STATE-OF-THE-ART OF RIDE-SHARING IN TARGET EU COUNTRIES

Deliverable D2.2

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1. EXECUTIVE SUMMARY

The present document constitutes the second deliverable to be prepared in the framework of WP2 of the RIDE2RAIL Project. RIDE2RAIL aims to further enhance the notion of ride-sharing by developing, testing and delivering a suite of as-a-service software components, proposing trips that will be covered partly by public transport modes and partly by private cars (ride-sharing). The overall goal of WP2 is to set the basis and define several assets that will be used in the framework of WP3 in order to develop and implement specific software artefacts. On the other hand, Task 2.2, in the framework of which the present document has been prepared, aims to define recommendations for a successful integration of the ride-sharing concept in the Shift2Rail IP4 ecosystem.

The report aims to fulfill the following objectives:

1. State-of-the-art analysis of existing ride-sharing systems operating around the world;
2. Thorough review of the legal frameworks relevant to ride-sharing in the European countries, in order for potential barriers of implementation to be identified.
3. Definition of ride-sharing users and identification of their characteristics.

Prior to fulfilling the aforementioned objectives, a concrete methodology has been formulated, which among others included the examination of existing definitions for ride-sharing systems. Several definitions are identified, including different features, relevant or not to the scope of the document. The authors finally concluded that the most suitable definition for our case is the following:

"Ride-sharing" refers to the transportation of persons in a motor vehicle when such transportation is incidental to the principal purpose of the driver, which is to reach a destination and not to transport person for any kind of profit (Code of Virginia 1989).

RIDE2RAIL will build on this definition and it will implement real-time route planning, ride matching and integrated trip payment services.

In order to fulfill the first goal several data sources are used: 1) EU research projects on sharing-mobility from the EU database CORDIS and partners' finalized and ongoing projects, which are relative to the scope of RIDE2RAIL (desk review), 2) Published papers and reports on the current state of ride-sharing systems, 3) Ride-sharing companies and services that operated or are still in operation. In total, 80 publications were identified as relevant, and 59 ride-sharing providers were recorded at global level (i.e., no geographic limitations); these systems are described and analyzed.

In order to fulfill the second goal, the legal framework for ride-sharing systems in each one of the EU member states is studied. The research is limited at the European level, whereas the ride-sharing systems were searched at global level. The authors used several national and international sources to fulfill this goal. A summary table is included at the end of section 8 synthesizing the information and depicting where ride-sharing is (just) allowed and where it is actually regulated.

The final step is to identify the characteristics of ride-sharing travelers and ride-sharing providers. Therefore, the pre-final chapter of the document summarizes important findings that focus on the identification of motivations and constraints that users may face when using ride-sharing services. The objective is to use this information to identify current and potential ride-sharing Travel Service Providers (TSPs) and ride-sharing travelers, to be targeted within the context of RIDE2RAIL.

The final chapter of the report, summarizes the findings of the above actions and draws important conclusions to be used in the next steps of the project.

2. ABBREVIATIONS AND ACRONYMS

CFM	**Calls for Members**
DL	**Dissemination and exploitation leader**
DoA	**Description of the Action**
EL	**Ethical leader**
EU	**European Union**
FS	**Financial Statement**
GA	**Grant Agreement**
H2020	**Horizon 2020**
HOV	**High Occupancy Vehicle**
IP4	**Innovation Programme 4**
OC	**Open Call**
PC	**Project coordinator**
PM	**Project manager**
PMO	**Project Management Office**
PMT	**Project Management Team**
PO	**Project Officer**
QAC	**Quality Assurance Committee**
S2R JU	**Shift2Rail Joint Undertaking**
TL	**Technical leader**
TSP	**Travel Service Provider**
WP	**Work Package**
WPL	**Work package leader**

3. BACKGROUND

The present document constitutes the Deliverable D2.2 “State-of-the-art of ride-sharing in target EU countries” in the framework of Task 2.2 “State-of-the-art analysis and recommendations for a successful ride-sharing system in a multimodal journey”, of WP2 “Travel behavior and system requirements”.

It contributes to WP2 (task 2.3) of RIDE2RAIL project (S2R-OC-IP4-01-2019).

4. OBJECTIVES/AIM

The overall goal of WP2 is to set the basis and define several assets that will be used in the framework of WP3 in order to develop and implement specific software artefacts. On the other hand, Task 2.2 aims to define recommendations for a successful integration of the ride-sharing concept in the Shift2Rail IP4 ecosystem. RIDE2RAIL shares the vision of the Shift2Rail IP4 ecosystem, of single Transport Service Providers (TSPs) joining a community of peers where governance strongly relies on collective intelligence and is supported by tools.

Coming to the present document, the objectives to be met are the following:

- Conduction of an extensive survey of existing, operating or not, ride-sharing systems. The geographical coverage hasn't been limited; ride-sharing systems around the globe have been studied.
- Analysis of relevant legal frameworks in EU countries aiming to identify potential barriers of implementation of ride-sharing systems.
- Identification of current and potential ride-sharing Travel Service Providers (TSPs) and ride-sharing travelers to be targeted. The scope of this activity is to identify user types having similar characteristics, behavior and needs.

5. INTRODUCTION

The overall objective of the RIDE2RAIL Project is to develop an innovative framework for intelligent mobility, facilitating the efficient combination of flexible and scheduled transport services, thus enhancing the performance of the overall mobility system. This framework, consisting in a combined suite of travel offer classifications and software components, will natively be integrated into existing collective and on-demand transport services, connecting and reinforcing the mobility offer especially in rural and low-demand areas, in order to induct the access to high-capacity services (rail, bus and other public transport services) thanks to easy-to-use multimodal and integrated travel planning, booking, ticketing and payment features.

More specifically, the Project aims to integrate multiple (public/private/social) data sets and existing transport platforms for promoting an effective ride-sharing practice to citizens, making it a complementary transport mode that extends public transport networks. The integration between the ride-sharing practice, along with a relevant critical mass of users, and the public transport network will deliver a crowd-based mobility network and will be achieved by the RIDE2RAIL framework for intelligent mobility that will integrate and harmonize real-time and diverse information about public transport, ride-sharing and crowdsourcing in a social ecosystem facilitating the comparison and the choice between multiple options/services classified by a set of criteria including environmental impact, travel time, comfort and cost.

As a primary achievement, RIDE2RAIL will address the current challenges of identifying criteria for multimodal travel planning by addressing the aforementioned existing barriers in ride-sharing practice, developing travel scenarios and testing related business cases.

5.1. Structure

The present document is structured around 5 main chapters. The current **Chapter 5** includes introductory information aiming to familiarize the reader with the goals of the RIDE2RAIL Project in general and with the scope of Task 2.2 in particular.

Chapter 6 aims to describe the methodology that has been implemented throughout the document in order to achieve the previously mentioned goals of Task 2.2 and D2.2 specifically.

Chapter 7 includes an extensive list of ride-sharing systems that have been implemented around the world, along with their description. For a common understanding to be established, the project partners have used a particular template to describe all systems.

Chapter 8 describes the legal framework imposed in the members of the European Union (EU-27) and the UK as regards the ride-sharing systems. The scope of this chapter is to identify the barriers and legal constraints, accruing from the various laws, in regards to the implementation of ride-sharing systems.

Chapter 9 includes the identification of characteristics, behavior and needs for different ride-sharing traveler groups and ride-sharing TSPs, and defines ride-sharing user types.

Finally, **Chapter 10** includes the conclusions drawn based on the outcomes of the above-mentioned activities that will be used in the following reports of Task 2.2, of WP2, as well as in the framework of WP3.

6. METHODOLOGY

6.1. Basic concepts

The emerging growth of on-demand transport services has contributed to the development of terminology with differences often not being distinct. Several definitions for different and partially overlapping concepts have emerged, including ride-sharing, ride-selling (commercial, organized by single person), ride-hailing (commercial, organized by companies) and ride-pooling (commercial, organized by public institutions). The most commonly used terms are (Electromobility, 2019):

Ride-sharing refers to the common use of a motor vehicle by a driver and one or several passengers, in order to share the costs. The term is used in different cases to describe 1) the common use of a motor vehicle for cost compensation in the context of a ride that the driver performs for its own account (referred also as Carpooling), or 2) the common use of a professional hired vehicle among various passengers which have the same (or different) destination in order to share the costs of the ride (such as for airport transfers). Therefore, ride-sharing is divided into for-profit and non-profit (i.e., trip cost sharing) services based on the concept that is adopted by each service provider. Figure 1 presents a classification of ride-sharing systems according to cost/benefit motivation in the vertical axis and route flexibility in the horizontal axis.

Pre-arranged ride-sharing facilitates the demand and the offers of journeys in advance before the date of the travel, via websites or applications.

Peer-to-peer ride-sharing refers to non-profit ride-sharing matched thorough the use of a digital platform where the ride is pre-arranged/pre-booked within a very short time and it is mainly used for local rides.

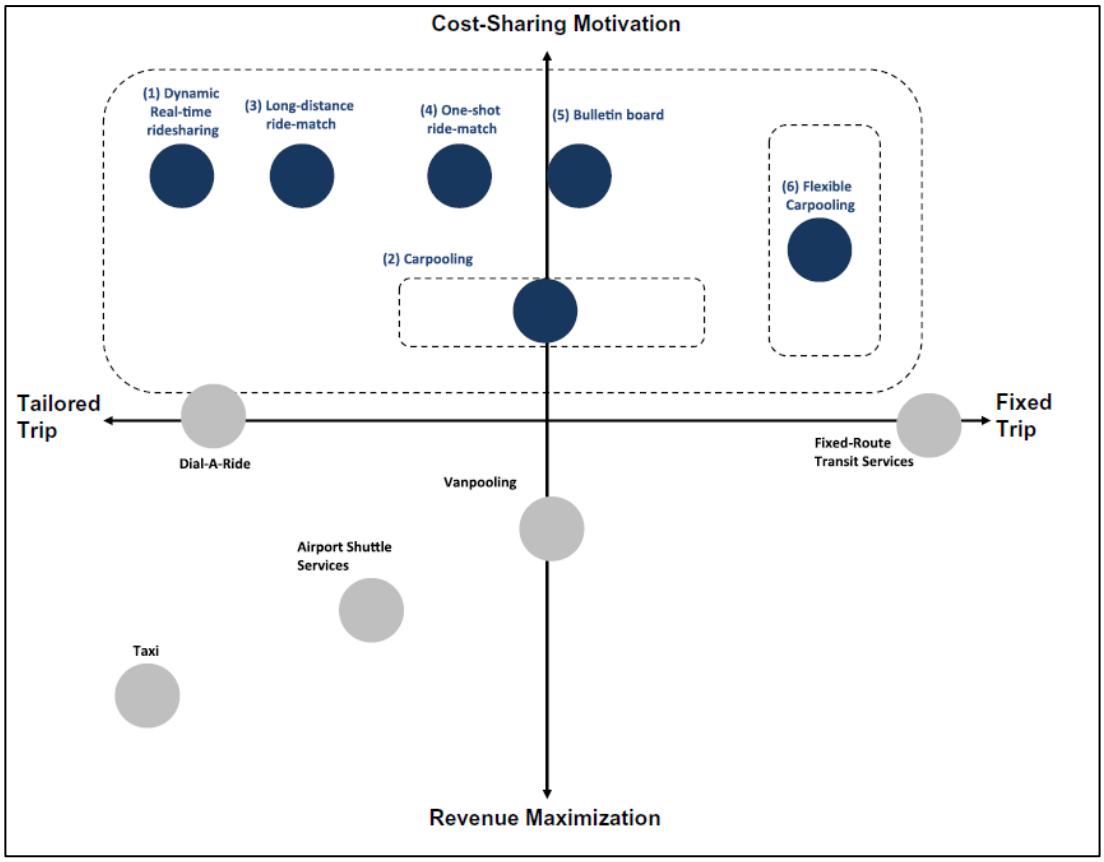

Figure 1. Classification of ride-sharing systems. Source: Furuhata et al. (2013)

Dynamic real-time ride-sharing refers to an automated process of ride-matching (routing, scheduling, and pricing) between drivers and passengers on very short notice or even en-route. Since the matching time-window can be very short, the system makes an automated ride-sharing match including a routing specifying pick-up and drop-off locations and times based on the simple input of participants' itineraries and schedules. Notice that a passenger's pick-up and drop-off locations need not be the same as the orgin-destination pair of the car driver as long as they are on the route of the driver's original trip. Matching agencies in this class propose a suggested cost for each participant based on their own pricing rules.

Ride-hailing refers to transportation by an unlicensed taxi service such as Uber or Lyft. Also called a "ride-sharing" service, which is a misnomer when applied to single-fare rides, but accurate when referring to the carpool service that the companies offer.

Carpooling is when a car owner shares their vehicle with other people to travel from and towards the same/or similar destinations. The idea behind carpooling is to stop commuters from having to make the same trip in their own separate cars and thus reducing the number of cars on the road. Online applications are available to facilitate communication between interested carpoolers and to help organize their trips.

Car-sharing is intended as short-time car access. Car-sharing generally involves accessing a car owned by another person or entity in exchange for an agreed monetary payment. During the time when a person has access to a car, they are responsible for it and its use is for their

exclusive benefit. The car is personally driven. Usage is billed in time increments of minutes or hours, and sometimes also based on distance travelled. Usage is round-trip as the customer must (with few exceptions) return the car to the same place that it was accessed, and pay for the entire time between when they gain access to the car and when they return it at the end of their reservation (Vine et al, 2014).

Point-to-point free-floating car-haring (often referred to as flexible car-sharing) enables one-way journeys within a specified geographic zone, in contrast to round-trip car-sharing. In the peer-to-peer model, the car-sharing fleet is de-centralized – owned by individuals – not owned by a central operator. People choosing to make their private car available for use by others receive payments when it is rented out.

Figure 2 presents the differences of ride-sharing from other models of shared mobility involving cars and vans.

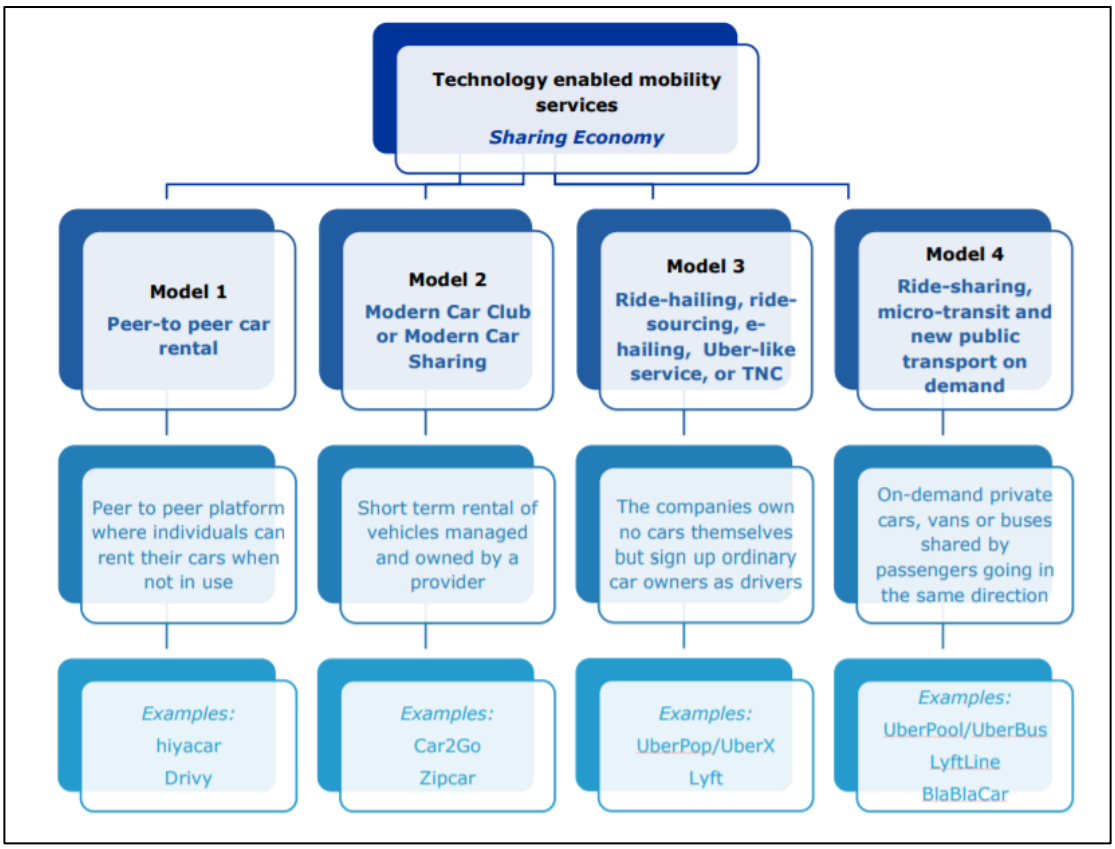

Figure 2: Adapted from Santos (2019)

6.2. Methodological approach

As presented above, Deliverable 2.2 focuses on a state-of-the-art analysis of ride-sharing systems that will constitute the basis for subsequent tasks in RIDE2RAIL, namely the release of recommendations and criteria for a successful ride-sharing. The methodological approach which is adopted in the context of Deliverable 2.2 builds on the principles of a systematic

literature review to achieve its purpose. The methodology focuses on the content of the publications, the research per se, rather than on their metrics.

A systematic review method helps researchers to develop a high-level overview of knowledge on a particular research area (Chandler and Hopewel 2013). Thus, a well-defined methodology is followed for the identification, analysis, and interpretation of all available evidence related to a specific research issue (Kitchenham and Charters 2007). Denyer and Neely (2004) argue that the reports of systematic reviews should outline the methodology used and providing a precise description of how the study was conducted to help minimize bias and to guarantee that all the decisions are made transparently. Following Moustaghfir (2008), the methodological approach adopted comprises of six parts (Figure 3), as follows:

1. **Identification of objectives.** Adapting the deliverable's scope to the purpose of the project, five main objectives were identified as of high relevance to the release of recommendations and criteria for a successful ride-sharing within the scope of RIDE2RAIL:

    1. Definition of ride-sharing system;
    2. State-of-the-art analysis of ride-sharing systems;
    3. Analysis of the legal framework in EU countries concerning aspects related to ride-sharing and identification of potential barriers of implementation due to legal constraints;
    4. Identification of current and potential ride-sharing TSPs;
    5. Identification of current and potential ride-sharing travelers.

For each of the objectives, research is conducted at global level except for the objective number 3, for which the research focuses on the 27 members of the European Union and the UK.

2. Identification of data sources and databases. The data sources that were used to collect the necessary information and data include: 1) EU research projects on sharing-mobility from the EU database CORDIS and partners' finalized and ongoing projects, which are relevant to the scope of RIDE2RAIL (desk review); 2) Published papers and reports on the current state of ride-sharing systems; 3) Ride-sharing companies and services that operated or are still in operation. The latter two have been based on online information, including webpages, social media and personal communication. The purpose of data collection through online sources is to use the most recent information available to fill data templates.

3. Selection of publications. A set of predefined selection criteria was used to select publications and assign them to five identified objectives: "Definition of ride-sharing system", "State-of-the art for ride-sharing systems", "Analysis of the legal framework in EU countries", "Identification of current and potential ride-sharing TSPs" and "Identification of current and potential ride-sharing travelers".

4. Development of tools for data collection. For facilitating the data collection process, two templates were developed, one to support the systematic literature review on ride-sharing and one to support the objective "State-of-the art of Ride-sharing systems".

The first template aimed to organize the collected information about ride-sharing or related services. First, each available publication was recorded according to its title, authors, year of publication and location of the study. Then for each publication, the ride-sharing service definition was recorded; the service definition also provided a screening criterion for exclusion. Services that were focusing on “car-sharing” were excluded. Based on its contents, each publication was then categorized in one of the following groups: 1) Barriers – referring to potential barriers that were faced in the implementation of the ride-sharing service, 2) Incentives – referring to the provided incentives for the implementation of the ride-sharing service, and 3) Behavior – referring to the users of ride-sharing services.

The second template (available in Annex I) aimed to collect and organize information relative to ride-sharing systems, which is provided on the websites and social media of ride-sharing companies or related services. The template supports the description of ride-sharing systems, according to the following main characteristics:

- Name of company or ride-sharing system
- Profit or non-profit
- Potential barriers and provided incentives
- Country of operation
- Company or service website
- Current operation of ride-sharing system
- Period of operation of the ride-sharing system
- Provision of short/long haul transport services
- References and sources
- Additional information

In addition, the required fields for completion ensured that the review of existing ride-sharing services will lead to:

1. A concrete analysis based on the scope of Ride2Rail project, and
2. The analysis of the state-of-the-art of ride-sharing systems and target types of ride-sharing TSPs and ride-sharing travelers and the release of recommendations and criteria for a successful ride-sharing in the IP4 ecosystem

5. Analysis. The 5 identified objectives support the scope of this deliverable. Collected and grouped information was analyzed and used as input towards supporting each of the five objectives: “Definition of ride-sharing system” (Chapter 7), “State-of-the art for ride-sharing systems” (Chapter 7), “Analysis of the legal framework in EU countries” (Chapter 8) “Identification of current and potential ride-sharing TSPs" (Chapter 9), and “Identification of current and potential ride-sharing travelers” (Chapter 9).

6. Evaluation and Synthesis. Deliverable 2.2 describes in detail Parts 1 through 5 of the proposed methodology. The results of the analysis (part 5) will be evaluated and combined with results from the conversational survey to provide recommendations and criteria for a successful ride-sharing (Deliverable 2.5).

