users, but also as an alternative source of funding before reaching the critical mass needed to implement a commission earnings system.

The question now is whether or not these actors intend to become public service providers, which would oblige them to stay with a B2G model and to abandon/postpone the prospect of developing into C2C[31], or whether their desire to connect with the authorities is in fact an opportunistic strategy to ensure their short-term financial survival. When examining the professional careers of the founders of these start-ups and their funding methods (fundraising on the private market), the DNA of these new actors tends towards the private market and entrepreneurship rather than the public service market (again with the exception of Ecov, whose founder is from the public sector).[32] Moreover, private actors tend to focus on the most profitable market segments, in other words

31. They would then be in direct competition with traditional carpooling services (La Roue Verte, Covivo) and professional carsharing operators.

32. See http://www.ecov.fr/, consulted on 10 February 2016.

long-distance journeys and densely populated areas, and not necessarily on short-distance journeys in peri-urban or rural areas, where mobility needs are just as great.

What do these new actors expect from the public authorities? Three key things: 1) communication and coordination with users and employees to help them to reach the critical mass; 2) experimental areas in which to test their solutions; and 3) constraint and incentive policies to encourage shared car use. What challenges does this pose for the public authorities? What might a public strategy aimed at using collaborative mobility to achieve more sustainable mobility entail? To answer this question, we must first examine the policy choice on the level of collaborative mobility integration into public mobility policies, then the technical possibilities for supporting the development of these services and their integration (types of partnerships between actors, incentive measures, design, etc.).

5.2. Integrating collaborative mobility into public mobility services: a policy choice?

Can collaborative mobility be integrated into public mobility services? The previous sections illustrated the uncertainty surrounding this question: public actors consider these new mobility services to be essential, while fearing their impacts in terms of competition; the new actors generally focus on private C2C markets, but are seeking to connect with the authorities.

However, the reports we identified as part of the literature review (see Table 1) seem to acknowledge that the public authorities may have a role to play in the development of these practices. Thus, although France Stratégie argues that "*The public authorities have neither the legitimacy nor the financial means to develop large-scale mobility solutions such as carsharing or carpooling themselves*", the authors agree that the authorities can facilitate the development of these services when they are in the public interest, especially through communication and by organising their complementarity with public transport (Paul-Dubois-Taine, 2012: 62). The CESE's position is more ambiguous: although it says that "*collaborative mobility is not a public service, nor is it seeking to become one*" (Duchemin and Marembaud, 2015: 28), the report nevertheless mentions the integration of these new services into public services, within public policies. Moreover, three principles define public services: continuity, mutability and equality. The CESE rightly explains that the principle of equality is not respected, since "*this entails an exchange between people who choose one another*": this is part of the wider debate concerning discrimination on collaborative platforms. However, another ambiguity can be seen for the principle of continuity, with the CESE explaining that this condition is not satisfied, since *"collaborative mobility does not guarantee service provision"*, while explaining further on (p. 170) that the authorities need to ensure that "*no requests go unanswered, even if this means proposing vehicles financed by the authorities or transport on demand*" in order to ensure the success of these new services. Collaborative mobility services are not deterministic (they depend on households contributing to the service), and the principle of continuity is therefore difficult to fulfil, but not impossible provided that this service is articulated with alternative modes of transport. Finally, the observation on mutability, "*collaborative mobility is not intended as a response to changes in the public interest*", is perhaps no longer representative of the range of new actors and their positions.

There is consensus on the public authorities' role in the development of collaborative mobility where communication and articulation with the different transport services are concerned. However, this is far less true for public financing and "strong" integration with public mobility services. It should be noted here that in accordance with the principle of mutability—one of the three fundamental principles of public services—the public services must not remain inactive in the face of social change, but should adapt to users' needs, especially as technology progresses.

5.3. The pillars of a public strategy for sustainable collaborative mobility

Below we present six pillars that could form a public strategy for sustainable collaborative mobility. In many cases, their importance goes beyond the scope of collaborative mobility, and they are applicable to all shared uses of cars, whether individual or professional, first-generation or new.

These pillars represent different degrees of integration for collaborative mobility, which are likely to vary depending on whether they concern large cities, where the challenge will be to accompany the emergence and articulation of services, or less densely populated areas (small towns, peri-urban and rural areas), where the authorities' role will be to create the conditions for the emergence of a service that does not yet exist.

Communication with users

Communication and coordination with existing and potential users are key challenges for the

collaborative mobility actors, which need to rapidly reach a critical mass of users. During the interviews, many entrepreneurs thus mentioned communication when asked about what they expected from the public authorities. The main difficulty for the public authorities is that of preventing competition: how can they justify communicating on one platform and not another? One alternative consists in communicating on the practices themselves—which is what the local authorities already do, at least for carpooling—rather than on the individual platforms. Another alternative way for platforms to increase their visibility is to form partnerships with companies rather than with the local authorities. Some new carpooling actors, like WayzUp for example, are thus developing a B2B type business model.

