Distr.: General
27 July 2020

Original: English

Economic Commission for Europe

Inland Transport Committee

Working Party on Road Transport

115th session
Geneva, 14-16 October 2020
Item 9 of the provisional agenda
Other business

Car-sharing and car-pooling study

Submitted by the Secretariat

Various forms of shared mobility are increasingly being included in the urban multimodal transport system and impact the social and public life of urban residents in the areas of economics, ecology, and safety. This study considers car sharing and carpooling in countries from Western Europe, Asia, and North America and tries to assess the possible development of similar services in Kazakhstan, Kyrgyzstan and Tajikistan. It also offers guidelines and recommendations taking into account the best practices that may facilitate the transition in Central Asia to modern forms of sustainable urban mobility. Following a presentation by the Secretariat on this study at SC.1's 115th session, SC.1's support will be sought.

ECONOMIC COMMISSION FOR EUROPE

TECHNICAL COOPERATION PROJECT

Strengthening the capacity of Central Asian countries to develop sustainable urban mobility policy on car sharing and carpooling initiatives

Guidelines on the creation of car sharing and carpooling services based on the desktop analysis adjusted to the needs of the Central Asian countries and selected target cities

UNITED NATIONS
Geneva, 2020

United Nations publication issued by the United Nations Economic Commission for Europe.

ECE/TRANS/302

ISBN: 978-92-1-117249-2
eISBN: 978-92-1-005147-7
Sales No.: E.20.II.E.35

United Nations Economic Commission for Europe

The United Nations Economic Commission for Europe (UNECE) is one of the five United Nations regional commissions, administered by the Economic and Social Council (ECOSOC). It was established in 1947 with the mandate to help rebuild post-war Europe, develop economic activity and strengthen economic relations among European countries, and between Europe and the rest of the world. During the Cold War, UNECE served as a unique forum for economic dialogue and cooperation between East and West. Despite the complexity of this period, significant achievements were made, with consensus reached on numerous harmonization and standardization agreements.

In the post-Cold War era, UNECE acquired not only many new member States, but also new functions. Since the early 1990s the organization has focused on assisting the countries of Central and Eastern Europe, Caucasus and Central Asia with their transition process and their integration into the global economy.

Today, UNECE supports its 56 member States in Europe, Central Asia and North America in the implementation of the 2030 Agenda for Sustainable Development with its Sustainable Development Goals (SDGs). UNECE provides a multilateral platform for policy dialogue, the development of international legal instruments, norms and standards, the exchange of best practices and economic and technical expertise, as well as technical cooperation for countries with economies in transition.

Offering practical tools to improve people's everyday lives in the areas of environment, transport, trade, statistics, energy, forestry, housing, and land management, many of the norms, standards and conventions developed in UNECE are used worldwide, and a number of countries from outside the region participate in UNECE's work.

UNECE's multisectoral approach helps countries to tackle the interconnected challenges of sustainable development in an integrated manner, with a transboundary focus that helps devise solutions to shared challenges. With its unique convening power, UNECE fosters cooperation among all stakeholders at the country and regional levels.

Transport in UNECE

The UNECE Sustainable Transport Division is the secretariat of the Inland Transport Committee (ITC) and the ECOSOC Committee of Experts on the Transport of Dangerous Goods and on the Globally Harmonized System of Classification and Labelling of Chemicals. The ITC and its 17 working parties, as well as the ECOSOC Committee and its sub-committees are intergovernmental decision-making bodies that work to improve the daily lives of people and businesses around the world, in measurable ways and with concrete actions, to enhance traffic safety, environmental performance, energy efficiency and the competitiveness of the transport sector.

The ECOSOC Committee was set up in 1953 by the Secretary-General of the United Nations at the request of the Economic and Social Council to elaborate recommendations on the transport of dangerous goods. Its mandate was extended to the global (multi-sectoral) harmonization of systems of classification and labelling of chemicals in 1999. It is composed of experts from countries which possess the relevant expertise and experience in the international trade and transport of dangerous goods and chemicals. Its membership is restricted in order to reflect a proper geographical balance between all regions of the world and to ensure adequate participation of developing countries. Although the Committee is a subsidiary body of ECOSOC, the Secretary-General decided in 1963 that the secretariat services would be provided by the UNECE Sustainable Transport Division.

ITC is a unique intergovernmental forum that was set up in 1947 to support the reconstruction of transport connections in post-war Europe. Over the years, it has specialized in facilitating the harmonized and sustainable development of inland modes of transport. The main results of this persevering and ongoing work are reflected, among other things, (i) in 58 United Nations conventions and many more technical regulations, which are updated on a regular basis and provide an international legal framework for the sustainable development of national and international road, rail, inland water and intermodal transport, including the transport of dangerous goods, as well as the construction and inspection of road motor vehicles; (ii) in the Trans-European North-south Motorway, Trans-European Railway and the Euro-Asia Transport Links projects, that facilitate multi-country coordination of transport infrastructure investment programmes; (iii) in the TIR system, which is a global customs transit facilitation solution; (iv) in the tool called For Future Inland Transport Systems (ForFITS), which can assist national and local governments to monitor carbon dioxide (CO_2) emissions coming from inland transport modes and to select and design climate change mitigation policies, based on their impact and adapted to local conditions; (v) in transport statistics – methods and data – that are internationally agreed on; (vi) in studies and reports that help transport policy development by addressing timely issues, based on cutting-edge research and analysis. ITC also devotes special attention to Intelligent Transport Services (ITS), sustainable urban mobility and city logistics, as well as to increasing the resilience of transport networks and services in response to climate change adaptation and security challenges.

In addition, the UNECE Sustainable Transport and Environment Divisions, together with the World Health Organization (WHO) – Europe, co-service the Transport Health and Environment Pan-European Programme (THE PEP).

Finally, as of 2015, the UNECE Sustainable Transport Division is providing the secretariat services for the Secretary General's Special Envoy for Road Safety, Mr. Jean Todt.

Contents

Executive Summary

Shared mobility services (car sharing and carpooling) are the part of the shared economy, which is based on the idea of rational use of limited resources, which creates an opportunity for a person to afford high-quality goods and services at a reasonable price.

This study provides a brief history of the emergence and development of shared mobility services, which contribute to a more efficient use of available resources and to achieve a number of United Nations (UN) sustainable development goals.

This analysis found that various forms of shared mobility are increasingly being included in the urban multimodal transport system, and as such they encourage the use of public transport, reducing the number of private cars owners. It also highlights the impact of shared mobility services on various aspects of the social and public life of urban residents in the areas of economics, ecology, and safety.

The customized ways of transportation offered by the concept of MaaS (Mobility as a Service) change the models of personal mobility in urban areas. Smart digital technologies help to increase the convenience of car sharing, simplifying the process of booking, access and operation. Efficient public transport and safe walking and cycling infrastructure also foster the development of shared mobility services. However, it is noted that shared mobility services are still a niche product. For example, the number of car sharing vehicles in Europe does not exceed a fraction of a per cent of the total number of private cars, the number of which is growing steadily.

This study considers the activity of selected car sharing and carpooling services (including those disabled for various reasons) in countries from Western Europe, Asia, and North America. Specific examples illustrate the history of the emergence and development of individual initiatives, the results they achieved, and the characteristics of the business models used.

Due to their generality, wide coverage of territories and representativeness, some of these examples are suitable for assessing the possible prospects for the development of similar services in the priority countries of Central Asia defined for this study (Kazakhstan, Kyrgyzstan and Tajikistan) and their capitals (Nur-Sultan, Bishkek and Dushanbe, respectively). A review of relevant national legislation of selected and priority countries regarding the regulation of shared mobility services has been carried out.

Examples and experience of projects implemented in the Russian Federation have been identified due to the similarity of this country to the Central Asian priority countries in its approach to the regulation of public transport, its principles of development of transport systems, lifestyle and culture.

The lessons learned from the experience of selected car sharing and carpooling operators show that successful projects in this area, including those that started exclusively as part of a private initiative, were implemented with the support and assistance of the public authorities and were created based on a robust regulatory framework. Another key success factor is a well-chosen sustainable business model and the availability of investment opportunities.

The guidelines and recommendations included in this study take into account the best practices and related identified strengths. They cover the following areas:

- Developing or updating a sustainable urban mobility plan;
- Shaping the regulatory framework for the implementation of car sharing and carpooling initiatives (including the development of principles and areas of public regulation, requirements for operators and customers of car sharing and carpooling, development of measures to stimulate the creation of shared mobility services);
- Possible administrative procedure for issuing permits for car sharing activities;
- Sustainable development of shared mobility services and financial support measures.

These guidelines and recommendations may facilitate the transition in Central Asia to modern forms of sustainable urban mobility.

This study contains two appendixes:

Appendix 1. The web resources and additional information on a number of well-known car sharing and carpooling platforms.

Appendix 2. Business guidelines on the creation of car sharing service, including:

- Access to information technologies;
- The study of a public opinion and the detailed analysis of a potential market;
- Choosing the type and the model of car sharing;
- Development of a website, mobile application and necessary software;
- Purchase or leasing of vehicles, their preparation for work in car sharing;
- Staff recruitment and training, advertising campaign;
- Work after launch. Lessons learned from the users' experience. Tariffs and discounts.

Introduction

A brief history of car sharing and carpooling

Modern technologies are beginning to blur the line between personal and public transport, and residents of many cities are beginning to understand that it is not necessary to own a car to be able to drive one. This is already a reality in large cities, where due to excessive congestion, high cost of parking or lack thereof, the private car as a general phenomenon begins to give way to new forms of mobility.

This shows that people are ready to change their mobility patterns for the better, especially in urban areas, by moving away from privately owned cars and towards the sharing economy, including Mobility as a Service options.

"The key concept behind Mobility as a Service (MaaS) is to put the user at the core of transport services, offering them tailor made mobility solutions based on their individual needs".[1] As an emerging concept, MaaS has been widely debated by researchers but a unique definition for MaaS is still pending. Most consider as key feature the potential to deliver integrated mobility to enable end-to-end trips by offering services combining different transport modes provided by different transport service providers under a single platform and a single service provider for trip planning, scheduling, ticketing and payment. A more detailed description of MaaS and the various outcomes can be found in the United Nations Economic Commission for Europe publications on MaaS.[2]

MaaS is already in operation in some cities where an increasing number of convenient, compelling alternatives to private cars are being offered, such as public transport, cycling, and on-demand shared mobility services.

Car sharing and carpooling are two of the most visible and rapidly evolving areas of moving away from car ownership and towards shared mobility vehicle use solutions. These services are of particular importance because they satisfy the population's need for mobility in conditions where most traditional modes of transport are less efficient.

Car sharing

Car sharing is a service that provides members with access to an automobile for intervals of less than a day (see subsection 1.3 "Shared Mobility Definitions" below). This takes the form of short-term car rental from specialized companies (most often for intracity and/or short trips) or from individuals (for any period and distance of the trip – by agreement).

While car sharing initiatives are often considered as a new phenomenon in mobility, their roots lie in reality in the predecessor of car sharing, traditional car rental first referred to in an advert published in the Minneapolis Journal of 22 July 1904. While it is not clear when the distinction between car sharing and traditional car rental developed, the first reference to car sharing in print identifies the "Sefage" (Selbstfahrergenossenschaf or Self-drive cooperative) car share program in a housing cooperative started in Zürich in 1948.[3]

[1] A one-stop-shop app for mobility services, IRU. https://www.iru.org/innovation/maas.
[2] See, e.g. the informal document WP.5 (2019) No. 7. https://www.unece.org/fileadmin/DAM/trans/doc/2019/wp5/id-19_07e.pdf.
[3] Shaheen S., Sperling D., Wagner C. Carsharing in Europe and North America: Past, Present and Future. Transportation Quarterly, 1998, 52 (3), pp. 35-52.

The program worked according to the club principle, that is, people living in the same area shared the cost of a car. Those who wanted to use the car booked it in advance by phone, and the keys were taken in the parking lot. Today, this form of car sharing is called "fractional car sharing". At that time, the main driver for the creation of this car sharing initiative was the fact that many people still could not afford to buy a car, and the creators of the project wanted to make cars more financially accessible. It can be seen therefore that, as today, early car sharing projects had social motives as their primary objective; commercial interests appeared later. The Sefage project remained in existence until 1998 when it was closed with little growth over its fifty-year history.

The first experimental systems comparable to today's car sharing schemes appeared in the 1970s and 1980s. In Europe, they included:[4, 5]

- Procotip (France, 1971 to 1973) using in-vehicle "meters" fed by tokens to enable members to pay for usage by distance
- "Witkar" (Amsterdam, 1974 to 1988) using electric vehicles and limiting its users to the city center
- "Green Cars" (Britain, 1977 to 1984)
- "Bilpoolen" (Lund, Sweden, 1976 to 1979)
- "Vivallabil" (Orebro, Sweden, 1983 to 1998)
- "Bilkooperativ" (Gothenburg, Sweden, 1985 to 1990)
- ShareCom (Zurich, Switzerland, 1987), now known as Mobility Car Sharing
- Stattauto car sharing service (Germany, 1988)
- Caisse Commune (Paris, 1998)
- Auto'trement (Strasbourg, France, 1999)
- Autolib' (Paris, 2011).

In the United States of America, Carshare Portland started in 1998 with one car shared within a neighbourhood, this soon grew to 20 cars as is recognized as the first official car sharing operation in the United States of America. Shortly after Carshare Portland, Flexcar and Zipcar started in 2000. Flexcar then acquired Carshare Portland, and in 2007 Flexcar and Zipcar merged. These programs are all station-based, in which vehicles are parked at a designated location for users to pick-up and drop-off.[6]

Some of these systems did not manage to become financially successful. The high fixed costs of fleet operations, including lease costs, depreciation, parking cost, fuel costs, insurance, transactions costs at the time of vehicle disposal, accidents, repairs and maintenance, as well as employee-related costs, minimise the margins of the business. Additionally, the need for rapid expansion to gain first-mover advantage and grow the customer base requires significant investments in vehicles and parking. In addition, especially in densely populated cities where membership growth is most promising, parking is scarce and expensive [4, Tiffany, 2013].

[4] Lessons Learned from the History of Car Sharing. Tiffany – Available at https://tiffanydstone.com/2013/08/23/lessons-learned-from-the-history-of-car-sharing/.

[5] Petite histoire de l'autopartage. David A. – Available at https://blog.drivequant.com/fr/petite-histoire-de-l-autopartage.

[6] Carsharing. Wikipedia. Available at https://en.wikipedia.org/wiki/Carsharing.

Between 1997 and 2009, 34 car sharing programs were launched and 15 programs were closed in the United States of America, yielding almost a 50% closure rate.

Despite the difficulties, car sharing is actively developing. To date more than two million people have become members in car sharing programs worldwide.

Carpooling

Carpooling has no single definition. For example, Wikipedia says that this form of shared mobility is the sharing of car journeys so that more than one person travels in a car, and prevents the need for others to have to drive to a location themselves.[7] At the same time, Merriam-Webster dictionary has the following definition of car pool: an arrangement in which a group of people commute together by car.[8]

Carpooling also has a long history. Shared trips began shortly after the advent of the first mass produced cars in the United States of America. With the advent of many cheaper cars, owners began to offer low-cost seats in their cars and the phenomenon quickly spread to other parts of the United States of America. While the sudden explosion of carpooling demonstrated its enormous potential, it also gave rise to significant backlash as streetcar operators fought the new form of competition with the help of city governments. Since then, the popularity of carpooling and other forms or ridesharing has usually been heavily dependent on the regulatory framework.[9]

Carpooling struggled to grow in the United States of America until the federal government sought to encourage it during World War II, in cooperation with the oil and car industry, to conserve resources for the war effort. The partnership between private industry and government, and wartime restrictions, have proven to be extremely effective in changing consumer habits.

The popularity of carpooling after the war declined as economic growth and the need to reduce resource consumption subsided. Interest was then reignited during the 1970s oil crisis with government funding being directed at carpooling initiatives and through the creation of a National Travel Task Force on Ridesharing and reduced subsidies for parking spaces (which were thought to have contributed to the over-distribution of cars with only one driver). Carpooling was also promoted to combat air pollution.

All this helped to make the end of the 1970s one of the most active eras in the history of shared journeys. According to the United States Census Bureau, by 1980, about 23.5% of Americans used carpooling cars, compared with 11% in 2011. Participation declined as oil prices plummeted in the 1980s, disposable income rose, and government support disappeared.

Carpooling is currently in resurgence in the United States of America, albeit for the first time in the absence of support from the government, major car manufacturers, or oil companies. The rapid rise in oil prices since 2005 combined with the decline in disposable incomes as a result of the financial crisis of 2008, have been enough to generate renewed interest in the practice despite the lack of government support.

[7] https://en.wikipedia.org/wiki/Carpool.

[8] https://www.merriam-webster.com/dictionary/carpool.

[9] The History of Carpooling, from Jitneys to Ridesharing. Jef Cozza-Tom Llewellyn-Casey O'Brien-Danny Spitzberg. Available at https://www.shareable.net/the-history-of-carpooling-from-jitneys-to-ridesharing/.

Carpooling is spreading also in other countries. For example, in Italy, carpooling was first introduced and promoted in the national legislation in 1998 with a law on sustainable mobility.[10] In France, in 2006, the largest carpool operator, BlaBlaCar, appeared, which still dominates the European market, with more than 50 million users in 22 countries.

The popularity of Internet and smartphones have greatly helped carpooling to expand, enabling users to offer and find rides thanks to easy-to-use and reliable online transport marketplaces.

Car sharing and carpooling are key examples of the Sharing Economy, which is based on the idea that it is more convenient to pay for temporary access to a product through a marketplace than to own this product. For those citizens that prefer not to own expensive assets in order not to bear responsibility and expenses, using shared consumption allows them to access to all the benefits of technology without incurring the ownership and running costs.

The transportation market is witnessing a transformation, which is reinforced by new technology-oriented services, providing customers with the ability to access services on demand using mobile platforms. In many cases, this is challenging the need to own or lease private vehicles, which is being replaced by a new wave of products and services, improving the efficiency of the transportation network and facilitating the seamless integration of several services, making it easier for people to be mobile.

According to PricewaterhouseCoopers (PwC), 8% of all United States of America adults participated in some form of automotive sharing, with 1% serving as providers for this new model, taking passengers (participating in carpooling) or renting their cars for an hour, day, or week.[11]

Car sharing and carpooling follow a common trend that is transforming the automotive and transportation industries; many companies are currently seeking to capitalize on this opportunity and to analyse the potential for creating new business models.

[10] Bresciani C., Colorni A., & Costa F. Luè, A., Studer L. (2018). Carpooling: facts and new trends. // International Conference of Electrical and Electronic Technologies for Automotive, July 2018. https://doi.org/10.23919/EETA.2018.8493206.

[11] The Sharing Economy. PricewaterhouseCoopers. April 2015. Available at https://www.pwc.fr/fr/assets/files/pdf/2015/05/pwc_etude_sharing_economy.pdf.

1. The importance of shared mobility services for transport and environmental issues

1.1. Basic models of car sharing services

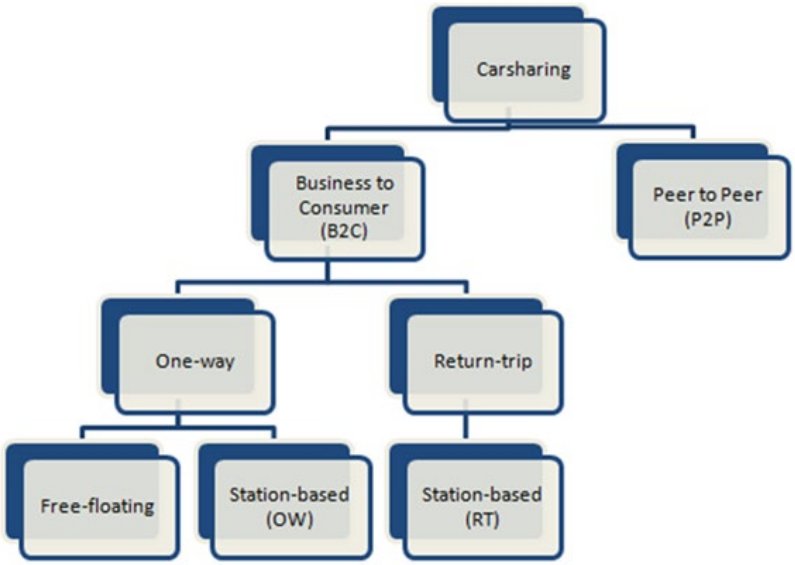
To understand the impact of car sharing it is important firstly to ensure that the basic concepts behind the sharing economy and shared mobility are set out in a manner that is fully comprehensible. Standardized definitions of these terms serve several purposes, namely:

- Reducing consumer uncertainty regarding shared mobility services;
- Clarifying government policies on shared mobility, such as insurance, taxation, parking and zoning;
- Unification of the conceptual framework, through the formation of partnerships between the public and private sectors, as well as the development of specialized services.

This section attempts to summarize and clarify the core terminology that is associated with the use of certain business models.

Car sharing is a type of short-term vehicle access upon which multitudes of business models are based. Figure 1 shows the semantic separation of the main types of car sharing as set out in academic texts.[12, 13]

Figure 1: **Various types of car sharing business models**



There are two major types of car sharing:

- Peer-to-peer (P2P), where users get in touch with car owners who are willing to rent out their personal vehicles (owners can be individuals or companies whose main activity is not rental activity); and

[12] Shaheen S., Chan N., Micheaux H., 2015. One-way carsharing's evolution and operator perspectives from the Americas, Transportation, Springer, vol. 42(3), pp. 519–536.