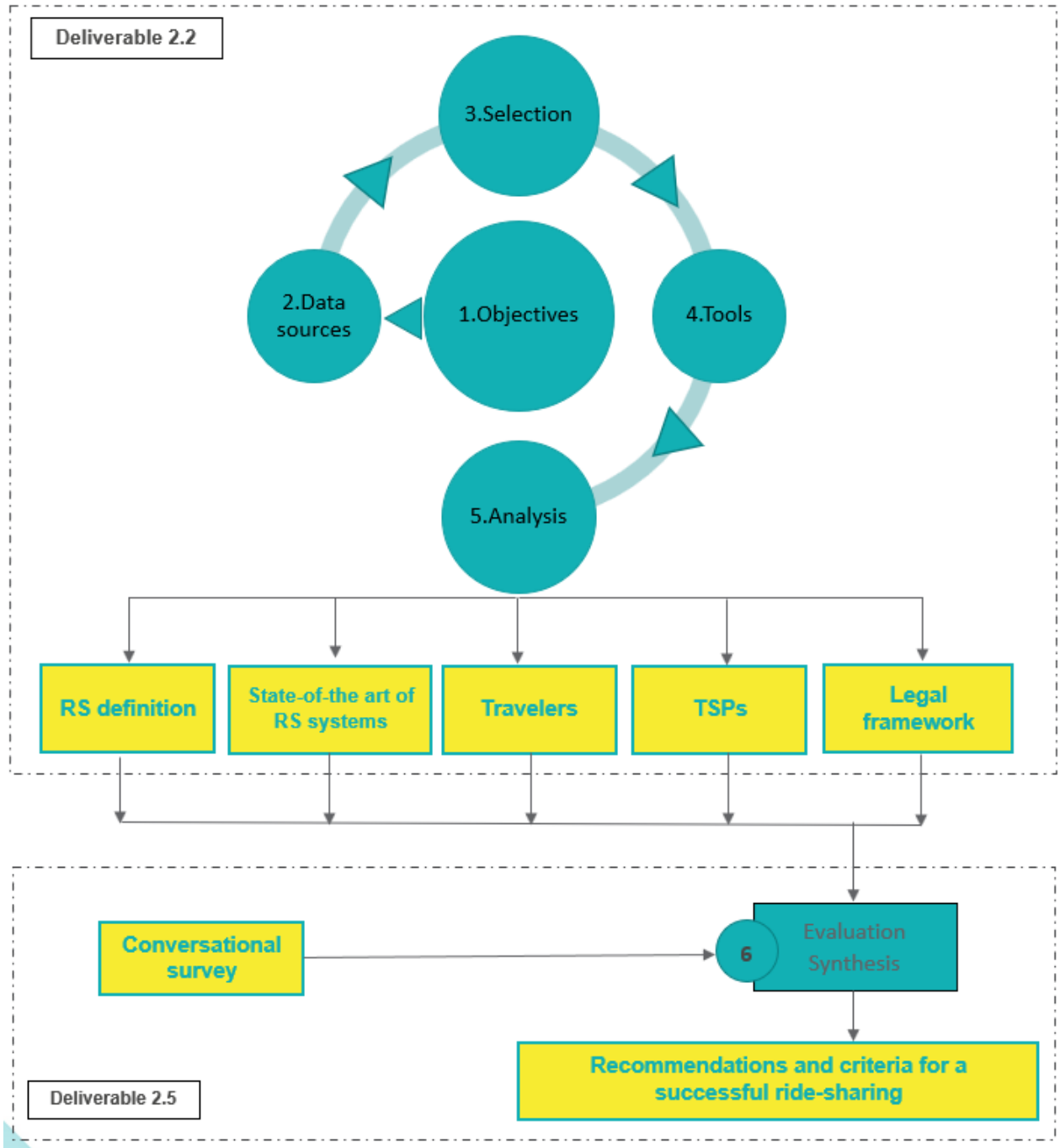

Figure 3. Methodological steps

7. STATE-OF-THE ART OF RIDE-SHARING SYSTEMS

The literature review focused firstly on the identification of different ride-sharing concepts and definitions as these are used in the literature. Thus, as a first step the keywords which are related to ride-sharing were identified; this enabled the conceptualization of the research and helped to target relevant articles. Keywords related to shared mobility definition include ride-sharing, carpooling, ride-hailing, on-demand mobility, etc. (Section 6.1). Information was searched through scientific web sites including Science Direct, Web of Science, Google Scholar, Wiley Online Library and Springer as well as the EU portal for European projects, CORDIS and individual project sites. Concurrently, authors and year of publication were also identified to perform a second search based on their names. Car-sharing related publications and projects were excluded from this research to focus exclusively on on-demand transportation for passengers.

In the next step, a database of all relevant publications was built. In this step the title, authors, year of publication, location of study, keywords for the service that is described in the publication, and the definition of the service used were recorded. Finally, service providers were identified and recorded. Most of the information was found in the English language, while publications identified in the local language were translated into the English language. In total, 80 publications were identified as relevant and 70 service providers were recorded at global level for further analysis.

7.1. Ride-sharing definition

Reviewed publications indicated that several terms are used in the context of ride-sharing services and systems including ride-hailing, ride-pooling, vanpooling, ride-sharing, dynamic ride-sharing, and carpooling. The literature review showed that a universally accepted definition for “ride-sharing” does not exist; thus, authors choose to define “ride-sharing” in each publication based on the context of their study. Additionally, the term ride-sharing is used either for profit or non-profit services.

RIDE2RAIL aims to further enhance the notion of ride-sharing by developing, testing and delivering a suite of as-a-service software components, proposing trips that will be covered partly by public transport modes and partly by private cars (ride-sharing). Ride-sharing will, therefore, complement rail and other public transport modes available in rural areas, with the focus being in the further inclusion of rail in the multimodal transport chain. RIDE2RAIL aims to facilitate access in the first/last mile of the provided transport services, to optimize multimodality and on-demand mobility, thus reducing single-occupant trips and finally to develop “smart rural transport areas”.

Therefore, within the scope of the RIDE2RAIL project, "ride-sharing” refers to the transportation of persons in a motor vehicle when such transportation is incidental to the principal purpose of the driver, which is to reach a destination and not to transport persons for any kind of profit (Code of Virginia 1989).

Furthermore, the project will build on this definition and it will implement real-time route

planning, ride matching and integrated trip payment services.

7.2. Ride-sharing systems

In total, 80 publications were identified as relevant and 59 ride-sharing providers were recorded at global level. The template that was used to collect relevant information is used for each ride-sharing system and is presented in Annex. It should be mentioned that the ride-sharing systems analyzed here refer to both for-profit and non-profit ones, to identify and highlight potential barriers and incentives related to all types of ride-sharing systems, and which could impact (negatively or positively) their market share. Such barriers and incentives, where applicable, should be examined for adjustability from for-profit to non-profit ride-sharing systems with the aim to develop successful ride-sharing systems (Deliverable 2.5). All referenced online sources in this section have been accessed from February 1 to February 15, 2020.

Twelve providers were excluded from further analysis as these are characterized as car-sharing systems. In total 38 for-profit (P) and 29 non-profit (NP) ride-sharing systems have been identified. Eight ride-sharing systems are identified as both for-profit and non-profit as for these ride-sharing systems the fee that each rider is charged for the trip lies on the driver's judgement, which is considered as the travel service provider.

The majority of NP ride-sharing systems charge travelers based on the distance traveled, to cover gas and parking expanses. The system recommends a ride fee and travelers decide to accept it or not; from the total fee the system retain a fixed amount to cover the transaction. Although this is the practice in only very few occasions (only 2% of the cases), which refer to long-haul services, drivers may decide what to charge passengers after reviewing the system's recommendation.

In terms of geographical coverage, a ride-sharing system that operates or operated in one or more EU, Asian, and Latin America countries is classified as Europe, Asia and Latin American-based, respectively. Other groups include Unites States and Canada. Ride-sharing systems that provide services to more than one of these geographic groups are classified as global services. The majority of the ride-sharing systems were found to be EU (34%) or global (35%). It should be noted that EU based systems include an Israeli and a Turkish ride-sharing system. U.S and Asia based systems accounted for 17% and 10% of all systems, respectively. A small share of only 3.4% systems has been found to operate exclusively in Canada (1.7%) and Latin America (1.7%). Although, these shares refer to the wider area of countries or continents, rarely one system covers the totality of a country as in most cases, systems operate in a specific city or several close-by cities.

Short and long-haul services cover roughly 58% and 12% of all services, respectively, while ride-sharing services that cover both short and long-haul trips account for 30% of all services. Short haul trips here are considered within the same city; long haul include all other trip types. Often, ride-sharing systems that provide only long-haul services provide booking access through a website platform and provision of further services that are usually provided though mobile applications are is not available.

Several of the systems identified through the research have ceased operations due to the low demand from customers; some of them have re-opened under different names and follow a different business model. Approximately, 80% of the ride-sharing systems surveyed are currently in operation, whereas 20% have ceased their operation. The vast majority of ride-sharing systems (92%) have started their operation in 2005 or after, while 65% was found to start operations in or after 2010, which might be explained by the advanced development of mobile applications and the rapid spread of smart phone utilization.

We found that an important aspect to address security concerns and improve the overall level of services is users' feedback, as all ride-sharing systems allow travelers to provide "feedback" either through the provided platform, through the application, or both. The feedback system allows travelers to comment and evaluate the seriousness and reliability of drivers and vice versa. In some cases, and to strengthen the feeling of safety, the mobile application employs GPS tracking that may or not be shared with users' contacts to ensure that rides are monitored and completed as planned. To further increase the sense of safety some systems provide women with the option to travel only with other women as co-travelers or even drivers.

The procedure to access the system the same in most cases: users enter the system, register and then search for offered trips. Although most of the systems rely on a mobile application to book trips, the majority of them offer standardized options to the user, probably in order to provide plain interfaces which are simple to use, and to minimize development and operational costs. Trips are usually organized within two hours before the actual trip taking place. In some cases, however, the systems offer the opportunity to pre-plan trips one to two days in advance (e.g., for long-haul trips).

Ride-sharing systems provide several incentives to improve and promote the utilization of their services. These incentives are provided in agreement with private companies or public authorities. Incentives include toll cost reduction, HOV and green zone access, free parking access in public or private areas, public transport ticket discounts and collection of points that may be redeemed in collaboration with selected companies.

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8. CONTEXT AND LEGAL FRAMEWORK IN EU COUNTRIES

The legislative and regulatory framework related to ride-sharing for each of the EU28 countries is described in this section; the descriptive review has been prepared based on a desk research. A template was not provided because the legislative and regulatory framework for ride-sharing systems and services vary greatly for each country.

The degree of sophistication of the existing laws and the quality of data varies significantly between countries, as the level of utilization of ride-sharing services changes. Given that the majority of legislative documents are written in the national language of each country, only documents written in English were considered for this analysis. These were supplemented by information and news released in journalistic web sites that provide an insight on the latest news and advances on ride-sharing.

The European Union transport policy aims to ensure the movement of people and goods throughout the EU by means of integrated networks using all modes of transport (road, rail, water and air). Governed by Title VI of the Treaty on the Functioning of the EU, transport is one of the EU's most strategic common policies. However, within the existing legislation a common directive for shared mobility is not shared. As the EU regulatory framework does not support yet shared-mobility services with a EU decision, which may hinder their success, such services will need to be well governed.

To best assess the impacts of shared mobility services in European cities, it becomes essential to understand the regulatory environment in which the service operates. In the section that follows, the situation in each one of the 27 EU members and the U.K. included, is briefly presented.

8.1. Ride-sharing legislation in EU Members States and the U.K.

1. Austria

Ride-sharing is relatively common in Austria; there are several ride-sharing-exchanges (Mitfahbörsen) that seek to match those proposing trips to those who would like to take them. There are some which are more well-known than others for example Blablacar (which is known across Europe) as well as the more local and German websites. The difficulties faced by ride-sharing companies in Austria include the price of the ride that is required to reflect only the costs and not cause any over compensation; otherwise this will be considered a for-profit service and may fall under laws relating to taxis. Another issue is the availability of rides to a location that may not be in a large city, but in a less densely populated area.

There is no specific ride-sharing and car-sharing legislation. Hence, general provisions regarding driving private vehicles apply. There are no regulatory rules for non-profit ride-sharing, but the total proceeds from the riders to the driver must not exceed the costs of running the car (generally, EUR 0.05/km per additional passenger has been established by jurisdiction and case law as an acceptable threshold).

2. Belgium

The situation in Belgium can be confusing due to the sometimes very drastic differences in legislation between the regions. Brussels, Flanders and Wallonia all have differing legislation, not to mention the bye-laws of the city or commune into account. The Federal government promotes the use of covoiturage for commuting to work and provides certain tax benefits or requires companies to support ride-sharing activities. This is possibly due to many companies in Belgium offering a company car that can contribute to congestion particularly in larger cities.

Websites that link people to ride-sharing opportunities in Belgium include Facebook, Blablacar and Carpool (Taxistop), another option for ride-sharing is Covoitstop where people are registered in a system and wear an armband at a predetermined stop to join a rideshare.

“Wallonia is considering introducing legislation which may update the new legal framework to take into account the new technological developments. Pre-arranged long-distance ride-sharing is provided by large international players (Blablacar).” (EU-DG Directorate 2016)

3. Bulgaria

Road transport in Bulgaria is regulated mostly by the Road Transport Law, but this legislation does not cover shared journeys. Car-pooling services have been operated occasionally in Bulgaria, either by companies or within the framework of research projects. The most popular shared journey planning webpages (i.e., www.carpool.bg, www.vednaposoka.com and www.3na100.com) provided a connection between drivers and passengers in order to share a journey. These three platforms had a different visual interface but all of them required the user to register before being allowed to search for various destinations. These platforms offered mostly work-related journeys and journeys between metropolitan and medium-sized cities in Bulgaria.

According to the Competition Protection Commission of Bulgaria, the court ruled that Uber would be deprived of the right to conduct its service until it complied with the requirements of the Bulgarian legislation. Following that act, the Bulgaria Parliament approved the second and final reading of amendments to the Road Transport Act, saying that taxi services may be rendered only by registered carriers with certificates of registration. The ride-sharing service Uber suspended its activities in Bulgaria in 2015; Sofia was the only place in Bulgaria where the Uber service was available.

4. Croatia

The main national legislation, the Road Transport Act (RTA) provides a legal framework for taxi service and ride-hailing services, while the detailed regulation is delegated to the local governments. There is no special legislation applicable to ride-sharing and car-sharing and, according to the replies to the stakeholder consultation, in the current legislative environment, it is difficult to develop innovative services. Long-distance ride-sharing intermediaries are also available in Croatia.

Despite the fact that no similar efforts had previously been undertaken, the CIVITAS ELAN project successfully implemented a carpooling scheme in eight institutions in Croatia in 2012.

Uber began operations in Croatia in 2015, the Sustainable Development of Croatia party and major taxi service companies were against it, stating that the price of Uber service is not enough to compensate the drivers for gas, car maintenance, passenger insurance, and health and retirement insurance for the driver; Uber prices also do not include VAT or surtax. In June 2016, Uber started operating in Split, Croatia and Dubrovnik. The Misdemeanor Court in Zagreb has rejected a motion filed by the government, which wanted the court to ban Uber in Croatia.

5. Cyprus

There are no specific rules for ride-sharing and car-sharing in Cyprus. Until lately, ride-sharing or carpooling services were not developed in Cyprus. Bolt (rides start with a fixed base fee, plus a per mile and per minute charge), a ride-sharing company identical to Uber, started operating in Nicosia offering short and long-haul trips. Car-pooling services for long haul trips where passengers arrange on their own the fee of their trip are available in Cyprus.

6. Czech Republic

The legal framework for taxi services is set forth primarily in Act No. 111/1994 Coll., Road Transportation Act, as amended (RTA). Ride-sharing and car-sharing are not specifically regulated under Czech law. However, if the driver pursues these activities regularly in order to make a profit, it will most likely fall within the category of classic taxi services and be subject to the same regulation.

Uber has reached an agreement with the Czech government to standardize its operations in the country. Its drivers will have the same or similar license as taxi drivers, and will register their sales. Uber is also open for foreign drivers, which is not the case for taxi drivers. Many also challenged the regulations for taxi drivers, who have to pass an exam on their knowledge of local geography in an era of online navigation systems.

Uber also experienced a legal fight in Brno the second biggest Czech city. The Brno city court ruled in April 2017, that Uber drivers could not provide services without a taxi permit. Uber's activity in Brno was preliminarily stopped by the regional court in July 2017, but, in October 2017, a higher court canceled the measure. In March 2018, Uber concluded an agreement with the Czech government. Drivers under this agreement will have to be licensed as taxi drivers.

7. Denmark

Denmark has very strict regulations for taxis, requiring specific items including the posting of fare information, company name on the vehicle, video surveillance, seat sensors and taximeters. These requirements mean that the difference between a ride-sharing service and a taxi service is important to avoid any illegality. Such strict regulations mean that, for example, Uber is de facto banned in Denmark. Ride-sharing does not seem to be affected.

“Transport Act EO15 exempts car-sharing and ride-sharing from the definition in EO1 Sec. 1, and thus from the Taxi Act and the other relevant executive orders. The only condition for exemption is that the users of these kinds of services only pay for the costs directly connected to the use” (EU-DG Directorate 2016).

8. Estonia

Until 2016, there were no specific ride-sharing regulations in Estonia. However, the Road Transport Act regulates the carriage of passengers for which the carrier does not receive remuneration. The Estonian Parliament has registered a draft law (an amendment to the Public Transportation Act) that would allow for unlicensed pre-arranged services intermediated by electronic platforms. The draft would allow for both physical persons and legal persons to offer services via the electronic platform operator, subject to minimum requirements, such as the fully electronic ordering of a ride, payments and good repute of the drivers. As of 2018, ride-sharing law removed the requirement of professional training for taxi drivers, and instead left it to the taxi and rideshare businesses to arrange all necessary training. A common licensing and quality vetting process will be put in place. Taxify and Uber have been operating all this time. In June 2017, The Parliament of Estonia voted to enable ride-sharing & delivery robots in traffic, a big step forward for the sharing economy.

9. Finland

Ride-sharing and car-sharing are not regulated in Finland since they are not regarded as professionals in their nature. To be considered nonprofessional, the payment for the ride should be insignificant, i.e. it should only cover the costs of the trip. Uber and Taxify are available in Finland (mainly in the Helsinki metropolitan area) and the Ministry has regarded Uber and Taxify as dispatch centers. Operating a dispatch center for ride-sharing or taxis does not require a taxi license.

Ride-sharing is allowed as long as the private drivers do not invoice more than the real costs of the journey; any transport activity for profit requires a license. Intermediaries like Uber and Taxify are allowed and considered as dispatch centers. The proposed reform should remove the quantitative restrictions and allow more competition between services. Car and ride-sharing cannot be operated professionally in Finland, as any provision of passenger transport services against payment requires a license. Thus, all the ‘operators’ are websites or groups, which match the demand and the offer of rides with the purpose to share the travel costs.

In the absence of specific legislation, such activity is governed by the general contract legislation (e.g. the Contracts Act). The vehicles used in ride-sharing are covered by a mandatory traffic insurance (see s.II.3.2 Insurance) and the drivers are subject to traffic rules set out in the Tieliikennelaki (Road Traffic Act 261/1981)). The websites are not ‘dispatch centers’ within the meaning of the Taxi Traffic Act and thus are not subject to the obligations set therein.

10. France

France comparatively has very clear regulations concerning ride-sharing. The definition is “The common use of a motorized ground vehicle by a driver and one or more passengers for travel without the burden of costs other than sharing the expenses of the trip on a journey that the driver is completing on her/his own account” (EU-DG Directorate 2016). With regards to insurance, the rules appear to be simple and clear, which is good for those who rideshare as

they will understand the regulations. For example, the registered owner of the car will be liable for any offences caused and not the driver (unless the owner and the driver are the same person). The government supports ride-sharing and encourages its promotion especially in companies with more than 250 employees.

This does not mean that there are no issues that arise in France. There is a debate around the "sharing" of insurance, as this means that someone, who is part of a rideshare and has only been driving for a short period of time will benefit from the insurance savings of the registered car owner that has been driving for a considerably longer period of time. And there is also the issue of ride-sharing with a company car; if all the expenses are paid by the company and not the driver, this may mean that the driver is making an income, which is not allowed for a rideshare as the money received by the driver cannot exceed the costs of the trip itself.

"The current legislation does not provide a systematic legislative framework for the ride-sharing or for the innovative mobility service providers. However, it contains Article L 3124-12 which punishes the organization of matchmaking system between consumers and taxis without being a road transport company allowed to carry out occasional services, a taxi company or a VTC company. The offence is a criminal offence. According to parliamentary work, the criminal offences introduced by the reform are aimed to specifically punish the reservation system organizing a fraudulent or fake ride-sharing" (EU-DG Directorate 2016).

11. Germany

With regard to ride-sharing, in the event that a ride-sharing service provider enters into the contract for transport with the passenger – beyond the mere mediation/facilitation – and influences the price of the transport, he is considered to run a passenger transport business and therefore, it has to obtain a license pursuant to Carriage of Passengers Act (PBefG). Ride-sharing intermediaries that match drivers offering the rides with passengers (without running a ride-sharing service business themselves and without entering into a passenger transport contract) are not covered by PBefG or German Ordinance on Operation of Motor Transport Business in Passenger Transport (BOKraft) or by any separate legal framework. However, there are some general provisions in relation to online platform services which also covers ride-sharing platforms such as the Telemedia Act (Telemediengesetz, "TMG"), which implements Directive 2007/65/EC. Interestingly, PBefG allows competent authorities to issue a license for occasional passenger transport services mixing up several types of admissible forms of occasional passenger transport if public order interests do not oppose such license. Until now, the authorities never issued such mixed licenses.

The country imposes a tangle of licensing rules that makes it hard to recruit independent drivers. Germany requires drivers to pass health and driving tests, as well as receive a business license that includes a bookkeeping exam. Car-pooling services are banned. While Uber waits for rule changes, it has teamed up with private car services and some taxi operators who already have the required licenses and drivers. As of the end of 2019, a Frankfurt Court has declared that Uber provides a service by itself and, therefore, it is obligated to hold a license as a hire car company. Uber has quickly adapted to that by declaring that the driver will show in the vehicle to which company with an approved license belongs.

The main current problem for ride-hailing car services in Germany is the obligation for the drivers to come back to the deposit where the car is registered before picking up another passenger. Despite some statements by the Transport Minister in 2018 advocating for an adaptation of the legislation to the needs of ride-hailing companies, nothing has happened yet. Taxi services facilitated through apps by companies such as Uber and performed by taxi companies are not controversial.

12. Greece

The taxis and car-hailing services are regulated by Law 4530/2018, which covers, among others, licensing terms and conditions, vehicles' technical requirements, and qualitative requirements to be met by vehicles' driver and owner. Private companies that provide ride-sharing services were introduced in 2017 as an attempt to liberalize a relatively closed market.

UberX, the basic level of UBER service, was introduced in Athens and it provided private rides in a standard car with a driver for up to four passengers. However, a new legislative framework has been adopted in 2018 with provisions affecting ride-sharing services. These provisions prohibit the operation of ride-sharing-type services and the transport of people by taxi brokers (i.e. broker is a company between a customer and a transport provider). In April 2018, Uber suspended its service in Greece after regulations were implemented that require all rides to begin and end in the fleet partner's designated headquarters or parking area. An amending Law 4607/2019, regulates on automatic payments made by card consumers through taxi applications (e.g. Taxibeat). Under the new law amendment, the consumer will pay the fare to the taxi driver and not to the mediator and his enforcement. Car-pooling services for long haul trips where passengers arrange on their own the fee of their trip are available in Greece (e.g., Facebook groups).