It would be beneficial for the authorities to collaborate with certain private actors (businesses, insurance companies) holding data that would be useful for targeting communication at the people most likely to use these services. For carpooling, communication could focus on employees who make long commutes, first because they are the people who generate the most emissions, and second because the financial incentives would be greater for them. Where carsharing is concerned, communication should be targeted at the people most likely to part with their cars, in other words those who own old cars and/or drive a small number of kilometres per year.[33]

Fiscal framework clarification and financial incentives

It is not just collaborative mobility, but rather the whole "collaborative economy" that raises fiscal challenges for the public authorities. The key question is that of the status of income generated by carpooling and/or carsharing. Where carpooling is concerned, most platforms implement rules to guarantee that payments to drivers do not exceed the sharing of costs associated with the journey, which ensures that this income is not taxable. Some plan to go beyond this remuneration (for example by offering vouchers or setting a fixed sum whatever the number of kilometres driven),[34] or to take the "high end" of cost sharing[35] to encourage drivers to propose their cars for carpooling, enabling them to reach the critical mass more quickly. With these payment options, carpooling is nevertheless at risk of becoming a lucrative personal transport service like UberPop, with all the competition and labour regulation issues this implies. For carsharing, the debate is still underway to determine whether the income generated should be considered as cost sharing, and in this case non-taxable, or whether it should be considered as rental income—in the same way as for people who occasionally rent out their homes on Airbnb—and in this case, which tax regime to apply.[36] The fiscal framework needs to be clarified in order to eliminate the uncertainty surrounding collaborative mobility actors, and the European Commission is calling for its harmonisation between member states to facilitate the development of new actors.

In addition to clarifying these fiscal issues specifically associated with the new carpooling and peer-to-peer carsharing actors, the public authorities can also use taxation to support collaborative mobility and, more generally, shared car uses. A reform of the "frais reels" (actual cost) tax loophole is often suggested. Actual costs enable households spending more than 10% of their income on professional costs—including mileage expenses—to declare these expenses and obtain tax deductions. In addition to the shortfall this tax loophole represents for the state (1.2 billion euros, according to Chancel and Saujot, 2012), this measure reduces the financial advantage of carpooling, especially for drivers making long commutes; moreover, drivers who declare their actual costs often worry that joining a carpooling platform will make them visible to the tax authorities—logically, they should deduct from their declaration any income from carpooling.[37]

On the contrary, proposals have been made for the partial reimbursement of commuting costs when employees carpool, along the same lines as the reimbursement of travel passes or the new cycling mileage allowance. These measures have a

33. The "Sans ma voiture" experiment conducted by Koolicar and MAIF in Bordeaux and Niort showed that 80% of participants had a car that was more than 10 years old, and that half of them drove fewer than 5,000 km per year.

34. Sharette proposed a payment of 2 euros per journey, whatever the number of kilometres driven.

35. The methodology for calculating costs associated with a journey is not clearly defined in the regulatory texts: the Cour de Cassation includes in cost sharing vehicle depreciation, maintenance and repair costs, fuel consumption and insurance costs (tolls are not included), but these elements are not clearly set out and nothing is said about their method of calculation (Jourdain, Leclerc, and Millerand, 2016).

36. The issue of the taxation of income generated by the collaborative economy has resulted in the publication of two reports (Bouvard *et al.*, 2015; Terrasse, 2016). The first advocates a specific tax allowance of up to 5,000 euros of income, whereas the second supports non-specific tax treatment of income generated by the collaborative economy. To date, the government has not decided between these proposals, and legal uncertainty persists.

37. Personal communication, 2015.

definite impact on employees' modal choices, as shown by feedback on cycling mileage allowance experiments or initiatives to increase the share of travel passes paid for by employers.[38] Some of the new carpooling actors that support this system also argue that platforms could act as a "trusted third party" to the public authorities in order to monitor journeys made using carpooling services and thereby determine employees' rights to reimbursement. This "trusted third party" role played by the platforms nevertheless raises questions, given that a large number of matches—the majority at present—are made outside of platforms. How would these "informal" carpoolers be reimbursed for their travel costs?

Road system planning with better integration of shared car uses

Because the efficiency of the mobility system depends on the balance and complementarity of the different modes of public, private and shared transport, the public authorities have an important role to play in terms of organising the access of these different modes to public spaces, especially road systems.

Three types of road system planning are possible:

- Carpool parking areas (pick-up/drop-off) and, more generally, physical meeting points between different modes of transport, such as park-and-ride facilities. These developments are not new: many authorities, especially the departments,[39] are developing carpool parking networks in their territory. This infrastructure is essential to support the development of carpooling, whether first or new generation, and to ensure its intermodality: it helps carpoolers to find each other and gives passengers somewhere to leave their car for the day. It also makes carpooling more visible to potential users[40] and helps them to find out about the transport options available to them. The public transport services thus materialise in road systems through parking areas, display panels, dedicated lanes and rails. Finally, their visibility within road systems helps to raise the political profile of shared car support policies: elected officials can thus show their constituents the investments made to improve mobility services.
- Dedicated parking spaces for carsharers. These spaces already exist for professional carsharing in many municipalities, in order to make carsharing more visible and to improve the quality of the service (no time lost looking for a space, better coverage of the area). Peer-to-peer carsharing could also benefit from such spaces, or from discounts on individual/private parking spaces: the goal here is not to use public space for private uses, but rather for collective uses. The platforms would then need to act as a "trusted third party" to the public authorities in order to determine whether or not owners are using their cars in "carsharing mode".[41] The new smartphone parking payment technologies show that it is now easy to make the connection between parking enforcement officers and a digital platform.[42]
- Developments to restrict car use: limiting the number of parking spaces in city centres or on company car parks is not only a challenge in terms of reclaiming scarce and valuable public space, but also a strong incentive to carpool or carshare, as are reserved lanes for carpoolers or carsharers. Carpooling lanes, which have been developed in the United States, do not yet exist in France: an expert appraisal is currently underway at the Ministry of Ecology.[43] These restrictions on the use of private cars are politically very sensitive. But perhaps a different approach is required: the public authorities often hope to restrict car use, especially in cities, and shared cars can lessen opposition by providing mobility alternatives.