[13] Blomme, J.L. (2016) Faculty of Geosciences Theses. (Master thesis). A city-level analysis of B2C carsharing in Europe. Available at https://dspace.library.uu.nl/bitstream/handle/1874/331112/Blomme_Jan_3642658_Thesis_final.pdf?sequence=1&isAllowed=y.

- Business-to-consumer (B2C), where operators own a fleet of vehicles that they rent out.

Within the B2C type of car sharing, there are two dominant subtypes:

- One-way, where a car can be rented at one location and dropped off in another. Places of pick-up and drop-off can either be limited by traditional rental points (stations), or can be located anywhere within the operating area (most of the one-way projects today is based on this second type, the free-floating model);
- Return-trip, where cars have to be returned to the same location they were rented from.

There are important differences between P2P car sharing and B2C car sharing which makes the comparison of these two types difficult. For example, there are many more shared P2P cars listed as available than there are shared B2C cars available. For example, Snappcar, one of the largest Dutch P2P car sharing organizations (CSOs), indicated during the Carsharing Symposium in June 2015, that a car listed on their website is rented out an average of only seven times per year. Shared B2C cars on the other hand need to be rented out much more frequently to make them economically viable [13, Blomme, 2016].

Another type of car sharing of note is the so-called "fractional" car sharing. Fractional ownership allows users to co-own a vehicle and share its costs and use. The users cooperate in groups on a territorial basis or on interests, they acquire and operate a car or fleet of different types of cars for joint use. Neighbourhood fractional ownership car sharing is often promoted as an alternative to owning a car where public transit, walking, and cycling can be used most of the time and a car is only necessary for out-of-town trips, moving large items, or special occasions. It can also be an alternative to owning multiple cars for households with more than one driver. This is often compared to the time-sharing model in the real estate market.

A relatively new (available since 2014) car sharing model is called "vehicle subscription".

It is a service where a customer pays a recurring fee for the right to use one or more automotive vehicles. Some vehicle subscriptions offer insurance and maintenance as part of the subscription fee; other subscriptions allow the user to switch between different vehicles during their subscription period.[14]

The main difference between vehicle subscription and car rental is that most subscriptions are designed to offer full-time possession of a vehicle such that the subscription replaces the customer's primary vehicle, whereas rental provides opportunities for vehicle using in specific dates or trips. Vehicle subscriptions have also been classified as a form of "transportation-as-a-service" and as a form of "mobility-as-a-service".[15]

1.2. Carpooling – How it works

The use of carpooling services is based on the registration on the site of the web platform (aggregator) as a passenger or driver, then choosing a travel option or posting a trip announcement in order to attract fellow travellers. Then the passenger pays the requested fare, after which contact details are sent to the driver and passenger, which allows the parties to agree on the time and place of the meeting.

[14] Vehicle subscription. https://en.wikipedia.org/wiki/Vehicle_subscription.

[15] Wayland, M. "Vehicle subscription services expand". 27 November 2017. Automotive News. Available at http://www.autonews.com/article/20171127/RETAIL/171129821/vehicle-subscription-services-expand.

In most cases the journey is for a defined destination at a specific date and time, but it is not unusual for driver and passenger to reach agreement on a variation in the route to change the drop-off point, which may involve a small additional charge.

Drivers' ratings from passengers are given on the websites or smartphone applications. Most reports suggest that the level of punctuality and care taken by drivers is high. Some systems allow for gender considerations such as allowing female passengers who may be apprehensive about taking a journey with a male driver to be able to see the profile of the driver, or to select a female driver if they prefer. Female drivers can also choose to carry only female passengers. Gender aspects are discussed in more detail in section 1.5.

In very many cases there are several alternative drivers offering the same lift and for most journeys there is more than one passenger.

Some countries have laws in which drivers can only charge for their actual expenses, so the driver does not need to take out additional insurance for passengers, because the carriage is not commercial by nature (see for example section 3.2) and they are automatically covered by their standard insurance policy. The aggregator platforms make their money from commission on the charge.

Charges are determined by the driver and vary according to the distance and type of vehicle, but they are considerably less than the cost of travelling in private car or by public transport. It can also allow drivers and passengers to save on airport parking fees.

The classification of carpooling services is somewhat simpler than car sharing and is based on the duration and frequency of trips. Depending on the method of planning a joint trip, the following types of carpooling can be identified:

- Classic – as a rule, a long trip (from several tens to hundreds of kilometres), which is planned in advance (from 1 day to several months);
- Dynamic – moving within an urban area over small distances (from one to a few dozen kilometres) in the presence of transport alternatives (own car, public transport, taxi, bicycle, walking, etc.), in this case, trips are often spontaneous (including the use of "slugging");[16]
- Regular – the participants of the trip, the route and the schedule of the trip are constant.

Often used for commuting, carpools can be arranged between known or unknown parties. The first option is the simplest type of carpooling; in any other case, the system of carpooling becomes more complex, and requires flexible solutions for travellers. These solutions are often identified as real-time or dynamic ridesharing solutions that match drivers and passengers based on destination through a mobile application before the trip starts. The passenger is usually expected to pay a share of the trip cost.

Carpooling is not always arranged for the whole length of a journey. Especially on long journeys, it is common for passengers to only join for parts of the route, and give a contribution based on the distance that they travel. This gives carpooling extra flexibility and enables more people to share journeys and save money. The main advantages of this service are lower costs, greater comfort when traveling compared to public transport, and social interaction.

[16] "Slugging", a type of carpooling, means that the driver picks up unpaid passengers (known as "slugs") at key points, because the presence of these additional passengers means that the driver has the right to use high-occupancy vehicle lane or receive a reduction in fare for toll road.

1.3. Shared mobility definitions

The table below shows the main definitions used within this document for shared mobility according to the 2018 SAE standard.

Table 1: **Shared Mobility Definitions**[17]

Term	*Meaning*	*Alternative Terms*
Bike sharing	Short-term bike rental, usually for individual periods of an hour or less over the course of a membership (periods which can range from a single ride, to several days, to an annual membership)	
Car sharing	A service that provides members with access to an automobile for intervals of less than a day. Major car sharing business models include traditional or round-trip, one-way or free-floating, and peer-to-peer (P2P), which allows car owners to rent them to other car club members	
Demand Responsive System	A system of transporting individuals (other than by aircraft), including the provision of designated public transportation service by public entities and the provision of transportation service by private entities, including, but not limited to, specified transportation service, which is not a fixed route system	Demand-response System
Fixed-route system	A system of transporting individuals (other than by aircraft), including the provision of designated public transportation service by public entities and the provision of transportation service by private entities, including, but not limited to, specific public transportation service, on which a vehicle is operated along a prescribed route according to a fixed schedule	
Microtransit	IT-enabled private multi-passenger transportation services, such as Bridj, Chariot, Split, and Via, that serve passengers using dynamically generated routes, and may expect passengers to make their way to and from common pick-up or drop-off points. Vehicles can range from large SUVs to vans to shuttle buses. Because they provide transit-like service but on a smaller, more flexible scale, these new services have been referred to as microtransit	
Mobility on Demand	An integrated and connected multi-modal network of safe, affordable, and reliable transportation options that are available and accessible to all travellers	
Paratransit	Comparable transit service, required by Law, for individuals with disabilities who are unable to use fixed route transportation systems	
Private shuttles	Corporate, regional, and local shuttles that make limited stops, often only picking up specified riders	Employer shuttle, tech buses
Public transportation	Regular, continuing shared-ride surface transportation services that are open to the general public or open to a segment of the general public defined by age, disability, or low income. Public transportation does not include intercity bus service; charter bus service; school bus service; sightseeing service; courtesy shuttle service for patrons of one or more specific establishments; or intra-terminal or intra-facility shuttle services	
Ridesharing	Ridesharing involves adding passengers to a private trip in which driver and passengers share a destination. Such an arrangement provides additional transportation options for riders while allowing drivers to fill	Carpooling, vanpooling,

[17] Shared Mobility Definitions. Federal Transit Administration. Available at https://www.transit.dot.gov/regulations-and-guidance/shared-mobility-definitions.

Term	*Meaning*	*Alternative Terms*
	otherwise empty seats in their vehicles. Traditional forms of ridesharing include carpooling and vanpooling	slugging, ridesourcing
Ridesourcing	Use of online platforms to connect passengers with drivers and automate reservations, payments, and customer feedback. Riders can choose from a variety of service classes, including drivers who use personal, non-commercial, vehicles; traditional taxicabs dispatched via the providers' apps, and premium services with professional livery drivers and vehicles. Ridesourcing has become one of the most ubiquitous forms of shared mobility	Transportation network company (TNC, ridesharing, e-hailing
Ride-splitting	A type of ridesourcing that allow customers requesting a ride for one or two passengers to be paired in real time with others traveling along a similar route	Dynamic carpooling
Shared-Use Mobility	Transportation services that are shared among users, including public transit; taxis and limos; bike sharing; car sharing (round-trip, one-way, and personal vehicle sharing); ridesharing (car-pooling, van-pooling); ridesourcing; scooter sharing; shuttle services; neighbourhood jitneys (fractional sharing); and commercial delivery vehicles providing flexible goods movement.	Shared mobility
Specified public transportation	Transportation by bus, rail, or any other conveyance (other than aircraft) provided by a private entity to the general public, with general or special service (including charter service) on a regular and continuing basis	

The definitions contained in SAE J3163™ standard are also of interest.[18] This document provides a taxonomy and definitions for terms related to shared mobility and enabling technologies.

The J3163™ standard defines shared mobility as "the shared use of a vehicle, motorcycle, scooter, bicycle, or other travel mode; it provides users with short-term access to a transportation mode on an as-needed basis".

This standard covers six categories of terms related to shared mobility:

- Travel modes (e.g. car sharing and bike sharing)
- Mobility applications (e.g. mobility tracker apps)
- Service models (e.g. peer-to-peer service model)
- Operational models (e.g. station-based roundtrip)
- Business models (e.g. business-to-business roundtrip)
- Deprecated terms (e.g. ridesharing).

It is noteworthy that the term "ridesharing" is deprecated and ceases to be used in professional literature, the above-mentioned standard states that it is often used inconsistently and incorrectly (for example, it is mixed with the terms "ridesourcing" or "ridehailing"). It is recommended to use the terms "carpooling" or "vanpooling".

Some of shared mobility definitions are of special interest for this study and are used accordingly in the rest of the report. For example, the above standard describes terms and classification of mobile applications, which are an integral part of shared mobility. The economy of shared consumption differs from the usual forms of economic activity not in the product of consumption as such – exchange and rent

[18] J3163_201809. Taxonomy and Definitions for Terms Related to Shared Mobility and Enabling Technologies – SAE International. https://www.sae.org/standards/content/j3163_201809/.

exist for as long as the economy itself – but in the way how modern communication technologies have simplified access to participation in consumption.

If the "application" term is removed from the chain "business – application – consumer", the result is a regular rental. Uber without a mobile application is a regular taxi; AirBnB without application – apartments for rent; BlaBlaCar without a site – just hitchhiking. Therefore, one of the proposed alternative names for the sharing economy is "access economy".

1.4. Shared mobility services as a tool for phasing out private car ownership

Car sharing and carpooling are the part of a wider trend of shared mobility, which in the future could lead to a decrease of private car ownership.

In addition to car sharing and carpooling, the transport sector of the shared economy includes the so-called "transportation network services", in which passengers can share a multimodal mobility transport network using modern technologies – usually mobile applications, examples of such transport services are modern decentralized taxi services (e.g. Uber).

According to some studies, one car sharing vehicle replaces up to 15 personal vehicles in terms of overall efficiency and carrying capacity,[19] according to other studies – from four to 13, depending on the country.[20]

Another advantage of short-term car rental for the city and society is a more efficient use of the vehicle in the temporary aspect. The car spends more time in motion and costs less, occupying a parking space; thus, car-sharing cars need fewer parking spaces.[21]

In addition, the spread of car sharing increases the level of use of carpooling, leads to an increase in the average distance travelled by foot and bicycle. The increasing demand for car sharing services also leads to an increase in the use of public transport. Thus, in this case, the user refuses more costly ownership in favour of a non-exclusively use/consumption, reducing costs for the individual and reducing the risks of "overconsumption", which can become a problem for the citizen and society as a whole.[22]

Using car sharing leads to a decrease in the average distance (by 20%) covered by each person in a car in a week, and to a decrease in the average distance covered by each car. This in some cases has led to a change in travel behaviour: time-based payments encourage a person to more carefully approach their "demand for movement" and plan their movements more economically around the city; in comparison with personal cars, shared cars are less accessible as they may not be outside the doorstep and this can also play a role [21, Harms, 2016].

In general, the problem of automobile "overconsumption" of fuel and space is especially acute in large countries with high motorization rates and a "car-dependent" society. The 3-year study examined the impact of the Car2go service in Seattle, San Diego, Washington DC and two Canadian cities, Calgary and

[19] Seeing the back of the car. // The Economist – 22 September 2012. Available at https://www.economist.com/briefing/2012/09/22/seeing-the-back-of-the-car.

[20] Shaheen, S.; Cohen, A. Carsharing and Personal Vehicle Services: Worldwide Market Developments and Emerging Trends. International Journal of Sustainable Transportation – 7(1) June 2012 – https://doi.org/10.1080/15568318.2012.660103.

[21] Harms, L., Jorritsma, P., Berveling, J., et. al. Carsharing in the Netherlands: User characteristics and mobility effects. – Shanghai, China, World Conference on Transport Research, July 2016.

[22] Botsman, Rachel; Rogers, Roo (2011). What's mine is yours: how collaborative consumption is changing the way we live (Rev. and updated ed.). London: Collins. p. 51.

Vancouver.[23] Researchers estimated that the service kept 28,000 privately owned cars off the streets. They surveyed Car2go customers and found that 2–5% of people sold their cars and 7–10% decided against buying a vehicle. The cars sold also averaged 14 years old and ran on older and more polluting emissions systems.

Therefore, car sharing also leads to qualitative changes in the fleet. Among the short-term rental car services, the share of low-emission cars and electric vehicles is usually much higher than in the average car fleet. Due to car sharing, the process of making the vehicle fleet younger is accelerating [20, Shaheen, 2012].

However, the development of short-term car rental services can lead to certain negative consequences. Sometimes using car sharing does not lead to the abandonment of a personal car, but it is the first step to purchasing it; however, although this is more characteristic of developing countries that are at an earlier stage of motorization.

It is worth noting that the benefits accruing from car sharing are recognized in developing countries. For example, in the city of Peshawar (Pakistan), a sociological study was conducted, which showed public perception of the idea of car sharing.[24]

Peshawar is the sixth largest city in Pakistan (the population of the city itself is about two million people, and the population of the whole province is about five million people). The city is facing serious congestion and pollution problems. Forecasts predict an even more tense transport situation in the near future due to the lack of planned public transport development. Peshawar is one of the most polluted and congested cities in Pakistan; slow traffic has become a daily problem in the city, where the number of cars has increased by about 230% over the past decade.

The introduction of a car sharing system in the city of Peshawar could be one of the possible solutions to the problems associated with the growth of motorization, traffic jams and environmental pollution. The success of such a system depends on sufficient demand, which remains an issue in Pakistan (as well as in the pilot countries).

1.5. Identification of social and cultural traditions and gender aspects that affect access to car sharing and carpooling services

Personal mobility through using a private car in its current form is not sustainable for various reasons, primarily because of serious environmental problems, which can could be solved, among other things, by sharing cars.[25] The car sharing model (in all its variants) changes the social aspect of using a car: the car is no longer seen as a luxury, but one of the many means of transportation. However, the perception is different in countries with low incomes and low levels of motorization, as owning a car here is often an indicator of the social status of the owner; it is a symbol of prestige. One of the most important motives for buying and using a car is purely psychological: it is the desire to change their social status, demonstrate success and financial capabilities.

More generally, car sharing is an alternative model of owning and using a car, which, in the classic version, is based on the shared ownership principle. The perception of

[23] US carsharing kept 28,000 private cars off road in three years. // The Guardian, 23 July 2016. Available at https://www.theguardian.com/sustainable-business/2016/jul/23/car-sharing-helps-environment-pollution.

[24] Ullah I., Liu K., Vanduy T. Examining Travelers' Acceptance towards Car Sharing Systems – Peshawar City, Pakistan. – Sustainability, 2019, 11(3), 808, 4 February 2019; https://doi.org/10.3390/su11030808.

[25] Redshaw, Sarah. (2008). In the Company of Cars: Driving as a Social and Cultural Practice. https://doi.org/10.1201/9781315588186.

car sharing pretty much depends on the age, gender and level of education of users. A well-known Internet trend analyst Mary Meeker is confident that young people of Generation Z (the term used to refer to the generation born after about 1995) are more likely to abandon a car than a smartphone.[26]

Shaheen and Martin[27] conducted a survey in Beijing to find out people's attitudes toward car sharing; the results showed that young and well-educated people use car sharing systems more often.

Therefore, development of an effective smartphone application is critical for successful implementation of car sharing services. With the help of smartphones, it is easy to determine the location of the car, communicate with the car owner (in the case of P2P car sharing) or technical support, open and close the car and offer other services that could make car sharing more attractive than traditional car rental.

At the same time there are also limitations, for example car sharing cannot be used in paratransit. It is unavailable to many people with disabilities, particularly to those who are unable to drive or to those who need vehicle adjustments in order to drive.

The gender perspectives on car sharing

Gender issues can have an impact on car sharing practices and development, and separate studies are required to take them into account. A new German study focused on women's specific requirements for their daily mobility in urban areas (Berlin)[28] is an example of such an analysis. The study found that outside commuting, women use cars mainly to transport shopping or accompany children. They try to avoid using public transport with children, which often doesn't offer (private) space for children/prams, nor the equipment necessary to take care of children, including those who need health care.

The study also found that women and men have different traffic patterns. Women have more complex trips than men, who have often uninterrupted trips to work and back. Instead of directly going home from work, women, as a rule, make a series of trips: to the store, to meet a friend or pick up children, etc.

The business models of car sharing operators can match with the urban model of women's movement, as their trips are generally shorter than men's. However, the study found that women use free-floating car sharing significantly less than men due to their higher burden of childcare and household duties. Additional items that need to be carried for these trips, such as groceries, child seats and accessories for children, make free-floating car sharing difficult.

In interviews, the participants discussed why they do not use car sharing more frequently, highlighting the following areas:

- Not enough cars nearby: most participants stated that they would not use a car sharing service if the car was further than 500 meters away because they have to walk with their children and carry child seats and other supplies for children;
- Installing and removing car seats repeatedly is not feasible;

[26] This is what teens are really doing on their phones. Robert Hackett. Fortune, 27 May 2015. – Available at https://fortune.com/2015/05/27/teens-phones-mary-meeker/.

[27] Shaheen S.; Martin, E. Demand for carsharing systems in Beijing, China: An exploratory study. Int. J. Sustain. Transp. 2010, 4, p. 41–55.

[28] Kawgan-Kagan I., Popp M. Sustainability and Gender: a mixed-method analysis of urban women's mode choice with particular consideration of e-carsharing. Transportation Research Procedia, V. 31, 2018, p. 146–159. https://doi.org/10.1016/j.trpro.2018.09.052.

- Car sharing does not allow for things to be left in the car and requires cleaning the car after its using.

Finally, the study also shows that women are more likely to use electric vehicles and prefer using one type of car rather than trying different models.

Nevertheless, the number of women using car sharing is increasing. For example, in the Russian Federation, the BelkaCar company (Moscow) analysed how the structure of service users has changed over the second year of the company's activities. In 2017, men accounted for 90% of the total number of users, while women accounted for 10%. In 2018 the share of female users jumped to 19%.[29]

Gender and carpooling

A study[30] brought together 18 studies on carpooling from all over the world that were published during the last five years (2014–2018) for a meta-analysis. The authors concluded that female travellers would be less likely to carpool if they were matched with strangers. However, gender effects do seem to be rather weak.

In addition to gender aspects, religious beliefs and national traditions could also affect choices relating to shared mobility services and solutions.

1.6. Possible benefits for sustainable development

Car access is more sustainable than car ownership. Car sharing and carpooling make a shift towards sustainable mobility, where the free movement of people or goods does not create negative environmental and health externalities and helps ensure a good quality of life and safety.

In suburbs where many destinations are within walking distance, there are nearby bike routes, and public transport services are good and reliable, people may not need to use a car every day. However, when a car owner chooses to walk, bike or catch public transport instead of driving, his car can still be a source of environmental and other issues. An unused car still occupies a parking spot, and can emit oils and other pollutants on the road, down the drain and into local creeks when stationary.

Despite growing investment in transportation infrastructure, the effects of pollution and congestion are accelerating, stifling an estimated 1% of global Gross Domestic Product (GDP) and leading to 7 million premature deaths per year; a smarter approach to development and mobility is required to manage these significant challenges.[31]

Car sharing and carpooling can contribute to more efficient use of available resources, generally reducing the number of cars in cities and, thereby, reducing the potential for road traffic crashes and reducing the harmful effects of road transport on the environment. Car sharing and carpooling expand the possibilities of public transport, providing users with safe, affordable and environmentally sustainable transport systems.