13. Hungary

Low numbers of ridesharers/carpoolers in Hungary mean that further matches between passengers and drivers can be difficult. Suspicion and security concerns may mean that people are less likely to take such an intimate form of transport. Home-grown apps are contributing to the increase in the use of ride-sharing, an example being Oszkar. "In Hungary, there is no separate regulatory regime which specifically applies to ride-sharing services. In case of IT intermediaries facilitating professional passenger transport, they must comply with the rules on dispatch center and obtain a license. Ride-sharing is currently allowed only to share the costs of the journey."

14. Ireland

Ireland does not have a large ride-sharing population. The terminology in the media is often not the same as the terminology used in more official reporting of the situation. Ride-sharing often means the Uber-style form of taxi services rather than a non-professional driver trying to recoup some costs of the trip that the driver was going to complete anyway (with or without the additional guest). The strict application of regulations relating to taxis means that carpooling companies may be put off due to fear of sanctions. The government does however,

appear to support the implementation of ride-sharing activities in companies by providing incentives. The Guaranteed Ride Home scheme allows for those whose rideshare has unexpectedly been cancelled due to an emergency to avail of a free taxi home. “Commercial ride-sharing is not permitted under the existing legislation. The carriage of passengers for a fare in a public place in a mechanically propelled vehicle with nine or less seats (including the driver’s) must adhere to the regulatory framework for small public service vehicle” (EU-DG Directorate 2016).

15. Italy

In principle the transport of passengers made for economic compensation, without licenses or authorizations, infringes both Italian Law No 21/1992 and the Highway Code, being the State the sole authority competent to adopt a legal framework applicable to services connecting the demand-side and the supply-side, such as platforms used to provide real-time ride-sharing, carpooling and car-sharing services. By fact, however, until 2016 carpooling and car sharing services were not regulated by any specific law or local regulation, for this reason there was no need for any license or authorisation.

To date, several ride-sharing systems are operating in Italy, such as BlaBlaCar and Sharethecity, but following different rules and models. For example, BlaBlaCar is a significant player in long distance, but does not operate in urban places, while Sharethecirty is far more active in the urban mobility segments. In addition, car-sharing services are provided by various players operating in more than one city such as Enjoy, Car2go, GirACI, Share’ngo (electric).

The situation remains still unregulated, with several applications being operable only under specific models. UBER, for example, is available only through the UBER Black app, which means higher prices and fancier cars.

16. Latvia

There is no specific regulation regarding ride-sharing and car-sharing services either at the national or at the regional level. The first legislative initiative that included a proposal for the introduction of ride-sharing amendments of Road Transport Law was submitted to the Latvian parliament (Saeima) in August 2016. Ride-sharing providers were already active in the market already before these amendments but such commercial activity was not recognized as fully corresponding to the legislation in the transport field due to the operation without the license and also according to taxation legislation. The new amendments in the Road Transport Law, adopted by the parliament on September 28, 2017, came into force on March 1, 2018. Amendments provided partly a unified approach defining the features of both kind services in the Road Transport Law. Some restrictions in law were applied to the providers of ride-sharing services, allowing them to accept only electronic payments. At the same time, for both taxis and ride-sharing providers, the new regulation stated obligation to register in the Enterprise Register as an enterprise (a commercial merchant or company) that automatically means that person (or company) is obliged to provide a complete accounting for its business.

From January of 2018 the Competition Council of Latvia was also involved in the evaluation of these legislative proposals submitted to the Cabinet of Ministers. The Competition Council of

Latvia challenged the imposition of excessive requirements for the ride-sharing services providers to register Enterprise Register, obligation to store data of mobile app providers on servers in Latvia and others. The Competition Council of Latvia's view was that although both kinds of services are similar and competing, the business models introduced should be different.

Finally, it should be admitted that although the actual legislation recognizes some common features of both services and sets similar requirements for setting up these business (also the need to register enterprise) with some differences of conducting business (restriction accept only electronic payments and use of online ordering only with mobile app by ride-sharing providers), it is more designed to restrict the possibility for private car owners to offer ride-sharing rather than create less burdensome requirements for taxi service providers.

17. Lithuania

Until October 2016 ride-sharing was an unregulated field under Lithuanian legislation and therefore, there were no requirements that drivers must be travelling from point A to point B themselves or that the ride-sharing activity could not be carried out for a profit. In October 2016, the Lithuanian Parliament passed an amendment to the Road Transport Code which regulated the ride-sharing service and introduced a fast-track procedure to obtain a license as ride-hailing transport operator.

18. Luxembourg

Luxembourg has no legal definition of ride-sharing, but as in other jurisdictions, it is tolerated, as long as the costs are limited to sharing the costs of the journey and do not appear to be paying for the service. The government even runs a website for carpooling/ride-sharing through which there are possible rebates for specific journeys when public transport in the area is unavailable e.g. trains during track upgrades. "Ride-sharing services exist in Luxembourg in the form of "genuine" ride-sharing (such as Karzoo, or Pendlerportal). Car-sharing was introduced at the end of 2015 and is managed by the municipality of Luxembourg Ville" (EU-DG Directorate 2016).

19. Malta

There is no specific legislation in place at the national or local levels that regulates ride-sharing. As regards to ride-sharing providers, Transport Malta is aware of two separate initiatives in the field of ride-sharing: Bum-a-Lyft and the University Car Pooling. No uber or Lift is available in Malta. However, Taxify a service very similar to Uber (both services match passengers with self-employed drivers) has been available in Malta for the last three years.

20. Netherlands

In the Netherlands, there is currently no special legislation applicable to ride-sharing. Ride-sharing is allowed to recover the costs of the journey. There are some incentives to share the vehicle such as designated ride-sharing parking. On December 8, 2014, the Dutch Administrative High Court for Trade and Industry 1323 banned the UberPOP ride-sharing

service that was launched as a pilot project in Amsterdam between July and September 2014, followed by an expansion into The Hague and Rotterdam. The Court ruled: "Drivers who transport people for payment without a license are breaking the law 1324. As a consequence, UberPOP has been marked as illegal by the Dutch court.

21. Poland

Until 2016, no specific rules were in place regulating ride-sharing and car-sharing. The Ministry of Finance had issued an opinion on the applicability of the tax regime to ride-sharing providers. No particular incentives existed, except the fact that ride-sharing and car-sharing were not regulated but generally accepted, and this seems to be an incentive for EU service providers to move/open their activities in Poland, especially companies experiencing difficulties under highly regulated jurisdictions such as France and Germany (Uber, Heetch, Wundercar).

Ride-sharing applications seemed tolerated and UberPop, Heetch and Wundercar are all active on the market.

As of 2018, under the new regulation drivers using peer-to-peer apps may do so without the need to apply for special licenses, unlike professional taxi drivers. Since entering the Polish market, Uber and Taxify have disrupted the industry, setting off numerous complaints and other protests from licensed taxi drivers who say that their livelihood is in danger.

In 2020 the Polish Act on Road Transport was amended and entered into force. This Amendment introduces completely new definitions, such as "intermediation in passenger transport", which also covers the activity of ride-sharing providers like Uber, Bolt and others, and explains that such intermediation is an economic activity consisting of transferring orders of passenger transport, collecting a fee for such transport, concluding relevant agreements and enabling the conclusion of agreements on passenger transport by taxi cab or other properly equipped car through "means of electronic communication, Internet domains, mobile applications, computer programs, telecommunication systems and other means of information"(EU-DG Directorate 2016).

From 2020, both carriers (drivers) and intermediaries are obliged to obtain a relevant licence to provide passenger transport services. Consequently, any person wanting to start or continue their service as a driver for a ride-sharing app like Uber or Bolt is legally required to obtain a license. The Amendment provides a new and clearer regulatory framework for intermediaries. While it may create some new barriers, such as licenses for ride-sharing apps drivers, the Amendment should not slow down the growth of ride-sharing apps, since they already enjoy equal or even greater customer confidence than traditional taxis. Time will tell whether the dispute will be mitigated and resolved.

22. Portugal

In Portugal the Law of Road Transport No 10/1990 regulates the activity of passengers' transport with light carriers. The government planned to revise and update the legislation to respond to technological changes. Concerning ride-sharing, the so-called 'Uber law'

establishes a legal framework for individual and paid passenger transport in 'ordinary' vehicles based on an electronic platform (TVDE).

According to Law 45/2018, TVDE operators must be awarded a license by the Institute of Mobility and Transport, which will be valid for 10 years. Operators must set up a company, because the law only allows "collective persons" to operate in the sector. The platforms operating in Portugal will be audited to ensure compliance with national legislation. TVDE drivers also have to complete a compulsory training course which will be valid for five years. The driver must have a written contract with a partner to become his/her employer in order to work legally.

TVDE drivers are restricted from picking up passengers on the street without an appointment through their platform, cannot drive in bus lanes and cannot stop at taxi ranks. Working time duration limits are also imposed for drivers. Car-pooling services, including CarpoolWorld and BlaBlaCar, for long haul trips where passengers arrange on their own the fee of their trip are available in Portugal.

23. Romania

According to a relevant study of the Commission, “In Romania, Law no. 38/2003 forbids the commercial transport of passengers by taxis without a license. A transport service via taxi or car-hailing service is provided by licensed operators with their own vehicles (including leased vehicles)”. In June, 2019 however, an emergency ordinance was adopted aiming to regulate ride-sharing services. Based on this, companies like Uber and Bolt are allowed to operate, but need to obtain a technical approval each year from the Ministry of Communications. Also, it is foreseen for the cars to meet specific criteria, such as the number of available seats (max. 5), a periodic technical inspection every six months and age (no more than 15 years old).

To sum up and based on various sources, after the market has been regulated in Romania, ride-sharing and carpooling are becoming increasingly popular.

24. Slovakia

No regulation specifically addresses ride-sharing and car-sharing in Slovakia. According to the rigid wording of the Road Transportation Act and to the interpretation of the authorities, ride-sharing and car-sharing activities might be considered as provision of taxi services if conducted as a business or with commercial purpose. An activity is considered to be conducted as a business if it is provided on a continuous basis in the person’s own name and responsibility and with the aim to achieve profit.

Furthermore, no legislative proposals are addressing this topic, even though from current market developments such legislation would be appropriate or amendments to the Road Transportation Act should be adopted to reflect the market situation.

Regular taxi operators were protesting against the arrival of new tech platforms (in particular Uber) in the Slovak market. They requested the Slovak government to adopt appropriate measures and prohibit such new market players. However, the situation is now at standstill and the government said they are yet analyzing the situation

Nevertheless, it is important to mention that, from a strictly legal point of view, these new technical platforms are most likely not violating the Road Transportation Act since they are only intermediaries providing a mechanism for the drivers to get more working opportunities. It should always be the drivers (provided that they would be provided the transportation services as defined under the Road Transportation Act and fulfilling the definition of conducting business) who would have to comply with all the requirements set out by the Road Transportation Act. Therefore, the risk of being sanctioned and even penalized by criminal sanctions rests mainly with the drivers.

25. Slovenia

Ride-sharing in Slovenia is not regulated, but as for any commercial transport, a license for the transport of passengers is required. More specifically, in the case of for-profit ride-sharing, this license is necessary. On the other hand, there is no existing regulation for non-profit ride-sharing, but the fee paid by the passengers must not exceed the costs of running the car. Amendments to the Road Transport Act are expected to regulate these types of services.

26. Spain

Ride-hailing services Uber and Cabify announced in January 2019 that they would stop their services in Barcelona. The Catalan regional government approved regulations that will force customers to request their services 15 minutes ahead of their planned journey time.

Following the 2019 regulations, taxis have been incorporated into the ride-sharing platforms. When booking a vehicle through UberX, the algorithm will offer users the closest car and inform them whether it is a VTC (private car) or a regular taxi. The process will be the same in either case: a fixed price, payment via the app, the chance to rate the driver and the choice of adding a tip or sharing the fare.

27. Sweden

There are no specific provisions on ride-sharing services, but national legislation allows for ride-sharing between private persons, for example colleagues sharing a ride to and from work. The current legislation is not easily applicable in peer-to-peer ride-sharing. Therefore, the Government has appointed an inquiry into this new form of service.

There is no special legislation applicable to car-sharing. The national legislation allows for non-profit ride-sharing, such as colleagues sharing a ride to and from work. In 2015, the Swedish Government appointed a commission to investigate how laws and regulations on taxis and ride-sharing can be adapted to the new reality. Ride-sharing platforms, especially for long-distance pre-arranged journeys, are active in Sweden, including Blablacar, Carpoolworld and Samanking, an important Swedish player.

The discussion about ride-sharing has mainly focused on how to allow and promote true ride-sharing without opening up the possibility of misuse of ride-sharing. An example of such misuse could be people claiming they are ride-sharing while they are actually offering taxi services for profit without fulfilling the requirements for taxi services. The governmental

inquiry's proposals about a new definition of ride-sharing have been criticized for making it too difficult to exert controls to ensure that people do not misuse ride-sharing.

At present, TNC-services are not permitted in Sweden, but they have triggered a much broader discussion than the particular issue of ride-sharing. Opening up the market for TNC-services and at the same time upholding a level playing field between TNC-services and traditional taxi services requires that the regulations for taxi services are reviewed. This is especially the case since the possibility to regulate TNCs –depending on the way the services are designed -is likely limited, owing to EU-wide rules on free movement for information society services and the prohibition on imposing prior authorization or any other requirements having equivalent effect on this kind of service provider.

28. United Kingdom

Ride-sharing figures in the U.K., in comparison with other countries, are lower. There could be many factors for this, including the fear that those who participate in ride-sharing will not have the correct insurance, or that there will be issues concerning taxes. Once again the issues with several different countries contributes to the confusion of regulations, as laws may differ in the different constituent countries of the U.K. with London having its own regulations. It is possible that the use of Transportation Network Companies (TNC) such as Uber, while enjoying wide market adoption, might be shifting users away from more efficient modes, such as ride-sharing.

"No specific ride-sharing and car-sharing legislation has been implemented by the U.K. authorities; however, various initiatives have taken place at national and local level to promote ride-sharing, especially for shift workers. An example is National CarShare UK,which was created in September 1998, which may be used also by employers to organize common shifts and which intends to amalgamate the sharing schemes run by individual companies. For car-sharing, a national non-profit organization, Carplus, that promotes responsible car use, has introduced an accreditation system for car-sharing operators which aims at providing a tool for organizations and authorities to assess operators when deciding who should be invited to submit proposals, supported or chosen for a contract" (EU-DG Directorate 2016).

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Table 1. Summary of relevant legislation in EU27 and the UK

	Country	Is ride-sharing allowed? (Y/N)	Is it regulated? (Y/N)	Comments
1	Austria	Yes	No	• Ridesharing is rather common, with several companies being available, either large ones, like BlaBlaCar or more local and hence smaller companies. • Difficulties faced by ride-sharing companies include the price of the ride which needs to reflect only the costs and not cause any over compensation
2	Belgium	Yes	Yes	• Very drastic differences in legislation between Brussels, Flanders and Wallonia; • Several large companies are available, biy not in all regions; • Companies promote ride-sharing, sometimes alos providing their own cars.
3	Bulgaria	Yes	Yes	• Uber available only in Sofia • Car-pooling services operating occasionally in Bulgaria, either by companies or in the framework of research projects.
4	Croatia	Yes	No	• Unofficial carpooling schemes have been successful • Long-distance ride-sharing intermediaries are also available in Croatia.
5	Cyprus	Yes	No	• Bolt, a ride-sharing company identical to Uber, operates in Nicosia offering short and long-haul trips. • Passengers arrange on their own the fee of their trip
6	Czech Republic	Yes	No	• Uber experienced a legal fight in the 2nd biggest city, Brno. Activity was preliminarily stopped. • Uber drivers will have to be licensed as taxi drivers.
7	Denmark	Yes	Yes	• Very strict regulations for taxis, making difference between a ride-sharing service and a taxi service important to avoid illegality. • Uber is de facto banned in Denmark. • Ride-sharing does not seem to be affected
8	Estonia	Yes	Yes	• It is up to to taxi and rideshare businesses to arrange necessary training • Taxify and Uber have been operating since 2015. • In June 2017 a law has been implemented, enabling ride-sharing & delivery robots in traffic.
9	Finland	Yes	No	• Uber and Taxify are available in Finland

	Country	Is ride-sharing allowed? (Y/N)	Is it regulated? (Y/N)	Comments
				• Car and ride-sharing cannot be operated professionally • Ride-sharing is allowed as long as the private drivers do not invoice more than the real costs of the journey
10	France	Yes	Yes	• The government supports ride-sharing and encourages its promotion • Most common issues to be discussed have to do with insurance and profit made (or not made) in some cases.
11	Germany	Yes	Yes	• Ride-sharing providers are considered to offer passenger transport business and they have to obtain a license. • Uber is available.
12	Greece	Yes	Yes	• UberX was introduced in 2017 and suspended in 2017. • Taxibeat, a similar service, is available. Car-pooling services for long haul trips where passengers arrange on their own the fee of their trip are available
13	Hungary	Yes	No	• Ride-sharing is currently allowed only to share the costs of the journey • Low level of interested users.
14	Ireland	Yes	No	• Government appears supportive of ride-sharing activities in companies by providing incentives. • Strict application of regulations relating to taxis means that carpooling companies may be put off due to fear of sanctions
15	Italy	Yes	No	• No specific license is required. For example, car-sharing services are provided by various players operating in more than one city such as Enjoy, Car2go, GirACI, Share'ngo (electric). • UBER is available only through the UBER Black app, which means higher prices and fancier cars
16	Latvia	Yes	Yes	• Providers of ride-sharing services can accept only electronic payments • Legislation is more designed to restrict the possibility for private car owners to offer ride-sharing rather than create less burdensome requirements for taxi service providers
17	Lithuania	Yes	Yes	• Uber and Taxify are available • There is a fast-track procedure to obtain a license as ride-hailing transport operator.
18	Luxemburg	Yes	No	• No legal definition of ride-sharing, but it is tolerated. • The government runs a website for carpooling/ride-sharing
19	Malta	Yes	No	• No specific legislation in place • No uber or Lyft available.

	Country	Is ride-sharing allowed? (Y/N)	Is it regulated? (Y/N)	Comments
				• Taxify, similar to Uber available the last three years.
20	Netherlands	Yes	No	• Ride-sharing is allowed in order to recover the costs of the journey. • Incentives provided to share the vehicle such as designated ride-sharing parking.
21	Poland	Yes	Yes	• Uber and Taxify are available. • From 2020, both carriers (drivers) and intermediaries are obliged to obtain a relevant license to provide passenger transport services
22	Portugal	Yes	Yes	• Ride-sharing is regulated by law and based on an electronic platform (TVDE). • CarpoolWorld and BlaBlaCar, for long haul trips are available.
23	Romania	Yes	Yes	• Uber and Bolt are allowed to operate, but need to obtain a technical approval each year from the Ministry of Communications • After the market has been regulated, ride-sharing and carpooling are becoming increasingly popular.
24	Slovakia	Yes	No	• There is no regulation which specifically addresses ride-sharing and car sharing. • Uber is available.
25	Slovenia	Yes	No	• For-profit ride-sharing license is necessary. • No existing regulation for non-profit ride-sharing.
26	Spain	No	Yes	• Ride-hailing services Uber and Cabify announced in January 2019 that they would stop their services in Barcelona. • taxis have been incorporated into the ride-sharing platforms
27	Sweden	Yes	No	• The national legislation allows for non-profit ride-sharing e.g. colleagues sharing a ride to and from work. • Ride-sharing platforms, especially for long-distance pre-arranged journeys, are active, including Blablacar, Carpoolworld
28	UK	Yes	No	• Ride-sharing figures in the U.K., in comparison with other countries, are lower • Uber is available

8.2. Summary

As it can be seen from the table included in the previous section, all EU-Members allow one way or another the operation of ridesharing systems. On the other hand, only 13 out of the 28 have implemented specific regulations in order to specify the context in which ride-sharing and carpooling systems could and should operate.

One of the main reasons for this situation is that, when making a profit is allowed, several complications arise with laws related to taxis. In this respect, many countries have chosen up till now not to regulate ride-sharing systems, but rather let them operate in a kind of “grey” area. Indeed, wherever large ride-sharing and/or carpooling companies enter the market (like Uber, BlaBlaCar and Taxify), huge strikes and other obstacles were encountered, which in many cases led to the banning (at least for some time) of these services. There are however other cases, such as the example of Croatia, where the Misdemeanor Court in Zagreb has rejected a motion filed by the government, which wanted the court to ban Uber in Croatia.

Several options have been examined to ameliorate this situation, such as including taxi drivers in the ride-sharing platforms (Spain) and obliging ride-sharing providers to acquire the same licenses as taxi drivers. In many cases, ride-sharing is allowed as long as the private drivers do not invoice more than the real costs of the journey. There are other cases, such as the case of the Czech law, where if the driver pursues these activities regularly in order to make a profit, it will most likely fall within the category of classic taxi services and be subject to the same regulation

Another way to work around the various legislations – and mostly to appease taxi drivers – is to allow large ride-sharing companies to provide only specific services (e.g., Uber black) or to allow them to operate only in specific areas and/or regions. One such case is Bulgaria, where Uber is allowed to operate only in Sofia.

Overall, the discussion about ride-sharing has mainly focused on how to allow and promote true ride-sharing without opening up the possibility of misuse of ride-sharing. An example of such misuse could be people claiming they are ride-sharing while they are actually offering taxi services for profit without fulfilling the requirements for taxi services (Sweden).

Despite this situation, Governments, countries and users acknowledge the many advantages of ride-sharing for the environment, for the sharing economy, and of course for the reduction of congestion in large urban areas. There are several cases of ride-sharing systems that were initiated in the framework of research projects or by specific companies and universities, which proved to be very successful and contributed to the overall promotion of ride-sharing systems.

For this reason, almost all EU Member States are in the process of identifying the (legal) ways in which ride-sharing could be allowed, without benefiting one sector over another and without causing problems to the economy.

9. RIDE-SHARING USERS

Ride-sharing services have been found to promote sustainable transportation as they reduce car utilization and minimize negative impacts related to carbon, emissions and travelling costs and congestion (Garling and Steg 2007). Several studies in the literature review focus on the understanding of users' attitude and characteristics towards encouraging them to use ride-sharing services (Neoh et al. 2017).