Effective experimentation and evaluation

The challenge for public mobility services is no longer providing uniform public transport services, but deploying a range of modes of transport to meet different demands in the context of a more holistic approach to mobility practices. This paradigm shift therefore implies a change in the way we plan, design and build public transport policies, and therefore in the culture within the authorities responsible for these policies. One of the fundamental challenges of this change is to integrate a culture of experimentation. Experimentation

38. Companies in the Grenoble Presqu'île district have thus offered to pay 85% of their employees' travel passes, rather than the 50% required by law; this measure has resulted in 2,000 additional subscriptions (personal communication, 2015).
39. These parking areas are especially used for interurban journeys. The Loire Atlantique department, for example, has invested substantially in its network of carpool parking areas.
40. Other communication tools exist, such as awareness campaigns or information points with mobility consultants, which are beginning to be developed in some companies and authorities (see, for example, Agence Ecomobilité in Chambéry http://www.agence-ecomobilite.fr/).
41. Personal communication, 2015.
42. See, for example: https://www.paybyphone.fr/villes/paris
43. Personal communication, 2016.

is crucial to a mobility policy whose goal is to characterise different demands and to optimise complementarity between the different modes of transport, especially to increase knowledge about mobility practices and to test new solutions with users. Experimentation is a real challenge for the public authorities, especially because the culture of experimentation—and failure—is very underdeveloped within the administration.

Moreover, experimenting does not mean testing anything, anyhow, anywhere, especially if it involves public money. Underlying the issue of targeting experimentation are some key political questions: which challenges—economic, social or environmental—are to be addressed? Should new solutions, and in particular collaborative mobility solutions, be tested in areas where they have the greatest chance of success, or in areas with the greatest needs, especially social needs? One of the main shortcomings of experimentation is its scale: for financial or political reasons—non-competition with public transport—the local authorities are often tempted to experiment in small areas, or even just on parts of journeys (in a feeder system approach), which often reduces the system's chances of success. Upstream planning between the public authorities and the project leaders regarding the scale of the experiment is therefore essential.

Finally, the evaluation and dissemination of results are crucial elements for effective experimentation. Private collaborative mobility actors are generally reluctant to communicate the results of their experiments, especially when these have failed, which seems to be less true for public actors.[44] The evaluation and dissemination of results should be systematised, which may require an accountability obligation within the framework of public financing. The issue of formalising and centralising these ex post evaluations also arises, especially in view of the overabundance of information facing local authority technicians: it is not so much the lack of information or dissemination channels that appears to cause the information failures described at the beginning of this chapter, but rather the lack of organisation in this information. It could therefore be useful to reflect on a common evaluation framework for experimental projects, which would make it easier to deploy them within other authorities.

44. There has, for example, been very little feedback on the experiment conducted between Sharette and RATP. Conversely, the Isère department, which tested a dynamic carpooling system a few years ago, has communicated significantly on the results of this experiment, in spite of its rather disappointing results.

Adapting mobility governance

Making mobility more sustainable implies developing transport services that meet the different mobility needs, while as far as possible maintaining the freedom and convenience offered by private cars. To overcome the fear—whether or not it is justified—of competition between collaborative mobility and public transport, the key challenge is articulating all of these services, which ultimately raises the question of the governance of multimodality. The AOMs have a key role to play in ensuring the joint design and planning of the different transport services in the different areas and managing these services.

For some actors, it is not always necessary to carry out ex ante joint planning of the different transport services, whether collaborative or traditional. Another option is to leave collaborative mobility actors to develop, or even to support them in all areas, and to adapt the traditional transport services ex post, for example by removing certain bus routes, reducing their frequency or scheduling them at times when collaborative mobility solutions are less effective.

Another way of addressing the governance challenge, suggested during interviews, is to task a "traditional" public transport operator with developing collaborative mobility services itself, in partnership with the new actors, or with an "in house" service. This idea is not always popular with the new actors, which fear being absorbed or are sceptical about the "agility" of traditional operators in terms of their capacity to effectively develop innovative solutions. It also implies integrating collaborative mobility into the public service, through public financing.

Public financing for collaborative mobility

Subsidising collaborative mobility is a form of public intervention that contradicts the views of many public actors (see the CESE and France Stratégie reports mentioned above). It has not, however, been rejected by the local authorities seeking new solutions to provide quality public transport services throughout their territory, and especially in rural areas. Nor is it dismissed by certain collaborative mobility actors: the analysis conducted in the previous section shows just how difficult it is to develop a private, sustainable business model in the short-distance segment, especially outside the large cities and their inner suburbs.