These mechanisms also increase the accessibility of citizens to work and leisure by providing them with a mobility solution which can be affordable and take people directly to their desired location. Affordable access to vehicles for all citizens

[29] Further details at https://www.vestifinance.ru/articles/109728.

[30] Olsson L.E. et.al. Why Do They Ride with Others? Meta-Analysis of Factors Influencing Travelers to Carpool. – Sustainability 2019, 11, 2414; https://www.mdpi.com/2071-1050/11/8/2414.

[31] Environmentally Sustainable Innovation in Automotive Manufacturing and Urban Mobility. A Frost & Sullivan White Paper in Conjunction with BT, 2016, 36 p. https://www.btplc.com/Digitalimpactandsustainability/Ourapproach/Ourpolicies/cars2025report.pdf.

regardless of their financial and social status including those less able to afford car ownership allows to reduce social inequality.

The predominant use of electric vehicles in a number of car sharing services supports the sustainable development of the urban environment and creates an additional mechanism to strengthen the planning and management capabilities associated with climate change.

According to an international study by PwC [11, PwC, 2015], more than 80% of users believe that sharing services help to save money and take care of the environment at the same time, reducing also risks to health.

Therefore, car sharing and carpooling are important drivers in achieving the Sustainable Development Goals (SDGs) and targets adopted by all the United Nations member States,[32] in particular, SDGs 3, 5, 11 and 13.

[32] United Nations Sustainable Development. 2019. Available at https://www.un.org/sustainabledevelopment/.

2. Analysis of the current situation in the markets of car sharing and carpooling services in Western Europe, Asia and North America

A global report presented by scientists from the Transportation Sustainability Research Center (TSRC) of the University of California, Berkeley showed that at the end of 2016, car sharing was operational on all continents except Antarctica. TSRC estimated that there were car sharing organizations (CSOs) in 2,095 cities worldwide. Fleet size was globally over 157,000 vehicles, and about 15 million members were registered (excluding P2P services).[33]

The development of car sharing and carpooling continues is shown in figure 2. The data given in the movmi.net blog[34] show that over two years the number of cities in which car sharing services operate has increased by almost 1.5 times.

Figure 2: **Data on car sharing services in the world at the beginning of 2019**

Source: [34, Phillips, 2019].

According to the above-mentioned report [33, Shaheen et al, 2018], Asia is by far the largest car sharing market with more than 40% of all services, Europe is the second largest market with 37% of the global car sharing fleet, with North America as the third largest market with about 20%. This chapter sets out the main trends in these regions.

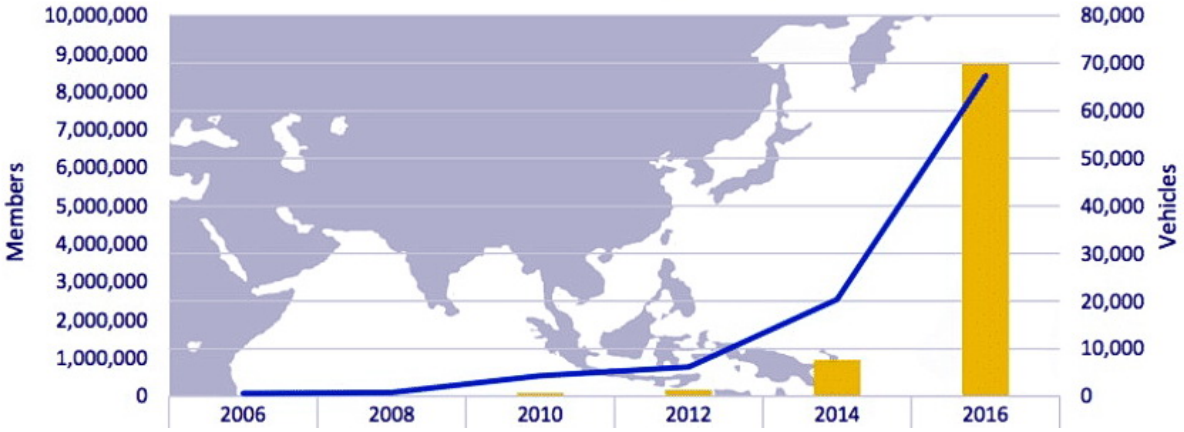
2.1. Main trends in the development of shared mobility in Asia

In 2016, Asia was the largest car sharing region worldwide. Furthermore, the fleet size more than tripled in only a 2-year period, from 2014 to 2016. Membership was at a staggering 8.7 million (see figure 3), double the numbers for Europe.

[33] Shaheen S., Cohen A., and Jaffee M. Innovative Mobility: Carsharing Outlook. Spring 2018. Transportation Sustainability Research Center – University of California, Berkeley. https://doi.org/10.7922/G2CC0XVW.

[34] Phillips S. Carsharing Market & Growth Analysis. 10 July 2019. Available at http://movmi.net/carsharing-market-growth-2019/.

Figure 3: **Development of car sharing in Asia**



Source: [33, Shaheen, 2018].
Note: Data from 10 countries, P2P services are not included.

The main factors that contributed to this growth were rapid industrialization and urbanization, which stimulated demand in the car market, as well as insufficiently developed transport infrastructure in some countries, including a shortage of parking spaces. The result was severe congestion: people living in the Asia-Pacific region got stuck in traffic jams for about 52 minutes a day or 13 days a year.[35]

Road congestion is already costing Asian economies approximately 2–5% of GDP each year due to loss of time and higher transportation costs. The region's cities suffer from the highest levels of air pollution in the world, with up to 80% of emissions coming from transport. Meanwhile, according to a report by WHO published in 2017, about one third of deaths in the region are due to air pollution.[36]

As a result, most governments in the region are making better use of the existing road networks, exercising strict control over the use of private vehicles, encouraging the use of shared mobility services and introducing electric transport.

For example, by the end of 2018, eight cities and one province in China have implemented car sales restrictions. Shanghai was the first city to begin restrictions in 1994, while other cities did not set the restrictions until 2011 or later, when the air pollution and traffic congestion problems became prominent.

The implementation and effects of car sales restrictions vary from city to city. The most common measure for local authorities is to directly control the number and the allocation of new vehicle license plates, thereby restricting the sales of private cars. Shanghai limits the number of license plates issued each year and holds public auctions to sell them. In the year 2017, the number of new license plates issued was about 132 thousand, while the total population of Shanghai is about 24 million. The shortage of license plates made the auction price extremely high (approximately $13,000) in 2017. The high cost of car plates significantly limits people's ability and willingness to own cars, lowering the private car ownership of the city.[37]

[35] Asia Pacific Car Sharing Market Size by Model. Regional Outlook, 2018–2024, available at https://www.graphicalresearch.com/industry-insights/1001/asia-pacific-car-sharing-market.

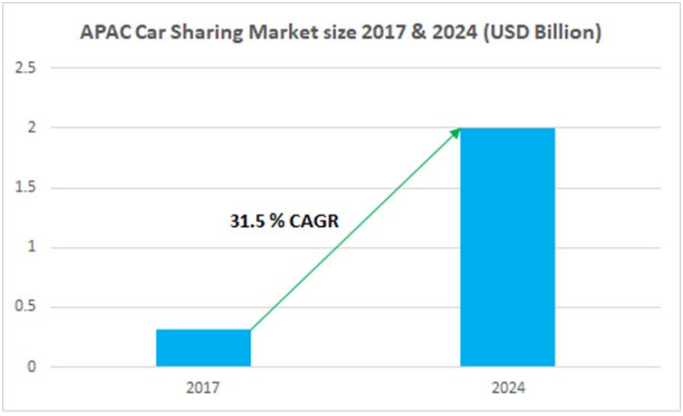
[36] One third of global air pollution deaths in Asia Pacific. WHO, 2017, available at https://www.who.int/westernpacific/news/detail/02-05-2018-one-third-of-global-air-pollution-deaths-in-asia-pacific.

[37] Gan, Y., Lu, Z., Cai, H. et al. Future private car stock in China: current growth pattern and effects of car sales restriction. Mitig Adapt Strateg Glob Change (2019). https://doi.org/10.1007/s11027-019-09868-3.

Unlike Shanghai, the new car license plates in Beijing are allocated by a lottery process. Guangzhou started restrictions in 2012 and constrained the number of new car license plates to 120 thousand yearly. Ten % of new license plates of Guangzhou is allocated to "clean energy vehicle" (e.g. BEVs), 40% is determined by a lottery system, and the remaining 50% is determined by auction [37, Gan, 2019].

The Asia Pacific car sharing market value exceeded $314.7 million in 2017 and was expected to rise at a Compound Annual Growth Rate (CAGR) of over 31.5% from 2018 to 2024 (see figure 4) [35].

Figure 4: **Forecast CAGR of the car sharing market in the Asia-Pacific region**



Source: graphicalresearch.com

The region's countries with the largest populations – China and India – also have the largest number of car sharing and carpooling initiatives.

China

Car sharing operators in China and their users plan to experience further market growth. Roland Berger, a German consulting company that has been studying the Chinese car sharing market for many years, estimates that it will grow annually at a rate of 45% by 2025.[38]

This growth is seen in the context of strict government regulations which include restrictions on car registrations as well as high start-up and after-sales costs, as well as significant external costs. Car sharing and carpooling initiatives are also filling the gap of public transport in some areas where urbanisation is outpacing public transport services.

In total about 90% of all car sharing services in China are operated locally. Most of the car sharing operators in China rely on government subsidies and exclusive partnerships, which help them gain an initial foothold in the market before creating a more profitable business model.

India

The Indian market provides excellent growth opportunities. Industry experts estimate annual growth rates for the fleet and membership base to be around 25%. Problems associated with owning a vehicle and finding parking space in megacities such as Mumbai or Bangalore are the main reasons fuelling this growth. Potential users want more comfort and convenience at fewer costs. The majority of the

[38] Car-sharing in China. Roland Berger. March 2017. Available at https://www.rolandberger.com/publications/publication_pdf/roland_berger_tab_car_sharing_china.pdf.

population uses road transport – more than 90% of passenger journeys are on roads,[39] India's road network is the second-largest and one of the busiest in the world (see https://en.wikipedia.org/wiki/Transport_in_India). The government's focus on infrastructure investments and a friendly approach towards the Private-Public Partnership (PPP) model gives room for private players in the industry.

Japan

The car sharing market in Japan is expanding rapidly. According to the Foundation for Promoting Personal Mobility and Ecological Transportation (known as the Eco-Mo Foundation), car sharing services in Japan have over 1.32 million registered members (in March 2018), about a fivefold increase over the previous five years.[40, 41] In 2018, the fleet size of car sharing service providers in Japan was estimated at around 33 thousand vehicles.[42]

Park24, which operates the nation's largest car sharing service Times Car Plus, have been quotes as saying that one reason for the rapid growth was the spread of smartphones, which have made it easy to search for available vehicles and make reservations. It was reported that drivers in Japan will soon be able to use their smartphones to start rental cars and vehicles in car-sharing services.[43]

It was reported that some of the car sharing clients in Japan used rented cars in an unusual way. For example, Japanese car sharing service Orix discovered that many of its customers were renting the cars but not driving them, a large number of customers said they slept or rested in vehicles, followed by customers who said they used cars as spots to eat or to talk with friends on the phone etc.[44]

South Korea

The number of car sharing service users has increased more than 40-fold over the recent five years (2013–2018). According to data prepared by the Korea Road Traffic Authority, the number of users of car sharing services increased by about 44 times from 172,340 in 2013 to 7.7 million in 2018. The number of vehicles also jumped 13-fold to 17,500 from 1,314 during the same period.[45] In 2015, the South Korean car sharing market size amounted to around 80 billion South Korean won ($70 million) and it was estimated to reach about 500 billion South Korean won ($405 million) by 2020.[46]

In 2017, Korea's largest automaker Hyundai Motor Co. had launched its own car sharing program as it seeks to diversify its revenue sources.[47]

[39] According to the report "Transport Industry in India – Growth Analysis, Trends and Forecast (2020–2025)", a summary is available at https://www.mordorintelligence.com/industry-reports/analysis-of-transportation-industry-in-india.

[40] Transport and Environment in Japan, 2019. Available at http://www.ecomo.or.jp/english/pdf/tej2019.pdf.

[41] https://www.straitstimes.com/asia/east-asia/full-speed-ahead-for-automakers-in-japans-car-sharing-drive, 25 June 2018.

[42] https://www.statista.com/statistics/1030770/japan-corporate-car-sharing-market-size/.

[43] Smartphones to replace ignition keys at car share, rental services, 4 September 2019. Available at http://www.asahi.com/ajw/articles/AJ201909240052.html.

[44] Growing number of car-sharing users don't rent cars for driving, 4 July 2019. Available at http://www.asahi.com/ajw/articles/AJ201907040011.html.

[45] http://koreabizwire.com/car-sharing-services-approach-8-mln-user-milestone/145092, 30 Septembre 2019.

[46] https://www.statista.com/statistics/999337/south-korea-car-sharing-market-size/.

[47] https://pulsenews.co.kr/view.php?year=2017&no=602079.

Turkey

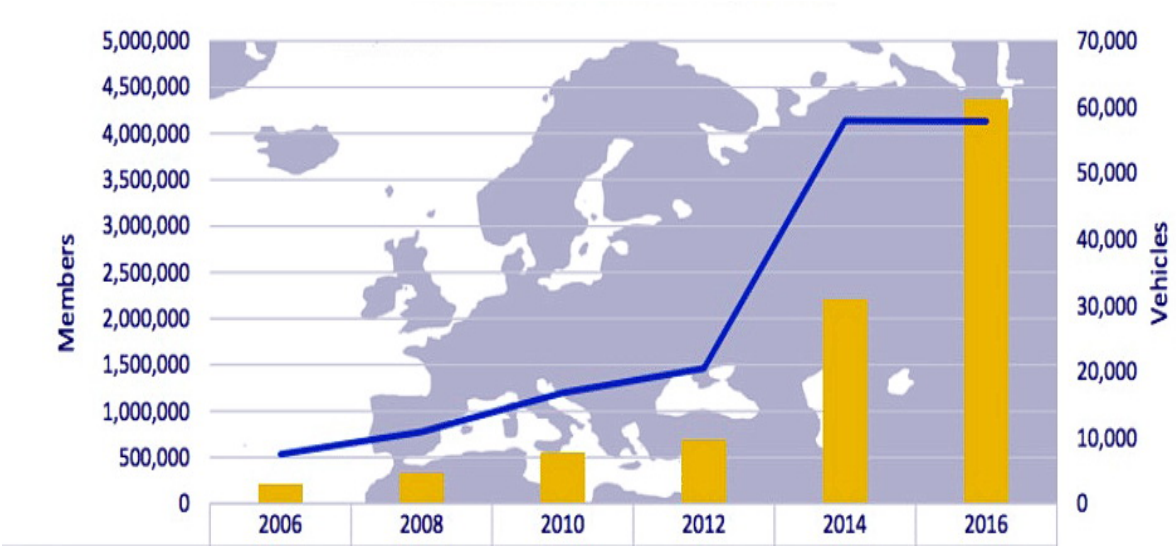
Shared mobility is gaining popularity in this country, but the scope of car sharing operators' activities is still small. Local researchers consider this to be caused by lack of public awareness, issues of personal data safety and security, complicated payment mechanisms, lack of integration with public transport systems, etc.[48] At the same time the market of shared mobility has good prospects. More than 50% of Turks have already had experience with shared mobility or are interested in it (they are ready to try it within a year).

The case of Istanbul, the largest city in Turkey, is illustrative. In Istanbul, although there is an integrated and highly accessible public transport system with metro, tram, buses and ferry services, still, there is a need for door-to-door mobility. This is especially important when one of the major reasons for people to prefer using automobiles for daily commuting is door-to-door mobility opportunity provided by automobiles. Therefore, integrating car-sharing systems with the public transport system will decrease car-usage rates and increase public transport usage at the same time [48, Canıtez 2017].

2.2. Main trends in the development of shared mobility in Europe

Europe is the second largest car sharing market globally (after Asia) partly due to its densely populated cities and partly because of the European Union having focused on adopting green technologies and reducing greenhouse gas (GHG) emissions. This has resulted in strong growth of operators and fleets. In 2016, 3.5 times more cars were available to Europeans compared to 2010 (see figure 5). It has also resulted in an important growth in membership (eight times in the period between 2010 and 2016).

Figure 5: **Development of car sharing in Europe. On the vertical axes: number of users (left), number of cars (right) (according to data from 12 countries, P2P services are not taken into account)**



Source: [33, Shaheen, 2018].

When comparing figure 5 (Europe) with figure 3 (Asia), it can be noted that a significant increase in car sharing occurred in Europe several years earlier than in

[48] Canıtez, F., Deveci, M., (2017) "An Integration Model for Car Sharing and Public Transport: Case of Istanbul", Transist Istanbul Transport Congress and Exhibition (Book of Proceedings), 2–3 November 2017, Istanbul, Turkey.

Asia, which is not surprising given the history of shared mobility services, which also appeared in Europe earlier than in Asia.

As indicated, the data shown in figure 5 do not include P2P services; figures 6 and 7 estimate the number of people using this type of car sharing and the cars used. According to these estimates,[49] the number of users has more than doubled since 2016, and the number of vehicles has almost tripled.

Figure 6: **Number of car sharing users in Europe**

Figure 7: **Number of car sharing vehicles in Europe**

Source: ING report

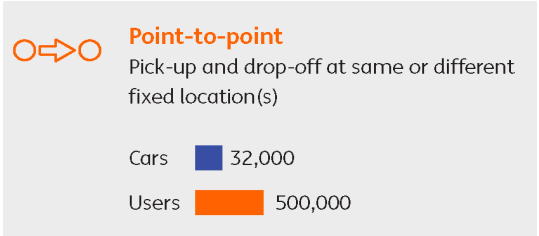
It is noteworthy that car sharing is still a niche product: despite the significant increase in the number of car sharing vehicles, they account for less than 0.1% of the total passenger car fleet in Europe.[50]

Private individuals who have concluded P2P agreements make up most of this fleet (323 thousand). The availability of these cars is unknown, as someone can give their car only once per month or per quarter. This contrasts with B2C professional fleet cars (47 thousand), which customers constantly use.

These services can be organized in different ways. Due to its convenience for customers, free-floating car sharing is often the most common (see figure 8). Free-floating car sharing services have 3.2 million customers compared to 0.5 million customers of services with fixed rental points (see figure 9). At the same time, the number of cars used by free-floating car sharing services is almost two times smaller that indicates a more efficient use of resources.

Figure 8: **Number of cars and users, free-float services**

Figure 9: **Number of cars and users, stationary services**



Source: ING report

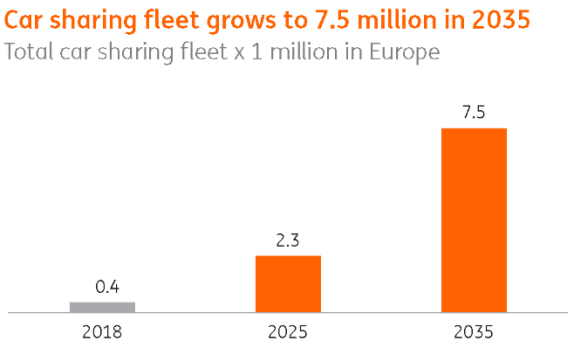
Free-floating car sharing is attracting the most users, it provides more convenience than other schemes, which oblige users to pick up and drop off cars at fixed locations. The fact that most free-floating suppliers have been on the market for less than five years underlines that this approach is still new; however, this market is booming.

According to the forecast in the figure below, the car sharing fleet in Europe will grow to 7.5 million in 2035 (see figure 10).

[49] Car sharing unlocked. Report of ING Economics Department, October 2018. Available at https://think.ing.com/uploads/reports/ING_–_Car_sharing_unlocked.pdf.

[50] According to ACEA the EU passenger car fleet grew by 8% over the last five years, with the number of cars on the road rising from 248 million in 2014 to 268 million in 2018.
Report: Vehicles in use – Europe 2019, 5 December 2019.
Available at https://www.acea.be/publications/article/report-vehicles-in-use-europe-2019.

Figure 10: **Forecasted growth of car sharing fleet by 2025 and 2035**



Source: ING report

United Kingdom of Great Britain and Northern Ireland

The CAGR estimates of car sharing growth in the United Kingdom of Great Britain and Northern Ireland are between 18–20% for fleet and membership over the next 7 years. This growth is partly due to improved infrastructure, the introduction of broadband Internet and a very unstable economy that results in people looking for alternatives to owning a vehicle. Car sharing operators are likely to increasingly shift to low-emission cars and electric vehicles.[51] A limitation is the lack of parking in big cities like London etc. Slowdown in economic activity and decrease in business confidence are also slowing down fleet renewal.

Germany

Estimates for growth in Germany are a little bit higher than in the United Kingdom of Great Britain and Northern Ireland (CAGR for fleet and members between 21% and 23%). This is not surprising, given that Germany is currently the biggest European car sharing market. At the beginning of 2018, more than two million people were members of a car sharing service, and more than 677 cities and communities offered such a service (80 more than in 2017). However, presently, car sharing makes up just 0.1% of passenger-km delivered by motorized passenger vehicles in Germany,[52] which confirms that the service is still a niche.