As stated by Neoh et al. (2017), it becomes unlikely that transportation planners will be able to make policy decisions on promoting sharing services by relying on single studies. Therefore, this section summarizes findings that focus on the identification of motivations and constraints that users may face when using ride-sharing services. The objective is to use this information to identify current and potential ride-sharing TSPs and ride-sharing travelers, to be targeted within the context of RIDE2RAIL. In order to define targeted types of users for the survey to be conducted (Deliverable 2.5), this section adopts the factor analysis approach to identify those factors (i.e., characteristics, behaviour and needs) that contribute to the utilization of ride-sharing services. The factors loadings are used to identify which factors are associated positively, negatively or neutrally with the likelihood to use ride-sharing services. Factor loadings are omitted from this section as the primary objective is to identify the factors associated with the likelihood of using ride-sharing services. Findings are grouped into ride-sharing riders and drivers, with the former ones referred as travelers and the latter ones referred as Travel Service Providers (TSPs).

9.1. Travelers and ride-sharing

The relationship that exists between demographic, behavioral characteristics and ride-sharing is found to be intricate according to the findings of surveyed literature. The socio-economic and demographic impacts can be described by a complex set of direct and indirect relationships (Buliung et al. 2010). Ride-sharing research results on travelers' characteristics and attributes tend to refer to identical factors, which can be categorized in various ways; for example, Buliung et al. (2010) classified ride-sharing factors as socio-demographic, spatial, temporal, automobile availability, and attitudinal, whereas Neoh et al. (2017) grouped them into internal or external to the commuter. Our approach adapts their approach with some minor adjustments, as ride-sharing factors are grouped into direct and indirect factors. Direct factors are considered to be all these factors associated with the traveler's demographic and socioeconomic status as well as with the reasons behind ride-sharing. Indirect factors refer to the environment that may promote or constrain the utilization of ride-sharing systems, such as policies, incentives, location, concerns about sustainability, etc. Although the terms ride-sharing and carpooling are used interchangeably in the literature, the term ride-sharing (defined in Chapter 6) is used thoroughly for our analysis

In previous studies the share of ride-sharing travelers for communities for which ride-sharing services are available is estimated to fluctuate between 9% and 16% (Bulteau et al. 2019). Several important traveler characteristics have been identified in the past including attitudes, demographic, habit and income changes. A sample of findings from recent studies is summarized in Table 2**Error! Reference source not found.**.

With respect to personal characteristics, Kaufman (2002) indicated that socio-economic characteristics do not play a significant role in the choice of ride-sharing, which is in agreement with other studies that expand the factor list that ride-sharing is not associated with socio-demographics, gender, age and educational level (Bulteau et al. 2019). The same research, which focuses on workers, mentions that only one income cohort appeared to be significant; households earning between €2.5 and 4k per month are more likely to adopt ride-sharing than those earning less than 1 k€. (Bulteau et al. 2019). Therefore, income is negatively associated with ride-sharing, which means as the household income increases the likelihood to use ride-sharing decreases. Therefore, as ride-sharing appears to be more popular among low-income commuters, there is a negative association for the factor income. More recent data from the National Household Travel Survey in the U.S. (2017) indicates that ride-sharing travelers generally have lower incomes, and minorities (typically Hispanics and African Americans) tend to ride-share more than other racial and ethnic groups (Shaheen and Cohen 2019). Higher vehicle ownership is found not to favor the utilization of ride-sharing services (Ferguson 1995); however, a study in China showed that the ride-sharing adoption rate was similar between households with cars and those without (Wang 2011). The tendency to adopt ride-sharing services is higher among individuals in households with more workers than vehicles, compared to other individuals. The presence of children, elderly persons, or both, in the household is likely to have a negative effect on the adoption and frequency of use.

Similarly, a study focusing on students showed that students between 18 and 24 years old with a relatively low-income level, that is, less than CAD $20K per annum, were more willing to use the social network-based ride-sharing system (Tahmasseby et al. 2016). It is worth mentioning that other studies concluded that younger and older people tend to be passengers, while middle-aged people tend to be drivers. Finally, there is not a relationship between the population density of the home environment and ride-sharing (Tahmasseby et al. 2016). In terms of marital status, travelers between the ages of 25 and 34 were more likely to make trips (96%) versus non-commute trips (80%) by using ride-sharing services, and they were more likely to be single or married without children (Tahmasseby et al. 2016). Specifically, a propensity towards ride-sharing systems is demonstrated among unmarried and divorced commuters. A possible explanation could be that single individuals may be more comfortable riding with a stranger than married people would be (Tahmasseby et al. 2016).

Another factor for which findings vary in the literature is the age of travelers. Females, younger workers, and those who live with others are more likely to rideshare (Lee et al. 2016). However, Ciari and Axhausen (2012) found that that female individuals in Switzerland are less attracted to carpooling, maybe for security concerns. The literature suggests that older workers are less likely to participate in travel demand management initiatives, whereas other research suggests that participation in ride-sharing may increase across the age profile, up to 55 years of age (Buliung et al. 2009).

In terms of trip characteristics, commuters who travel longer distances were found to be more willing to use ride-sharing services. Similar findings were also reported for public transport student riders who would need to transfer between transit lines to reach their residence (Tahmasseby et al. 2016). Thus, a higher number of required transfers between public transport lines to complete a commute is a determining factor that may affect positively travelers to participate in real-time ride-sharing systems (Tahmasseby et al. 2016). However,

the in-vehicle time for public transport services was found to have a marginal impact on travelers' propensity toward ride-sharing (Tahmasseby et al. 2016). Based on transport mode shares for U.S., Australia, U.K. and Canada, there is some evidence that ride-sharing services and public transport may be competitors and that in the absence of adequate public transport services commuters opt for ride-sharing (Amey 2010).

Psychological barriers, attitudes and perceptions have been found to affect more the decision to use ride-sharing services than socio-demographics (Vanoutrive et al. 2017). Research showed that enjoying travel with others, environmental considerations, travel time saving, and vehicle cost-sharing affect at a significant level the choice to use ride-sharing services (Li et al. 2007). Participation in activities such as reading a book, texting, or browsing the internet on their smartphone during the commute may be another influential factor relating to ride-sharing demand (Tahmasseby et al. 2016). Transport cost and travel time have been found to be associated with ride-sharing and being one of the main reasons for participating in ride-sharing services (Bulteau et al. 2019, Chan and Shaheen 2012).

A main contributing factor for student travelers to choose ride-sharing services is their desire to save on gasoline costs, followed by a preference to do other things during riding (Tahmasseby et al. 2016). Reduced stress and travel time savings through the use of High Occupancy Vehicle (HOV) lanes in the U.S. are some of the results of using ride-sharing services (Tahmasseby et al. 2016). HOV lanes are used as an incentive by policy-makers as an approach to encouraging ride-sharing formation and use (Buliung et al. 2009). For this reason, potential increases of travel time as a result of increase in ride-sharing passengers could lead to dissolution of newly formed ride-shares. Suggestions have been made that emphasis should be placed on improving ride-sharing infrastructure (Buliung et al. 2009).

Frequently cited barriers to ride-sharing formation and use include: rigid scheduling and lack of matches between drivers and passengers (Morency 2007). Several incentives have been provided occasionally to ride-sharing travelers, including parking, commuter reward programs that may provide money or gift cards for ride-sharing, access to green zones, etc. Such incentives show that ride-sharing may attract participants from either single occupancy vehicles and/or public transit (Dorinson et al. 2009). Also, ride-sharing services are more likely to be used when an organization such as a company, university etc. provides these services in their premises (Tahmasseby et al. 2016). Those who work three to five days a week are more likely to use this rideshare program than those who work less than three or more than five days (Lee et al. 2016).

Other important factors for ride-sharing include security and trust (Hartwig and Buchmann 2007). Additionally, the flexibility in working schedule and concerns about sustainability showed a significant impact on the tendency towards real-time ride-sharing systems (Tahmasseby et al. 2016). People who work full time but with flexible schedules are more likely than other workers and non-workers to adopt and frequently use these services. Finally, research showed that the more information shared by travelers (i.e., time and place of the ride and information on interests and preferences), the more likely a matched ride could occur (Selker and Saphir 2010). Overall, financial incentives and environmental concerns appear to contribute the most relatively to other presented factors (Vanoutrive et al. 2017).

Table 2. Sample studies on ride-sharing: Positive (+), negative (-) and neutral (=) association of direct/indirect factors and ride-sharing travelers

	Direct								Indirect						
	Marital status*	Commute trips	Income	Gender+	Educational level	Age	Trip cost	Trip distance/ time	Security / trust	Incentive**	Matching	Rigid schedule	Population density	Sustainability concerns	Lack of transit stops
Agatz et al. (2012)				-			-		+						
Amey (2010)			-					+					-		+
Buliung et al. (2009)			-	+		+		+	+	+	+	+	=	+	
Bulteau et al. (2019)			-	=	=	=	-	+					=	+	
Hartwig and Buchmann (2007)							-		+						
Lee et al. (2016)		+	=	+	-	-	+	+				+	+		
Li et al. (2007)							-	+	+	+				+	+
Morency (2007)											+	-			
Neoh et al. (2017)			+/=	+	+	-	-	+	+	+	+		+	+	+
Shaheen and Cohen (2019)	+	+	-				-	+		+					
Tahmasseby et al. (2016)	+		-			+		+	+	+	+	-		+	+
Vanoutrive et al. (2017)			-				-	+					+	+	
Wang (2011)			+					+						+	

Notes:

*Marital status: unmarried and divorced

** Incentives: Free parking, use of HOV lanes, ride-sharing service available in the company or University

+Gender = female

9.2. Drivers and ride-sharing

This section identifies the characteristics of drivers within ride-sharing systems. The goal is to use these findings as a foundation for identifying potential Travel Service Providers (TSP) within the context of the project. The drivers who provide the ride-sharing services and are considered independent private entities will be considered as TSPs. This approach is different from most traditional forms of passenger transportation, where an authority or organization owns vehicles and/or employs drivers. Ride-sharing users can offer a ride as a driver or request transportation as a traveler. If the driver and the traveler agree on the proposed arrangement, the driver picks up the rider at the agreed time and location.

Several surveys have been conducted to study the traveler's behavior, however fewer of these focus on the driver's behavior. Individual workers citing a preference for driving all of the time or riding all of the time had less success with ride-sharing, than workers who indicated a preference for shared responsibilities. Respondents with a preference for driving only or riding only were nearly 50% and 53%, respectively, less likely to have ride-shared than those willing to share in the responsibilities (Buliung et al. 2010).

A survey of ride-sharing users in the U.S. found that 60% participated as passengers, while 12% were drivers and 28% were both passengers and drivers. Drivers indicated departure time flexibility as the primary reason for driving instead of riding (Oliphant 2008). Approximately, 33% of the respondents stated that they would rather not offer a ride in the evening (18:00 to 24:00), while more than 52% of ride passengers stated that they would not accept a ride in the evening (18:00 to 24:00) (Correia et al. 2013).

For drivers, a rider's profile is an important factor. Riders whose social network profile appears unattractive or incomplete have a lower chance of finding a ride offer. Therefore, it becomes essential for potential ride travelers to have a trustworthy profile, including a picture and education or job details, and contact information on a social network (e.g., LinkedIn, Facebook or Instagram). Similarly, the driver's profile plays the most significant role in one's decision to accept an offered ride (Tahmasseby et al. 2016). This challenge has been largely addressed through the development of increasingly sophisticated ride-matching systems.

Other studies concluded that younger and older people tend to be passengers, while middle-aged people tend to be drivers (Tahmasseby et al. 2016). Finally, drivers appear to avoid sometimes ride-sharing as they do not like delegating the driving task to others, which causes anxiety and stress (usually studied as 'locus of control') (Neoh et al. 2017, Vanoutrive et al. 2017).

Two studies conducted at the University of California examined the impact of toll increases on ride-sharing and transit use. The toll discouraged some drivers and riders, not only because of the cost itself, but also because the insertion of money into the social dynamics of offering or accepting a ride made them uncomfortable. Research results indicate that a $1 payment is now offered to drivers at most casual carpool sites. A few drivers stopped picking up riders because they were worried that collecting a fee would create insurance and liability issues. The toll did not affect more wealthy drivers because they considered the savings in travel time

in the high-occupancy toll lane more important than a toll (National Academies of Sciences 2012).

Drivers in ride-share arrangements are likely to respond to decreases in their operational costs such as parking and toll for entering city central zones. However, as solo drivers appear not to be so favorable about using ride-sharing services, incentives may need to be supplemented by pricing or/and educational strategies (e.g., sustainable commuting).

9.3. Ride-sharing trip purpose

Very limited information exists on the trip purpose of ride-sharing users, compared to the exploration of demographic characteristics for specific ride-sharing users, such as for the workers and students. Similarly, as most studies focus on commuting for work or education purposes, leisure/recreation trips are usually not investigated. Reinforcing our conclusion regarding leisure/recreation trips, Wilkowska et al. (2014) suggest that little analysis is performed on trip purposes other than work, while Li et al. (2007) found that only about 11% of single-occupancy vehicle trips were for leisure/recreational purposes, compared to 72% of high-occupancy vehicle trips (i.e., 2 or 3 passengers) that were for leisure/recreation purposes. As presented in Section 9.1 the majority of studies focus on workers' characteristics and behavior. Teal (1987) identified three types of ride-sharers based on how users ride-share: 1) Household (use only with household members), 2) External (use with unknown individuals), and 3) Riders (use only as travelers).

Nevertheless, ride-hailing services are preferred compared to ride-sharing services for leisure trips. For ride-hailing services leisure ranks first between trip purposes for different cities in United States, India, Brazil and Chile while work trips are ranked second (Tirachini, 2019). Similarly, a survey on ride-hailing trip characteristics, showed that 67%, were social or leisure in nature (such as trips to bars, restaurants, and concerts or visits to friends or family) in contrast to just 16 percent of trips that were work related (Cohen and Shaheen 2016).

9.4. Ride-sharing user types

Categorization of ride-sharing user (i.e., travelers and TSPs) is based on the users' trip purpose. An understanding of users' characteristics in relation to the trip purpose will provide the basis for developing a successful ride-sharing system. Given that the purpose of trips varies for different urban forms and locations, it is important to embrace a significant share of current and potential ride-sharing users to the forthcoming survey (i.e., be conducted in Task 2.2) covering a wide area of activities, hence providing recommendations and criteria for a successful ride-sharing. This is achieved by identifying sufficient user groups to represent the majority of ride-sharing users, independently of the location.

Taking into account the objective of this section and the literature review findings, the RIDE2RAIL proposes four main user types to be considered and targeted for the survey that will be conducted in Task 2.2. The four user types that are defined here represent the majority of trip activities that have the potential to ensure successful ride-sharing services; these are:

- Household work user
- Solo work user
- Education user
- Recreation/entertainment user

Household-based ride-sharing has the greatest success in terms of formation and in sustaining the practice (Tirachini, 2019). Recent data suggest that household ride-sharing likely represent the largest share of arrangements (Morency 2007). However, ride-sharing should be considered for recreation/entertainment activities as some of them are fixed in terms of time, day and place (e.g., grocery shopping, training).

As mentioned, and presented in Section 9.1 the literature offers mixed findings on the relationship between demographic, behavioral characteristics and ride-sharing. There might exist some relationships between ride-sharing, specific user types and their characteristics; however, after a specific user group adopts ride-sharing services, the practice may vary greatly within this user group, hence more complex relationships may ultimately describe the interactions that lead to such decisions (Buliung et al. 2010). Therefore, Table 3 refers to user characteristics that are identified in the majority of the publications and are associated with the defined user types. A further analysis, following the survey in D2.5, will be able to explore the user characteristics for specific locations, and reveal clusters of users having similar characteristics, behavior and needs.

Table 3 : List of ride-sharing user types and their characteristics

Ride-sharing user type	Description and characteristics
Household work user	**Trip to work with at least one other worker from the same household** Low-income; Age 25–49; Mode of transport for commuting - Car as driver and public transport; Travel time savings; Being in a multi-person household; Having more licensed drivers in the household than vehicles; Existing family members/friends or colleagues who ride-share; Travel time saving.
Solo work user	**Trip to work with unrelated individuals** Younger commuter; Family members/friends or colleagues who carpool; Travel time saving; Cost savings; Flexibility; Finding someone with the same location and schedule; Desirable user's profile.
Education user	**Trip for educational purposes with or w/o unrelated individuals** Low-income level; Undergraduate; Single/divorced; Flexible work time; Time saving; Concern for sustainability; Travel longer distances to the university; Low application fee; Desirable user's profile; High number of required transfers in public transport.

Recreation/ entertainment user	**Trip for recreation and entertainment purposes with or w/o unrelated individuals** Relaxation while traveling; Enjoy travel with others; Get work done while traveling; Cost saving and the desire to travel environmentally Age 18-29; Concern for sustainability.

The user types in Table 3 refer both to traveler and drivers as there is no evidence that role preferences are associated with specific trip purposes. Sharing roles, as opposed to drive-only or travel-only, has shown to affect success of ride-sharing. Sharing roles and resources appears to be the preferred approach, as participants look to acquire both the economic advantages of driving some of the time, and the perceived psychological/comfort benefit of being a traveler (Levin 1982). The literature shows that household and employer-based ride-sharing initiatives have the greatest success, with most ride-sharing users expressing an interest in sharing driving responsibilities (Buliung et al. 2010).

10. CONCLUSION

The ultimate goal of the RIDE2RAIL Project is to promote an effective ride-sharing practice of citizens, making it a complementary transport mode that extends public transport networks. Having this in mind, it was considered necessary first to conduct a detailed and complete, to the extent possible, state-of-the-art analysis in regards to existing or past ride-sharing systems encountered around the world, emphasizing on the ones operating in Europe. The present document serves this goal and sets the basis for the next project actions.

As a first step, the actual definition of ride-sharing was (re)searched. Several relevant definitions were found in previous scientific documents with the actual wording varying and including more or less features each time. Some of the definitions found, apart from *ride-sharing*, included notions such as ride-*hailing* and *ride-pooling.* Other definitions regarded similar notions, some of them being pre-*arranged ride-sharing, dynamic ride-sharing,* the "famous" *carpooling* and *car-sharing*. A very important comment to make at this point is that ride-sharing is used both in for-profit and non-profit offered services.

The authors of the present document have identified the following definition of ride-sharing that will be dealt with in the framework of the RIDE2RAIL project: *"ride-sharing refers to the transportation of persons in a motor vehicle when such transportation is incidental to the principal purpose of the driver, which is to reach a destination and not to transport persons for any kind of profit (Code of Virginia 1989").* However, the correct, in the sense of compatibility with the project's goals definition, will be further discussed and re-visited during the course of the project.

Afterwards, the project partners conducted an in-depth desktop research to identify ride-sharing systems around the globe, having as a scope to examine their main features, way of operation and problems encountered. Overall, 59 ride-sharing providers were identified around the globe, through the review of more than 80 research publications. The main conclusions drawn from this review are the following:

- Ride-sharing systems are either for-profit or non-profit.
- Several of the systems identified through the research have ceased operations due to the low demand on behalf of customers; some of them have re-opened under different names and following a different business model.
- Drivers need to be older than 17, in some cases older than 21.
- The procedure in the case of most systems is the same; users enter the system, register and then search for offered trips.
- Paying methods usually entail the use of credit cards; no ride-sharing system has been identified offering the possibility of payment by cash.
- Trips are usually on the spot, 0-2 hours before the actual trip taking place. In some cases, however, systems offer the opportunity to plan your trip 1-2 days before (mostly for the long-haul).
- In terms of geographical coverage, only rarely one system covers the totality of a country. In most cases, systems operate in a specific city or close-by cities.

- Safety is valued and guaranteed by most of the systems through rating and feedback systems that allow users to comment and evaluate the seriousness and reliability of drivers.
- In some cases, and to strengthen the feeling of safety, the system's mobile application employs GPS tracking and user's satisfaction to ensure that rides are monitored and completed as planned.
- To further expand the sense of safety some systems provide women with the option to travel only with other women as co-travelers or even drivers.
- Several incentives have been found to be provided by various systems to users. These include:
    - Reduction in tolls in case of more than 3 passengers (e.g. Autostradecarpooling).
    - Loyalty systems are offered by some ride-sharing systems, providing discounts once a specific amount of points has been collected (e.g. BerlKönig).
    - Access allowed to HOV lanes, which significantly speeds up the journey for both driver and passengers (e.g. Casual Carpool).
    - Some systems use electric or hybrid cars to further promote environmentally friendly solutions (CleverShuttle).
    - Exclusive parking spaces available for the users of the systems in specific participating locations. Drivers are entitled to park in the designated parking spaces (Flinc).
    - Discounts offered to specific user categories, such as students.
- Some systems offer more specific services such as trusted parents-drivers in the neighborhood or rides for pets.

The next step taken was the examination of the legislative framework with regards to ride-sharing that has been imposed in various countries. Research was limited to EU member States. The research was conducted through desk research, as well as through the examination of local sources.

If we were to draw one conclusion from this activity, this would be that Uber and similar services have never started operation in any country, with at least minor objections occurring from similar services providers, mainly taxi drivers. In fact, in most cases objections were strong enough to lead in many cases to the ceasing of the company's operation. The same happened with other similar service providers, like Taxify and Lyft.

The rationale behind these objections is that ride-sharing and companies offer services very similar to the ones offered by taxis, with fewer restrictions imposed on them and therefore allowing the offer of better prices. In some cases, this situation led to the total banning of ride-sharing services, while in others, policy makers preferred to leave the sector unregulated so as to allow, at least marginally, the operation of these companies.

In the countries where ride-sharing systems are allowed, drivers are requested to provide at least a valid driver's license, while in other countries a criminal check is also conducted. The

authors are in favor of this criminal check, as it ensures passengers' actual and perceived safety, increasing the market potential of ride-sharing companies.

Coming to pricing and relevant rules, this comes down to 3 categories; countries allowing only for-profit ride-sharing services, countries allowing only non-for-profit ride-sharing services and finally countries that allow ride-sharing services where travelers share the cost of the trip and only that, with no earnings being allowed on behalf of the service provider.

The final and probably most important step was to identify the characteristics of ride-sharing travelers and ride-sharing providers and define user types. This will assist partners in the next steps of the project to cluster user groups based on their characteristics, needs and behavior. The methodology for this activity included the review of several and variable sources. The four user types that are defined here, represent the majority of trip activities that have the potential to ensure successful ride-sharing services; these are: 1) Household work user, 2) Solo work user, 3) Education user, and 4) Recreation/entertainment user.