Whether in the short or the long term, collaborative mobility actors are therefore looking for public funding to stabilise their business models, and the local authorities are willing to finance new

collaborative solutions in order to attract them to their area. We can thus envisage three scenarios:

- financing new collaborative mobility actors through the local authorities, which would themselves organise complementarity between collaborative services and the other modes of public transport;
- financing partnerships between these new actors and traditional public transport operators, with the organisation of complementarity between services being left to the charge of these partners. However, there is a risk that the collaborative mobility actors will ultimately be "absorbed" by traditional operators, which are far larger and more hardened to the demands of public service provision;
- financing traditional operators, which develop collaborative mobility solutions themselves, as Transdev is doing with Fleetme, for example. This option has the advantage of ensuring the effective integration of collaborative mobility services into public transport provision, but the operators' capacity for innovation can be questioned, since their institutional constraints undoubtedly make them far less agile than start-ups.

In theory, the AOMs could finance the new collaborative mobility actors, since with the extension of their jurisdiction, they can finance all activities linked to mobility rather than just public transport. This funding for mobility should enable equalisation between the different modes of transport and the different areas. For example, one possibility is a tax on carpooling services that function well in the daytime in order to finance transport on demand systems to ensure the continuity of transport services at night.

Which legal tool should be used to finance collaborative mobility? The management of public transport services by a local authority is traditionally organised by public service delegation (PSD) to public transport operators. This approach to the management of public services could be adapted in the hypothesis of a partnership between a traditional operator and a new collaborative mobility actor, or the development of a collaborative mobility service by such an operator. But it is often presented as inappropriate for a new actor alone, which has neither the competence nor perhaps the vocation to respond to an administrative procedure such as PSD. In terms of contracting with these new actors, it is therefore important to think outside the box and to use different legal regimes: public procurement, concession agreements, public domain occupancy agreements, partnership agreements, etc.

Finally, in order to lead by example, a local authority may become a collaborative service user, which would provide a valuable source of income for the new actors: renting out its vehicle fleet, using carsharing or carpooling cars for civil servants.

5.4. Conclusion

The new collaborative mobility actors provide new solutions for the deployment of carpooling and carsharing practices. They nevertheless face considerable development challenges, especially in less densely populated areas, which have the highest levels of car dependency and use. For this reason, and because the public authorities responsible for transport are in the best position to articulate these new solutions with the traditional modes of transport, it is important that the latter integrate collaborative mobility into their transport policies.

This integration may take different forms, from simple support for communication to public financing for collaborative mobility. Such financing, which would imply creating a public service for collaborative mobility, or more specifically integrating collaborative mobility into public mobility services alongside traditional public transport, is a contentious issue. It could even be unnecessary in areas where new actors are already developing today, with a real chance of large-scale deployment. But some actors—both private and public—are giving it very serious consideration, arguing that it could be the only chance of seeing the new carpooling and carsharing solutions extend beyond the areas and populations already covered by the first generation of solutions, especially in rural areas.

We will conclude this section by highlighting a cross-cutting challenge for the development of a public strategy aimed at using the new collaborative mobility solutions to organise a more sustainable kind of mobility: that of urban data governance. Whether to ensure complementarity between services, to raise taxes, to fine-tune experiments or to provide carsharers with reserved spaces, the public authorities may need to access data collected by collaborative mobility entrepreneurs or insurance companies. This new field of local action is gradually finding a response through experiments, but also through legislation (for example, the energy transition bill on the sharing of data from distributors). The mobility sector has a key role to play in discussions on urban data governance, as shown by the debate on open data for transport (Jutand, 2015).

6. CONCLUSION

The new collaborative mobility actors are currently attempting to develop new solutions in the short-distance segment. The dissemination of smartphones and digital innovations has helped to design new tools and to improve the ergonomics of user interfaces, thereby facilitating peer-to-peer transactions. These new actors are renewing the shared car uses made popular by a first generation, and reiterating the promise carpooling and carsharing hold for sustainable mobility. These practices provide additional solutions that are essential to improve the sustainability of daily travel: reducing congestion and emissions of GHGs and other pollutants, but also restrictions on access to mobility linked to spatial and socio-economic factors (age, financial constraints).

In spite of these innovations, these new actors are struggling to develop within a system structured by private cars. Moreover, these difficulties are compounded by the fact that their efficiency depends on their capacity to rapidly attract a large number of users. If we are serious about the idea of a mobility paradigm shift and a transition to a multimodal regime, this implies a fundamental change in the way individuals approach their mobility within their area and the way in which it is organised. It seems unlikely that this change can be achieved through technological innovations alone, just as the development of cars was not founded solely on the invention of the combustion engine.

This is the context in which this study has examined the role the public authorities—and in particular the local authorities responsible for transport—play in supporting the development of these new actors. Our study describes six pillars to ensure better integration of collaborative mobility into the public services and to organise its articulation with the other modes of transport: support for communication; fiscal clarification; road system planning; experimentation; better governance; and public financing. The challenges to be addressed and the degree of integration needed for the development of collaborative mobility vary depending on whether they concern large cities, where the challenge will be accompanying the emergence and articulation of services, or less densely populated areas (small towns, peri-urban and rural areas), where the authorities' role will be to create the conditions for the emergence of a service that does not yet exist.