One of the main factors for the rapid spread of car sharing in Germany is that some of the largest car manufacturers offer their own initiatives in this area (Daimler, BMW). Another important factor is that the state has a unique regulatory framework to support clean energy solutions. For example, in 2017, the Bundestag adopted the so-called car sharing law, which facilitates the creation of parking spaces specifically for car sharing.

Introducing large electric car sharing fleets is one of the biggest opportunities in Germany, given the negative pressure on diesel registrations. Currently, 10% of the car sharing fleet in Germany already consists of electric vehicles; this share is approximately 100 times higher than the share of electric cars in the total private vehicle fleet.

P2P car sharing in Germany is also known as “private car sharing”. The advantage of this model is the low price and the wide variety of cars and also its availability

[51] IBISWorld report, October 2019. Available at https://www.ibisworld.com/united-kingdom/market-research-reports/car-rental-leasing-industry/.

[52] Best A., Hasenheit M., Ecologic Institute. Car Sharing in Germany:
A Case Study on the Circular Economy. Deliverable, 21 September 2018. – Available at https://circular-impacts.eu/content/car-sharing-germany-case-study-circular-economy.

within rural regions where professional carshare providers may not be readily available. Companies that offer P2P service in Germany include, SnappCar, Turo – who has partnered with Daimler, newcomer Getaway and market leader Getaround (formerly Drivy).[53]

Carpooling is actively developing. Germany has the highest adoption of carpooling, with France coming in second. One of the largest carpooling projects – Carpooling.com (bought in 2015 by a competitor, BlaBlaCar) – was born in Germany (2001), since shared trips in this country have historically been popular. Carpooling.com allowed drivers to offer available seats online and passengers to find a ride. People could select the users they wanted to ride with, based on how much space and comfort they needed, where they wanted to meet and how much they were willing to pay. People could also book and pay for a seat online and drivers and passengers could rate each other after a ride. The service could be accessed from a computer, a smartphone or Facebook. It was available in 7 languages and localized in 9 countries. The site also offered rides on train, bus and planes to give passengers a link to their final destination.[54]

France

Growth potential for France is similar to that of Germany. However, France is also seeing the growth of a significant market for the P2P model, with Getaround (Drivy in the past) having more than 1 million users and Citiz, which operates in more than 80 cities (14 local service providers).

France has very strict car sharing regulations, especially for free-floating vehicles. They all must be fully electric or at least hybrid vehicles. If these criteria are met, service providers are given preferential access to parking spaces.

Carpooling is used extensively in the country. One recent example of increased demand in the use of carpooling arose during the transport strike in France in December 2019 that paralyzed public transport and forced commuters to find other ways to travel. During the strike authorities in the Ile-de-France region around Paris promoted carpooling apps to keep commuters moving, providing each driver €4 ($4.40) per shared ride.[55]

BlaBlaCar is the most popular carpooling service in France, where it was founded in 2006. In 2019, the platform had 70 million users and was available in 22 countries, almost all of which are located in Europe. The latest information on the number of French users of the service (15 million) refers to 2018.[56] Foreign countries now represent almost 75% of BlaBlaCar's activity. It is also reported that in France in particular, 40% of people aged between 18 and 35 are using BlaBlaCar. While the company is reaching market saturation on this segment, elderly people currently represent a growth opportunity. The alternative carpooling operator Heetch employs professional drivers only.

Italy

The local car sharing market has more than 0.5 million users. As in many other countries, it is divided between large international players (for example, SHARE NOW), local service providers such as Enjoy (a project of the oil giant Eni), and the

[53] Shared Mobility by Region: Germany, 19 August 2019. Available at https://movmi.net/shared-mobility-germany/.
[54] Carpooling.com.Wikipedia. https://en.wikipedia.org/wiki/Carpooling.com.
[55] French Cosy Up in Carpools to Beat Transport Strike, 5 December 2019. Available at https://www.voanews.com/europe/french-cosy-carpools-beat-transport-strike.
[56] https://techcrunch.com/2018/09/24/blablacar-is-on-the-path-to-profitability/.

electric fleet of Share'Ngo and 4UsMobile, the latter of which is also available in smaller communities.

Due to insurance restrictions in Italy, the P2P car sharing model is not allowed. At the same time, there are both free-floating and stationary car sharing services, the latter being organized by local communities. Prospects for further development are generally favourable, but rapid growth is not foreseen as the market is close to saturation and is in the process of consolidation. In mid-2019, there were 27 car sharing operators in Italy, second only to the United States of America (with 33).[57] The main market in Italy for these services is Milan, which is dominated by the free-floating model, covering up to 80% of the market.

Carpooling is actively developing in the country; currently, BlaBlaCar is the first operator on the Italian market.

BePooler is a new carpooling platform in Milan, originally launched in Switzerland in 2016. It collaborates with city administrations and gas stations and is considering expanding the business model by integrating it with public transport. Its mobile app not only manages shared trips, but also reserves parking lots (see the details at https://www.bepooler.com/?lang=en).

A very promising sector in Italy is corporate carpooling. More and more users are interested in this type of carpooling and are pushing their employers to offer alternative solutions that allow them to save on transportation costs and optimize their trips to work.

Russian Federation

Most of shared mobility projects in the Russian Federation are concentrated in the western territory of the country. The first car sharing services were launched in the Russian Federation in 2012. The largest market for shared mobility services in the Russian Federation is in the metropolitan area of Moscow which suffers from significant road congestion problems. JPMorgan consider the Moscow B2C car sharing market as one of the most dynamic and promising in the world,[58] the fleet has grown by almost 50% (from 20 thousand cars), making Moscow the megacity with the largest car sharing fleet.[59]

One of the reasons for this is the support of local authorities: in the fall of 2015, the "Moscow Car sharing" project was launched, under which operators were able to acquire preferential parking permits (Moscow authorities introduced parking fees in 2013).

This experience shows that the system of preferential parking permits proved to be an effective measure and can be recommended for countries developing car sharing initiatives.

There are currently at least 10 operators in the Moscow car sharing market,[60] but only a limited number of them have a significant number of vehicles and customers. The distribution of the fleet by operators as of September 2018 is set out in figure 11 below. At the end of 2019, the top two companies have switched places.

[57] More details at http://movmi.net/carsharing-market-growth-2019/.
[58] As the car sharing market in Moscow was the fastest growing. RBC, 27 September 2018. Available at https://www.rbc.ru/technology_and_media/27/09/2018/5bab94a69a79474169e307c1, in Russian.
[59] https://www.autostat.ru/news/42403/.
[60] https://truesharing.ru/carsharing/.

Figure 11: **Shares of B2C car sharing market in Moscow by the number of cars**

Source: RosBusinessConsulting[61]

Car sharing in the Russian Federation is set to grow further as only 12% of Russians with a driver's license are registered in at least one car sharing program, which is much less than in the leading economies of Europe, Asia or the United States of America. This is stated in a recent study[62] looking at the future of road transport.[63] The study [62] was conducted in Russia for the first time in 2018; it compares Russia to 12 other countries. In addition to increasing the share of users, the growth potential of a car sharing service also lies in increasing regularity, the study notes in its comparisons that 67% of Russian customers make from one to five trips per month, while 42% of customers follow this pattern worldwide. Only 9% of Russian customers make over 15 trips per month, while worldwide, 24% of customers do so.

It should be noted that there are practically no noticeable P2P car sharing initiatives in the Russian Federation as there is a general mistrust of car owners sharing their car with strangers. There are P2P websites in Russia (for example, https://carenty.ru/, https://rentride.ru/, etc.), but these services do not have mobile applications.

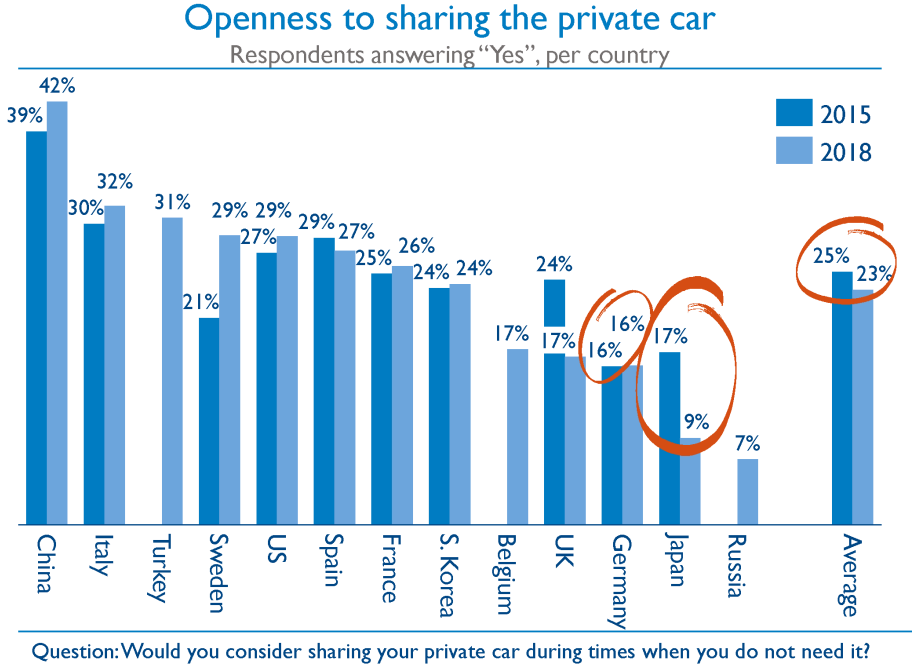
This phenomenon is shown in figure 12 below where China shows the highest support for P2P car sharing. Worldwide the support for P2P car sharing in 2018 fell on average in many markets with a significant growth seen only in China and Sweden. Russian P2P supporters' percentage is the lowest – most coming from the Moscow area.

[61] https://www.rbc.ru/technology_and_media/27/09/2018/5bab94a69a79474169e307c1.

[62] Future of automotive mobility – reloaded. Arthur D. Little report. December 2018. – Available at https://www.adlittle.com/sites/default/files/viewpoints/adl_future_of_automotive_mobility_global_study_executive_summary-min_0.pdf.

[63] According to other worldwide data younger people, are far more likely to be interested in car-sharing programs and those who live in cities are the most likely to use more than one service. Roughly 33% of under 30s are registered with car sharing programs, compared to 25% of over 30s – see at https://www.statista.com/statistics/1010292/percentage-drivers-car-sharing-platform-registrations-by-age/.

Figure 12: **Readiness to accept P2P car sharing**



Source: Arthur D. Little.

The global audit company Deloitte commented on the above Arthur D. Little Report: the fact that owning a car remains important for Russians may be a constraining factor – 54% of respondents are not ready to give up their cars even if there is a car sharing service available that fully meets their requirements. This compares with the average in across other countries that shows that 44% of drivers are not ready to part with their personal cars.[64]

In addition to high growth rates in Moscow, car sharing is also growing in other major cities. A recent study on car sharing[65] showed that while at the start of 2017, 92% of the car sharing market was in Moscow, at the end of 2019, this had fallen to 85%. St. Petersburg and the Leningrad Region, which accounted for 8.35% of trips remains the second largest while other areas (in the Bashkortostan, Sverdlovsk, Samara, Novosibirsk and Nizhny Novgorod regions, as well as the Krasnodar Territory) account for only small shares but the growth rates are similar to the early years of car sharing in Moscow with between 73% and 83% of users from these regions are classified as new.

Carpooling in the Russian Federation

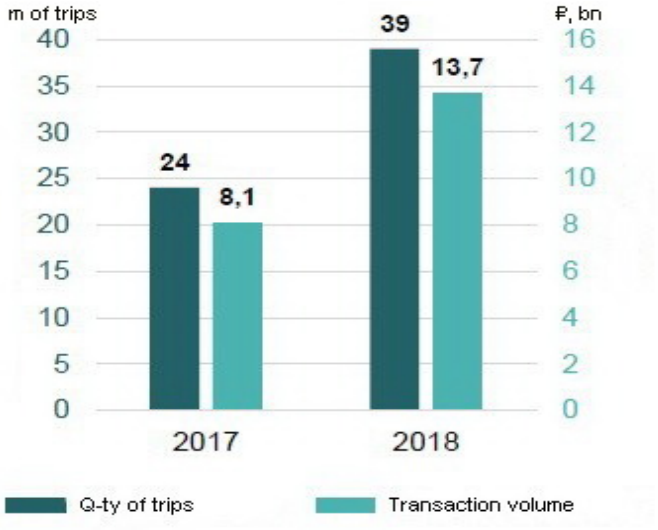
Shared journeys are a key component of travel in the Russian Federation due to considerable distances and uneven development of the railways. It may be why the Russian carpooling market is becoming the largest in Europe with about 16 million users and is continuing to grow as shown in figure 13.[66]

[64] https://www2.deloitte.com/ru/ru/pages/about-deloitte/deloitte-in-press/2019/karsheringom-rossii-polzuetsya-12-procentov-voditelej.html.

[65] Car sharing market in Russia. March 2019. Available at https://www.sberbank.ru/common/img/uploaded/files/pdf/analytics/car_28_19.pdf.

[66] The economy of shared consumption in Russia 2018: models, industries, trends. TIAR Center 2018. Available at https://tiarcenter.com/sharing-economy-research/, in Russian.

Figure 13: **Dynamics of the Russian carpooling market in 2017–2018**



Source: Tiarcenter

About 100,000 Russians use carpooling daily; 60% of carpooling users are men aged 25–35 with average income.[67]

The key carpooling operator is BlaBlaCar, but private announcements on the social networks such as "VKontakte" and "Odnoklassniki" also offer to their users the possibility to organize carpooling.

In 2014, BlaBlaCar entered the Russian market by purchasing the local service "Podorozhniki". In August 2018, BlaBlaCar announced its merger with BeepCar, a travel search platform created by the Mail.ru Group for the Russian market making it the dominant operator in the Russian Federation.

BlaBlaCar's global expansion is reflected in its own study analysing data from its 70 million-users.[68] The study provides shows that drivers deviate as much as 18 km from their route to pick up or drop off fellow travellers (compared to 15 km on average for BlaBlaCar worldwide); 3.1% of users of the service would not have travelled at all if it had not been for BlaBlaCar (5.2% on average for BlaBlaCar worldwide). The average trip length in the Russian Federation is 258 km (257 km on average for BlaBlaCar worldwide).

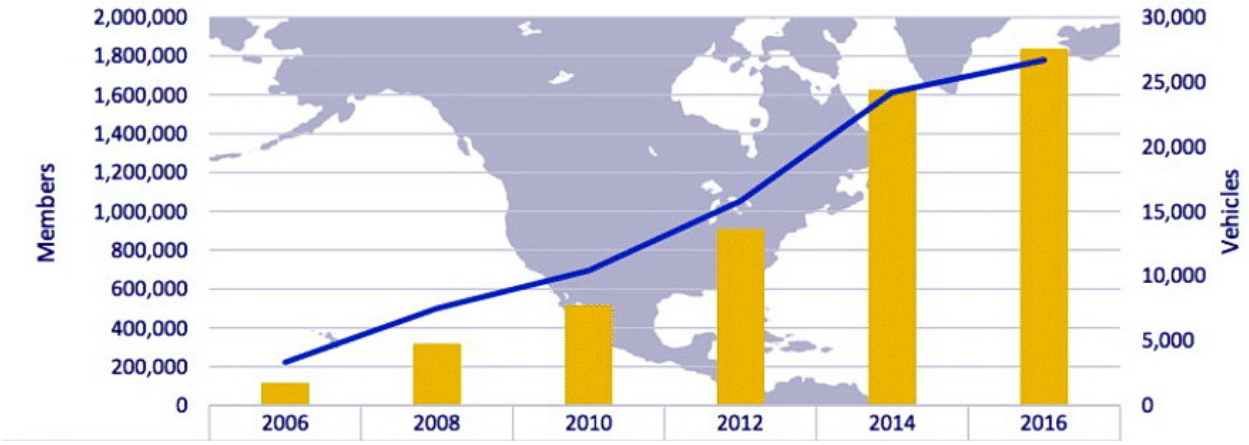
Carpooling in the Russian Federation for intercity trips is still limited. The practice of intercity shared trips is for the most part based on long-term offline agreements between neighbours and colleagues. Platform solutions for short trips are currently being tested.

[67] According to official data (as of 2018), the average income of the population in the Russian Federation was 32,635 rubles per month (about $520).

[68] https://blog.blablacar.com/newsroom/news-list/zeroemptyseats.

2.3. Main trends in the development of shared mobility in North America

Figure 14: **Development of car sharing in North America. On the vertical axes: the left is the number of users, the right is the number of cars (according to data from 3 countries, P2P services are not taken into account)**



Source: [33, Shaheen, 2018].

United States of America

The car sharing fleet and membership in the United States of America is expected to grow by about 17% to by 2024 [33, Shaheen, 2018].

The key players in the market are RideCell, Getaround, Vulog, the Hertz Corporation, Lyft, Zipcar, and Turo. The industry is also witnessing the emergence of many small and regional players. P2P car sharing services are also widespread in the United States of America.

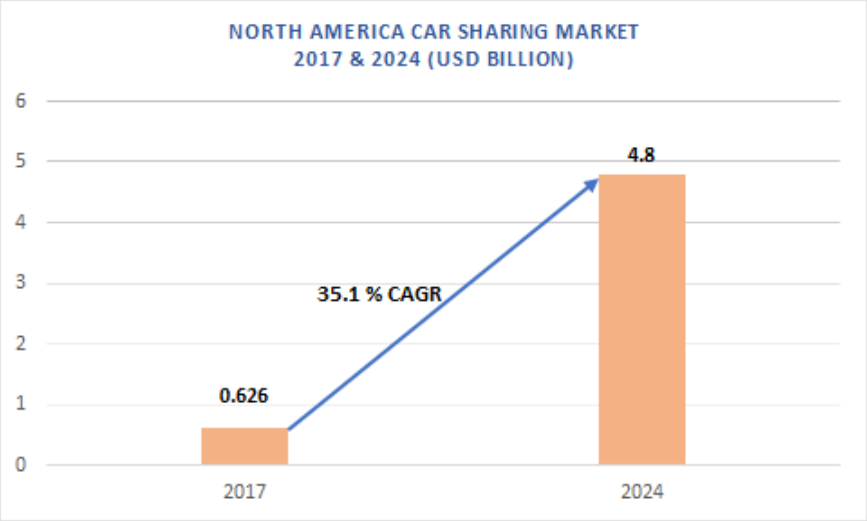
The growth of the market is connected, among other things, with the regulatory incentives used by the authorities in the United States of America. Some of these incentives are at municipal levels; others have been introduced by different states. State legislations generally focus on car sharing taxation and incentives for using car sharing fleets. Examples are tax credits (Washington state), special programs that increase co-location between transit hubs and car sharing locations (California) or partnerships between public transit operators and car sharing providers (Oregon), and in particular special car sharing parking permits (several states).

Canada

While Canada is a smaller market compared to the United States of America, its population is located mainly in metropolitan areas (over 85%) and boasts some of the most vibrant car sharing markets. This is why some CAGR estimates for fleet and members are closer to 20–23%. Vancouver is an example of a flourishing car sharing market: it has four operators (two are station-based, and two are free-floating), and citizens have access to a fleet of almost 3,000 vehicles. As of 2016, almost 1/3 of Vancouver's adult population (approximatively 200,000 people) had one or more car sharing memberships.

Strict regulations for tightening emissions control are expected to accelerate the growth of the car sharing market in North America (some estimates are up to 35.1%, see figure 15).

Figure 15: **Forecast of CAGR of the car sharing market in the North America region**



Source: graphicalresearch.com[69]

In 2018, the City of Los Angeles launched all-electric car sharing operations in partnership with the French Bolloré group, where vehicles are strategically parked in low income neighborhoods. The company expects to have 100 vehicles available at 40 locations by the end of the year and to triple in size by 2021. Another program that is currently being tested is aimed at solving transport problems in Honolulu (Hawaii), a city with less dense public transport infrastructure compared to typical large cities (Paris, London, New York). This programme is based on is a partnership between Toyota and a large dealer network (Servco). Using dealers to operate car sharing fleets allows for a unique setup, which could create new opportunities in smaller and more rural communities.

The growing competition from other mobility solutions, such as ride-hailing services, bicycle rentals, ridesharing and car rental services, is expected to restrict the car sharing market growth. These services provide a high degree of flexibility at low costs, thereby attracting a large number of customers. Furthermore, these solutions reduce the number of vehicles on the road to a large extent as compared to the car sharing services, thus restraining the industry's growth.

Carpooling in the United States of America

Carpooling is quite popular throughout the United States of America and is often used when traveling for short distances, for example, to work. The service is especially effective in areas poorly covered by public transport. This is the main difference from the European model, in which carpooling is associated with long-distance trips. Platforms such as Waze Carpool, UberPool and Lyft Line (in some cities) provide customers with a wide range of search and selection options for joint trips.