Based on the National Household Travel Survey in the U.S., the trend of declining average vehicle occupancy, measured as person miles per vehicle mile, was reversed after 2001. Vehicle occupancy to and from work (1.13 in 2009) is much lower since 1977 compared to activities such as shopping (1.78 in 2009) and social recreation (2.20 in 2009). Also, trips to and from work account for roughly 20% of all person trips while multi-occupant trips by personal vehicle account for 48.9% of all trips. This trend shows that people are less likely to ride-share for commutes to and from work, but more likely to share rides for social and recreational trips. This is an interesting fact to consider when developing a ride-share strategy. Nevertheless, the objective that is pursued in each case sets the basis for developing the most suitable strategy. For example, if the main goal is simply to maximize vehicle occupancy, then this may be a worthwhile effort. If the main goal is however to target trips that cause congestion and overload the network (leading to costly infrastructure expansion), then there is probably more value in focusing on increasing the occupancy of commuting trips (Amey 2010).

Socio-demographic characteristics were found to be related to ride-sharing. Ride-sharing is more common among commuters with lower incomes, those with longer travel distances to work, and with less access to a vehicle. So, when the costs of driving alone are relatively high, ride-sharing is more likely to be considered as an alternative. Studies have found that females and younger people are more likely to have the intention to switch to ride-sharing. Ride-sharing travelers between the ages of 25 and 34 were more likely to make commute trips versus non-commute trips and they are more likely to be single or married without children. Beliefs and attitudes, such as sustainability concerns and security were found to play an important role when choosing to use ride-sharing services. Also, travel cost and time are important factors associated with the intention to start ride-sharing. The general consensus seems to be that attitudinal variables are more important factors in the decision to start ride-sharing than socio-demographic variables are (Abrahamse and Keall 2012).

Based on findings from the literature review, it appears to be a norm for several factors, whereas some other factors fluctuate for different locations-studies. The provision of ride-sharing strategies is a rather interesting and complicated task that should take into account local and regional characteristics (i.e., demographics, economy, users, geography, transport). Findings show that a combination of personalized information about ride-sharing users and

well-structured incentives delivered via social media can be successful in encouraging the uptake of ride-sharing.

Additionally, it becomes important to examine the factors related to solo driving in each society and decide customized interventions to target the behavior of solo drivers. Initiatives that are aimed to encourage solo drivers to start ride-sharing could address some of the perceptions around the comfort and the convenience of driving alone versus ride-sharing.

Public transport, walking, and biking are strong alternatives for travelers that avoid traveling alone, reducing the potential market for ride-sharing. For this reason, the estimates of participation rates must be considered case-specific and decision makers will need to consider whether to open and market the program to all or to focus on solo drivers.

Finally, continuous collection of feedback and periodic reports from ride-sharing users is an important aspect in developing and improving ride-sharing programs. If a program is pursued, major institutional support and recognition is needed for key components, including the development of an extensive marketing plan; parking management, and the definition of monitoring and evaluating programs to consider short- and long-term outcomes (Deakin et al. 2010).

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12. ANNEX

Table A1. Template for "State-of-the art of ride-sharing systems"

Name	**Name of company or ride-sharing system**
Brief description	Provide a brief description regarding the ride-sharing system.
Barriers and incentives	Potential barriers and provided incentives can be added here
Country	Country of operation
Website	Website of operation (NA if Not Available)
In operation	Indicate if the ride-sharing system is still in operation (Yes, No)
Year	Period of operation of the ride-sharing system
Short/Long haul	Indicate if the ride-sharing system provides short/long haul transport services
References	References and sources used
Additional info	Any additional information that may be used for R2R

Table A2. State-of-the art of ride-sharing systems

Name	**1. AutoinComune (NP)**
Brief description	AutoinComune was the first institutional "carpooling" service on a regional basis and represented an innovative solution to mobility problems offering citizens the possibility to save time and money thanks to the reduction of transport costs. In 2012 about 287 municipalities of the regional territory joined it, but the goal was to extend it to create a national level platform. Registration for the service was performed through the website. Users had to create a free personal account in order to propose by citizens to share a business or pleasure trip. AutoInComune was a service that allowed user to offer and search for car rides, with the aim of saving on fuel and tolls, driving less, reducing pollution and traffic and making new friends. AutoInComune could be used in different ways, depending on the needs and offers interesting opportunities to many user profiles. AutoinComune.it worked like this; who offers a ride registers on the site by inserting the place of departure and arrival and was waiting for those looking for the ride to that destination or a place along the way. In turn, the latter could insert the desired path and wait for a proposal to pass online. When a user found an interesting route, he wrote to AutoinComune.it then forwarded the communication thus establishing contact between future travel companions, without paying for the service obtained.
Barriers and incentives	Safety was guaranteed by the feedback system which allowed all participants to comment and evaluate the seriousness and reliability of users
Country	Italy
Website	http://www.autoincomune.it/
Year	2012 - 2017
In operation	No
Short/Long haul	Short
References	Citta di Lucca (2012) http://www.comune.lucca.it/flex/cm/pages/ServeBLOB.php/ L/IT/IDPagina/11074 http://www.comune.lucca.it/flex/cm/pages/ServeBLOB.php/ L/IT/IDPagina/10666 https://www.cascianatermelari.gov.it/il-comune/attivitaa0/autoincomune/1631

Name	**2. Autostradecarpooling (NP)**
Brief description	Autostrade per l'Italia aims to organize the travels in company, on the A8-A9 motorway. In particular, there is a virtual meeting place where, after registering as a driver and / or passenger, the user can offer or request a ride. The user can use: • a free area, open to all users without registration, containing the description of the Autostrade per l'Italia project and a lot of useful tips for users, a navigable demo of the service, maps of the area concerned with evidence of points of interest (metro, parking, stations), the list of available trips,

	• a reserved area dedicated to the community where, after registration, users of the site organize their trips and can insert a new travel offer, find a trip among those available in line with their needs, • get in touch with other users of the platform to finalize the agreements (time, indication of the place and method of meeting, etc.). To begin, registration is required (some characteristics and personal data are required, not all of them are visible to other users of the site). In fact, once registered the user is identified only through the nickname, gender and a few other optional data (e.g. occupation, hobbies, etc.) useful to facilitate the composition of the crews. The user can enter a new trip by proposing himself as a driver, passenger or both. It is necessary to indicate the day, place and time of departure and place of arrival. Alternatively, the user can consult the list of trips already entered to find the one that best meets his needs (departure, arrival, time, crew members, etc.). Once user selected the path of his interest, he can request or offer a ride and subsequently undertake the necessary agreements (meeting point, how to recognize himself, etc.). The agreements are finalized following acceptance by the driver who includes the passenger in his crew. The group to which they belong is displayed on the page of each user of the site.
Barriers and incentives	Following the trip, each user is invited to give feedback on their companions, also expressing a judgment on punctuality and reliability. To ensure the security of the virtual community, contacts between users, through the platform, are only possible if a trip is being organized. Furthermore, to guarantee privacy of the user, only at user discretion, exchange of users personal and / or sensitive data (e.g. name and surname, telephone number, etc.) could be.
Country	Italy
Website	http://www.autostradecarpooling.it/
Year	2009
In operation	Yes
Short/Long haul	Long
References	Autostrade carpooling (2009). http://www.autostradecarpooling.it
Additional info	Cars with at least 4 passengers on board have reserved track at the Milano Nord exit and pay 50 euro cents toll, instead of 1.70 euro, from Monday to Friday (excluding midweek holidays), in two time slots distinct (06:30 – 09:30 a.m. and 05:30 – 08:00 p.m.). Cars with Car Pooling requirements are reserved for a track manned by an operator, who verifies the existence of a crew of at least 4 passengers, the vehicle class and applies the discounted toll fare. On the dedicated track, payment can be made in all provided methods (Telepass, Viacard, Fast pay ATM, credit cards and cash). The cars equipped with the Telepass device still have to stop to allow the operator to check the presence of at least 4 people on board. The track is recognizable thanks to the indication "Reserved" Car Pooling.

Name	**3. Avacar (NP)**
Brief description	Avacar.it was the first social&mobility network for carpooling in Italy. Avacar.it was therefore a service designed for the people who wanted to travel for personal or

	business reasons for a long, medium or short distance journeys by car and were looking for the travel companions. By registering on the site it was possible to find out if there were any users traveling on the same route and offer themselves as drivers or passengers through a messaging service. Unlike a common carpooling site, each user created his own profile, in all respects similar to common social networks, through which he interacts with other users, creating his own list of contacts. At the end of each trip, driver also received feedback from his travel companions, which built his reputation on the site and made him a more or less reliable or pleasant traveler. Due to its dynamic nature, Avacar.it was an ideal tool for the age group ranging from 18 to 35 years. The search was not limited to just going from X to Y on day Z, because there was also the possibility of looking for (or offering) rides in a flexible way, which was certainly useful for those who wanted to have a trip in the company having flexibility in the dates and in the destination.
Barriers and incentives	Avacar.it was equipped with a practical and efficient feedback system (reliability, punctuality, driving) which already allowed user to have adequate level of control (a necessary condition to take advantage of a web-based service). There was an option for women to travel only with female users.
Country	Italy
Website	www.avacar.it
Year	2011 - 2013
In operation	No
Short/Long haul	Short/Long
References	Ninja (2011). https://www.ninjamarketing.it/2011/03/16/intervista-avacar-it-quando-il-car-pooling-si-fa-social travelblog.it (2011). https://www.travelblog.it/post/13999/avacar-social-network-e-carpooling

Name	**4. BerlKönig (P)**
Brief description	BerlKönig is a ride-sharing service based on the principle of shared call taxis in local public transport, which has been operated by the Berlin public transport company in cooperation with the start-up company ViaVan since September 2018. Operation began with 40 battery-electric B-Class vehicles (B 250 e) from Mercedes-Benz, each with four passenger seats, and ten diesel minibuses from the same manufacturer, each with six seats (V-Class). Vehicles are booked per app for around 2000 trips in one day. The fare for using the BerlKönig is made up of the following components and is given to the customer when booking: A price of EUR 1.50 per kilometer (according to the pre-calculated, time-optimized route). A minimum price of 4 euros must also be paid for distances of less than three kilometers. A surcharge of 25% of the total fare is payable at peak times. Peak times are Monday to Friday from 7 a.m. to 9 a.m. If a passenger books a trip for several people at the same time, each passenger within the booking receives a discount of 50% on the fare. Berlkönig employs 390 drivers in Berlin.

	Around 5000 boarding points were defined in the area, just over 600 at normal bus stops, the rest are so-called "virtual stops", mostly at crossroads.
Barriers and incentives	All personal data processing meets the legal requirements for data protection. Data can be analyzed anonymously to improve the offer, traffic planning or marketing. Drivers (professional) are trained and licensed to transport people. After each trip user has the opportunity to leave feedback about your driver - as of course about the pick-up point, the route, the vehicle and other information.
Country	Germany
Website	https://www.berlkoenig.de/
Year	2018
In operation	Yes
Short/Long haul	Short
References	Der BerlKöning fährt (2020). www.berlkoenig.de Wikipedia (2019). https://de.wikipedia.org/wiki/BerlKonig
Additional info	It is operated for four years after a special permit from the Berlin Transport Senate under the experimentation clause in Section 2 of the Passenger Transport Act. The ride-sharing service, comparable to a shared taxi, is not a taxi offer and not a door-to-door service. The operators do not see themselves as a competition for a taxi, but as an extension of public transport. It uses an experimentation clause in Section 2 of the Passenger Transport Act (PBefG), which allows practical testing of new modes of transport or temporary means of transport, such as this atypical bus service with stops. As part of a project funded by the Federal Ministry of Transport and Digital, the BVG has been testing a service called "BerlKönig BC" since August 2019. First, minibuses, operated by the Berlin taxi guild, commute between Rudow underground station and the Brandenburg town of Schulzendorf. In contrast to the regular BerlKönig service, which is paid according to the principle of a graduated price based on the time of day, a BerlKönig BC service requires a VBB ticket for the Berlin B and C tariff zones and a nominal fee of 50 cents. The service is operated with three Mercedes-Benz Sprinter City minibuses, which normally run on BVG lines at night. The service does not have a timetable, but runs after ordering in advance through the BVG app, initially between 5 a.m. and 9 a.m. and 2 p.m. to 8 p.m. The start or finish is always the Rudow underground station, trips within Schulzendorf or Zeuthen are not possible.

Name	**5. BlaBlaCar (P, NP)**
Brief description	The platform may be used by individuals aged 18 or over. The Platform enables members to post and view adverts and to interact with each other to book a seat. The user can view the adverts if he is not registered on the platform. However, user cannot post an advert or book a seat without having first created an account and become a member. As member, and providing fulfil the conditions below, the user can create and post adverts on the platform by entering information about the trip he intend to make (dates/times and collection points and arrival, number of seats offered, options available, amount of the cost contribution, etc.).

	When posting his advert, he can indicate the milestone cities in which he agrees to stop, to pick up or drop off passengers. The sections of the trip between these milestone cities or between one of these milestone towns and the collection point or destination of the trip constitute "Legs". The methods of booking of a seat depend on the nature of the trip envisaged. For some trips, BlaBlaCar has set up an online booking system. BlaBlaCar allows its Members to book one or more seats on behalf of a third party. In this case, user undertakes to accurately indicate to the driver, at the time of the booking or when sending the message to the driver (in the context of a trip without Booking), the forenames, age and telephone number of the person on whose behalf he is reserving a seat. It is strictly prohibited to book a seat for a minor under the age of 13 travelling alone. In the case where you are reserving a seat for a minor over the age of 13 travelling alone, he undertakes to request the prior agreement of the driver and to provide him with duly completed and signed permission of his/her legal representatives.
Barriers and incentives	User is only authorised to post an advert if he fulfils all the following conditions: • He holds a valid driving licence; • He is and remains the main driver of the vehicle subject of the advert; • The vehicle has valid third party insurance; • He has no contraindication or medical incapacity for driving; • The vehicle he intends to use for the Trip is a touring car with 4 wheels and a maximum of 7 seats; • He does not intend posting another advert for the same Trip on the Platform; • He does not offer more Seats than the number available in his vehicle; • All Seats offered have a seatbelt, even if the vehicle is approved with seats having no seatbelt; • To use a vehicle in good working order and which complies with the applicable legal provisions and customs, notably with an up-to-date Ministry of Transport certificate (UK applicable).
Country	France, Spain, United Kingdom, Italy, Portugal, Poland, Netherlands, Belgium, Germany, Ukraine, Russia, Turkey, India, Hungary, Croatia, Serbia, Romania, Mexico, Brazil, Slovaki, Czech Republic
Website	Blablacar (2020). www.blablacar.com
Year	2006
In operation	Yes
Short/Long haul	Long
References	www.blablacar.com
Additional info	BlaBlaCar is the world's leading long-distance carpooling platform – a global, trusted community of 87 million drivers. The platform connects people looking to travel long distances with drivers heading the same way, so they can travel together and share the cost.

Name	6. BlancRide (P)
Brief description	Drivers who download the app make themselves available to offer rides along an indicated route. Passengers seeking a ride are matched to the route and timing of the driver's trip. The app notifies both passenger and driver and posts the price for the ride. Driver and passengers confirm the link up. At the appointed time the driver picks up the passenger and confirms this through the app. When the passenger reaches his or her destination Blancride handles payment putting the money directly into the driver's registered bank account. Blancride may be more expensive than public transit but it is a fraction of the cost of taking a cab. A driver can pick up several passengers who are along the route. The driver is never inconvenienced by having to go out of his or her way. The passengers don't have to ride the bus or street-car or try and hail a cab. Once the user finds a ride, he will be able to see the profile and rating of the driver. Both the driver and the passenger will need to accept the ride before going anywhere. BlancRide charges the passenger's credit card based on the mileage of the trip and the average cost of the ride per kilometer. The app isn't designed to be profitable for the driver – it's designed to split the cost of the ride.
Barriers and incentives	The mobile application employs GPS tracking and user's satisfaction to ensure that rides are monitored and completed as planned. It also allows for driver/passenger preferences, and the option of rejecting matches. After each ride, user can rate his fellow BlancRider and let app know what he thought of your experience.
Country	Canada
Website	https://blancride.com/
Year	2015
In operation	Yes
Short/Long haul	Short
References	BlancRide (2020).https://blancride.com/ 21st Century Tech (2015). https://www.21stcentech.com/gizmos-gadgets-blancride-fills-empty-car-seats/ Global News (2015). https://globalnews.ca/news/2088464/carpooling-app-blancride-sees-huge-usage-increase-in-toronto-thanks-to-pan-am-hov-lanes/

Name	7. Bolt (previous Taxify) (P)
Brief description	The company develops and operates the Bolt mobile application, which allows people to request a taxi or private driver from their smartphone, as well as electric scooters and food delivery services. Became the first transportation app in the world to allow customers to pay for their trips via mobile carrier billing. Expanded into electric scooters in September 2018 and became the first platform integrating these with ride-hailing services in one app. Bolt operates their app, which enables people to hail rides from their smartphones. The application is available for Android, iOS and Windows Phone. Riders must choose a payment method: cash, credit card or mobile carrier billing before they can use the

	service. The customer requests a ride and confirms their pick-up location. Once the driver accepts the trip, the customer will be able to see the driver's name and car details. After the ride is completed both driver and the rider can rate each other.
Barriers and incentives	All drivers undergo a criminal background check and in-person training. Drivers are also required to be at least 21 years old and have had a driver's license for at least 3 years. Bolt has a zero-tolerance policy against alcohol and drug use. In Nigeria, Bolt has included an SOS button for drivers that sends real time emergency alerts to the Lagos State Emergency Response Agency. In London, an in-app SOS button links riders and drivers with the emergency services.
Country	Europe (Armenia, Azerbaijan, Austria, Belarus, Cyprus, Czech Republic, Estonia, Spain, France, Georgia, UK, Croatia, Hungary, Lithuania, Latvia, Malta, Poland, Portugal, Romania, Serbia, Russia, Sweden, Slovakia, Ukraine) Africa (Ghana, Kenya, Nigeria, South Africa, Tunisia, Tanzania, Uganda) Asia (Iraq, Kazakhstan, Saudi Arabia) North America Australia
Website	www.bolt.eu
In operation	Yes
Year	2013
Short/Long haul	Short
References	Bolt (2019). https://bolt.eu/en/ The Spark (2017). http://www.thesparkng.com/taxify-vs-uber/ Arctic Startuo (2015). https://arcticstartup.com/estonian-taxify-first-in-the-world-to-launch-mobile-billing-for-cabs/ IOL (2017). https://www.iol.co.za/motoring/industry-news/ride-hailing-services-how-safe-are-you-7736311

Name	**8. Brazil 99 (P)**
Brief description	The platform 99, formerly known as 99Taxis, or Braizil 99 is a ride-sharing company operating in Brazil 99, one of the leading mobility companies in Brazil, has just reached its first billion races. The milestone comes two years after the company became the first Brazilian unicorn, when it was bought by the Chinese Didi Chuxing. Brazil 99 provides taxi services through its application software that enables users to request taxis by phone in Brazil.It offers its services through 99Taxis system, a platform that optimizes the initial contact between 'drivers' and 'passengers'. 99's platform, 99Taxis allows registered passengers to locate and contact drivers in their area to directly and exclusively request the provision of transportation services. The application connects more than 600,000 drivers to 18 million passengers in more than 1,600 cities in Brazil.