Underlying these different levels of integration for collaborative mobility is the potential for a new public mobility service, in the sense that these services would no longer be peripheral, but integrated into a package of solutions under the responsibility of the public authorities. This could ensure efficiency and attractiveness to individuals. These changes to public services are nevertheless controversial, since the balance is still fragile between the obligations the authorities would then have in terms of accountability for an uncertain service that is dependent on contributing individuals, and the needs of the new collaborative mobility actors in terms of visibility, articulation with the other modes of transport and financial support to enable them to develop and to provide quality services over time. This study has initiated a discussion that must now work towards identifying this intersection and creating the conditions for its existence so that collaborative mobility can bear fruit.

To conclude, we would like to reiterate three elements of the global context that are important to the future of collaborative mobility.

The first is that of the local authorities: the crisis in public finance that reduces their room for manoeuvre in the operation and development of public transport networks; the pursuit of decentralisation, with new jurisdiction and broader inter-municipal scope, requiring them to find new mobility solutions in less densely populated areas where public transport is inefficient; and the progressive paradigm shift from a supply-oriented transport approach to a demand-oriented mobility approach. These factors clearly contribute to rekindling the local authorities' interest in collaborative mobility. At the same time, the financial and institutional context could also impede the shift towards a new mobility service, requiring the authorities to take risks, through experimentation and innovation in terms of contracting (management of the different actors) and steering (articulation with public transport, data management, etc.). Could the state have a role to play here in accompanying these processes, supporting capacity building and fostering experience sharing?

The second is that of the automotive industry and of people's attitudes towards cars. The 2008 economic crisis, which resulted in serious financial difficulties for many car manufacturers, is often presented as one of the reasons for the new attitude towards cars, which are seen less and less as a status symbol and increasingly in pragmatic utilitarian terms. This change is reflected in the success of low-cost makes and the development of shared car practices—especially carsharing—showing that people are becoming less attached to car ownership. It is nevertheless called into question by the recent upturn in car sales in France and Europe and high growth in premium makes,[45] in-

45. Especially BMW, Mercedes and Audi.

cluding electric models[46] and plug-in hybrids, indicating that cars are still far from being seen only in utilitarian terms. The other disruptive innovation facing the automotive sector is the arrival of autonomous cars, expected in the next 10 years: this is disruptive first because the actors in this sector are not traditional car manufacturers, but digital actors such as Google and Apple; and second, because autonomous cars are likely to radically alter the way people use and view cars: many people see this as a service market, in which individuals are no longer owners of vehicles, but rather users. Autonomous cars would thus go beyond collaborative mobility: if they are not owned, cars can no longer be shared by individuals. Analyses of the implications of automotive sector changes for collaborative mobility are currently lacking, since the future of autonomous cars and the development paths for the automotive industry are still so uncertain.

The third and final element is that of social equity in the context of the energy transition. Energy transition actors are showing increasing interest in the mobility sector, especially those concerned by transport poverty issues. Indeed, mobility has a significant impact not only on our energy consumption, but also on household budgets. Faced with the need to limit single occupancy car use, which is synonymous with wasted energy and financial resources, collaborative mobility is emerging as a positive, modern solution—being generally considered to be high-tech—and one that is more acceptable than the alternative consisting in restricting car use. Nevertheless, as noted in this study, a certain level of constraint, especially in the form of reserved parking spaces or lanes, is needed to enable the development of these new forms of mobility. Collaborative mobility helps to reconcile environmental and social demands within a positive narrative of reclaiming urban space and deploying innovative, modern solutions. It also provides interesting solutions in the context of the energy poverty reduction policies being implemented by a number of local authorities. Moreover, these solutions are integrated into individual poverty management strategies: the literature review conducted as part of this study has thus shown that "traditional" informal carpooling mainly concerns blue collar workers. The new collaborative mobility actors are unquestionably one more solution to mobility-related energy poverty that needs to be analysed and tested with the people actually experiencing these difficulties. Finally the emergence of new digital solutions adds a modern, ecological dimension to carpooling, helping to make it more efficient and practical, but also—and perhaps more importantly—reducing its social stigma: carpooling is now seen as a positive choice rather than one dictated by financial necessity. There is no doubt that this dimension is one of the keys to successfully attracting new users from beyond the traditional groups.