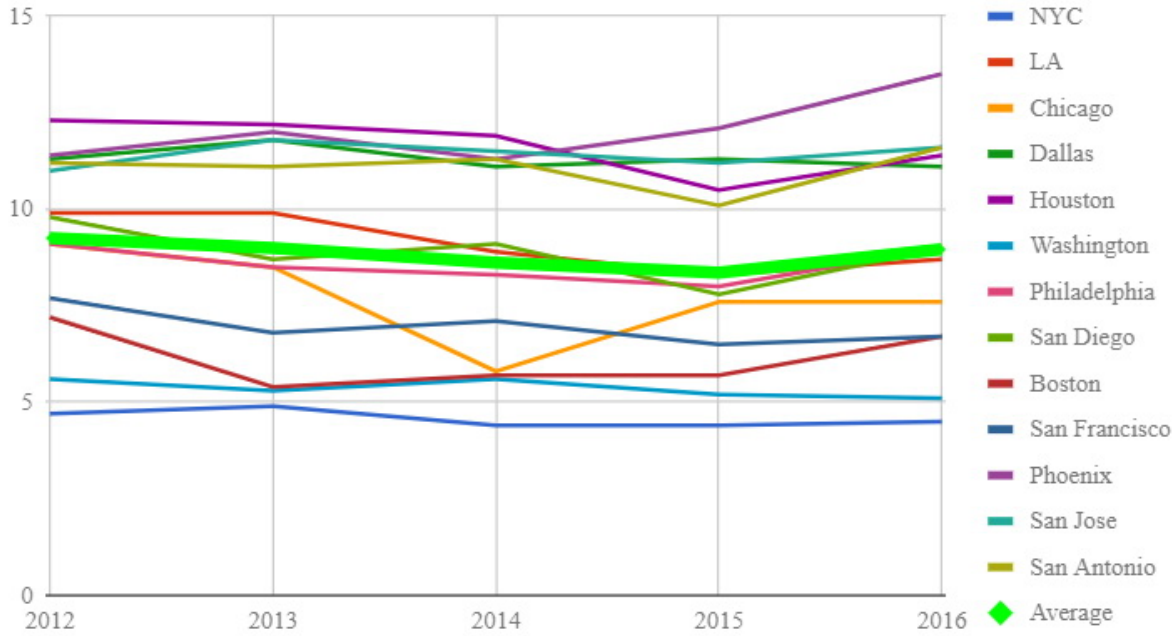
Some United States of America municipal authorities grant cars carrying passengers the right to drive on dedicated (High Occupancy Vehicle – HOV) lanes while also providing special parking lots for carpooling cars and giving carpooling drivers discounts on personal car insurance.

[69] https://www.graphicalresearch.com/industry-insights/1001/asia-pacific-car-sharing-market.

At the same time, the CityLab study[70] highlighted a number of limitations that exist in the United States of America. Most suburban, and even many urban households have at least two cars. Most often, both adult parents go to work on their own, in separate vehicles. At the time of the study, it was found that, on average, less than 10% of the United States of America residents go to work together, and 77% of Americans go to work alone.

In figure 16, the vertical axis represents the percentage of residents in a number of the United States of America cities that use carpooling services. The relatively small decrease in 2015 reflects certain changes in the behaviour of citizens.

Figure 16: **Change in the percentage of carpooling users in several United States of America cities [70, Bliss, 2017]**



Unlike carpooling that was popular in the suburbs in the past, it is today often associated with low-income workers with limited resources. Many of today's carpoolers do so out of economic necessity rather than conscious choice. In fairness, it should be noted that this fact applies to other countries of the world.

2.4. The social and economic indicators of selected countries in the regions of Asia, Western Europe and North America and priority countries

It is advisable to consider a number of indicators characterizing the socioeconomic situation in some European, Asian and North American countries in comparison a subset of Central Asian countries. These indicators provide basic information about the conditions under which car sharing services can develop and the actions that should be taken to make this development successful (see table 2).

[70] Bliss L. Carpooling Is Totally Coming Back This Time, We Swear. 15 September 2017. Available at https://www.citylab.com/transportation/2017/09/is-carpooling-making-a-comeback/539979/.

Table 2: **Key socioeconomic indicators for selected countries of the world, including priority countries, as of 1 January 2018**

	Country	*Index GCI[1] rank*	*Population, mln[2]*	*GDP per capita at PPP, $ (country ranking is given in brackets)[3]*	*Social risk [4] (2016)*	*Motorization rate[5] (2015)*
Europe						
1	Germany	5	82.9	50 715 (16)	4.1	593
2	France	22	67.0	42 779 (26)	5.5	492
3	Italy	43	60.4	39 817 (29)	5.6	706
4	United Kingdom of Great Britain and Northern Ireland	8	66.5	47 877 (24)	3.1	587
Asia						
5	China	28	1 392.7	16 807 (76)	18.2	118
6	India	40	1 352.6	7 056 (120)	22.6	22
7	Turkey	53	82.3	27 916 (47)	12.3	195
North America						
8	United States of America	2	327.1	59 532 (11)	12.4	821
9	Canada	14	37.0	46 378 (22)	5.8	646
CIS countries						
10	The Russian Federation	38	146.9	25 533 (53)	18	358
11	Kazakhstan	57	18.0	26 410 (51)	17.6	249
12	Kyrgyzstan	102	6.3	3 726 (145)	15.4	224
13	Tajikistan	79	9.1	3 180 (151)	18.1	54 for the whole country, 87 for Dushanbe[6]

Notes:

1. World Economic Forum (WEF), available at http://reports.weforum.org/global-competitiveness-index-2017-2018/competitiveness-rankings/;
2. World Bank report «Research & Outlook», available at https://data.worldbank.org/indicator/SP.POP.TOTL;
3. World Bank statistics, available at https://en.wikipedia.org/wiki/List_of_countries_by_GDP_(PPP)_per_capita;
4. Social risk is reported road traffic fatalities rate per 100 000 population, figures according to WHO Global status report on road safety 2018, available at https://www.who.int/violence_injury_prevention/road_safety_status/2018/en/;
5. International Organization of Motor Vehicle Manufacturers (OICA), available at http://www.oica.net/category/vehicles-in-use/;
6. Pirov J.T., et al. Analysis of Road Traffic Organization in the City of Dushanbe. Proceedings of ISTU Vol. 21, No. 6, 2017.

Brief description of key figures in a selection of Central Asian countries

As a follow-up activity to this study pilot projects will be explored in a selection of Central Asian countries, therefore a brief description has been provided below of the key countries to where this work will take place.

Kazakhstan is the largest among the pilot countries and has the fastest growing economy. Its urban population exceeds its rural population, accounting for 54%, but the motorization rate here is still more than two times lower than in Western Europe

and three times lower than in the United States of America. Almaty, with a population of about two million people, is the largest city and the economic center of Kazakhstan. Cities with over a million people also include Nur-Sultan (former Astana), the administrative capital, and Shymkent. Among the countries selected for analysis, and whose car sharing activity can be used for comparison, Turkey is the one which is most similar to Kazakhstan.

Kyrgyzstan is mainly rural; only about one-third of the population live in urban areas. Road transport in Kyrgyzstan plays a major role; minibuses provide public transit in cities and between cities and neighbouring villages. Bishkek, the only big city with a population of about one million people, is the administrative capital and economic centre of the country. Osh is the second most populated city, with over 250 thousand people (see official statistics at http://www.stat.kg/kg/statistics/download/operational/769/).

Tajikistan is the smallest and the least urbanized country in Central Asia: only 26% of the population live in cities; overall, it is a rural country, where agriculture accounts for about three quarters of the GDP. Automobiles account for more than 90% of the total volume of passenger transportation and more than 80% of domestic freight transportation (see at https://en.wikipedia.org/wiki/Tajikistan). Dushanbe, the largest cultural, political, economic, industrial and administrative centre of the country, is the capital of Tajikistan. As of 1 January 2019, the city's population was about 850 thousand people; the entire Dushanbe agglomeration had more than 1 million 600 thousand people, including the Gissar Valley, the most densely populated region in the country (see official statistics at http://stat.ww.tj/publications/July2019/macmuai_sumorai_aholi_to_1_anvari_soli_2019.pdf).

3. Comparative analysis of the legal context

Recognizing the benefits of specialized car sharing services and network-based carpooling platforms, a number of countries around the world are pursuing a policy favouring their development, for which relevant regulatory acts are being adopted.

3.1. Car sharing initiatives

3.1.1. United Kingdom of Great Britain and Northern Ireland

In the United Kingdom of Great Britain and Northern Ireland, car sharing services are known as car clubs. Car clubs are short-term car rental services that allow members access to locally parked cars and pay by the minute, hour or day. As of January 2018, there were at least 48 distinct car sharing clubs in the United Kingdom of Great Britain and Northern Ireland.[71]

London has about 75% of all car club vehicles.[72] Some car clubs are running promotions for Ultra Low Emission Zone (ULEZ), avoiding charges on vehicles and involving vehicles that meet the ULEZ standards in order to support local efforts to clean up London's toxic air. Car sharing fleets comprise cars with a lower average age, significantly lower emissions outputs and higher safety standards than the average passenger vehicle fleet of United Kingdom of Great Britain and Northern Ireland.

In order to function, car clubs need to establish a set of rules to determine members' behaviour, obligations and financial responsibilities to the club as well as registration and termination.

The United Kingdom of Great Britain and Northern Ireland still has no specific car sharing regulation. Drivers or vehicles participating in car sharing clubs do not need to hold taxi or private hire vehicle (PHV) licenses as of 2019.

The majority of car sharing schemes currently use a return-trip model, one-way car sharing is just starting in the United Kingdom of Great Britain and Northern Ireland.

3.1.2. Germany

In Germany, the Car Sharing Preference Act (Car sharing Act – CsgG) entered into force on 1 September 2017.[73] This law provides incentives to promote the use of car sharing vehicles to reduce the climate and environmental impact of motorized private transport.

The definition of a shared vehicle is introduced: it is a motor vehicle which can be offered and independently reserved and used by an indefinite number of drivers on the basis of a framework agreement and a time- or kilometre-dependent tariff or hybrid forms of such tariffs including the energy costs. The law allows local authorities to reduce or waive parking fees. Therefore, to benefit from these legal provisions, car sharing vehicles must be registered by the authorities and identified as car sharing vehicles.

[71] Review of the UK passenger road transport network. January 2019. Available at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/773676/passengerroadtransport.pdf

[72] https://movmi.net/shared-mobility-uk-ireland/.

[73] CsgG – Gesetz zur Bevorrechtigung des Carsharing. Gesetze-im-internet.de (Law-in-internet). Available at https://www.gesetze-im-internet.de/csgg/BJNR223000017.html.

Any driver who operates a car sharing vehicle may, in accordance with this law, obtain preferential rights in road traffic if this does not impair the safety and ease of traffic. These preferential rights include:

1. For parking on public roads or paths where it is not normally permitted,
2. With regard to charging for parking on public roads or paths.

The car sharing models that can be used are either free-floating or stationary. As a result, the law distinguishes between two types of reserved car space. First, with the introduction of a new parking sign, the municipal authorities may set up priority parking for drivers of vehicles that belong to a free-floating car-sharing service.[74]

However, this sign is not yet in force, as the draft amendment to the traffic regulation implementing it has to pass the Bundesrat (at a federal level). As a result, two years after the Carsharing Act came into force, authorities are still reluctant to set up designated car spaces.

Secondly, individual providers of station-based car-sharing services may apply for a special permit to set up car parks on public roads reserved exclusively for their fleets. However, since the Carsharing Act is a federal law, this special permit cannot be based on the Carsharing Act but presupposes a state regulation from each individual Bundesland (federal state) that implements the Carsharing Act. So far, not all federal states have enacted such regulations.

Ultimately, the federal legislator's initiative to eliminate parking issues in crammed metropolitan areas as the bottleneck of car-sharing service is a commendable step in the right direction.

3.1.3. France

The country's transport industry is heavily regulated, including for car sharing; there is a legal framework put in place by the public authorities to promote the development of car sharing among communities, businesses and individuals.[75]

Car sharing is defined by Article L.1231-14 of the Transport Code as:

> "The pooling of a motorized road vehicle or fleet of motorized road vehicles for the benefit of users who are subscribers or authorized by the organization or the person managing the vehicles. Each subscriber or authorized user can

[74] Benedikt F. Flöter, https://iot.taylorwessing.com/new-mobility-and-old-laws-the-modernization-of-germanys-regulatory-framework-for-mobility-services/.

[75] The web resource of the French Ministry of Ecological and Solidarity Transition contains a selection of existing legal acts regarding car sharing activities. Autopartage en France. Ministry of Ecological and Solidarity Transition. Available at https://www.ecologique-solidaire.gouv.fr/autopartage-en-france.

access a vehicle without a driver for the trip of his choice and for a limited time.".

Article 54 of Law No. 2010-788 of 12 July 2010 on a national commitment to the environment (Grenelle 2) establishes "car sharing specific" markings, allowing vehicles with this sign to benefit from reserved parking spaces and, as part of urban travel plans, preferential rates.

Law No. 2014-58 of 27 January 2014 on the modernization of the regional authorities and on the affirmation of the metropolises (MAPTAM) has registered the transformation of the authorities organizing urban transport (AOUT) into authorities organizing the mobility (AOM) and broadened their competencies in car sharing activities. In addition to issuing the aforementioned markings, they are now authorized to organize public car sharing service in case of insufficient private supply. The transport payments can now be used to finance the capital and operating costs of any action within the AOMs' scope, and hence car sharing services.

Many provisions encouraging the development of car sharing have been enacted by Law No. 2015-992 of 17 August 2015 relating to the transition of economy to "green growth". This law resulted in the requirement for fleets to be fully electric or at least hybrid.

The recently adopted Law on Mobility Orientation (LOM)[76] aims to improve the daily journeys of the French people, by putting the environment at the centre of discussions. This new regulation aims to radically transform transport and mobility. The law contains some provisions that encourage shared mobility and are of special interest:[77]

- The closer the decision-making centers are to the territories, the more concrete, fast and adapted the strategies put in place can be. To achieve this, the LOM suggests for the entire French territory to be covered by Mobility Organizing Authorities (MOA) who will be used to better coordinate local travels. Until then, only some of major cities has this power;
- To encourage carpooling, local authorities will be able to create grant programs. They will also be able to develop dedicated carpooling lanes for the least polluting vehicles on major roads;
- To make work-home commuting easier, the LOM act introduces a sustainable mobility package of up to €400 per year without taxes, and social contributions to encourage the use of carpooling and bicycles. This package encourages public and private employers to play a part in the financing of sustainable transport for their employees;
- In addition, the LOM act anticipates the massive deployment of electric vehicle charging stations, car sharing electric vehicles, electric buses and car fleets. To facilitate the development of terminals, its article 23 defines the activity of electric vehicles charging operators as a service provision and no longer a mere provision of electricity.

3.1.4. Italy

For an effective introduction of the shared transport services, the government had taken legislative action aimed at encouraging car sharing. Specifically, the decree of the Ministry of the Environment of 27 March 1998 concerning "Interventions for sustainable mobility" aimed at supporting public investments in car sharing by

[76] Loi n° 2019-1428 du 24 décembre 2019 d'orientation des mobilités.
[77] https://blog.padam-mobility.com/2019/08/01/7-things-to-remember-from-the-lom-act/?lang=en.

establishing in article 4 paragraph 1 that "Municipalities [...] encourage associations or companies to organize optimal collective use of cars, as well as to promote and support forms of sharing of cars destined to be used by several people, upon payment of a proportional share of time of use and the kilometres travelled".

According to the Associazione Nazionale Industria dell'Autonoleggio e Servizi Automobilistici (the national car rental association – ANIASA), the introduction of regulatory measures for car sharing and carpooling should be accelerated[78] to allow for wider development of shared mobility.

This is the goal of two bills assigned to the IX Transport Commission of the Parliament.

The measures under consideration affect two areas related to sustainable transport: car sharing and carpooling. The texts contain provisions that facilitate the sharing of private vehicles as a tool to reduce the number of cars in circulation and the related environmental impact.

Bill C. 859 encourages the design and development of digital platforms that allow the spread of this car sharing practice.[79] Bill C. 930[80] is dedicated to the promotion and dissemination of carpooling; it gives it an unambiguous definition and regulates it. The text asks administrations and government agencies to reserve space for this sustainable mobility service on their websites and intranets. It also provides for a tax credit of up to €10,000 per year for those directly managing the carpooling business, within the maximum total turnover of €1 million per year.

3.1.5. China

The increase in car sharing in China is mainly driven by government support and subsidies, aimed at promoting these types of services, as well as consumer demand for alternative mobility solutions.[81]

China is promoting car sharing initiatives both at central and local levels. In October 2015, the State Council encouraged the automotive industry to develop and implement innovative car sharing models.

There is no separate law in the country specifically dedicated to innovative mobility services. However, there are laws that can affect activities which include:

- The E-Commerce Law of the People's Republic of China as adopted at the fifth session of the Standing Committee of the Thirteenth National People's Congress on 31 August 2018, which came into force on 1 January 2019; it outlines consumer protection measures on China's online platforms;
- The Cybersecurity Law of the People's Republic of China, as adopted at the twenty-fourth session of the Standing Committee of the Twelfth National People's Congress on 7 November 2016, which came into force on 1 June 2017. The law regulates the actions of suppliers of network products and services for the collection, storage and processing of user data, determines the order and specifics of ensuring the security of information infrastructure.

[78] "La sharing mobility si consolida, ora adeguare la normativa" – Ambiente & Energia. Redazione ANIASA, 8 maggio 2019. Available at http://www.ansa.it/canale_ambiente/notizie/focus_energia/2019/05/08/la-sharing-mobility-si-consolida-ora-adeguare-la-normativa_b131ad1c-b1df-4414-9373-b33e946f9a47.html.

[79] See the details at https://www.camera.it/leg18/126?tab=&leg=18&idDocumento=859&sede=&tipo.

[80] See the details at https://www.camera.it/leg18/126?tab=&leg=18&idDocumento=930&sede=&tipo.

[81] Shared mobility services and car-sharing in China – Sustainable Transport in China. 25 April 2018. – Available at https://www.sustainabletransport.org/archives/5934.

Of key importance in the legal landscape are the guidelines or opinions that are usually developed and adopted by one or more state bodies (ministries). These include:

- The Guidelines for Promoting the Development of a Shared Economy (No. 1245 of 3 July 2017) adopted by the National Development and Reform Commission, together with seven other government agencies,[82] which aims to facilitate deep integration of the Internet, Big Data, artificial intelligence and the real economy as well as promote the emergence of new sources of growth and boost development in various areas of the shared economy. This sector of the national economy is expected to account for more than 10 percent of China's GDP by 2020. The guidelines state that a balance must be struck between encouraging innovation and appropriate government regulation of the sector and ensuring orderly competition. Support for car sharing and carpooling is seen as part of the overall development policy.[83]
- In August 2017, the Ministry of Transport, together with the Ministry of Housing and Urban-Rural Development (MoHURD), adopted guidelines for the promotion of car sharing which focus mainly on the legal status, insurance and regular maintenance of vehicles and requires the use of electric vehicles in car sharing services as a priority.[84] In addition, the guideline also encourages the use of new smart technologies such as satellite positioning networks and mobile internet-based applications that will facilitate the management of cars and users when they make orders.

China's local governments have significant power relating to the promotion of urban mobility.

In February 2016, the Shanghai local government set the targets for car sharing to have 6,000 parking lots, 20,000 new energy vehicles (NEV) and 30,000 charging points by 2020.[85] Furthermore, free

parking spaces were provided to car sharing operators and subsidies were granted for platform development, charging infrastructure, electricity consumption and general operation. Shanghai`s Jiading district is subsidizing car sharing, giving €5,180 ($5,800) per NEV each year. Similar policies can be found in the cities of Chengdu or Wuhan.

3.1.6. India

Car rentals, including car sharing, are governed in India by the Rent a Cab Scheme 1989[86] of the Motor Vehicles Act. The scheme clearly stipulates that in order to gain a license for the business of car rentals, the individual or company must possess a fleet of at least 50 vehicles. The country has yet to shape the specific regulatory environment for car sharing at the federal level with some interventions taking place at a local level with authorities seeking to promote shared mobility.

For example, in Bangalore, government involvement was limited to the allocation of a fleet service license to ZoomCar. Even this "support" proved to be a laborious

[82] https://www.ndrc.gov.cn/fzgggz/gjscys/gjsgz/201802/t20180212_902687.html, in Chinese.
[83] Ma Y., Zhang H. (2019) Development of the Sharing Economy in China: Challenges and Lessons. In: Liu KC., Racherla U. (eds) Innovation, Economic Development, and Intellectual Property in India and China. ARCIALA Series on Intellectual Assets and Law in Asia. Springer, Singapore. First Online 7 September 2019. https://doi.org/10.1007/978-981-13-8102-7_20.
[84] http://www.chinadaily.com.cn/china/2017-08/15/content_30620870.htm.
[85] Shared mobility services and car-sharing in China, 25 April 2018. Available at https://www.sustainabletransport.org/archives/5934.
[86] http://transport.bih.nic.in/Docs/rent-a-cab.pdf.

process because the operator was required to have a fleet of 50 vehicles before it could apply for a fleet permit and had to collaborate with an existing taxi operator in the interim.

So far, India has not experimented with any kind of car sales restrictions (like in China) although several big Indian cities have considered levying a congestion charge.

As part of wider guidelines to incentivize electric vehicles, the central government asked state governments in a letter issued on 17 July 2019 to promote shared mobility in order to reduce congestion on roads and tackle pollution.[87]

3.1.7. Turkey

There are currently no specific car sharing regulations in the country. Some provisions on the priority of shared mobility programs are included in the National Energy Efficiency Action Plan for 2017–2023.