Barriers and incentives	The company performs periodic facial recognition with all drivers before they connect, in addition to inviting passengers to check whether the image of the driver matches whoever performed the ride, before and after the call. 99 requests and validates the payment method for all passengers before the ride. It also shows drivers the travel's final address, and allows the driver to choose whether to accept cash payment or not.
Country	Brazil
Website	https://99app.com/
In operation	Yes
Year	2012
Short/Long haul	Short
References	Crunchbase (2012). https://www.crunchbase.com/organization/99taxis#section-overview

Name	**9. BRIDJ (P)**
Brief description	The BRIDJ enables their clients - Mass Transit Operators and Public Transport Agencies - to deliver shared services. BRIDJ is a SaaS platform designed to support 'demand responsive' or 'on demand' public transport providers. Its platform includes an optimisation engine, traveller app, driver app and client portal. The traveller app allows passengers to book, pay and track a service between two locations within a service area. The optimization engine consumes pre-planned and real-time bookings and then allocates passengers to the available vehicles to create the optimal trips for the given service objectives. The optimisation engine is designed to handle large numbers of passengers and vehicles of both small capacities (1-6 pax) and high capacity (6-50+). BRIDJ technology is currently deployed on public transport services in Sydney, Australia and for staff transfer services Singapore.
Barriers and incentives	RIDJ can provide a more efficient and customer friendly 'first and last mile' service while at the same time facilitating upgrades on the trunk bus network to 'turn-up-and-go' style services (i.e. reallocation of large bus resources to trunk corridors with headway frequency).
Country	Country of origin: USA (operation 2014 – 2017) Country of operation: Australia (operation 2017 – now), Singapore (operation 2019 – now)
Website	https://bridj.com/
In operation	Yes
Year	2014
Short/Long haul	Short
References	Sealink (2019). https://www.sealinktravelgroup.com.au/news-media/2019/sealink-announces-strategic-acquisition-of-transit-systems-group-and-launches-capital-raising/

	Citilab (2017). https://www.citylab.com/transportation/2017/05/bridj-is-dead-but-microtransit-isnt/525156/

Name	**10. Bringme (NP)**
Brief description	Bringme Srl is the company born of the homonymous project launched in 2011: "Bringme Carpooling & Autostop". It is one of the very first carpooling portals in Italy, reaching over 17.000 offerings per week. Together with the web portal, Bringme was the first carpooling service in the world to equip itself with a mobile application able to certify the presence of one or more passengers in cars. This innovation, at the time based on Bluetooth technology, has allowed the startup to be incubated at the prestigious Incubator of Innovative Enterprises of the Politecnico di Torino, I3P. In 2013 Bringme become a supplier of a dedicated carpooling service for the Sapienza University of Rome, managing the commuting needs of university students. From these experiences Jojob was born at the end of 2014, a service completely designed and studied to meet the needs of the commuters who travel the home-work route every day. Bringme was the leader Italian startup in the corporate carpooling sector; their goal was to make home-work carpooling a real transport alternative.
Barriers and incentives	Not Available
Country	Italy
Website	http://www.bring-me.it/carpooling
Year	2011 - 2014
In operation	No
Short/Long haul	Short
References	jojob (2020) https://www.jojob.it/chi-siamo/

Name	**11. Daimler AG – car2gether (NP)**
Brief description	Daimler AG developed an innovative concept for urban mobility: car2gether. The car2getner is a carpooling system, web-based ride-sharing community for people who simply needed a ride. Car2gether was arranging incoming offers and requests for transportation. The system took advantage of the increasing used and acceptance and the many different communication possibilities offered by mobile internet. Rides were by arranged via smartphones on the way or from a PC at home – almost in real time. The ride offers and searches were also displayed in the form of a live ticker on the car2gether web portal. This ticker, which was similar to Twitter, displays all offers and searches in a short form and was automatically updated every 15 seconds. If interested, users were be able to get further details of the ride from the live ticker and directly opt for it. The members of car2gether system who have asked for the same ride will be placed together by a computer program, who then lets everybody know what ride is available. The cars used by Daimler, driven by their own driver, will then

	sweep by and pick up the passenger assigned to them, just like a much more elaborate taxi service. The driver of a car2gether vehicle could post his route on the car2gether website and get matched with somebody who goes to the same direction.
Barriers and incentives	All users were registered by car2gehter. The Daimler created the donation system. The company donated 20 eurocents per kilometer i.e. a total of 8,000 €. After the dotation's by the Daimler a.g. the system was closed.
Country	Germany, USA (only pilot program)
Website	https://www.greencarcongress.com/2010/09/daimler-ag-launches-car2gether-ride-sharing-pilot-project-in-ulm-.html https://www.wired.com/2010/09/daimler-car2gether/ http://www.car2gether.com – out of operation
In operation	No
Year	2010 – 2011
Short/Long haul	Short/Long
References	Green car congress (2010). https://www.greencarcongress.com/2010/09/daimler-ag-launches-car2gether-ride-sharing-pilot-project-in-ulm-.html Wired (2010). https://www.wired.com/2010/09/daimler-car2gether/ Daimler (2010). https://media.daimler.com/marsMediaSite/en/instance/ko/Daimler-AG-starts-a-further-pilot-project-in-Ulm--ride-sharing-20-with-car2gether.xhtml?oid=9919054 Club smart car (2010). http://clubsmartcar.com/index.php?/topic/22319-car-2gether-sharing-programm/

Name	**12. Carrem (P)**
Brief description	A transportation network and ride-sharing company based in Dubai, United Arab Emirates. Careem is a vehicle for hire company based in Dubai, with operations in over 100 cities in 15 countries. Careem has a huge strength of more than a million drivers. It can be said, that the Careem was a monopoly when it comes to Taxi hailing services in the MENA countries (Middle East & North Africa). All drivers for Careem stated that they provided their original Computerized National Identity Cards, driving licenses, documents of their vehicles, and an electricity or phone bill of their current addresses. If a passenger reports the person driving the vehicle was not the person whose credentials appear on the app at the time of the journey, the account-holding driver's partnership with the company is terminated immediately. The Careem have a special rating system. Each individual ride being rated by the customer ex post facto. If the ratings of a driver drop below a certain level, they lose out on peak time bonuses. However, the Careem call center employees have the ability to artificially alter this rating and on occasion will do so if the driver can make a case for the same. The fact that it is possible to alter the rating may reduce the

	effectiveness of the rating system. In 2018 the company was a subsidiary of Uber, with an independent brand and separate operations.
Barriers and incentives	All activities are in the cooperation with Uber company. Careem's official position is that the drivers working for them are not employees but partners, or contractors. This takes away the drivers right to claim overtime charges and other perks that companies provide their employees. This can also exclude them from the benefit of any internal complaint procedure against for instance, sexual harassment at the workplace.
Country	Algeria; Bahrain, Egypt, Iraq, Jordan, KSA, Kuwait, Lebanon, Morocco, Oman, Pakistan, Palestine, Qatar, Turkey, UAE
Website	https://www.careem.com/en-ae/
In operation	Yes
Year	2012
Short/Long haul	Short
References	Digital rights foundation (2019). https://digitalrightsfoundation.pk/wp-content/uploads/2019/01/Careem-Uber-Research.pdf Arabian business (2018). https://www.arabianbusiness.com/transport/402773-dubais-careem-to-test-bus-service-in-egypt Dawn (2020). https://www.dawn.com/news/1238160

Name	**13. CARRIVA (NP)**
Brief description	The CARRIVA Ride-sharing Club (CARRIVA-Mitfahrclub) was founded by the support of funding from the Federal Ministry of Transport, Building and Urban Development of Germany in 2007. The carpooling service predominantly addresses about 70,000 commuters, who work at the Frankfurt airport. The first step was to establish an internet-based service that should be expanded by a phone-based ride matching.
Barriers and incentives	The main advantage of an internet-based matching system is that frustrating experiences are held to a minimum, since users only get positive feedbacks in terms of information on a successful match, while unsuccessful matches are not communicated. Therefore, an internet-based carpooling service is a useful first step for establishing a flexible carpooling service, since it does not provoke frustrating experiences due to unsuccessful matches. This is highly important for the launching phase of a new service, since frustrated users will not be willing to use this service again. The CARRIVA concept is based on the idea to offset passengers' rides and drivers' lifts up to a limit of 20 €. This means that passenger lifts are drawn from the individual account, while giving lifts results in a surplus. If the personal account exceeds 20 €, drivers can be paid out, while passengers have to fill up their account to 20 € as soon as they have depleted their credits. Such a billing system also allows listing all lifts and routes for each ride club member on a monthly basis.
Country	Germany
Website	www.carriva.org (does not work anymore)
Year	2008

In operation	No
Short/Long haul	Short
References	Research Gate (2013). https://www.researchgate.net/publication/278700690_Flexible_Ridesharing

Name	**14. Carticipate (NP)**
Brief description	Carticipate on the iPhone was the first ride-sharing application on a location aware mobile platform and is available as a free download on Apple's App Store on iTunes. The Company developed a location based mobile social network for ride-sharing, ride combining, and carpooling, an activity which the company refers to as 'carticipation.'
Barriers and incentives	Carticipate on the iPhone is the first ride-sharing application on a location aware mobile platform and is available as a free download on Apple's App Store on iTunes. It allows users to indicate where they are going and when, broadcast the information, and allow others heading in the same direction (with iPhones) to find each other. In order to offer rides, one has to register. The user can schedule rides by selecting the times he/she is planning to travel and the origin and final destinations.
Country	USA, Germany
Website	https://www.carticipate.com/About.html
Year	2008-2012
In operation	No
Short/Long haul	Short
References	Carticipate (2008). https://www.carticipate.com Crunchbase (2008). https://www.crunchbase.com/organization/carticipate#section-overview

Name	**15. Casual Carpool (NP)**
Brief description	Casual Carpool is a 'casual', community-driven ride-sharing system for commuters from the East Bay travelling into San Francisco and back. The main purpose of the scheme is to benefit from the carpool lanes, making this a typical HOV-lane carpooling scheme. It is casual because it requires no app or technology or pre-booking system: carpools are formed 'on the fly' based on ~30 pre-determined pick-up points in the Bay area. It operates when the carpool lane is active i.e. 5am to 10am and 3pm to 7pm. The service is one of the first of its kind, having started back in the late 70s at the time of the oil crunch.
Barriers and incentives	The main incentive is access to HOV lanes, which significantly speeds up the journey into San Francisco for both driver and passengers. To be eligible, a car must have 3 passengers (1 driver must therefore pick up two passengers). Drivers and passengers share the benefit of time and cost savings (toll fares) - as well as lower carbon emissions (mentioned on the web site). The web site claims this way of travelling can

	be faster than by BART (the Bay Area Rapid Transit – elevated and subway rail system), with up to 20 minutes shorter commute compared to other options. Payment is optional, but the etiquette suggests passengers to offer 1$ for the ride – 2$ after 7pm or outside main traffic hours to encourage drivers to continue offering the service. In terms of waiting time, the service operates as first-come-first serve. While finding a ride is usually not a problem during peak time, passengers can be left waiting for drivers – in which case most pick-up points are located close to public transport systems. In terms of safety, the service relies on the 'community service' mindset: both passengers and drivers have an incentive 'to treat each other respectfully' to keep the service going, and expect both drivers and passengers to exercise judgment before taking a ride, and it is acceptable to refuse a ride (e.g. a woman preferring not to board with a male-driver in a 2-seat car). Amey (2010) refers to a service called RideNow.org, which attempted to organize the timing of the service for guaranteeing a ride, but this failed due to lack of critical mass (and probably other factors related to the difficulty to preplan and commit to an exact timing). One main benefit of Casual Carpool is therefore precisely that it is casual and requires minimal pre-planning effort.
Country	San Francisco Bay Area, California, USA
Website	https://sfcasualcarpool.com/ what appears to be the most official web site for the service, which includes a 'lost and found service' https://www.ridenow.org/carpool/ a second website for the same service, providing also https://511.org/carpool/casual (site of the Metropolitan Transportation Commission, which lists the service and pick-up points) https://www.sfmta.com/casual-carpool (site of the San Francisco Municipal Transportation Agency)
Year	Started more than 30 years ago
In operation	Yes
Short/Long haul	Short
References	SFgate (2019). https://www.sfgate.com/travel/resources/transit/article/I-took-casual-carpool-and-it-made-me-sad-14143751.php

Name	**16. CleverShuttle (P)**
Brief description	A Berlin-based company offering a 'ridepooling' app for 'affordable and eco-friendly door-to-door transportation' – what the young owners had envisioned as a type of 'sustainable door-to-door chauffeur service'. In practice this is both a taxi service and a real-time ride-sharing service: the company owns its own fleet of green-and-white branded electric and hydrogen vehicles and hires its own drivers. At the same time the service algorithm aims to put together passengers requesting trips in the same direction together. The app functions as most other Uber-styled services: 1) the traveler enters her destination 2) H/she confirms the pick-up location 3) He/she chooses the number of seats required (this feature is more specific to this pooling service) 4) she confirms the

	booking and tracks the approaching vehicle for pickup 5) he/she pays the trip via app or in cash, with or without tip.
Barriers and incentives	The main advertised benefit of the scheme using shared and electric vehicles is 'for the sake of the environment'. Cars are emissions-free and quiet. The service does provide a reduction of travel costs by automatically putting together the traveler with other potential passengers in real time – and therefore sharing the cost of the ride efficiently (what they call ridepooling). It is unclear how successful this is in practice however. The service claims detours (to pick up or drop-off other passengers) are 'minimal', but it would also be interesting to investigate what is considered minimal in percentage of additional travel time. One main aspect of the service is the need to hire drivers, for whom flexible working arrangements are provided among other benefits. In terms of driver experience, one of the advertisements for the service claims it is 'just fun', because of the electric cars and the passengers themselves. In terms of regulatory barriers, the founders had difficulty convincing cities to allow their operation due to car rental laws which requires vehicles to return to their 'anchorage' after each trip. In other words, it was difficult to reconcile the service with Germany's Passenger Transport Act.
Country	Germany: Berlin, Munich, Leipzig, Dresden, Düsseldorf and Kiel. Previously the service was also offered in Hamburg, Frankfurt and Stuttgart but the service was discontinued in October 2019.
Website	https://www.clevershuttle.de/ (with presence on Facebook, LinkedIn and Twitter)
Year	2014
In operation	Yes
Short/Long haul	Short
References	Clever shuttle (2020). https://www.clevershuttle.de/fahrer-gesucht?utm_source=hpbanner&utm_medium=organic Crunchbase (2014)/ https://www.crunchbase.com/organization/clevershuttle Der spiegel (2016). https://www.spiegel.de/auto/aktuell/clevershuttle-ridesharing-dienst-zieht-sich-aus-drei-deutschen-staedten-zurueck-a-1291478.html

Name	**17. COVOIT'ICI (P)**
Brief description	A 'comprehensive' service to enable peer-to-peer ride-sharing on (currently) six dedicated 'lines' in France, targeting rural and peri-urban localities and shorter distances than BlaBlaCar. The service aims to use up the spare seating capacity in solo drivers' vehicles with travellers going in the same direction (this is not a taxi service). The system is comprehensive for a ride-sharing system as it is designed similarly to a public transport system: lines and stops are predetermined, stops are clearly identified and include a dedicated pick-up drop-off zone ('Station de covoiturage', or 'Ride-sharing Station'), stops have ticket machines, and roads are equipped with a digital signboard announcing in real-time waiting passengers on upcoming stops. The system also includes an internal portal and an app for drivers, but it does not require the app to function. The ticket machines at the stops log the booking; drivers

	see the number of waiting passengers at the next stop and their destination both on billboards and on their app; a driver can decide whether to pick up passengers if the destination matches theirs; the passenger gives the ticket to the driver who can then claim their profits (this can be done by simply providing the ticket code into the app at a later stage). As of December 2019, an app-based service was rolled out to passengers as well. The app provides the same booking service as the ticket machines and a ticket code for the driver, and it also allows to monitor approaching drivers in real-time.
Barriers and incentives	Main incentive is that there is no need to preplan a trip and also no need for a smartphone. Benefits claimed by the system are: 1) Cheaper than driving your own car (12c /km, minimum 60c per ride paid to the driver, with a 2€ monthly member fee paid to the operator) – see [3] for typical charges per line 2) More respectful towards the environment 3) Reduces congestion 4) And probably more pleasant than driving alone On some lines, if travelers travel during peak time (between 7h and 9h) they are guaranteed a return trip between 17h and 19h. If no drivers picks them up, COVOIT'ICI will pay for a taxi. This is also the case if the passenger needs to wait for more than 20 minutes.
Country	France, 6 different rural and suburban regions
Website	https://www.covoitici.fr/
Year	3-year experiment started in 2015
In operation	Yes
Short/Long haul	Short
References	Covoitici (2020). https://www.covoitici.fr/lignes-covoiturage/ L'usine-digitale (2016). https://www.usine-digitale.fr/article/covoit-ici-peut-il-enfin-faire-decoller-le-covoiturage-de-proximite.N387392
Additional info	English description of the service and equipment at stations: https://www.construction21.org/infrastructure/fr/covoitici--local-carpool-public-service.html

Name	**18. Curb – and Curb Taxi Media (P)**
Brief description	Dubbed the 'Taxi App', the app serves as a booking service for existing taxis across the USA ("50,000 Cabs, 100,000 Drivers", in 30 cities). It runs approximately 10 million trips per month and reaches 20 million people per day via its Curb Taxi Media company which includes, on top of the Curb app, TaxiTV, and digital or static taxi tops. This service is therefore an interesting combination of mobility service and mobility media, "connecting brands with audiences on the go". As a service it operates exactly like the Uber or Lyft apps, and although drivers are fully-licensed taxi drivers, riders can rate

	drivers. Drivers are notified of potential trips via the app as well as via their onboard taxi dispatching system.
Barriers and incentives	The service claims to be 1) Fast, including seamless payment 2) Convenient, operating in most major cities and enables to watch the driver arrive 3) Safe, operates only with fully licensed and insured taxi drivers One main stated benefit is the app brings the experience of booking a taxi ride on par with Uber and Lyft, including monitoring the approaching cab, seamless payment with or without tip, and driver ratings. It typically costs about 2$ more and the wait is on average 3 minutes longer than Uber or Lyft; the app does not use surge pricing, therefore the cost is more predictable.
Country	USA, 30 major cities
Website	https://gocurb.com/ and https://mobileapp.gocurb.com/, also present on Facebook, LinkedIn and Twitter
Year	2007
In operation	Yes
Short/Long haul	Short
References	Curbtaximedia (2020). https://www.curbtaximedia.com/ PR Newswire (2020). https://www.prnewswire.com/news-releases/curb-taxi-media-launches-programmatic-smart-taxi-tops-in-nyc-300990213.html iMore (2017). https://www.imore.com/curb-lets-you-delete-uber-or-lyft-and-go-back-taking-cabs Crunchbase (2007). https://www.crunchbase.com/organization/ridecharge The verge (2016). https://www.theverge.com/2016/3/23/11294758/curb-app-taxi-hail-uber-nyc-verifone

Name	**19. Didi (P)**
Brief description	Didi is a China-based ride-hailing app from the company Didi Chuxing. It is now a global service operator and competes with the likes of Uber – it is sometimes dubbed the Chinese Uber. It has a stake in Bolt in Europe, it purchased Uber China in 2016 and the Brazilian 99 more recently in 2019. Didi has become the one-stop app to go to for hailing cabs or private cars, with 30 million trips completed on Didi's platform every day (i.e. more than 10 billion trips a year). Didi Chuxing is also diversifying its services into bike-sharing systems, food delivery, HOV lane carpooling (ExpressPool), minibus pooling services or professional chauffeurs in deluxe cars.
Barriers and incentives	Although barriers and incentives are similar to that of Uber, this quote summarizes well the context: "Unlike other tech-powered offline transactions, where the encounter between the supply and demand sides is usually brief, such as food and online shopping delivery, ride-hailing passengers and drivers enter an enclosed space

	together for far longer periods of time". Because of this unusually long face-to-face encounter in a restricted space taking place on millions of trips every day, the issue of predicting and handling potential unsafe situations becomes critical.
Country	Origin: China (APAC), operating in mainland China, Taiwan, South America (Chile, Peru, Columbia), Australia, and Japan.
Website	https://www.didiglobal.com/ also present
Year	2012
In operation	Yes
Short/Long haul	Short
References	Crunchbase (2012). https://www.crunchbase.com/organization/didi-dache One mile at a time (2017). https://onemileatatime.com/using-didi-chuxing-the-chinese-uber/ Techcrunch (2017). https://techcrunch.com/2017/08/01/chinas-didi-invests-in-taxify/

Name	**20. DiDi Express (P)**
Brief description	**Didi Express** is one of the travel services offered by Didi. The service is matching travelers sharing the same direction with an available shared car. DiDi Express carried over 2.4 million daily rides in 2018. **Didi Express** includes several sub types, which differ in the quality of the service and price level: • ExpressPro – similar to 'Uber Pool', your route is likely to be shared with other riders heading in the same direction, • Express – traveller is assigned the closest available Didi vehicle, which may include less experience driver, • Select – traveller is assigned well-rated Didi driver knowledgeable of local environment. 90% routes are shared among carpooler.
Barriers and incentives	During rush hours on weekdays 20% of the demand for Didi Express service cannot be met. However, the overall rate of served passenger is relatively high. The company hopes that the used pricing motivates its signed drivers to work more at peak hours and travellers to travel at off-peak hours. The initial fee during peak hour (6:00-10:00) is 14 yuan, the mileage fee is 1.8 yuan per kilometer. At off-peak hours (10:00-17:00), the initial fee is the same, but the mileage fee is reduced to 1.45 yuan.
Country	China
Website	https://www.didiglobal.com/travel-service/express
Year	2015
In operation	Yes
Short/Long haul	Short/Long

References	Rehmann (2020). https://rehmann.co/blog/didi-explained-expresspool-vs-express-vs-select-luxe-express-premier-taxi/ Wikipedia (2020). https://en.wikipedia.org/wiki/DiDi ChinaDaily (2020). http://global.chinadaily.com.cn/a/201907/10/WS5d257efaa3105895c2e7cb93.html

Name	**21. DiDi Hitch (NP)**
Brief description	DiDi Hitch is inter-city carpooling service focused on commuting and distance-traveling that lets passengers cover the cost of fuel and a driver's basic costs. It is operated by Chinese ride-hailing firm Didi Chuxing. Didi Hitch is a modern approach to hitchhiking that facilitates passenger ride for free with a driver headed in their direction. Passengers are expected to leave a tip to cover fuel. The main idea is to make car rides more efficient. Didi does not charge the service. Didi Hitch is a strategic way to attract passengers and drivers for commercial Didi services. Didi Hitch has handled over a billion trips from 2015 to 2018.
Barriers and incentives	After a relaunch of the service in November 2019 a new in-app Safety Assistant was introduced. It shows information on drivers and passengers and enables real-time support from safety experts. This also includes features such as algorithms that can detect abnormal route changes. Already in the past, Didi has dealt with the murder of a customer. In 2016, a woman in Shenzhen was robbed and murdered by a Didi driver.
Country	China
Website	https://www.didiglobal.com
Year	2015
In operation	Yes
Short/Long haul	Long
References	Reuters (2019). https://www.reuters.com/article/us-china-didi-chuxing/chinas-didi-plans-to-relaunch-hitch-service-with-new-safety-features-idUSKCN1UD0X3 Tech Crunch (2020). https://techcrunch.com/2019/11/06/didi-hitch-carpooling-relaunch/ Tech Crunch (2020). https://techcrunch.com/2018/05/11/didi-chuxing-suspends-its-carpooling-service/ South China Morning Post (2020). https://www.scmp.com/news/china/society/article/1941112/didi-chuxing-driver-suspected-killing-young-woman-passenger

Name	**22. FLINC (P)**
Brief description	Flinc is a ride-sharing service in Germany and it has a growing network of drivers and passengers. It connects navigation systems with smartphones and arranges available seats in cars in real-time via a fully automated process. The service combines features of both a typical carpooling agency and a social network. The Flinc service

	automatically matches passengers to the best available drivers based on an intelligent routing with a goal of getting the passenger door-to-door. A large part of Flinc's technology appears to involve smart navigation: it works out your route from A to B, and then the route for individuals looking for rides, and then it matches them up. People who are driving in one direction find people who are looking to go in the same direction and offer them rides, with the subsequent deal either negotiated in cash or simple done for free. The app provides dynamic real time negotiation as automatically informs about appropriate drivers and passengers on your route – and suggest a suitable price. For drivers, Flinc handles pricing proposals so as to take away awkward negotiation between driver and passenger. Flinc works bidirectional: interactive maps display the routes of all users in order to create a "live schedule". Therefore, trips can be proposed by drivers or vice versa requested by passengers. In the app, passengers may search and find registered colleagues who live near them on a map view. By clicking on one of these colleagues on the map, they will immediately see the departure time and destination of the colleagues. They may also build their own personal network by sending contact requests via the app. After pairing with other colleagues, they are shown further contact information and they can coordinate and agree on a ride by phone, email, messenger, etc. Live positioning informs the passenger that the driver is on his/her way to the pick-up location. That way the passenger knows exactly when the driver will arrive.
Barriers and incentives	Users are registered by Flinc and can be assessed and rated by other users. Which aims to create confidence and trust in the reliability of the carpooling service. Exclusive Flinc parking spaces are available for you at participating locations. Flinc drivers are entitled to park in the designated parking spaces. Flinc is also the first carpooling service to establish a partnership with a car sharer: DriveNow (developed by BMW and Sixt). More than 500,000 people have used the service to date.
Country	Germany
Website	http://flinc.org/
Year	2010
In operation	Yes
Short/Long haul	Short
References	Medium (2018). https://medium.com/snapp-mobile/flinc-ride-sharing-f209144babd1 Tech crunch (2017). https://techcrunch.com/2017/09/28/daimler-acquires-german-p2p-carpooling-startup-flinc/ SUTM (2014). https://www.sutp.org/en/news-reader/dynamic-ridesharing-with-flinc.html