46. See, for example, the success of Tesla.

ANNEXES

Annex 1. List of people interviewed

Type of actor	Name	Organisation
Local authorities	Nathalie Granes	Conseil régional Île-de-France
	Françoise Guaspare	Conseil régional Île-de-France (représentation à l'Union européenne)
	Amaury Lombard	Association des Régions de France
	Leslie Blanc	Conseil régional Bourgogne
	Yvan Martinod	Conseil général de l'Isère
	Thierry Trombert	Conseil général de l'Isère
	Marc Letourneux	Conseil général de Loire Atlantique
	Laure Bertin	Conseil général de Gironde
	Romain Cipolla	GART
	François Tanguy	Conseil général de Moselle
	François Ferrieux	Ex Conseil général de l'Oise
	Gilles Farge	Nantes Métropole
	Stéphanie Nair	Agglomération de La Rochelle
	Aurélien Trescazes	Agglomération d'Avignon
	Marie Françoise Boncampain	Agglomération de Chalon sur Saône
	Lucie Verchère	Grand Lyon
	Marion Steunou	Agglomération de Rennes
	Barbara Muller	Agglomération de Grenoble
	Pierre Bredinaud	Agglomération de Bordeaux
	Céline Depière	Agglomération de Lille
	Pierre Hanauer	Strasbourg Eurométropole
	Clément Districh	Syndicat mixte de Belfort
	Florence Busnot Richard	PNR Loire Anjou Touraine
Collaborative mobility entrepreneurs	Stéphane Savouré	Koolicar
	Olivier Binet	Karos
	Cyril Becquart	Buzzcar, Drivy
	Laure Wagner	Blablacar
	David Larcher	Coovia
	Thomas Matagne	Ecov
Traditional actors	Olivier Joyeux	Cityway
	Paul de Rosen	Transdev
	Christine Peyrot	Transdev
	Marie Martese	La Roue Verte
	Jean Baptiste Schmider	Citiz
	Frédéric Bisson	Feduco
	Thomas Ollivier	MAIF
	Patrick Vergelas	Renault
	Jean Grébert	Renault
	Laurent Monnin et Thomas Sanchez	Caisse des dépôts et consignation
	Hervé Richard	SNCF
	Bruno Renard	PDIE Grenoble presqu'île/GIANT
Experts/research	Mathieu Chassignet	Ademe
	Gabriel Plassat	Ademe
	Christophe Saroli	Cerema
	Teddy Delaunay	LVMT
	Christine Raynard	France Stratégie
	Bernard Jullien	ENS Cachan
	Alain Sauvant	SNCF Réseau
	Marie Huyghes	Université de Tours
	Guillaume Lucas	Inddigo
	Nicolas Mercat	Inddigo
	Nicolas Louvet	6T
	Andy Bruère	ENSAE
	Richard Darbéra	CNRS
	Lisa Créno	VEDECOM

Annex 2. List of workshop participants

Type of actor	Name	Organisation
Public authorities	Nathalie Granes	Conseil régional Île-de-France
	David Herrgott	Association des Régions de France
	Leslie Blanc	Conseil régional Bourgogne
	Yvan Martinod	Conseil général de l'Isère
	Marc Letourneux	Conseil général de Loire Atlantique
	Laure Bertin	Conseil général de Gironde
	Pierre Hanauer	Strasbourg Eurométropole
Collaborative mobility entrepreneurs	Elisa Desgranges	Koolicar
	Olivier Binet	Karos
	Julien Honnart	WayzUp
	Franck Rougeau	OuiHop
	Karim Ait Youcef	Wimoov
Traditional actors	Olivier Joyeux	Cityway
	Paul de Rosen	Transdev
	Christine Peyrot	Transdev
	Adrien Allard	Transdev
	Catherine Drillaud	MAIF
	François Pistre	Renault
	Laurent Monnin	Caisse des dépôts et consignation
	Bruno Renard	PDIE Grenoble presqu'île/GIANT
Experts/research	Mathieu Chassignet	Ademe
	Gabriel Plassat	Ademe
	Christophe Saroli	Cerema
	Teddy Delaunay	LVMT
	Ghislain Delabie	Ouishare
	Bernard Jullien	ENS Cachan
	Alex Villareal	ENS Cachan
	Damien Demailly	Iddri
	Mathieu Saujot	Iddri
	Oliver Sartor	Iddri
	Anaïs Guerry	Ecole de droit – Sciences Po
	Laura Brimont	Iddri

Note: Workshop on "The role of the public authorities faced with the emergence of the new collaborative mobility actors", 8 March 2016, Paris.

Annex 3. Methodology used for Figure 5

The estimations presented in Figure 5 concern the journeys made by an individual who works full time and has no children. The costs are divided into five categories:

- **Commutes:** it is estimated that an individual travels five days per week, 44 weeks per year. The average distance travelled is 15 km/one way.
- **Other short-distance journeys:** these are journeys other than commutes, for example, shopping, visiting friends, etc. The number of these journeys is estimated at 100 per year, with an average distance of 8 km.
- **Medium-distance journeys:** these are journeys of between 30 and 40 km/one way, for shopping, visiting friends or other activities. It is estimated that an individual makes 25 of these journeys per year, with an average distance of 35 km.
- **Long-distance journeys (> 80 km)**: it is assumed that an individual makes four journeys of 300 km per year.

The mobility scenarios compared are the following:

- **The private car scenario:** the individual uses his car for all journeys. In this scenario, the cost per kilometre is 0.16 euros; for long-distance journeys, the toll cost is added (50 euros/journey).
- **The carpooling/private car scenario:** the individual uses carpooling for short- and long-distance journeys and uses his own car for occasional medium-distance journeys. In this scenario, the cost of carpooling journeys is 0.06 euros/km for long-distance carpooling, but 1.5 euros/journey for short-distance journeys (which corresponds to the minimum rates of short-distance carpooling platforms).
- **The carpooling/carsharing scenario**: the individual uses carpooling for short- and long-distance journeys and carsharing for medium-distance journeys. For these journeys, we estimate the cost of carsharing at a fixed cost of 30 euros per year (membership) and a cost per journey of 38 euros.
- **The public transport/carsharing/carpooling scenario:** the individual uses public transport for short-distance journeys, carpooling for long-distance journeys and carsharing for medium-distance journeys. For public transport, the average cost is 725 euros per year, which corresponds to the Navigo Pass in Paris.