In 2018, the government introduced a range of changes to the regulatory framework to streamline transport-related applications and improve road safety. These reduce the fees and documents required for obtaining authorization certificates, which makes it possible to actively develop car sharing platforms.[88]

3.1.8. United States of America

Car sharing laws are developed and applied at the state level. There have been many cases brought against this industry, and several pieces of legislation have been proposed and passed in the last few years. These cases indicate that this country does not have a uniform policy to encourage car sharing, and the following information can be useful for the shaping of the mobility sector in priority countries, as the lessons learnt from different approaches of regulatory authorities.

The regulator often focuses on P2P car sharing services such as Turo and Getaround, which allow users to rent private cars. Two factors are putting P2P car sharing at an advantage when it comes to legislation. States see these services as a tool for reducing pollution, traffic, and other environmental impacts.[89]

For this reason, several states have enacted P2P car sharing legislation, including California, Oregon, Washington, and Wisconsin. They offer tax credits and designated parking in limited-time zones. In Massachusetts, the local Department of transportation is partnering with the Zipcar service.

It should be noted that in the United States of America, taxation is the most significant lever that the authorities use to regulate the provision of car sharing services. If car sharing is organized as part of the rental model, then companies and customers will obey the same rules as companies that provide car rental services; these rules aim to create a level playing field.

Specifically, many rental agencies would like car sharing services to be taxed similarly to the car rental sector as if car sharing is defined as a rental, car sharing will be subject to daily taxes, regardless of whether cars are used by minutes, hours or days.

---

[87] Govt wants private carpooling to be a no-profit no-loss service. Nishtha Saluja. 16 September 2019. Available at https://economictimes.indiatimes.com/industry/auto/auto-news/govt-wants-private-carpooling-to-be-a-no-profit-no-loss-service/articleshow/71140689.cms?from=mdr.

[88] Turkey Updates Rules for Road Transport. E. Moroğlu. Available at https://www.lexology.com/library/detail.aspx?g=026045d0-96f1-47f9-b364-80221257acb4.

[89] The Evolving Face of Car Sharing Legislation. Chana Petron. 22 April 2019. Available at https://www.cbtnews.com/the-evolving-face-of-car-sharing-legislation.

To date, states within the United States of America have had very different approaches to the calls to regulate the segment. Colorado chose not to impose the daily fee because car sharing "benefits the state by reducing traffic congestion, greenhouse gas emissions, and the amount of wear and tear on the highways".[90] Minnesota also withdrew from taxing some services. Hawaii took a different path by enacting Bill 2731. The state has established a system that distributes tax more evenly so that it does not burden short-term renters (the ones that rent cars by minutes or hours), but rental tax rates still exist.

Other states have not yet determined what car sharing is and how to create equality between competing services.

3.1.9. The Russian Federation

The country does not yet have any car sharing regulations at the federal level, although there have been calls at a national level to introduce something in this area.[91] In several major cities, local governments adopt regulations that provide incentives for companies which develop shared mobility schemes.

For example, the Moscow Government (City Hall) has decided to stimulate the development of car sharing since, according to statistics, one car sharing vehicle replaces 15 personal cars, which has a direct effect on road conditions. The decree of the Moscow Government dated 31 August 2011 No. 405-PP (as amended on 14 June 2018) "On urban support for taxi services and car sharing services in the city of Moscow" initiated the "***Moscow Carsharing***" project. As part of this project, companies were able to acquire preferential parking permits in the capital. Furthermore, under this decree, the Moscow government will subsidize leasing or loan payments from the city budget in order to reimburse part of the costs borne by those paying interest on loan agreements concluded with the aim of acquiring passenger cars intended for taxi transportation or providing car sharing services.

The standard procedure for licensing of road passenger transport in this country is defined in the "Regulation on licensing the activity of transporting passengers and other persons by bus" (as amended by Decree of the Government of the Russian Federation No. 195 dated 27 February 2019, available at http://www.consultant.ru/document/cons_doc_LAW_319291/). This is a federal-level document. The conditions for issuing a license for passenger transportation by bus are standard. For example, a tachograph is required on board, and the specific conditions of the Law "On Transport Security" must be met.

According to these rules, a license may only be issued for the transportation of passengers in urban, suburban and intercity transport with more than eight passenger seats. Minibuses, for example, fall into this category.

In the case of the city of Moscow a preferential parking permit for vehicles of the car sharing system is necessary for all operators. Requirements are imposed by the government (City Hall) of Moscow (see table 3).

[90] Colorado Revised Statutes Title 43. Transportation paragraph 43-4-804. Highway safety projects--surcharges and fees--crediting of moneys to highway users tax fund – definition. Available at https://codes.findlaw.com/co/title-43-transportation/co-rev-st-sect-43-4-804.html.

[91] The law will help to secure car sharing / Parliamentary newspaper. 25 February 2019. Available at https://www.pnp.ru/economics/polzovateley-karsheringa-mogut-obyazat-prokhodit-identifikaciyu.html, in Russian.

Table 3: **Comparison of requirements of the government of Moscow to documents for obtaining permit for taxi activity and preferential parking permit**

No.	*Title of the document*	*Documents for taxi service*[1]	*Documents for car sharing service*[2]
1.	Application for permission to transport passengers and baggage by taxi, electronically	+	_
2.	Request for a parking permit, in paper	_	+
3.	Identity document (ID) of the applicant or the applicant's representative	+	+
4.	Road vehicle registration certificate	+	+
5.	Vehicle leasing agreement (if the vehicle is provided on the basis of a leasing agreement)	+	+
6.	Vehicle rental agreement (if the vehicle is provided on the basis of a rental agreement)	+	+
7.	Certificate of conformity and conclusion on the suitability of the technical device for operation and its installation on the vehicle[3,4]	_	+
8.	Photographs[5]	-	+
9.	Declaration on the provision of services in accordance with service standards	_	+
10.	Contract with a call center[6]	-	+
11.	Contract for processing consumers' personal data[7]	-	+
12.	Mandatory Motor Third Party Liability (MTPL) insurance certificate[7]	-	+

1. The complete list is available on the Moscow City Hall website at https://www.mos.ru/pgu/ru/services/procedure/0/0/7700000000161604475/.

2. The complete list is available on the Moscow City Hall website at https://www.mos.ru/pgu/ru/services/procedure/0/0/7700000000160642141/.

3. The conclusion from the manufacturer of the technical device allowing the person providing the car sharing service to:

- Carry out satellite monitoring of the vehicle (GLONASS, GPS, etc.);
- Remotely monitor the vehicle's fuel and battery level;
- Remotely close and open the vehicle's doors, give sound and light signals, start and stop the engine, and safely lock the engine.

4. The conclusion on installation from the person who installed the specified technical device on the vehicle, and the certificate of conformity on this technical device.

5. Photographs are provided to confirm that the vehicle specified in the request has a colour scheme that allows the vehicle to be identified as being used for taxi or car sharing services, according to the requirements approved by the city.

6. Contract with a call-center for provision of customer service for car sharing users, or a certificate of the company's staff providing such services confirmed by an extract from the staff schedule.

7. Contract on processing of personal data of car sharing services consumers with a certified organization, or documents confirming ownership of certified servers containing personal data and an extract from the staff schedule containing information about the presence of an employee responsible for processing personal data.

8. Certificate of insurance of civil liability (Motor Third Party Liability) for damage caused by persons driving a vehicle (in respect of the vehicle specified in the request).

It should be noted that, although the permission for privileged use of parking space is not formally a license, rather a mechanism for admitting operators to commercial activities in the field of car sharing.

It is also recommended to take into account the possibility of additional requirements being introduced, for example, those contained in Decree of the Government of Moscow No. 289- ПП "On the organization of paid city parking lots in the city of Moscow" dated 17 May 2013 (with amendments and additions, available at http://docs.cntd.ru/document/537935060).

The section on parking policies regarding car sharing contains the following provisions (abridged):

- The authorized body (the state institution "Administrator of the Moscow Parking Space", abbreviated as GKU "AMPP") maintains a register of preferential parking permits issued for each car sharing vehicle;
- Individuals (consumers) do not pay for car sharing vehicles in paid city parking lots;
- Preferential parking permits are issued if the following service standards are met:
    - Car sharing services are provided in round-the-clock mode;
    - The vehicle's ecological class is Euro-4 or higher;
    - The vehicle's length is not more than 470 cm, and the width is not more than 185 cm);
    - The vehicle is equipped with GPS/GLONASS and other devices (see note 3 to table 3);
    - Mandatory Motor Third Party Liability (MTPL) insurance is available;
    - The vehicle is not more than 1 year old at the time of application for the preferential parking permit;
    - The car has distinctive signs of car sharing service in accordance with the established rules;
    - A call-center working around the clock is available to consumers;
    - The software that allows the customer to book a car is freely available;
    - The navigation and information system of the city of Moscow is provided with data on the location of car sharing vehicles and their status ("free/busy"), as well as the car brand and the registration mark.

Preferential parking permits are issued for vehicles if their owner (or the person managing the vehicles) does not have any of the following on the day of the request:

- Overdue taxes, fees and other obligatory payments to budgets of the Russian Federation;
- Liquidation or bankruptcy proceedings initiated against them;

- A decision taken regarding them to suspend activities in the manner prescribed by the Code of Administrative Offenses of the Russian Federation.

An individual preferential parking permit for a car sharing vehicle is valid for three years.

Requirements for the provision of public services comply with the Federal Law No. 210-ФЗ "On the Organization of the Provision of State and Municipal Services" of 27 July 2010 (available at http://www.consultant.ru/document/cons_doc_LAW_103023/).

3.2. Carpooling initiatives

International experience with judicial or legal definitions of carpooling is mainly based on two elements:

(i) The driver travels for his personal needs with or without passengers (this is not a service at the request of the passenger);

(ii) The driver and the passengers share the costs associated with the trip and, accordingly, do not make a profit.

Requirements for carpooling were identified in several court decisions in Europe.

Belgium: in May 2015, in a decision of the Brussels Police Court, carpooling was defined as follows: "The concept of carpooling, which follows from the principle of shared organization, is associated with two essential criteria, one of which is that it is a shared trip, and the other is that the driver should not make a profit, and any funds received by the driver from passengers should reflect only the expenses associated with travel".

France: in a decision of 12 March 2013, the "Cour de cassation" ruled that a situation where "transported passengers compensate the driver for the cost of fuel or take turns using their vehicles for transportation without the cost of travel" should be considered as carpooling and thus excluded from the scope of regulation of commercial transport;

Spain: in February 2017, the Madrid court ruled as follows: "The [BlaBlaCar] website does not provide transport services, but is an online platform that provides information services, and therefore it does not belong to the sphere of regulation of transport in Spain. Fellow travellers can use the [BlaBlaCar] website to find each other for private shared trips and sharing of their expenses on such trips, which is in the field of private transportation and is not a service regulated by the transport legislation of Spain";

European Union: a ruling of the European Court of 27 October 2016 established that services such as Uber should not be considered as carpooling due to the fact that: "carpooling is usually defined as the use of a private car by several persons making the same trip, in order to improve traffic conditions and jointly pay travel expenses. On the contrary, [...] the Uber service should be characterized as taxi services provided by the driver, the destination for which is determined solely by the passenger".

In some countries, a ***legal definition of carpooling*** has been adopted in order to formally exclude this activity from the scope of regulation applicable to commercial passenger transport:

France: Article L3132-1 of the French Transport Code: "Sharing a vehicle by a private person with one or more passengers on an existing trip planned by the driver for his own purpose. The driver does not have the right to make a profit, but can share the costs. Intermediation between drivers and passengers may be carried out

for the purpose of making a profit and is not considered a regulated intermediary activity in the field of transportation";

Germany: the Passenger Transportation Act, which regulates passenger transportation for commercial purposes, states that "this law does not apply to passenger transportation in private cars if such transportation is free or provided that the payment covers only the running costs of operating the car";

Netherlands: the Passenger Transportation Act states that "the law does not apply to the transport of people on vehicles other than public transport if the amount of payment for such transportation does not exceed the cost of operating the car and additional transportation costs, unless such transportation is carried out in the conduct of professional or commercial activities";

Italy: car sharing was first introduced into national legislation in 1998 with the adoption of the Sustainable Mobility Act. In October 2017, the Italian Parliament's Transport Committee approved a bill aimed at "promoting the sharing of private cars," which proposes the following definition of carpooling: "carpooling is a transport system based on the sharing of private cars by two or more persons following one direction (or part of the direction). This transport service is not a commercial activity. The transportation fee includes the cost of transportation, estimated on the basis of the kilometre-by-kilometre operating cost of the car, calculated in accordance with the national reference books published by the Italian Motorists Club and periodically published in the Official Journal [of the Italian Government], in addition to the cost of using a toll road network."

In some countries, official rates determined by law set the cost of operating a car per kilometre. Established prices, of course, help to make a distinction between shared payment of expenses and profit-making.

In general, there are two ways to determine the cost of operating a car, which may vary from country to country:

- A clear definition of the costs taken into account to determine the "vehicle operating costs" with threshold values (for example, in the Netherlands); or
- Official thresholds determined by administrative authorities. Such threshold values determine the cost of operating the car depending on the model of the car and/or its engine power for the purpose of applying the transport tax, as well as the distance travelled in kilometres per year, and are regularly updated (for example in Belgium, France, Italy, Poland).

Transition economies are also attempting to regulate carpooling.

India: the relevant regulation in the country is the Motor Vehicles Act, 1988 (MVA). The MVA does not include provisions disallowing carpooling. The MVA regulates the Contracts of Carriage and Public Service Vehicles that carry passengers for "hire and reward".

In 2019, the Ministry of Road Transport developed draft guidelines for private car owners, which will require the identification of car owners and users, as well as a limit to the maximum number of trips per day to four. The search for travel companions should be carried out only through the use of mobile applications. These are the basic guidelines for carpooling that state governments can customise, but the central government's main goal is to prevent carpooling from becoming a

commercial activity for drivers and carriers, which negatively affects the income of taxi drivers.[92]

The Russian Federation: there is neither a definition of carpooling nor an official reference guide for calculating the cost of a trip by car. This makes the legislative differentiation of carpooling from other services difficult.

A clarification could also help the carpooling services to identify customers using the service for commercial purposes and who, therefore, should comply with the rules applicable for commercial transportation.

The Ministry of Transport of the Russian Federation has developed a new bill[93] and amendments to the existing standards to regulate web platforms (aggregators) of shared trips by car. Aggregators and carriers would face network blocking if they violate the rules. The Ministry of Transport proposes to allow the use of cars with no more than eight passenger seats (category M1) for carpooling, to limit the number of trips that such a car can carry out per day, and to transfer and receive travel fees by non-cash payments only, which will allow to control any excess of the fee limit.

In addition, in order to ensure road safety, it is proposed to establish requirements for the driver to have at least two years of experience, for the vehicle to undergo a technical inspection, and to have a mandatory MTPL insurance.

The bill also requires that the carpooling platform concludes an information exchange agreement with the federal executive body authorized by the government, which will help to fulfil the requirements for checking drivers and vehicles. Given the large volume of organizational work necessary to implement the provisions of the bill, it has been proposed to postpone its entry into force for one year from the date of publication.

Meanwhile, the Ministry of Finance of the Russian Federation advocates collecting income tax from carpooling drivers.[94]

3.3. The legal framework and the state of public transport in selected Central Asian countries

Along with private cars, public transport (including taxis) is the main competitor for shared mobility services. This section provides information on urban passenger transport in the major cities of the pilot countries and on national regulatory requirements in the field of passenger transportation.

3.3.1. Kazakhstan

Road transportation of passengers in Kazakhstan is regulated by the following laws, rules and standards (links to official resources containing relevant texts of documents in Russian are provided):

- Law of the Republic of Kazakhstan No. 476-II “On Road Transport” of 4 July 2003 (with amendments as of 24 July 2019);
- The Rules of Road Transportation of Passengers and Luggage, approved by Order of the acting Minister of Investment and Development of the Republic

[92] Saluja, N. (2019). Govt wants private carpooling to be a no-profit no-loss service. Retrieved 22 October 2019, from https://economictimes.indiatimes.com/industry/auto/auto-news/govt-wants-private-carpooling-to-be-a-no-profit-no-loss-service/articleshow/71140689.cms.

[93] https://regulation.gov.ru/projects#npa=97045, in Russian.

[94] Новый, В. (2019). Попутчиков рассадят по машинам (Fellow travelers will be seated in cars). Retrieved 22 October 2019, from https://www.kommersant.ru/doc/4017776, in Russian.

of Kazakhstan No. 349 dated 26 March 2015 (with amendments as of 16 July 2019);[95]

- The National Standard "Motor services for regular and occasional passenger traffic" ST RK 2273-2012, according to the law "On Road Transport" defines the requirements to carriers, bus stations and passenger services.[96]

None of these documents contain references to car sharing or carpooling services; there is no regulation in these areas for now.

Both regular and non-regular intercity and international transportation of passengers by buses and minibuses are subject to licensing. A license is issued in accordance with the procedure established by Law No. 202-V "On Permissions and Notifications" of 16 May 2014.[97] Thus, in Kazakhstan, a license for car sharing and carpooling is not needed.

As mentioned earlier (see subsection 2.4), the prospects for the development of car sharing in Kazakhstan are primarily associated with cities with a population of more than a million – Almaty, the capital Nur-Sultan (former Astana) and Shymkent.

Almaty. Traditional public transport in Almaty includes bus, trolleybus and metro.

Other transport services are also available:

- Taxi; there are more than 20 operators in the city, including Yandex.Taxi and Uber, most of them use the ride-hailing model and mobile applications;
- Bicycles; in 2016, fifty stations of the Almaty Bike automated bike rental system were opened on the central streets of the city and next to some of the metro stations. Bicycle rental facilities are powered by solar energy and equipped with parking terminals.

There are two car sharing services in the city (see subsection 5.2). There are no local carpooling platforms.

Nur-Sultan (former Astana). Today, Nur-Sultan public transport includes bus and minibus. The design and construction of the city's rail system is underway.[98] Taxi services are widely developed; some have mobile applications.

In 2020, Anytime is planning to launch a service in Nur-Sultan (for more details, see subsection 5.2). There are no local carpooling platforms in the city.

Shymkent. The city has more than three dozen transport companies of different sizes and quality. Taxis are usually hailed by telephone. Car sharing initiatives have not yet been developed. There are no local carpooling platforms.

3.3.2. Kyrgyzstan

Road transportation of passengers in Kyrgyzstan is regulated by the following laws, rules and regulations (links to official resources containing relevant texts of documents in Russian are provided):

- Law of the Kyrgyz Republic No. 154 "On Road Transport" of 19 July 2013 (as amended by Law No. 83 of 8 July 2019);[99]

[95] https://tengrinews.kz/zakon/pravitelstvo_respubliki_kazahstan_premer_ministr_rk/tpanspopt/id-V1500011550/.
[96] https://online.zakon.kz/Document/?doc_id=31565959#pos=1;-191.
[97] https://online.zakon.kz/document/?doc_id=31548200.
[98] See https://en.wikipedia.org/wiki/Nur-Sultan_Light_Metro.
[99] See http://cbd.minjust.gov.kg/act/view/ru-ru/203963.

- The Rules of Road Transportation of Passengers in the Kyrgyz Republic. Approved by Decree of the Government of the Kyrgyz Republic No. 519 of 23 September 2013 (with amendments as of 7 October 2019);[100]
- Regulation on the licensing of certain types of activities in the field of automobile and water transport of the Kyrgyz Republic. Approved by Decree of the Government of the Kyrgyz Republic No. 430 of 17 September 2018.[101]

None of these documents contain references to car sharing or carpooling services; there is no regulation in these areas at the moment.

Transportation of passengers by road (excluding passenger taxis) and international freight transportation by road are subject to licensing. A license is issued in accordance with the procedure established by Government Decree No. 430 of 17 September 2018 [102] in order to implement the norms of Law of the Kyrgyz Republic No. 195 "On the licensing system" of 19 October 2013. Thus, in Kyrgyzstan, a license for car sharing and carpooling is not needed.

As mentioned previously (see subsection 2.4), the country's only large city, the capital Bishkek, with a population of about 1 million people, has the potential to develop car sharing services.

Bishkek's public transport system consists of minibuses, along with a network of bus and trolleybus routes. Currently, minibuses (jitneys) are the dominant transport in Bishkek; dozens of private carriers operate over 120 routes. The density of minibus traffic leads to difficulties in passengers' boarding and disembarking and to traffic jams near stopping points, which negatively affects all road users. Buses and trolleybuses combined make half the volume of minibuses traffic.

The City Hall has extensive plans to reform the transport system: to increase the bus fleet, change routes, introduce electronic tickets, revise fares and introduce high-speed bus routes. Some plans are already being implemented. In 2017, the Bishkek Municipality launched the Inobi mobile application as a travel planner, which shows the optimal route options, traffic patterns and movement of connected buses, trolleybuses and minibuses in real time. This was followed by a free Wi-Fi network deployed in the municipal transport network of Bishkek.

The taxi system in Bishkek is well-developed; the main services, including Yandex.Taxi and Uber, use mobile applications, but a number of small taxi companies also accept orders by phone. Car sharing initiatives have not yet been developed. There are no local carpooling platforms.