Name	23. Flinkster (P)
Brief description	Flinkster is the name of the carsharing operations of the railway and logistics company Deutsche Bahn (DB) in Germany. Flinkster offers own cars (around 750) and access to those of regional partners, i.e. other car-sharing companies (about 4000 vehicles in total).Flinkster offers two tariffs, the nationwide tariff without a monthly fee (but with relatively high usage fees for hours and kilometers), and a city tariff with lower usage fees but a 10 Euro monthly subscription. Holders of a BahnCard, the DB customer loyalty card, enjoy special conditions.
Barriers and incentives	Registration fee for customers with BahnCard: **free**
Country	Germany, Italy, Switzerland
Website	https://www.flinkster.de/
Year	2001
In operation	Yes
Short/Long haul	Short/Long
References	Flinkster (2020). https://www.flinkster.de/ Wikipedia (2020). https://en.wikipedia.org/wiki/Flinkster
Additional info	Additional services available: Call a bike and Reservation of train tickets

Name	24. Gett (P)
Brief description	Gett (previously known as GetTaxi), is an Israeli on-demand mobility company that connects customers with transportation, goods and services. Customers can order a taxi or courier either through the company's website, or by using the company's GPS-based smartphone app. Available services: Vehicle for hire (passenger & shipping)
Barriers and incentives	London customers can choose to donate 20p per journey by simply selecting Gett Green in the menu. Customer donations are helping fund installation of innovative air cleaning technology in primary school classrooms across the capital, including those identified in the Mayor's school air quality audit programme.
Country	Israel, United States, England, Russia
Website	www.gett.com
Year	2010
In operation	Yes
Short/Long haul	Short/Long

References	Crunchbase (2010). https://www.crunchbase.com/organization/get-taxi#section-overview Gett (2020). Gett.com Wikipedia (2020). https://en.wikipedia.org/wiki/Gett
Additional info	2. corporate target segment 3. software-as-a-service/SaaS-based business model

Name	**25. GoCarma (NP)**
Brief description	Carma Technology Corporation is a real-time transportation technology company headquartered in Cork, Ireland. Its flagship product, Carma Carpooling, matches users with nearby commuters and enables them to share the cost of driving. Carma also has offices in San Francisco, California and Austin, Texas. The GoCarma app uses Bluetooth to automatically detect when users are in their car. As long as there are at least 2 people in the car with the GoCarma app, they may qualify for an HOV toll discount.
Barriers and incentives	Users of GoCarma can get high-occupancy vehicle (HOV) toll discounts on TEXpress Lanes in the Dallas-Fort Worth metroplex.
Country	United States
Website	https://www.gocarma.com/
Year	2007
In operation	Yes
Short/Long haul	Short
References	Crunchbase (2007). https://www.crunchbase.com/organization/carma-2#section-overview Google (2020). https://play.google.com/store/apps/details?id=com.gocarma.tolling&hl=en Wikipedia (2020). https://en.wikipedia.org/wiki/Carma
Additional info	Anonymized O&D information

Name	**26. Go-Jek (P)**
Brief description	Gojek is a Southeast Asian on-demand multi-service platform and digital payment technology group. Gojek was first established in Indonesia in 2010 as a call center to connect consumers to courier delivery and two-wheeled ride-hailing services.
Barriers and incentives	Gojek's transformation from being a ride-hailing service to becoming the largest Super App with three platforms: consumer, driver, and merchant applications with more than

	20 services today: Transport & logistics; Food & FMCG; Payments; Daily needs; News & entertainment; Business.
Country	Indonesia, Vietnam, Thailand, Singapore, Philippines, India, Malaysia
Website	https://www.gojek.com/
Year	2010
In operation	Yes
Short/Long haul	Short/Long
References	Wikipedia (20200. https://en.wikipedia.org/wiki/Gojek Gojek (2020). https://www.gojek.com/ Apple (2020). https://apps.apple.com/us/app/gojek/id944875099
Additional info	Emergency button in the app in the event of dangerous situation

Name	**27. GoMore (NP)**
Brief description	GoMore is a ride-sharing, peer-to-peer rental, and private leasing platform. The services are available in five countries with a total of 2,325,000 members: Denmark (800,000), Norway (70,000), Sweden (75,000), France (180,000) and Spain (1,200,000). **Carpooling:** GoMore is an online marketplace for carpooling. The website and app match drivers with passengers traveling in the same direction and are willing to travel together to share the cost of the trip.
Barriers and incentives	Users are verified with Bank-ID and driver's license. And all rentals are insured by Moderna Försäkringar (full insurance and road assistance). Keyless car option is available. Keyless cars are unlocked via the app without having to match the owner.
Country	Spain, Denmark, Norway, Sweden, France
Website	www.gomore.dk
Year	2005
In operation	Yes
Short/Long haul	Short/Long
References	Wikipedia (2019). https://sv.wikipedia.org/wiki/Gomore Google (2020). https://play.google.com/store/apps/details?id=dk.gomore&hl=en Gomore (2020). www.gomore.dk
Additional info	The driver sets the price for the carpool rider

Name	28. Grab (P)
Brief description	Grab Holdings Inc., formerly known as MyTeksi and GrabTaxi, is a Singapore based ride-sharing company. In addition to transportation, the company offers food delivery and digital payments services via mobile app. It operates in the Southeast Asian countries of Singapore, Malaysia, Indonesia, Philippines, Vietnam, Thailand, Myanmar, Cambodia and Japan. It is the region's first "decacorn" (a startup with a valuation of over US$10 billion).
Barriers and incentives	Ride-hailing app, food delivery service, and cashless payment solution all in one.
Country	Southeast Asia (except Laos and Brunei), Japan
Website	https://www.grab.com/
Year	2012
In operation	Yes
Short/Long haul	Short
References	Grab (2020). https://www.grab.com/
Additional info	Driver wait-time less than 3min Carpooling via Grabhitch functionality

Name	29. Heetch (P)
Brief description	Heetch is a ride-pooling app targeted at late night transportation seekers, offering an alternative to taxis (15% commission for heetch, driver designated, for profit).
Barriers and incentives	Not available
Country	France, Belgium, Morocco, Cameroon, Algeria
Website	https://www.heetch.com/
Year	2013
In operation	Yes
Short/Long haul	Short
References	Heetch (2020). https://www.heetch.com/

Name	30. Jojob (NP)
Brief description	Jojob is an app with helping with: Finding travel companions; Splitting costs; Know how much you save for each journey; Access account of the division of travel costs; Leave feedback to your commuters
Barriers and incentives	• **Assignment of reserved parking:** Even without any hardware it is possible to establish who is entitled to reserved parking spaces based on user data and, in more integrated cases, managing them in real-time. • **Fuel Vouchers, company products or other prizes** can be awarded to those who use carpooling more than others thanks to a Jojob-designed charting system that ensures high levels of interaction between employees in a healthy competitive environment. • Drivers save 5 cents per km for each passenger on board • Passengers find people to go to work with only 5 cents per km
Country	Italy (Politecnico di Torino), Spain
Website	https://www.jojob.it/ www.jojob.es
Year	2014
In operation	Yes
Short/Long haul	Short
References	https://www.jojob.it/ www.jojob.es

Name	31. Juno (P)
Brief description	Juno is now owned by Gett. Compared to its competitors, Juno takes a smaller commission from every ride, as part of a strategy to attract and retain happier drivers. Juno initially had an equity structure that planned to give drivers fifty percent of the founder's equity by 2026, but this program was discontinued in 2017 when Juno was acquired by Gett.
Barriers and incentives	Not available
Country	United States
Website	https://gojuno.com/
Year	2016 - 2017 (acquired by Gett) – 2019 (service ceased)
In operation	No

Short/Long haul	Short
References	Wikipedia (2020). https://en.wikipedia.org/wiki/Juno_(company)

Name	**32. LaZooz (P)**
Brief description	A Decentralized Transportation Platform owned by the community and utilizing vehicles' unused space to create a variety of smart transportation solutions. By using cryptocurrency technology LaZooz works with a "Fair Share" rewarding mechanism for developers, users and backers. The LaZooz platform will synchronize empty seats with transportation needs in real-time, matching like-minded people to create a ride-sharing experience for a "Fair fare".
Barriers and incentives	La'Zooz is built on top of Bitcoin's blockchain technology, which makes it so that the platform is completely decentralized and owned by everyone who uses it. Just like Bitcoin has no central bank, La'Zooz belongs to no single company that skims profit off the top. For people looking to become a future La'Zooz driver, the best way to go about things is by running the mobile app and driving around for over 20 km. This action will reward users with Zooz tokens, which is an extra incentive for early adopters to take a more hands-on approach.
Country	Israel
Website	http://lazooz.org/
Year	2014
In operation	Yes
Short/Long haul	Long
References	Lazooz (2020). http://lazooz.org/ Fastcompany (2015). https://www.fastcompany.com/3041403/could-lazooz-be-the-ride-sharing-app-weve-been-waiting-for Newsbtc (2016). https://www.newsbtc.com/2016/03/22/using-blockchain-decentralized-ride-sharing-lazooz/

Name	**33. Liftshare (NP)**
Brief description	Liftshare enables organized ride-sharing by connecting people travelling in the same direction so they can arrange to travel together and share the costs, whilst reducing congestion and pollution at the same time. Liftshare is based in Norwich (UK) with a small team, and has been providing a car share platform for 20 years (700,000 users).
Barriers and incentives	Personal travel plans (PTP): The myPTP tool is a journey planner in the UK that gives public transport, walking and cycling results as well as car-sharing matches in one

	place, so that the user can make an informed, yet independent decision on how to best travel to their place of work.
Country	UK
Website	https://liftshare.com/uk
Year	1998
In operation	Yes
Short/Long haul	Short
References	Liftshare (2020). https://liftshare.com/uk Crunchbase (1998). https://www.crunchbase.com/organization/liftshare-com-ltd

Name	**34. Lyft (P)**
Brief description	Lyft, Inc. is a ridehailing company based in San Francisco, California and operating in 644 cities in the United States and 12 cities in Canada. It develops, markets, and operates the Lyft mobile app, offering car rides, scooters, a bicycle-sharing system, and a food delivery services. **Shared Ride**, which is not available in all cities, is the cheapest option and will match passengers with other riders if they are going in the same direction (max 5 min walk time).
Barriers and incentives	Not available
Country	United States, Canada
Website	https://www.lyft.com/
Year	2012
In operation	Yes
Short/Long haul	Short
References	Wikipedia (2020). https://en.wikipedia.org/wiki/Lyft Lyft (2020). https://www.lyft.com/

Name	**35. Motar (NP)**
Brief description	Motar (i.e MOre Than A Ride)'s aim is to provide travel mates for drivers on the road wishing to reduce their costs or to have a pleasant trip. On the other hand, for passengers, it is to find a less expensive, faster and more flexible way of travelling instead of the slow public transport with "unreliable" service.

	Motar is the most liked ride-sharing website in central Europe. The Motar carpooling system started its actual operation on 26 November 2007. Since then the community has grown to more than 770,000 users.
Barriers and incentives	No app required.
Country	Central Europe (Hungary)
Website	https://www.motar.eu/
Year	2007
In operation	Yes
Short/Long haul	Short/Long
References	Motar (2020). https://www.motar.eu/

Name	**36. MyLifts (EuroLifts) (NP)**
Brief description	MyLifts is an interactive journey planner designed to give you access to a wide selection of travel alternatives and tools to promote environmentally friendly travel.
Barriers and incentives	No installation required.
Country	UK
Website	www.mylifts.com
Year	1997
In operation	Yes
Short/Long haul	Short/Long
References	Mylifts (2018). www.mylifts.com

Name	**37. MyTaxi – FreeNow (P)**
Brief description	FreeNow (formerly mytaxi) is a Taxi e-hailing marketplace, mobile commerce network and is part of the mobility joint venture between BMW and Daimler, formed in February 2019. In July 2016, mytaxi announced the merger with Hailo, the leading taxi app in the UK and Ireland - an important step towards becoming Europe's largest e-hailing app. The Free Now app uses mobile and GPS technology to match taxi drivers with passengers based on availability and proximity, and requires a valid phone number and valid form of payment (debit or credit card, Apple Pay, Google Wallet or PayPal) to

	operate. The Free Now app is compatible with both iOS and Android mobile devices, and works with licensed taxis, including black cabs in the UK. Depending on location, customers can order a taxi, E-scooter or car through the app.
Barriers and incentives	Not available
Country	Deutschland, Ireland, United Kingdom, Espana, Italia, Polska, Portugal, Sverige, Osterreich, Romania (available in over 100 European cities)
Website	https://free-now.com/
Year	2009
In operation	Yes
Short/Long haul	Short/Long
References	Free-now (2020). https://free-now.com/

Name	**38. Ola (P)**
Brief description	Ola Cabs is an Indian ride-sharing company (TNC) offering services that include peer-to-peer ride-sharing, ride service hailing, taxi and food delivery. Ola offers different levels of service, ranging from economic to luxury travel. The cabs are reserved through a mobile app and also through their website and the service accepts both cash and cashless payments with Ola money.
Barriers and incentives	• Cashless rides with Ola money or using credit/debit card to enjoy hassle free payments. • A membership program with Ola that lets users ride a Prime Sedan at Mini fares, book cabs without peak pricing and has zero wait time • Verified drivers, an emergency alert button, and live ride tracking are some of the features in place to ensure a safe travel experience. • Free Wi-Fi facility • In cab entertainment
Country	India, Australia, New Zealand, UK (169+cities)
Website	https://www.olacabs.com/
Year	2010
In operation	Yes
Short/Long haul	Short/Long
References	Olacabs (2018) https://www.olacabs.com/

Name	39. PoolMyRide (NP)
Brief description	Poolmyride is a global carpooling ride-sharing platform, which intelligently connects users commuting through same path. Poolmyride is a global carpooling platform encouraging commuters to share ride, working on 0% commission model. Riders and vehicle owners both can create carpool and add their route details along with other preferences.
Barriers and incentives	Sharing phone numbers is an inevitable process when one has to coordinate to share ride. In order to use convenience of calling without knowing actual contact details, PoolMyRide provides number masking facility, where the user's number will be masked by another number on their server, hence the user's contact details are never shared in this process.
Country	India
Website	https://poolmyride.com/
Year	2013
In operation	Yes
Short/Long haul	Short/Long
References	Poolmyride (2015). https://poolmyride.com/ Crunchbase (2013). https://www.crunchbase.com/organization/pool-my-ride

Name	40. POPARIDE (P, NP)
Brief description	The interested traveler enters information in the system regarding origin and destination, as well as date of desired trip. Once the suitable ride has been found, the traveler pays by credit card and then meets the driver on the agreed date and time. Review is requested after the trip. Drivers on the other hand offering trips, first need to create an account. For this to happen they need to agree with the basic rules, which are to be reliable, to be paid online after the termination of the trip (credit card only, no cash) and to drive safely without using mobile phones. They are then asked to provide information on the provided trip: date and time, trip preferences such as availability or not to carry luggage, number of people seating in the back, snow tyres (or not) able to carry skis, bikes and pets. Following the need to out a per seat price for the trip offered and then select the method of payment. Finally, they can provide further information/details on the offered trip.
Barriers and incentives	In order to ensure safety, both travel service providers and travelers have verified profiles (email, name, phone number and verified credit card or bank account). Drivers' license is also checked. Both derivers and travelers received ratings so future interested parties can make their informed decisions on who to travel with. Students receive a $5 discount to their first trip. Any barriers are actually imposed by Canada's law on carpooling that foresees the following:

	In Canada, carpooling is regulated at a Provincial level. In general, Provincial laws allows the act of carpooling based on these following rules: • The driver and passenger share a trip with a common origin and destination • The driver does no more than one return trip a day • The driver receives contributions towards their costs and does not turn a profit • The seating capacity of the vehicle is not more than 10 passengers
Country	Canada and US.
Website	https://www.poparide.com/
Year	Started in 2010 as FLO and was rebranded in Poparide in 2016
In operation	Yes
Short/Long haul	Long
References	Poparide (2020). https://www.poparide.com/ CBC (2019). https://www.cbc.ca/news/canada/british-columbia/rideshare-poparide-complaints-passenger-1.5176665
Additional info	Impacts mentioned in website include the following: <u>Environmental impact:</u> • Increasing occupancy rates by filling empty seats in cars • Forging partnerships with mobility organizations to incentivize shared transportation. • Reducing carbon emissions by keeping cars off the road. <u>Social Impact:</u> • Building a community based on the idea of sharing. • Educating people on the need for shared mobility. • Creating friendships by connecting people through ride-sharing. • Providing accessible travel for all. Economic Impacts: • Reducing car ownership costs. • Offering a competitive means of transport for travellers. • Building economic value by connecting towns & cities. • Helping smaller communities travel where public transport is unavailable.

Name	**41. RideJoy (P, NP)**
Brief description	Community marketplace for sharing long-distance rides
Barriers and incentives	Two points related to ride-sharing and long-distance rides in the United States: • Lyft's original parent company, Zimride, which we competed with in 2011-2012, sold off its carpooling business in 2013, the same year we ceased operations on Ridejoy • BlaBlaCar, a French company that raised $200 million dollars in 2015 and has been helping people carpool across Europe for ten years, has never entered the US market".

Country	US
Website	No website available
Year	2011-2013
In operation	No
Short/Long haul	Long
References	Jasonshen (2017). https://www.jasonshen.com/2017/ridejoy-lessons-learned/

Name	**42. RideShark (NP)**
Brief description	RideShark is a commute management platform that helps governments, corporations and campuses reduce drive alone commuting and increase the use of sustainable commuter options. It includes all travel modes, along with the tools and resources to reward, plan and manage commuters. The provided solutions are categorized in corporate, government and campus. Each potential purchaser of a mobility platform will select the system that best meets their functional needs and desired direction for their outreach efforts for the next 3-5 years.
Barriers and incentives	Different incentives provided per type of platform built
Country	US and Canada but delivering services worldwide
Website	http://www.rideshark.com/
Year	2002
In operation	Yes
Short/Long haul	Short/Long
References	Crunchbase (2002). https://www.crunchbase.com/organization/rideshark
Additional info	This is not a platform per se, but a company building customized platforms for governments, companies and schools/universities. The company's SaaS-based information software offers companies the opportunity of having a portal to encourage and support sustainable commuting options by employees, enabling commuters to find intelligent rideshare matches which will reduce the problem of parking demand and congestion.

Name	**43. RoadSharing (NP)**
Brief description	RoadSharing.com is a way to find someone to share a trip with, is a meeting point between those who offer and those who look for a lift and it is the best way to save money, pollute less and meet new friends.
Barriers and incentives	Lack of application
Country	Florence, Italy

Website	http://www.roadsharing.com/
Year	2008
In operation	Yes
Short/Long haul	Short/Long
References	Lefigaro (2010). https://www.lefigaro.fr/web/2010/04/19/01022-20100419ARTFIG00539-internet-se-mobilise-pour-aider-les-naufrages-du-volcan-.php

Name	**44. Ryde (P)**
Brief description	Ryde offers multiple carpooling options for passengers. RydePool (per pax) is a service where the driver can pick other passengers up, but with a stricter rule of only one passenger per RydePool. RydePool (per trip) gets you to your destination directly without any other pickups. More specifically, with Ryde, riders can choose from several trip options depending on their needs: • RydePOOL (per pax): Riders do not mind sharing the ride. • RydePOOL (per trip): Riders pay for a direct trip without detouring • RydePET: Pet-friendly option for riders. No sharing. • RydeX: Private Hire Bookings. Fares vary with peak period timing. No sharing.
Barriers and incentives	• Lower commission taken from the drivers is translated into lower fares for commuters. • Dynamic pricing in which fares fluctuate based on supply and demand. • Apart from typical carpooling services, Ryde School allows the finding of trusted parent-drivers in the neighbourhood whose children attend the same school, so carpools can be safe and reliable. • Ryde offers a pet-friendly carpool option, matching riders with passengers who are comfortable with having pets in their cars.
Country	South-east Asia (Singapore, Sydney, Hong Kong, Kuala Lumpur)
Website	https://www.rydesharing.com/
Year	2018
In operation	Yes
Short/Long haul	Short/Long
References	https://weekender.com.sg/w/trending/5-things-you-need-to-know-about-carpooling-app-ryde/
Additional info	In Singapore, the Land Transport Authority allows drivers to be compensated for offering carpool trips under Road Traffic (Car Pools) (Exemption) Order 2015.

Name	**45. sRide (P, NP)**
Brief description	sRide is a social carpooling app that helps people to carpool by connecting people like you going your way. It uses a real-time matching process to help match people going

	in the same direction. Some of these users will be car owners (can give ride to other people to share cost) and some of these user will need ride.
Barriers and incentives	sRide places emphasis on easiness of use and simple user experience. Main features to accomplish this include: Real Time Tracking; Safety ToolKit; Click Ride Post; Verified Riders; 24*7 Support; Better Matching Algorithm; New Friendly UI. Benefits of carpooling for you • Save money for gas, tolls and parking • Takes cars off the road and reduces emissions, traffic and parking issues • Get college kids home for school breaks • Find a ride if you don't have a car or help a friend with a ride • Social networking while you travel. Make a friend • Commute with friends and feel the difference in commute stress. Stay healthy with carpooling
Country	India
Website	https://sride.co/
Year	2014
In operation	Yes
Short/Long haul	Short/Long
References	Crunchbase (2014). https://www.crunchbase.com/organization/sride
Additional info	sRide is present across 4 cities in India with over 1+ Million rides offered and 8 cities in USA.