BIBLIOGRAPHY

6T. 2014. « L'autopartage en trace directe: quelle alternative à la voiture particulière ? » Ademe.

———. 2015. « Enquête nationale sur l'autopartage entre particuliers ». Ademe.

Arthaut, Régis. 2005. « Le budget transports des ménages depuis 40 ans ». 1039. Insee Première. INSEE.

Baraud-Serfaty, Isabelle. 2014. « Le nouvelle économie du stationnement ». *La revue foncière* 1 (octobre): 10-14.

Bleuze, Camille, Lucie Calvet, Marc-Antoine Kleinpeter, et Elen Lemaitre. 2009. « Localisation des ménages et usage de l'automobile: résultats comparés de plusieurs enquêtes et apport de l'enquête nationale transports et déplacements MEDDTL ». 14. Etudes & documents. Paris: Commissariat général au développement durable (CGDD).

Bouvard, Michel, Thierry Carcenac, Jacques Chiron, Philippe Dallier, Jacques Genest, Bernard Lalande, et Albéric de Montgolfier. 2015. « Sur l'économie collaborative: propositions pour une fiscalité simple, juste et efficace. Rapport d'information fait au nom de la commission des finances ». 690. Sénat. http://www.senat.fr/rap/r14-690/r14-6901.pdf.

Breteau, V. 2011. « Manifestation spatiale de la congestion et localisation des emplois et des ménages ». Thèse de Doctorat en économie des transports, Université Paris Est.

Brice, Lucie, Patricia Croutte, Pauline Jauneau-Cottet, et Pauline Lautié. 2015. « Baromètre du numérique ». CREDOC.

Bruère, Andy, et Martine Ged. 2015. « Ce que vous pouvez (vraiment) gagner en louant votre voiture ». *Sharingblog*. avril 9. http://www.sharinblog.fr/2015/04/09/ce-que-vous-pouvez-vraiment-gagner-en-louant-votre-voiture-963.

CERTU, l'urbanisme et les constructions publiques (France). 2012. *La mobilité urbaine en France: enseignements des années 2000-2010*. CERTU.

CGDD. 2014. « Chiffres clés du transport - Edition 2014 ». Repères. Commissariat général au développement durable (CGDD). http://www.developpement-durable.gouv.fr/IMG/pdf/Rep_-_Chiffres_cles_transport_2014-2.pdf.

Champagne, Eric, et Paula Negron-Poblete. 2012. « La mobilité urbaine durable : du concept à la réalité ». *VertigO - la revue électronique en sciences de l'environnement* Hors série 11 (mai). https://vertigo.revues.org/11779.

Chancel, Lucas, et Mathieu Saujot. 2012. « Les "frais réels": une niche fiscale inéquitable et antiécologique ». n°19/2012. Working Paper. IDDRI.

Chassignet, Mathieu. 2015. « Enquête auprès des utilisateurs du covoiturage longue distance ». Paris: Ademe, 6T bureau de recherche.

Cochez, Nicolas, Eric Durieux, et David Levy. 2015. « Vulnérabilité énergétique. Loin des pôles urbains, chauffage et carburant pèsent fortement dans le budget ». 1530. Insee Première. INSEE.

Cour des comptes. 2015. « Les transports publics urbains de voyageurs: un nouvel équilibre à rechercher ». Rapport public annuel 2015.

Créno, Lisa. 2016. « Covoiturer entre inconnus: des risques perçus à la construction de la confiance, parnorama des expériences vécues des usagers ». Télécom ParisTech.

Donada, Carole, et Guy Fournier. 2015. « Stratégie industrielle pour un écosystème en émergence: le cas de la mobilité 2.0, décarbonée, intermodale et collaborative ». *Revue d'économie industrielle* 148 (4): 317–348.

Dufour, Nathalie, Nicolas Mercat, et Sucche. 2015a. « Etude nationale sur le covoiturage de courte distance. Leviers d'actions, benchmark et exploitation de l'enquête nationale transports et déplacements (ENTD) ». INDDIGO, Ademe.

Dufour, Nathalie, Nicolas Mercat, et Patrick Sucche. 2015b. « Leviers d'actions pour favoriser le covoiturage de courte distance, évaluation de l'impact sur les polluants atmosphériques et le CO2 – Approche méthodologique d'évaluation de l'impact du covoiturage sur les polluants atmosphériques et le CO2 ». Ademe.

Dupré, Mickaël. 2014. « Représentation sociale du covoiturage: des contraintes perçues au faire-ensemble ». *Les Cahiers Scientifiques du Transport* 66: 97-113.

Faivre d'Arcier, B. 2008. « Prospective pour un financement durable des transports publics urbains ». Ministère de lécologie et du développement et de l'aménagement durable.

Hampshire, R, et C Gaites. 2011. « Peer-to-Peer Carsharing. Market Analysis and Potential Growth ». *Transportation Research Record: Journal of the Transportation Research Board* 2217: 119-26.

Husson, Jean-François. 2015. « Rapport fait au nom de la commission d'enquête sur le coût économique et financier de la pollution de l'air ». 610. Sénat.