3.3.3. Tajikistan

Road transportation of passengers in Tajikistan is regulated by the following law and rules (links to official resources containing relevant texts of documents in Russian are provided):

- Law of the Republic of Tajikistan No. 22 "On Transport" dated 29 November 2000 (as amended by Law No. 1050 dated 28 December 2013) regulates the activities of carriers on all types of transport;[103]
- Charter of Road Transport of the Republic of Tajikistan dated 30 December 2009 No. 696;[104]

[100] See http://cbd.minjust.gov.kg/act/view/ru-ru/94728?cl=ru-ru.
[101] See http://cbd.minjust.gov.kg/act/view/ru-ru/12344.
[102] See http://cbd.minjust.gov.kg/act/view/ru-ru/12344.
[103] See http://mintrans.tj/sites/default/files/2015/July/zakon_respubliki_tadzhikistan_o_transporte.pdf.
[104] See http://www.adlia.tj/show_doc.fwx?rgn=15159&conttype=5&login=yes.

- The Rules of Road Transportation of Passengers and Baggage and Hand Luggage in the Republic of Tajikistan. Approved by Order of the Minister of Transport and Communications of the Republic of Tajikistan dated 20 July 2009 No. 10.[105]

None of these documents contain references to car sharing or carpooling services; there is no regulation in these areas at the moment.

The following types of transportation are subject to licensing:

- Intra-republican (urban, suburban, intercity) and international transportation of passengers by road;
- Intra-republican and international transportation of goods by road.

The license is issued in accordance with the procedure established by Law of the Republic of Tajikistan No. 37 "On licensing certain types of activities" dated 17 May 2004 and the Regulation "On the features of licensing certain types of activities" (approved by Government Decree No. 172 of 3 April 2007).[106]

According to these documents, taxi transportation requires a state license, which is issued to legal entities and individual entrepreneurs. In practice, many drivers do not comply with this requirement. Thus, in Tajikistan, a license may be required for car sharing, but not for carpooling, which is not commercial.

As mentioned earlier (see subsection 2.4), the capital of the country – Dushanbe – and densely populated areas of the Gissar Valley directly adjacent to it could be ideally placed to develop car sharing.

The city public transport system consists of bus, trolleybus and minibus routes, as well as taxis. It is necessary to take into account the large number of vehicles transiting through the city. The absence of a bypass road complicates the organization of traffic inside the city, especially during rush hours causing significant congestion.[107]

Insufficient parking spaces have also been identified as potentially causing problems with illegal parking often leading to lane restrictions.

Minibuses (jitneys) account for about 55% of passenger traffic. Minibuses are relatively small in capacity, and their unreasonably large number on routes leads to traffic jams.

Since mid-2018, the City Card has been operating in Dushanbe – an on-line payment system for travelling in the city's public transport. Some large taxi companies operate in Dushanbe, and they have mobile apps; at the same time, illegal carriers also operate in the capital. Car sharing initiatives have not yet been developed. There are no local carpooling platforms; the search for travel companions is limited to messages on social networks (e.g. https://vk.com/popititjkruss).

Legislation in Central Asian countries does not require local authorities to develop sustainable urban mobility plans (SUMPs). However, in Kazakhstan, Law No. 194-V "On Road Traffic" of 17 April 2014 has a special article 30 "Sustainable Transport".[108] Paragraph 5 of this article states that "local executive bodies of

[105] See http://mintrans.tj/sites/default/files/2015/July/koidahoi_hamlu_nakli_musofiron_rusi.pdf.
[106] See http://extwprlegs1.fao.org/docs/pdf/taj82044.pdf.
[107] Pirov J.T., et al. Analysis of road traffic organization in the city of Dushanbe. Proceedings of Irkutsk State Technical University. 2017, vol. 21, no. 6, pp. 142–148. (In Russian) DOI:10.21285/1814-3520-2017-6-142-148.
[108] Official text is available at https://online.zakon.kz/document/?doc_id=31536713#pos=678;-55, in Russian.

regions, cities of republican significance and the capital provide transport planning taking into account the development of sustainable transport.".

Therefore, Kazakhstan's legislation in its present form creates an opportunity for the introduction of sustainable modes of transport at the level of regions and large cities.

In other Central Asian countries, the state planning system does not provide for the development of sustainable urban mobility plans but does not ban it. At the same time, the strategic planning documents of these countries emphasize the need to fulfil international obligations to implement the United Nations sustainable development goals.

For example, the National Development Strategy of the Kyrgyz Republic for 2018–2040 (approved by Presidential Decree UP No. 221 of 31 October 2018) provides for the creation of a sustainable environment for socioeconomic development and gradual transition to environmentally friendly modes of transport, including electric vehicles.

In the Republic of Tajikistan, the "National Development Strategy until 2030" (adopted by Resolution of the Supreme Assembly – the Parliament of the country No. 636 dated 12 January 2016) sets some priorities, including:

- Comprehensive development of all types of transport and rationalization of the rolling stock structure;
- Optimization of transport operation to ensure the industrial and innovative development of the national economy and to meet human needs.

Currently, in Central Asia countries, a SUMP can be approved as an annex to the city development program to ensure optimal mobility for citizens.

Requirements for the provision of public services in selected Central Asian countries:

- In Kazakhstan – on the basis of Law of the Republic of Kazakhstan No. 88-V "On Public Services" dated 15 April 2013;[109]
- In Kyrgyzstan – on the basis of Law of the Kyrgyz Republic No. 139 "On State and Municipal Services" dated 17 July 2014, [110] available at http://cbd.minjust.gov.kg/act/view/ru-ru/205360 in Russian;
- In Tajikistan – on the basis of requirements established by local authorities. A draft Law of the Republic of Tajikistan "On Public Services" is under development. Note that in Tajikistan, taxi transport is subject to state licensing, and it can be expected that a license will also be required for car sharing. In this case, one should be guided by the requirements of the State Transport Supervision and Regulation Service (the agency's website is available at http://transcontrol.tj/ru/ in Russian).

3.4. General policies to incentivize the creation of shared mobility services

A number of incentives can be offered to encourage shared mobility that can be divided into administrative and financial measures.

These measures are selected based on the general policy for the development of urban transport systems and the legal possibility of introducing restrictions on particular categories of vehicles. Examples include restrictions on the use of private

[109] See https://online.zakon.kz/m/document/?doc_id=31376056.

cars in accordance with the numbers on license plates. The results of these measures are mixed, as households often buy second cars, increasing their total number.[111]

Another example of regulatory policy is restricting the movement of vehicles in certain areas, as has happened in a number of cities across Europe (e.g. London, Milan and Stockholm).

If the goal is to discourage the use of personal vehicles and move to shared mobility, the introduction of restricted traffic zones is of undoubted benefit. Another way to manage mobility is to impose restrictions on car ownership. An example of direct control of this kind is the vehicle quota system in Singapore, which was introduced in 1990 and is still in effect. Those who would like to own a vehicle have to purchase a Certificate of ownership first, which is, in fact, a license that is valid for ten years. These certificates are distributed through an auction, so an element of a market mechanism is built into the process. Restrictions on the possession or use of motor vehicles have also been imposed in some cities in China and other developing countries (see section 2.1).

The idea of government agencies imposing restrictions on vehicle ownership in the priority countries will certainly be perceived very negatively and is unlikely to be implemented at present.

Financial incentives can also be used to limit car use in the form of taxes and registration fees. Targeted use of the proceeds from these fees may help the public accept the introduction of paid parking. According to the decree of the Moscow Mayor, the money collected for parking will be redirected to the districts of Moscow in proportion to the amount of funds collected in the territory of each district. Local authorities, in turn, will invest in the improvement of the district, based on the requests of residents.

Local authorities have the right to determine parking regulations, such as restrictions on parking in particular places and paid parking with tariffs differentiated by parking place, duration of the parking session, location of parking lots, etc. (in the Russian Federation, such a right is granted to local authorities by the Law “On Traffic Management”).

Both the positive aspects of on-street parking (economic development of commercial zones, some opportunities to improve pedestrian safety) and the negative effects (reduced road capacity and related effects, the overall reduction in road safety, etc.) should be taken into account.

The use of various traffic management measures is effective for stimulating the development of shared mobility services, and therefore local authorities are encouraged to expand this practice.

[111] Santos G. Incentives to encourage shared mobility. 6 November 2017. Centre on Regulation in Europe (CERRE). See https://www.cerre.org/sites/cerre/files/171106_CERRE_SharedMobilityIncentives_final_0.pdf.

For example, admitting carpooling vehicles to restricted lanes is of interest. These lanes are called “2+ lanes” or High Occupancy Vehicle (HOV) lanes. They are designed to reduce the use of single-driver vehicles and thus to decrease congestion. Such lanes have been common in the United States since the 1960s. In other countries (for example, in the United Kingdom of Great Britain and Northern Ireland), this is a relatively rare occurrence, with dedicated public transport lanes being much more common. However, admitting carpooling vehicles to these lanes is controversial.

An example with the closest analogue—car sharing—shows that Moscow government is not going to allow shared vehicles to onto dedicated bus lanes, nor is it going to bring this initiative to the federal level.

Although local governments are often on a tight budget, subsidies are used in the transport sector to encourage the purchase of fuel-efficient and/or environmentally friendly vehicles or the disposal of old ones. In particular, subsidies may also be provided to encourage the sharing of vehicles.

4. Case studies of car sharing/carpooling initiatives

Specialized car sharing operators, car rental companies and car manufacturers, as well as some public transport operators, offer commercial car sharing services. The following are some examples that summarize the experience of both existing organizations and those that have stopped their activities.

4.1. Car sharing projects

4.1.1. Car2go

Car2go was a German car rental company, a subsidiary of Daimler AG, which provided car sharing services in urban areas of Europe and North America. In 2019, car2go was one of the largest car sharing operators.[112]

The project was planned as international from the very beginning; the car2go application was developed for several mobile platforms and in many languages. This meant that every week car2go customers received usability enhancements and new features.

The car2go business model was the same in all markets, although prices varied by location. The company used the "one-way" model at fixed rental points and charged per-minute rates, with discounts for the hourly and daily periods, which were applied automatically. Rates included car rental, fuel, insurance, parking (in permitted areas) and maintenance; sometimes a low fixed annual fee was also charged. Users refuelled cars using a payment card and received bonus minutes for performing this operation.

In most countries, car2go vehicles had been parking either in designated areas or in regular public parking spaces with special permissions from the local municipality.

In order to use the service, foreign citizens were required to confirm the legality of their stay in the country. It could be a residence permit or a passport with a valid visa. The driver's license had to be of international standard.

In most cities, car2go offered only two types vehicles that were either diesel or electric powered.

4.1.2. DriveNow

DriveNow was a car sharing service created in June 2011 as a joint venture between the automaker BMW Group (vehicles) and the car rental company Sixt SE (technology platform).

In October 2017, DriveNow service had reached the milestone of one million customers and operated more than 6,000 vehicles in nine European countries.[113]

A similar service from BMW was operating under the name ReachNow in North American cities. It is noteworthy that BMW had first opened its car sharing service in San Francisco in 2012, but soon found that its free-floating model had been in direct conflict with the rules of parking and car sharing in the city.

The city of San Francisco was providing parking spaces only to those car sharing programs that forced the customer to return their car exactly where it was picked up, or to one special place set by operator. The service was unable to obtain parking

[112] Daimler, BMW to merge car-sharing, other digital services. David McHugh. 28 March 2018. Available at https://phys.org/news/2018-03-daimler-bmw-merge-car-sharing-digital.html.

[113] DriveNow reaches one million customers milestone. Author: Fleet News. 10 October 2017. Available at https://www.fleetnews.co.uk/news/fleet-industry-news/2017/10/10/drivenow-reaches-one-million-customers-milestone.

permits from the city authorities, and its services in San Francisco were discontinued in November 2015. This example shows how important it is to interact with local authorities and to study local regulations in advance.

After that, ReachNow used various car sharing models, mainly the "one-way" model, in other United States of America cities; DriveNow did the same in Europe. According to this model, a vehicle could be parked in any permitted area of the city where it was rented, with the exception of Düsseldorf and Cologne. DriveNow also offered packages of services, and in addition to the car sharing service, DriveNow customers were granted a 5% discount on the cost of purchases in stores of the Billa retailer.

DriveNow managed a fleet of mono brand cars that were made by the BMW Group and offered the world's largest fleet of electric vehicles, which accounted for about 15% of the total.

4.1.3. SHARE NOW

In October 2019, SHARE NOW became the world's largest car sharing company with more than four million registered customers and a fleet of more than 20,000 cars in 30 cities and 13 countries in North America and Europe.[114] It was created from the merger of the above mentioned car2go and DriveNow.

4.1.4. Zipcar

Zipcar is an American car sharing company; it is a subsidiary of the Avis Budget Group (bought in 2013), which also manages a group of companies engaged in traditional car rental (Avis, Budget, Payless, etc.).

The first cars of the operator appeared in 2000–2002 in Boston, Washington, D.C., and New York. In 2007, Zipcar merged with Flexcar, one of the oldest car sharing companies in the United States of America, and the merged company retained the "Zipcar" brand. In 2009, the first mobile application was released allowing the unlocking of some cars in addition to the traditional access card. Zipcar currently has over one million members and 12,000 vehicles of different sizes and fuel type. The model is based on a fixed parking location to which each vehicle must return at the end of use. Zipcar operates in over 500 cities and towns and on over 600 college campuses. As previous examples, tariffs include vehicle insurance, a fuel card for the car, and other services.

4.1.5. Zoomcar

The first and the largest car sharing company in Bangalore, India. Bangalore is one of the fastest growing cities in Asia, it is the country's largest scientific and industrial centre, the third largest settlement and fifth agglomeration of India and has a high proportion of young and educated people. In April 2019, Zoomcar was operating in around 29 cities and operates a fleet of more than 6,500 vehicles, with more than 3,000 daily rides.[115]

The company offers a wide selection of cars of various brands; more than 10% of the fleet consists of electric vehicles. Cars are available for rent on an hourly, daily, weekly or monthly basis.

[114] BrandHub. Share Now: Facts and Figures. https://brandhub.share-now.com/web/6570a0eb69e15b2f/factsheets/ Retrieved 29 October 2019.

[115] Zoom Car: India's first self-drive car rental – PA Wealth Advisors Blog. https://blog.pawealthadvisors.com/2019/04/13/zoom-car-self-drive-car-rental/.

In order to reduce its tax burden in 2017 the company has announced the sale of the entire fleet of vehicles to private individuals thus moving towards a P2P model.[116] The company charges a commission of 25% on the revenue that the driver makes. Tariffs for the customers include the cost of fuel, insurance and taxes (but not tolls). In addition to providing cars at fixed points (parking lots), the company also moves the car to the desired place, charging the nominal cost of the service.

The company also offers a subscription service providing a car for 6, 12, 24 or 36 months. All the service's cars are registered under the Zoomcar Self Drive Car Rental license, which makes them commercial in nature. As per government regulations, all the commercial cars need to be fitted with speed recorders, and Zoomcar car sharing vehicles have a forced speed limit of 80 km/h.

4.1.6. YoYo

YoYo is currently the most successful national car sharing service in Turkey.

YOYO car sharing started in Istanbul in 2012 with 15 cars, and it has continued to develop since then. In March 2017, YOYO established a joint venture with Zain Group to optimise their services. In 2019, the service, which also covers Bahrain and Kuwait, had more than 20 thousand customers.[117] The company is seeking to develop an electric charging network to be able to switch to electric vehicles.

Tariffs include the cost of fuel, MTPL (Mandatory Motor Third Party Liability) insurance, but no CASCO (Casualty and Collision) insurance, and taxes. The operator refuels the car, but, if necessary, the customer can refuel it for free at Shell stations, where the YOYO car recognition system is installed. The cars can be picked up at (and must be returned to) dedicated parking places; some of them are located inside universities. The operator also offers a valet service in the event that a car is not picked-up at or returned to the designated parking space.

4.1.7. Yandex.Drive

With its home base in the Russian Federation, Yandex.Drive, in October 2019, counted a fleet of 16,500 vehicles, growing to 20,000 by the end of 2019.[118] The service began on 21 February 2018 in Moscow with a fleet of 750 cars. In 2018, "Drive" was launched in St. Petersburg, and in 2019 in Kazan. The Yandex.Drive fleet covers a number of categories: economy class, business class and executive class cars as well as cargo vans and minibuses.

Yandex.Drive works through a mobile application. The terms of use require an age of at least 21 years and a driving experience of two years minimum. In Moscow, the trip completion zone includes the area within the Moscow Ring Road, some nearby Moscow cities and the airport zones. The user can leave the car at any location where parking is allowed, with the exception of indoor and underground parking, areas with limited access and places where there is no cellular communication coverage and no wireless Internet.

Thanks to the Yandex.Auto system, cars recognize drivers and apply their personal settings in different cars: after boarding the car, the customer does not need to enter his username and password. Instead, Yandex.Auto greets the driver by name, downloads their favourite points of interest, and turns on a personalized radio.

[116] https://www.livemint.com/Industry/2t75en4SyXSjJVYDFZRFBP/Zoomcar-to-shift-to-marketplaceonly-model-by-yearend.html.

[117] Further details at http://driveyoyo.com/en/about.

[118] Car sharing Yandex.Drive. Trushering is a publication about car sharing and transport of the future. Further details at https://truesharing.ru/carsharing/yandex-carsharing/, in Russian.

Yandex.Drive is the first car sharing service of the Russian Federation that uses dynamic pricing according to demand and traffic. The cost of a Yandex.Drive trip includes municipal parking and fuel. Trips can be completed without refuelling. If refuelling is necessary, these costs are reimbursed.

All Yandex.Drive cars are insured: they have the compulsory MTPL insurance and Comprehensive Insurance (CASCO). Starting in 2019, it is now possible to make trips at a fixed fare. After specifying the destination, the user can find out the cost of the trip before it starts. This allows the company to implement the so called "chains of orders" and reduce car downtime; for users, this reduces the cost of trips to areas with high demand for services. This was followed in the same year by the introduction of a new "Intercity" tariff for Moscow to St. Petersburg and Moscow to Kazan trips. Initially this tariff was applicable only to cargo vans and minibuses, giving customers the opportunity to transport goods on their own instead of using the services of transport carriers, as well as to go on a trip with friends in a comfortable minibus that can accommodate up to eight people plus a driver. Travel on toll roads is included in the fare, each of the vans and minibuses has a transponder for contactless payment.[119]

In 2020, the tariff is also applied to business class cars such as BMW, Mercedes, Volvo and sports cars like Porsche and Range Rover.

4.1.8. Examples of existing car sharing services in Kazakhstan

Currently, only two car sharing services are operating in Kazakhstan, located in the country's largest city, Almaty.

The Docsar car sharing service is the first local company; at the start of operation in February 2016, its fleet had only 11 cars, but by the end of 2018 it counted 22 economy class cars and a total of about 10,000 users. The company uses a stationary model with 16 rental points; cars can be used at a distance of up to 200 kilometres from the city limits. The service has now reached brake-even but Almaty residents are not aware of the service, and more support from the city administration to car sharing activities could be necessary.

The second car sharing project, called "Anytime", started operation in October 2018. The Kazakh market is seen as promising because of the size of its large cities and the extensive use of non-cash payment systems. The service, at the end of 2019, operates with approximately 500 vehicles. It currently has 65,000 registered customers, of which more than 35,000 are active. Anytime was launched with the support of the Almaty city administration as part of the Smart City project. It maintains business relations with "Aparking", the operator of paid city parking lots, since Anytime service takes care of all the costs of paid parking. As for Doscar, its CEO explained that his company did not require infrastructure support, but they turned to the administration with a request to help in the purchase of electric vehicles.

Both car sharing operators are planning to develop in other large cities of Kazakhstan, but they consider different ways of business. The Anytime service is going to increase its fleet in Almaty and to launch a similar project in Astana in 2020. Shymkent and Karaganda are also being considered. Doscar's plans are associated with a new service under the P2P model, for which a software platform is being developed. The company also plans to make his service available in other cities of Kazakhstan.

[119] Further details at https://yandex.ru/support/drive/rates-and-payments/cities.html, in Russian.

Almaty car sharing services have a more serious competitor: taxi which have low rates due to the presence of multinational ride-hailing services, such as YandexTaxi and Uber.

4.2. Carpooling projects

4.2.1. BlaBlaCar

The world's leading long-distance carpooling platform, BlaBlaCar counts on a global community of 80 million drivers and passengers in 22 countries.

The project started in 2006 in France and moved to the website Covoiturage.fr in 2008 where it became the most popular shared travel site in this country. Following the takeover of the German rival Carpooling.com the company was renamed BlaBlaCar in 2013.

In 2014, BlaBlaCar expanded into the Russian Federation and Ukraine, having taken over the Russian-Ukrainian service "Podorozhnik". During the first 10 months, more than one million people registered for the service, which became an absolute record across all countries where the operator had been launched before, confirming the high level of consumer interest in carpooling services.

In August 2018, BlaBlaCar acquired BeepCar, a Russian carpooling service. In September 2019, the merger of BlaBlaCar and Busfor bus ticket search service took place.

The operator faces difficulties in the Russian Federation due to the lack of regulation. In November 2018, the "Association of Passengers and Road Carriers" filed a class action to ban BlaBlaCar. The operator charges a service fee for the use of its platform (at start up, in some countries, this fee was waived) depending on the rules below:

- Registration, authorization and any actions on the website are free;
- Booking a trip on a route shorter than 120 km is free;
- The customer will be charged for a trip with a length of more than 120 km;
- The service is still free for drivers.