Name	**46. TwoGo (P, NP)**
Brief description	TwoGo is a smart and flexible carpooling service. The user just enters the ride and the intelligent technology finds the perfect match. Drivers and passengers each enter their preferred starting point, destination and time of arrival. TwoGo saves all the settings to make the next ride even easier. By analyzing rides from all users, TwoGo identifies the best carpool fit for each user and even factors in real-time traffic data to calculate precise routes and arrival times.
Barriers and incentives	Solutions like this application improve inclusion and mobility. Whether the best route to work is by a ride-share, or by a city bus, the application brings every neighborhood together, and does so via all the transit methods available. By providing TwoGo as a secure option at the enterprise level, companies enabled their employees to create a massive reduction in CO_2 emissions and roadway traffic.
Country	US
Website	https://www.twogo.com/en
Year	2011
In operation	Yes
Short/Long haul	Short/Long

References	Here360 (2019). https://360.here.com/here-and-sap-twogo-are-update-the-carpool-experience Pcworld (2013). https://www.pcworld.com/article/2036609/sap-launches-ridesharing-app-twogo.html
Additional info	While there are other ride-sharing applications in the market, TwoGo automatically matches up employees who are looking to share rides based on their preferred timing, location and other factors, rather than making users go through lists to find ride partners that fit their schedules

Name	**47. Uber (P)**
Brief description	**Uber**, is a ride-hailing company offering services that include peer-to-peer ride-sharing, ride service hailing, and a micro-mobility system with electric bikes and scooters. Its platforms can be accessed via its websites and mobile apps. Uber is not a taxi service; drivers cannot pick up riders off the street. Uber is a car-for-hire service that relies on smartphone technology to dispatch drivers and manage fees. Also, unlike taxi services, Uber drivers do not possess special licenses; rather, they use their personal vehicles to offer discounted fare rides. Uber's smartphone app takes care of the entire ride-hailing and payment process. Passengers use their credit or debit card to pay right in the app, with no need for cash. When you need a ride, use the app to tell Uber your pickup location. You can choose from a variety of ride-type options; the most common is UberX. Alternately, you can select Uber Pool if you are willing to share the ride and save money.
Barriers and incentives	The taxi industry has claimed that ride-sharing companies skirt regulations that apply to passenger transport and that ride-sharing companies are therefore considered as illegal taxicab operations. This has resulted in additional regulations imposed on ride-sharing companies and, in some jurisdictions, certain ride-sharing companies are banned from operating. Every passenger that uses Uber services rates every driver on every trip, and drivers are required to maintain an average customer rating of 4.6 out of 5.0. (Minimums vary by city.) Uber deactivates drivers who fall below this standard. Similarly, every driver gets to see the passenger rating when deciding whether to pick him/her up. Every driver rates the passenger right after they leave the Uber vehicle. This is to protect future drivers from having to deal with rude, violent, aggressive, and drunk/impaired passengers. If a passenger's rating is too low, Uber can bar him/her from using the service temporarily or permanently. To encourage kinder, gentler Uber rider behaviour the app displays rider ratings right underneath names in the Uber app's menu.
Country	70 countries and more than 780 cities
Website	https://www.uber.com
Year	2009
In operation	Yes
Short/Long haul	Short
References	Wikipedia (2020). Uber https://en.wikipedia.org/wiki/Uber Lifewire (2019). https://www.lifewire.com/how-does-uber-work-3862752

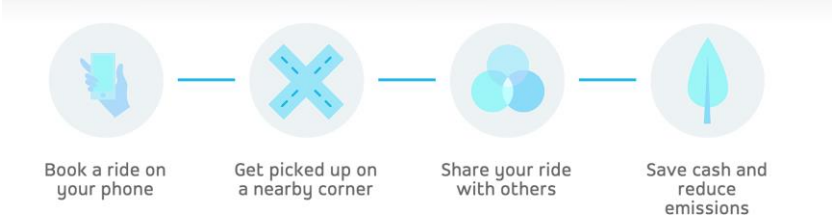
	Quartz (2017). https://qz.com/1084981/map-all-the-places-where-uber-is-partially-or-fully-banned/
Additional info	Uber has been banned in several EU countries. **Bulgaria:** Uber is currently banned across the country. **Czech Republic:** Uber is currently banned in Brno, the country's second-largest city. **Denmark:** Uber is currently suspended because of government regulations. **France:** Uber's cheapest service, UberPop, is currently banned. **Germany:** UberPop is currently banned. **Hungary:** Uber is currently suspended because of government regulations. **Italy:** UberPop is currently banned.

Name	**48. UberPOOL (P)**
Brief description	UberPool, allows you to share your ride with another person and split the cost. UberPool is available for up to two people per party, and it provides a ride that is possibly shared with other riders going in the same general direction. Unless the rider pays an additional fee for door-to-door service, the rider(s) are required to walk a short distance at both ends of the ride to save time for the driver and other riders. The pickup/drop-off locations are indicated via a map in the mobile app.
Barriers and incentives	See Uber
Country	UberPool started in San Francisco and is now active in more than 50 cities around the world.
Website	Wikipedia (2020). Uber https://en.wikipedia.org/wiki/Uber
Year	2009
In operation	Yes
Short/Long haul	Short
References	Mashable (2019). https://mashable.com/article/uber-ride-hailing-non-stop-shared-rides/?europe=true
Name	**UberPop**
Brief description	**UberPop** is a budget version of the app-based ride-share service that essentially allows anyone to become a taxi driver with their own car
Barriers and incentives	See Uber. UberPop suspended in many EU countries including Spain, Netherlands, Switzerland and France.
Country	85 countries
Website	Wikipedia (2020). Uber https://en.wikipedia.org/wiki/Uber
Year	2009-
In operation	Yes
Short/Long haul	Short

References	Wikipedia (2020). Uber https://en.wikipedia.org/wiki/Uber

Name	**49. UBER X (P)**
Brief description	UberX, is the basic level of Uber service. It provides a private ride in a standard car with a driver for up to four passengers. UberX and UberXL cars with child safety seats are available for an additional charge. Persons with a service animal may use any type of Uber service, as required by law. Rider service levels, many of which are only available in certain cities. UberX is the cheapest and most commonly used form of Uber. Vehicles are ordinary, four-door, models that fit up to four riders. Fares are about half the price of taxis in major cities.
Barriers and incentives	See Uber
Country	UberX has now made its mark in over 500 cities in 60 countries.
Website	https://www.uber.com
Year	2009
In operation	Yes
Short/Long haul	Short
References	Wikipedia (2020). Uber https://en.wikipedia.org/wiki/Uber

Name	**50. Via (P)**
Brief description	Via Transportation is an American transportation network company and a real-time ride-sharing company. Via is an on-demand transit provider primarily focused on shared rides. For riders who choose a shared vehicle, Via's algorithm matches multiple passengers heading in the same direction and books them into a single vehicle. Shared rides are usually from corner-to-corner to streamline vehicle routes, requiring passengers to walk to a nearby pickup point, indicated on the app. Select cities also offer private rides, as well as direct door-to-door transportation. Via operates as a sole-service provider in six cities globally. In the remaining cities Via operates in partnership with a local transit authority, government entity, university, taxi fleet, university or private organization. Via has partnerships with some of the world's largest public transportation providers, including the LA Metro in Los Angeles, Berliner Verkehrsbetriebe (BVG) in Berlin, King County Metro in Seattle, Transport for London, Transport for New South Wales (TfNSW) in Australia, and Land Transport Authority (LTA) in Singapore. Via operates similarly to Uber and Lyft, but with a few distinctive differences. The most obvious distinction is that it is set up as an actual ride-sharing service. Passengers, in most cases, will get in a car with strangers who are heading in the same direction as them. It offers corner-to-corner service, so they won't get dropped off at their exact location. Via also says wait times are usually about 5 minutes, which is faster than the bus system. Depending on your destination, you may need to walk that last block or two to reach your desired location.

	Another big difference with Via is that it focuses heavily on the commuter market. The way drivers and passengers communicate is also different from the UberPool. According to Via, a live support team manages all communications with the passengers. That allows drivers to focus on driving. The support team organizes the pickup spots and lets customers know where to be in real-time. All the driver has to do is drive to that location. Passengers will be able to review the time of their pickup, the price of the ride, and the details of their trip. More than one passenger at a time may use the vehicle.
Barriers and incentives	Unlike uberPOOL and Lyft Line, there is a flat rate for specific routes, no matter the distance or traffic. Via cars can hold up to six passengers (SUV)-the pickups and drop-offs are always along your route (not stuck zig-zagging as often happens with other ride-share services).
Country	USA (New York, Chicago, and Washington, D.C. and in London, Amsterdam, and Berlin through our ViaVan venture). Via operates in more than 20 countries globally, including the United States, United Kingdom, Canada, Israel, Australia, New Zealand, Singapore, Japan, Brazil, Finland and Germany.
Website	https://ridewithvia.com/
Year	2012
In operation	Yes
Short/Long haul	Short
References	Via Company (2020). https://en.wikipedia.org/wiki/Via_(company) Gig Worker (2019). https://gigworker.com/via/
Additional info	

Name	**51. Viaggiainsieme (P, NP)**
Brief description	Viaggiainsieme is an innovative method for car-pooling, that is to share the use of a private car, saving money, socializing and limiting CO_2 emissions. ViaggiaInsieme is a web page where transport demand meets transport request. Customers first sign up and then can access the service with their user name and password. After the registration customers can insert a trip offer or request. They have to specify if they are “drivers” or “riders”. Its system can manage periodic requests as well as regular trips. When a customer chooses a trip, he receives information about his potential driver/passenger: photo, trips made and vote (as driver or passenger). If a trip is feasible, the customer can send an email to the driver or passenger. If the respective driver/passenger replies, the contact is established. The site will combine all the individual travel availabilities (as passenger or driver) expressed in the groups. The possibility of establishing territorially qualified groups is an element of strength for three reasons: 1) This facilitates the establishment of a local

	community which is virtual and real at the same time; 2) Because participation in the group reduces mistrust, 3) The structuring into groups allows making important choices regarding the reward mechanisms generally connected to the social and environmental purpose of car-pooling. For users: Viaggiainsieme.it is therefore an ideal meeting place for those who, in addition to the road trip, have in common environmental and social sensitivity and attention to saving. For local institutions: The system is also designed to be an application, or a tool, within institutional sites. In this way, citizens have an efficient service available for free, and for institutions it is possible, at extremely low costs, to implement or integrate policies for sustainable mobility.
Barriers and incentives	Viaggiainsieme aims to make users' identification transparent so that the more data users provided (addresses, telephone numbers, etc.), the greater the rating of the users will be at the time of the registration. Establishing reward mechanisms in public services for those who use car-pooling can be interesting for a municipal administration. Viaggiainsieme appears inactive since 2016, the year coincides with the Italian ban on other ride-hailing services including Uber.
Country	Italy
Website	http://www.viaggiainsieme.it/ (not available)
Year	2010-2016
In operation	No
Short/Long haul	Short
References	Google sites. https://sites.google.com/site/ilvitellozzo/viaggiainsieme TRIMIS (2014). Accessed February 10, 2020. Trimis (2014). https://trimis.ec.europa.eu/sites/default/files/project/ documents/20140317_113500_48143_addhomeFinal_Brochure.pdf

Name	**52. ViaVan (P)**
Brief description	**ViaVan** operates ride-sharing services through their parent company, Via. Their technology pairs the best of public transportation with the convenience of a private car. ViaVan is an on-demand transit system that takes multiple passengers heading in the same direction and books them into a shared vehicle. Using an app, ViaVan is a corner-to-corner service, that picks up passengers at a nearby corner and then drop them off within a couple blocks of their requested destination. This helps ensure that even with multiple pickups, trip times are comparable to a taxi. ViaVan connects passengers with a vehicle operated by a trained and experienced driver who is covered by the required insurance. All driver partners undergo thorough criminal background checks before driving on the ViaVan platform. For all rides, fare will be based on how far passengers go, when they ride, and the number of +1s in your party. The best way to pay for ViaVan is to buy a Ride Credit in the app. Each time passengers take a ride, ViaVan deducts the cost of their ride from their remaining credit. If they have less credit remaining than a full ride fare, ViaVan will deduct any remaining credit and charge the rest of the fare directly to their card on file. *There is a limit of £1 per trip.*

Barriers and incentives	Passengers should leave their feedback and review regarding the driver of their ride to help ViaVan rate drivers.
Country	London, Amsterdam, and Milton Keynes, as well as in New York, Chicago, and Washington, D.C
Website	https://www.viavan.com/
Year	2017-
In operation	Yes
Short/Long haul	Short
References	Wikipedia (2019). Accessed February 10, 2020. https://en.wikipedia.org/wiki/ViaVan ViaVan (2020). Accessed February 10, 2020. https://support.viavan.com/hc/en-us/articles/360003187331

Name	**53. Ville Fluide renamed WeDrive (NP)**
Brief description	Ville Fluide, renamed WeDrive, which established a recurring home-to-work carpool system using mobile phones. WeDrive allows its users to finally easily share their vehicles during their daily trips and specifically the journey home - workplace. WeDrive is an application that you use from your mobile and it is the first community transportation network to share vehicles for efficient travel in daily transportation.
Barriers and incentives	Not available
Country	France
Website	http://wedrivecarpool.com/
Year	2008-2015
In operation	No
Short/Long haul	Short
References	We drive (2019). http://wedrivecarpool.com/

Name	54. Volt (P)
Brief description	Volt, is an on-demand inner-city peer-to-peer ride-sharing app that connects casual drivers with passengers going in the same direction. Unlike traditional car hailing apps which dispatch professional drivers to the passenger's location, Volt connects passengers with non-professional drivers already driving in traffic and heading in the same direction. Drivers earn back their driving expenses (~3000€/year - without making profit), while passengers enjoy rides that are 70% cheaper than taxi. By matching car owners and passengers in real-time, Volt was working to fill the empty seats in traffic. It aims to bring a solution to traffic in Istanbul with ride-sharing. Volt will connect passengers with drivers/passengers going in the same direction who are willing to pay for the cost of their ride.
Barriers and incentives	Not available
Country	Turkey (Istanbul)
Website	http://volt.istanbul/ (not available)
Year	2014-2017
In operation	No
Short/Long haul	Short
References	Crunch base (2019). https://www.crunchbase.com/organization/volt F6S (2020). https://www.f6s.com/voltturkey

Name	55. Waze carpool (NP)
Brief description	Waze Carpool, is an app that allows non-professional drivers to offer rides to people who are traveling on a similar route for a nominal fee. Waze defines a carpool as one driver plus one rider. Nevertheless, earlier this summer, the company updated the app to let drivers pick up more than one passenger at a time for a maximum of four riders. Drivers are paired with riders with nearly identical commutes based on home and work addresses. Drivers and riders are limited to two rides per day. This is not a money-making service. Waze carpool lets you shift through a selection of potential drivers, filtering by criteria such as coworkers, genders, and more to find Waze users that match up best with your needs. It's as simple as that. Riders are charged a maximum rate of 58 cents per mile, which is the current IRS reimbursement rate for business travel by car (up from 54 cents last year). The idea is to reimburse drivers for driving-related costs, such as gas, and nothing more. A driver could get up to $19, depending on the distance and the number of riders in the car, while most riders end up paying less than $5 per ride. To get around this problem of profits (or lack thereof), Waze is partnering with major employers to promote carpooling to their workers.

Barriers and incentives	The carpool lane, also known as a high-occupancy vehicle (HOV) or commuter lane, is strictly meant only for vehicles with 2 or more riders. As such, it's often empty, meaning you could theoretically cruise down the highway using that particular lane and reach your destination faster than everyone else—but if you're doing so while riding solo, you're looking at a potentially fine. The Waze provides additional benefits such as, sending anonymous information, including your speed and location, back to its database to improve the service, along with turn-by-turn voice navigation, real-time traffic, and other location-specific alerts. The Waze community is able to detect mapping and navigation errors, as a result of crowdsourcing which is easily achieved by running the app while driving. It uses gaming conventions such as cupcakes for involvement of users in providing more information to the Waze.
Country	US, Mexico, Brazil, and Israel
Website	https://www.waze.com/carpool
Year	2018
In operation	Yes
Short/Long haul	Short
References	The Verge (2019). https://www.theverge.com/2019/10/10/20906281/waze-carpool-anniversary-stats-update-fee-navigation-drivers T.Talele , G.Pandit and P.Deshmukh (2012). Dynamic ridesharing using social media. http://airccse.org/journal/ijans/papers/2412ijans03.pdf

Name	**56. Wingz (originally known as Tickengo) (P)**
Brief description	Tickengo is a peer-to-peer transportation network company that provides private, scheduled, and fixed-price rides. Tickengo was originally a ride-sharing platform matching drivers and passengers going to the same destination. In October 2011, Tickengo was the first company in the world to introduce the concept of a peer-to-peer ride online platform, where non-commercial drivers could accept any posted ride request to make some money, even if they were not going to the same destination. In October 2012, Tickengo received a "cease and desist" letter from the California Public Utilities Commission (CPUC). In November 2013, California regulators formally legalized ride-sharing services, classifying them as "Transportation Network Companies". Thus, Tickengo was the second company in the world to get a license for ride-sharing, just before Lyft and Uber obtained theirs. In early 2014 Tickengo rebranded as Wingz. The service used to be specifically focused on rides to and from airports but has recently expanded into a personal car service intended for rides anywhere within participating cities. Wingz offers the ability to request specific drivers for rides and allows users to build a list of their favorite drivers for future bookings. All Wingz rides are flat-rate, meaning they are not affected during phases of low supply or high demand. Once a passenger requests a booking, they are presented up front with their price for the trip; all transactions must be made by credit card and are not charged until a ride is provided. In terms of key differences, Wingz generally requires

	flight information, the number of passengers and the number of bags. The number of passengers and bags do affect the price.
Barriers and incentives	After the ride is complete, users are able to rate their driver and compensate them with a tip that goes directly to them. Drivers who do not maintain a high rating are removed from the platform. Drivers on the platform receive a higher percentage of the passenger's fare if they're requested as a Favorite Driver. Wingz offers the ability to request specific drivers for rides and allows users to build a list of their favorite drivers for future bookings. Passengers aren't able to see where drivers are en route to location. Wingz drivers undergo an extensive vetting process that involves a more thorough assessment than traditional rideshare services, resulting in only 5% of drivers being accepted into the program. Drivers must be at least 21 years old and are individually trained, interviewed, and background/DMV record-checked. Wingz maintains a zero-tolerance policy towards drug and alcohol use and regularly schedules interviews with their drivers to ensure high levels of service.
Country	United States (30 major cities across the United States)
Website	https://www.wingz.me/
Year	2011
In operation	Yes
Short/Long haul	Short
References	Wikipedia (2020). Wingz. https://en.wikipedia.org/wiki/Wingz_(company) Map Happy (2016). https://maphappy.org/2016/08/review-is-wingz-worth-the-hassle-of-switching-over-no/

Name	**57. youTrip (P, NP)**
Brief description	**youTrip** is an innovative means of contact between two or more people who need to move on time and without distance limits. Registration with youTrip is totally free. To register, simply enter the name and surname and e-mail address. Any additional data entered can however increase user credibility, and provide to the user more opportunities. Anyone owning a car, motorbike or scooter can become a driver. Passengers may either pay my money or provide items of various value in exchange for one or more passes. Drivers usually request fees or just companion for the trip. After the trip is completed drivers share their trip with other passengers. The feedback is released by the two users (driver and passenger) who have agreed for the trip.
Barriers and incentives	Leave feedback on the trip
Country	Italy
Website	https://www.youtrip.it/viaggiamo_insieme/
Year	2009
In operation	Yes

Short/Long haul	Long
References	YouTrip Blog (2020). https://www.youtrip.it/viaggiamo_insieme/ Facebook (2020). YouTrip carpooling. https://www.facebook.com/groups/youtrip/about/

Name	**58. Zebigo (NP)**
Brief description	Zebigo is a dynamic ride-sharing system. Participants sign up for the service through the website. When passengers need a ride or drivers have extra seats in their car, they can input their trip data and let Zebigo find a match. When a match is found, the system sends out an alert through e-mail or text message; it keeps track of two people with respect to location and time. Signing up for the matching service is free; Zebigo uses PayPal to transfer an amount of money from the rider to the driver based on the distance traveled to cover gas and parking. From the total fee, Zebigo takes a 49-cent fee to cover the transaction. For a typical 13-mile trip, a rider would pay $5 to the driver, plus a 49-cent fee to Zebigo. Money is passed via the website, so none changes hands in the car.
Barriers and incentives	To make riders and drivers feel more comfortable with each other, Zebigo designed the system to allow each participant to look up information about the other. This check focuses on any criminal records, but it doesn't include any driving information. Whether or not someone has a valid driver's license or insurance isn't included in the Zebigo check. Users can decline potential matches for any reason, and can also filter search results based on criteria like gender, employer or Zebigo's rating (submitted by the commuters) of each driver or rider.
Country	United States (Seattle)
Website	https://zebigo.com/landing.php (not available)
Year	2010-2013
In operation	No
Short/Long haul	Short
References	Seattle Business (2011). https://www.seattlebusinessmag.com/article/zebigo-starts-its-engine T.Talele , G.Pandit and P.Deshmukh (2012). Dynamic ridesharing using social media. http://airccse.org/journal/ijans/papers/2412ijans03.pdf

Name	**59. Zimride (P, NP)**
Brief description	Zimride is a secure ride-sharing platform for companies and universities. Coworkers and students connect through a private network to carpool to the same destination. The major drawback of Zimride is that, it is only available in U.S. and it does not have a mobile application but is still one of the leading ride-sharing site in U.S. The company Zimride was renamed to Lyft in May 2013, and ultimately Zimride the service (excluding Lyft) was sold to Enterprise Holdings.

	Creating a Zimride profile is free. Zimride users must first select a network that a given corporation or university has set up, and then sign in. A driver can post a trip and available seats in his or her car, along with personal details like smoking and musical preferences, allowing passengers to find a match for the destination. The service only connects people that work at the same company or go to the same university, reducing anxiety and lack of trust which according to Zimmer, was the number one reason for past carpooling failure. However, trusted partners with universities or companies may be included in ride-sharing plans. The site uses an algorithm that accounts for the distance to pick someone up and the time for detouring to a passenger drop-off point. The site then ranks the options and assigns a score to the best matches. Drivers decide what to charge passengers, although Zimride offers suggested charges based on gas costs. Passengers can pay with PayPal or credit card, and will receive a full refund if the driver fails to pick up.
Barriers and incentives	There are many Zimride features that enhance the ride-sharing experience. As someone seeking a ride, he/she: • Can include certain criteria (e.g. no smoking, gender preferences, etc.) in your search • Can use generalized addresses of his/her location (e.g., I will be at the corner of x and y streets) • Can offer cost-sharing options (e.g., splitting the gas) to the provider • When a ride match is determined by Zimride passengers will receive an instant notification and a map showing the route. Passengers may then choose to accept the ride. • Zimride interfaces with Facebook for making fast, convenient searches • Can post the completed ride experience on the Zimride site for other members to see.
Country	United States
Website	https://zimride.com/
Year	2007 - (The company Zimride was renamed to Lyft in May 2013)
In operation	Yes
Short/Long haul	Short/Long
References	Wikipedia (2020). Zimride. https://en.wikipedia.org/wiki/Zimride