Huyghe, Marie, Hervé Baptiste, et Jean-Paul Carriere. 2013. « Quelles organisations de la mobilité plus durables et moins dépendantes de la voiture dans les espaces ruraux à faible densité? L'exemple du Parc naturel régional Loire-Anjou-Touraine ». *Développement durable et territoires. Économie, géographie, politique, droit, sociologie* 4 (3). https://developpementdurable.revues.org/10000?lang=en.

INDDIGO SAS. 2015. « Etude nationale sur le covoiturage de courte distance. Enquêtes auprès des utilisateurs des aires de covoiturage ». Ademe.

Jourdain, Loïc, Michel Leclerc, et Arthur Millerand. 2016. *Economie collaborative & Droit. Les clés pour comprendre*. Fyp. PAris.

Jullien, Bernard, et Benoît Rivollet. 2016. « Usages novateurs de la voiture et nouvelles mobilités ». Paris: CGDD, DGE, PIPAME.

Jutand, Francis. 2015. « Ouverture des données de transport ». Rapport remis au secrétraire d'Etat chargé des Transports, de la Mer et de la Pêche. http://www.developpement-durable.gouv.fr/IMG/pdf/vf_rapport_jutand.pdf.

Koning, Martin. 2014. « La variété des coûts de congestion routière. Le cas du boulevard Périphérique parisien ». http://www.cairn.info/resume.php?ID_ARTICLE=RERU_134_0737.

Krattinger, Yves. 2012. « Les transports publics locaux en France : mettre les collectivités territoriales sur la bonne voie ». Rapport d'information fait au nom de la délégation aux collectivités territoriales 319 (2011-2012). Sénat. http://www.senat.fr/rap/r11-319/r11-319_mono.html.

Le Jeannic, T., Philippe Roussel, et Dominique François. 2010. « La mobilité des Français, panorama issu de l'enquête nationale transports et déplacements 2008 ». La Revue du CGDD. Paris: Commissariat général au développement durable (CGDD).

Limousin, Lerelei, et Denis Voisin. 2014. « Les solutions de mobilité soutenable en milieu rural et périurbain ». Paris: Fondation Nicolas Hulot (FNH), Réseau Action Climat (RAC).

Olivier Darmon Consultants. 2015. « Le transport de la compétence transport du département vers la région ». Association des Directeurs des Services Techniques Départementaux; Sartotio - Lonqueue - Sagalowitsch & Associés. http://extranet-departement.org/webdav/site/myjahiasite/users/siteadmin/private/Accueil/Publications/Flash%20-%20Annee%202015/Flash%20999%20-%2016-11-2015/ODC-CD76-ADSTD%20-%20Transfert%20competence%20transport%20Departement%20Region.pdf.

Orfeuil, Jean-Pierre. 2011. « Le droit à la mobilité, aujourd'hui et demain ». In *Mobile, immobile: quels choix, quels droits pour 2030*. Kaufmann, V. et Gay, C.

Place, Dominique. 2013. « La mobilité à longue distance des Français en 2012 ». 463. Chiffres et statistiques. Paris: Commissariat général au développement durable (CGDD).

Prud'homme, R, et Y Sun. 2000. « Le coût économique de la congestion du périphérique parisien: une approche désagrégée ». *Les Cahiers Scientifiques du Transport* 37: 59-73.

Richard, Isabelle. 2011. « Facteurs et processus psychosociaux du changement pour l'adoption de comportements pro-environnementaux: le cas du covoiturage ». Aix Marseille 1. http://www.theses.fr/2011AIX10206.

Steinmann, Lionel. 2014. « Le succès de Blablacar bouscule la SNCF ». *LesEchos.fr*, juillet 2. http://www.lesechos.fr/02/07/2014/lesechos.fr/0203613823111_le-succes-de-blablacar-bouscule-la-sncf.htm.

Terrasse, Pascal. 2016. « Synthèse du rapport sur l'économie collaborative. » Premier ministre.

Vincent, Stéphanie. 2008. « Le covoiturage: une paratique multiforme, sociale mais durable? » In *Automobilités et altermobilités, quels changements?*, édité par Fabrice Clochard, Anaïs Rocci, et Stéphanie Vincent, L'Harmattan, 239-49. Paris.

The new collaborative mobility actors: from promises to challenges for the public authorities

Laura Brimont, Damien Demailly, Mathieu Saujot, Oliver Sartor (IDDRI)

IDDRI'S PUBLICATIONS

- Brimont, L. *et al.* (2016). Collaborative mobility: from promises to challenges for public authorities, *Policy Briefs* N°03/16, IDDRI.
- De Feraudy, T., Saujot, M. (2016). Could "urban crowdsourcing" transform how cities are made?, *Issue Briefs* N°06/16, IDDRI.
- Demailly, D., Hippe, R. (2015). The ICT revolution for more sustainable mobility? A long-run perspective, *Working Papers* N°09/15, IDDRI.
- Massé, D. *et al.* (2015). Comprendre l'économie collaborative et ses promesses à travers ses fondements théoriques, *Working Papers* N°05/15, Iddri.
- Saujot, M. (2012). La mobilité, l'autre vulnérabilité énergétique ?, *Policy Briefs* N°05/12, Iddri.

Publications available online at: www.iddri.org

To learn more on IDDRI's publications and activities, visit www.iddri.org

IDDRI

www.iddri.org