The service administration controls the cost of the trip (on average, the passenger pays no more than one third of the cost of fuel for a particular trip) and the number of passengers (no more than eight people). Drivers using BlaBlaCar do not earn money by providing transport services, but only partially or fully compensate the cost of the trip, which is distributed proportionally among all fellow travellers.

Online payment system already exists in some European countries where BlaBlaCar operates. For example, in France and Spain, online payment is mandatory for BlaBlaCar users, and in Germany, the driver decides how the trip will be paid. However, in any case, the user will have to pay an online commission to the service. A similar system is being planned for the Russian Federation.

BlaBlaCar states that it verifies profiles and user reviews so that travellers know whom they are getting into the car with and for security reasons. However, users are encouraged to independently check out reviews and profiles of drivers and companions on social networks before going somewhere with them. The website has the "only for women" option, which only shows trips where the driver and the companions are all female.

4.2.2. JoJob

JoJob is a corporate carpooling service provided by Bringme Srl, operating in Italy and Spain designed specifically to meet the needs of users who travel from home to

work on a daily basis. Prior to widespread adoption, companies in Piedmont and Tuscany tested Jojob for approximately four months. Jojob was officially launched in March 2015, and at the end of that year, it already had as customers 29 large companies in Italy.

Currently, Bringme Srl is the leader in the Italian corporate carpooling sector. The company estimates that an investment of €16 per employee is enough to provide an annual saving of €1,330 and reduce CO_2 emissions by 865 kg, and this does not take into account the enormous advantages in terms of reducing traffic.[120] The Jojob team provides support to corporate clients to customise their service accordingly.

The platform developed by Jojob performs a social function, facilitating communication between the users of corporate carpooling.

4.2.3. BePooler

Founded in Lugano, Switzerland in 2015, the company aims to provide companies and individuals with a quick and safe way to combine travel on daily commute. To counter congestion problems in Lugano, BePooler created more than 500 carpooling routes that are available through the app for employees of local organizations. The success of the project has allowed BePooler to open offices in Milan and Rome in 2016. In Milan, it is helping the city to implement sustainable transport solutions.[121]

Partner companies pay to BePooler a registration fee and monthly fees (B2B model), and drivers pay a commission when organizing carpooling, proportionate to the quantity of trips and mileage (B2C model), using a digital wallet. BePooler users can save up to €2,000 per year (calculated on trips of 20–30 km per day).

Thanks to the BePooler platform, companies also have several advantages: they receive daily travel reports on their employees' travel habits, assisting them in their compliance with corporate social responsibility requirements. Using carpooling, employers offer their employees a social support tool that allows them to optimize their daily travel expenses.

In March 2018, the organizing committee of the 2024 Summer Olympics in Paris selected BePooler as the official provider of smart mobility solutions for the upcoming sporting event.

4.2.4. SRide

This is one of the most used carpooling and bike sharing apps in India[122] and works like other carpooling services. The main target group of SRide customers are users who make daily trips, especially between home and work. Users save up to 5,000 rupees per month (about $70) in travel costs. The app can also be used for long-distance travel. Unlike some other oeprators, the SRide app offers online payment options to facilitate transactions between users to which the company applies a commission. The service is currently available in Pune (about 3.1 million people), Mumbai (18.4 million), Delhi (19 million), Kolkata (4.5 million), Hyderabad (seven million), Chennai (7.1 million), and Bangalore (8.5 million).

[120] Una app per tagliare chilometri e costi. L'esperienza di Jojob. 29 ottobre 2019. Available at https://www.ilsole24ore.com/art/una-app-tagliare-chilometri-e-costi-ACxEgFs?refresh_ce=1.

[121] Swiss Made Carpooling System Seduces the Italians. Startupticker.ch: The Swiss Startup News Channel. Dimitri Loringett, 11 July 2019. Available at https://www.startupticker.ch/en/news/july-2019/swiss-made-carpooling-system-seduces-the-italians.

[122] Top 10 Carpool Apps in India for 2019 – Why Carpooling is Still a Dubious Affair? Lopa Mohanty, 16 April 2019. Available at https://blog.grabon.in/top-10-carpool-apps-india-carpooling-still-dubious-affair/.

4.2.5. Didi Hitch

This carpooling service was founded in China in 2015 and is part of the DiDi Chuxing group of companies. The Didi Hitch carpooling platform developed when the Chinese government decided that local city authorities should regulate tariffs by fighting monopolistic companies and stop unfair practices.

At the same time, the DiDi Hitch service has shown good results and has become an important solution for ensuring mobility between cities, as the ongoing urbanization in the country encourages regional transportation and migration of the population. During the Chinese lunar New Year in February 2018, 30.7 million citizens used the DiDi Hitch platform to get to annual family meetings on vacation.[123] Over the years, a number of security problems have been identified in relation to violent acts in vehicles, which has forced the service to be temporarily suspended on a number of occasions.

The lessons learned on overcoming security vulnerabilities are very important for the development of carpooling in priority countries. It is recommended that the operator takes full responsibility for ensuring the safety of service's users and takes a number of priority measures. For example, in the case of DiDi Hitch, the personalized tags that drivers could leave in passenger profiles (including comments about the attractiveness of female passengers) were removed. The company has introduced an emergency button, travel restrictions after 10 p.m. and at night, as well as new verification methods, including face recognition, to minimize the risk of unauthorized use of the account.

The modernization of the service included the introduction of mandatory scanning of licenses for all drivers of the platform before they can take any orders. This was a step aimed at preventing unauthorized persons from acting under the guise of registered drivers. Notifications were automatically sent to passengers and car owners about the inability to make trips in the time interval from 10 p.m. to 6 a.m.

As further experience has shown, even these security measures were insufficient and further steps need to be taken to increase safety.

The current relaunch of the service follows a comprehensive security analysis and product update. The updated app has new security features, including both stricter checks of drivers and passengers, and a virtual "security assistant" that will allow users to see more details about drivers and fellow travellers. Users will also be able to register in real time through the support hotline.

[123] China's Didi to relaunch hitch carpooling service this month. Singh M. 6 November 2019. Available at https://techcrunch.com/2019/11/06/didi-hitch-carpooling-relaunch/.

5. Challenges related to car sharing and carpooling services

5.1. Car sharing issues

A number of common issues have arisen in relation to car sharing services. These are identified in this section.

Illegal activities

The growing popularity of car sharing has led to the emergence of fraudulent schemes and even to criminal activities. Since the platforms are not able to control all users, the fraud threat is quite real.

For example, in June 2017, the American company Enterprise Holdings Inc. announced termination of its operations in Chicago due to a lack of cars resulting from vandalism, theft and fraud. The company explained that about 40% of its fleet in the city had either been stolen or damaged. In 2015, more than 20 cars belonging to the Zipcar service were stolen in New York as a result of access cards being forged or other schemes used to gain access. In 2012, vehicles were also stolen from start-up HiGear, which specialized in premium car sharing, which lead to it being forced to cease operations.[124]

Cases of theft of car sharing operators' property often occur. The operator BelkaCar stated that in 2018 the following things were stolen from their cars: seven steering wheels, 146 batteries, 97 mats, 14 front seats and one rear seat, 18,000 litres of windscreen washing liquid and 2,100 snow cleaning brushes.[125] To counter this phenomenon, some operators have resorted to tagging car components with sensors or chips.

Car sharing operators have also begun to actively block users who violate the traffic rules; law enforcement agencies also tighten control on the roads. For example, in Moscow, police checked over nine thousand car sharing vehicles over the summer of 2019 and 2,783 drivers (about one third of users) were fined for traffic violations.[126]

Fake accounts

The simplified remote procedure for user registration sometimes creates an opportunity for illegal use of car sharing vehicles, by using or stealing other user's accounts or registering fake ones. In most cases, the security services of car sharing companies detect fraud by indirect evidence. Systemic measures to combat this phenomenon typically include:

- Installation of video cameras inside the vehicles;
- Checking and comparing pictures taken by vehicle cameras with user documents;
- Resetting passwords and re-identifying the customer;
- Measures to protect personal data of citizens taken at the state and corporate level.

[124] Scammers are embracing car sharing, 6 September 2017. Available at https://www.rbc.ru/newspaper/2017/09/07/59aec3869a7947b18eb23374, in Russian.

[125] Drifters, stolen steering wheels, racing, and other car sharing problems in Russia. 13 February 2019. Available at https://tass.ru/ekonomika/6102752, in Russian.

[126] The Moscow road police is working to identify and prevent violations by car sharing drivers, 6 September 2019. Available at https://77.xn--b1aew.xn--p1ai/news/item/18203549/, in Russian.

These measures need to be implemented rigorously and systematically. The unique case of mass theft in Chicago is an example of what happens when these requirements are violated. After Car2Go simplified their data verification procedure for the convenience of customers, 75 cars were stolen in one day, on 17 April 2019. All of them were eventually found, and rebuilt, but some lacked doors, seats and other parts.[127]

The need for new insurance products

The car sharing business requires careful calculation of risks and their hedging. Typical risks include theft, damage or complete loss of a car because of an accident; such risks must be insured.

With full insurance, the user may only be penalized under the condition that they were the culprit of the accident or violated state laws or the rules of the operator. For example, the rules of the Yandex.Drive service set out that insurance doesn't cover the user if he/she:

- was under the influence of drugs or alcohol;
- took potent drugs without a doctor's prescription or in excess of dosage;
- was driving without a license or let a person without a driver's license control the car;
- committed actions aimed at the occurrence of an insured event;
- drove through red light;
- drove into the opposite lane;
- left the scene of an accident.

If the accident happened due to the fault of another driver, and the customer followed the established procedure completely, nothing has to be paid.

The problem is that not all services offer full CASCO insurance. For example, some car sharing companies use the franchise model, according to which the client takes on part of the cost of damage. When the amount of damage is significant, some companies also add a fine in proportion to the damage caused.

For example, in the Russian Federation, at first, insurance companies did not want to work with car sharing operators, since there were no accident statistics; there was no understanding of how to work with fleets of such cars, and tariff calculations were unclear. In car sharing, it is obvious that the faster the customer arrives at their destination, the cheaper the trip. Since this approach clearly does not contribute to a safe ride, many insurance companies applied very high insurance premiums.

As a result, some insurance companies have had problems related to this lack of experience on car sharing accident risks: for example, one company reported that the first contracts with car sharing companies had been highly unprofitable. The frequency of accidents in car sharing exceeded the average by more than six times.[128] Having built up a statistical base, this company prepared a new product for car sharing, a per minute full CASCO insurance. When using the special per minute rate, the customer is insured for all risks, but pays only for the actual time that the car is in motion.

[127] Mercedes Thieves Showed Just How Vulnerable Car-Sharing Can Be. Joshua Brustein., 11 July 2019. Available at https://www.bloomberg.com/news/articles/2019-07-11/mercedes-thieves-showed-just-how-vulnerable-car-sharing-can-be.

[128] https://truesharing.ru/tp/15718/, in Russian.

Economic impacts

The car sharing business model involves significant expenditures and includes the following costs:

- Developing the software platform
- Leasing payments for cars
- Depreciation and repair
- Fuel
- Payment for parking permits
- Car washing and cleaning
- Payroll (developers, management).

Since the overwhelming share of expenses grows with the growth of the fleet, in order for this business model to be profitable, it is necessary to find a balance between rental rates and the demand for the service providing a high utilization rate.

Car sharing companies operate on a similar basis as traditional car rental companies, with car utilization and revenue per unit (vehicle) goals. Typically, a traditional car rental company aims for at least 50% utilization, meaning that each vehicle is rented for at least 50% of the time. However, because car sharing works on an hourly and even minute basis, and most members only use the car for a few hours, an utilization rate of 30 to 40 % per vehicle is a more reasonable expectation for car sharing.[129]

In general, a high entry threshold characterizes car sharing – significant investments are required to start a business. This has led to many companies still making a loss. For example, in the Russian Federation, at the end of 2018, all services were operating at a loss.[130] This is as a result of the aforementioned illegal activities that mean that more investments need to be made as well as to the high cost of creating the infrastructure and increasing the fleet.[131]

In other countries, the situation is similar. For example, the largest operator SHARE NOW has decided to exit the North American market effective 29 February 2020. The reasons for this decision were announced as following: "The first being the volatile state of the global mobility landscape, and the second being the rising infrastructure complexities facing North American transportation today and the associated costs needed to sustain operations here".[132]

It is important to note that all cases are different and that local conditions often affect the degree of success of each operation.[133] Yandex's success in the Russian Federation is not seen in China – where interest in car sharing is overwhelmed by the availability of ride hailing alternatives – nor in Paris where Autolib failed after a few years.

Thanks to investments and subsidies, operators are trying to increase their fleets and market shares, as well as taking other measures. To reduce car downtime – one of the main indicators of business success – operators introduce flexible marketing policies and compete with each other on price.

[129] https://www.finance-monthly.com/2017/06/profitable-car-sharing-a-look-behind-the-numbers/.
[130] https://www.rbc.ru/technology_and_media/06/08/2019/5d4971ba9a794722d38e4f24.
[131] https://ria.ru/20191016/1559867092.html.
[132] https://www.geekwire.com/2019/car2gone-share-now-shuts-north-america-leaving-seattle-no-free-floating-car-sharing-services/.
[133] https://www.strategyanalytics.com/strategy-analytics/blogs/automotive/connected-mobility/automotive-connected-mobility/2019/02/11/car-sharing-prophets-and-losses.

However, the overall results cannot be considered favourable for car sharing operators. For example, a 10-year study by University of Duisberg-Essen's Centre for Automotive Research (CAR) in Germany shows that car sharing has yet at achieve the success expected. In 2009 there were 504 cars per 1,000 citizens in Germany, which increased to 567 by 2019. In 2019, only 202,200 vehicles were available for car sharing, that's 0.04% of all private vehicles in Germany.[134]

"Both the number of cars and the car density has increased each year. So, there was no sign of a trend reversal. Rather, the opposite is the case. The trend for personal cars is very stable. This is in clear contradiction to the claims that the German population is "car-tired". The opposite is true, as this long-term study shows", CAR director Professor Ferdinand Dudenhoeffer said.

Technical condition of the cars

Some per-minute car renters drive aggressively, trying to save money, so the technical condition of their cars may be very poor. To conduct business, car sharing operators need to constantly carry out routine maintenance and car repairs. The service may be outsourced (to official or unofficial dealers) or done by staff members (mechanics). Discounts and individual arrangements with fuel companies are also necessary.

Experience shows that there are frequent cases of vandalism and ordinary theft. It takes time and considerable effort to train people to handle cars with care. The driving style often worsen when using rented cars. Some users take cars for night rides and stunts. As a result, many operators raise nightly rates and impose fines for the inappropriate use of cars; however, maintenance procedures have to be carried out much more often than on normal cars.

Opposition to car sharing schemes

Some countries have seen opposition to the setting up of car sharing schemes raised by traditional mobility services, for example, taxis. For example, in 2015, the Indian car sharing operator Zoomcar issued a special warning to its customers, asking them to refrain from traveling to a certain area. In the Ladakh region, taxi union representatives were allegedly attacking Zoomcar vehicles, smashing windshields and side windows, damaging the car body and endangering the safety of drivers and passengers.[135]

In Sochi, Russian Federation, some local taxi drivers allegedly drove car sharing vehicles away before the arrival area at the airport before flights from Moscow were arriving. [112, TASS]

Lack of regulatory support

The key issue in the relationship between the customer and the car sharing operator is the conclusion of a short-term car rental contract. In the Russian Federation, instead of a contract, an agreement regulated by civil law is drawn up between an individual and a legal entity. Often, the interests of the customers are unreasonably infringed, their rights are limited, and inadequate fines are introduced.

For the operator, absence of a verification procedure for driver's licenses before signing the agreement and lack of access to personal credit history are the problems. A single secure user database can help identify unscrupulous customers who violate

[134] Personal Car Loses Economic Contest, But Wins Sharing Battle. Neil Winton, 2 January 2020. Available at https://www.forbes.com/sites/neilwinton/2020/01/02/personal-car-loses-economic-contest-but-wins-sharing-battle/#380f69715046.

[135] https://www.medianama.com/2015/07/223-zoomcar-ladakh-taxi-union-cars/.

the rules of service providers and/or laws but may introduce issues related to privacy and personal information management.

A solution could be to introduce regulations at the state level, standardize conditions and fines, and develop general (framework) rules for car sharing. This would ensure that the interests of both the mobility service provider and the consumer are protected.

Regulatory support is important for the car sharing industry. For example, in Germany, legislation provides rules supervising the creation of specific parking spots for car sharing vehicles (see 3.1.2). In China, guidelines for the promotion of car sharing were adopted which focus on the legal status, insurance and regular maintenance of vehicles etc. (see 3.1.5). In the United States of America, some states have enacted legislation regarding car sharing that includes incentives to use car sharing, addressing car-sharing taxation, electrification of car sharing fleets and creating a regulatory framework for peer-to-peer car sharing (see 3.1.8).

Government agencies could also provide citizens with informational support aiming to explain the advantages of car sharing and its regulatory features.

Some problems of car sharing identified in emerging markets

According to a recent study,[136] emerging markets have their own barriers to car sharing.

1. The attitude of users towards car use and ownership

   One of the key questions is whether car sharing encourages individuals to become car owners or replaces the private car ownership model. Using a focus group in China as an example, the authors of the study [123, WRI, 2015] found that car sharing participants seek personal mobility, which is both an obstacle and an opportunity for sharing vehicles. Despite the fact that these services allow people to access cars, most people still considered private ownership the best option. This is especially true in developing countries where cars are often seen as a status symbol. For example, in the above-mentioned focus group of car sharing users from Hangzhou, half of the participants planned to purchase a personal car in the short term. In addition, a third of all participants believed that owning a personal car reflects a person's social status.

2. Transport infrastructure

   Traffic congestion is becoming a serious issue in emerging countries due to traffic infrastructure not keeping pace with exploding population growth in urban areas. Due to underdeveloped road infrastructure and the deficit of public transport in developing countries, traffic congestion is quite frequent.

   It is often difficult for car sharing operators to predict when users will return the rented vehicles, and this is a serious problem for fleet management. In traffic-heavy cities, operators often place multiple vehicles in one place, giving users choice. In some countries (Brazil and China), privileges are provided to users with respect to time of use, alternatively, the Zipcar service in the United States of America, charges a fine of $50 for delayed return.

[136] Carsharing: A Vehicle for Sustainable Mobility in Emerging Markets? World Resources Institute. 2015. Available at https://www.itdp.org/2015/12/14/carsharing-a-vehicle-for-sustainable-mobility-in-emerging-markets/.

Among the traditional infrastructure's problems there also should be noted the poor quality of roads in emerging economies having an effect on fleet maintenance as well as road safety and accidents.

3. Governmental restrictions

Due to congestion and air pollution caused by excessive use of private vehicles, restrictions on the possession and/or use of motor vehicles have been imposed in cities in China, Brazil, Mexico and other developing countries. On the one hand, this can help car sharing, as it makes it more attractive for citizens. On the other hand, restrictions influence the total number of car sharing vehicles and fleet renewal.

The regulatory environment is not always clear in emerging markets not only in car sharing sphere but in road transport sector as a whole and in public transportation in particular. For example, bus services are subject to various regulations but requirements such as service frequency, vehicle types, ownership, maintenance, and comfort are not always covered.[137] Therefore, there is no regulatory environment for car sharing in principle. Also, competition among mobility providers (including taxis) undermines service quality and quantity.

4. Competition from taxis, auto rickshaws and personal two-wheeled vehicles

As car sharing enters new markets, it often faces strong competition from similar modes of transport, such as taxis and auto rickshaws, which are widely available in developing countries. However, despite the tough competition, car sharing has a competitive advantage or example when they need to make long or multiple trips or through special offers to attract users making multiple trips in a short period.

5.2. Carpooling issues

The insufficient growth of carpooling is primarily associated with the problems specific to this type of shared mobility; some examples of these problems are given below.

First, there is often little support from public authorities and employers which should seek to encourage people to use shared mobility solutions. Secondly, there are objective limitations for carpooling, as people are accustomed to flexible working hours and the convenience of immediately accessing their own car. Thirdly, the safety and security risks associated with carpooling, associated with an insufficient level of travel safety, remain a barrier for potential customers.

The spread of carpooling in emerging markets is primarily a consequence of the economic advantages of shared trips, and not the desire of the state to reduce the number of vehicles on the roads. The benefits of carpooling may not be sufficiently explained to citizens with news coverage associated with carpooling often being negative. Of course, the degree of danger of carpooling is often exaggerated, but this doesn't mean there are no risks of shared trips as such:

- Booking a seat with an unscrupulous driver can be an issue for the passenger. For example, it may turn out that instead of a comfortable car, passengers will find a regular minibus in which they will have to travel for several hours. Another risk is that at the end of the trip, the driver may ask to pay more than agreed;

[137] Pojani D. & Stead D. (2017). The Urban Transport Crisis in Emerging Economies. 10.1007/978-3-319-43851-1_1. Available at: https://www.researchgate.net/publication/310482186.

- Travel companions significantly reduce freedom of choice of travel time; if one customer is late, this affects the schedule of each travel companion. The car may not have enough personal space, and conversations can be unpleasant. In addition, if someone is sick, there is a greater likelihood of getting sick. This is especially important during epidemics of infectious diseases;
- Drivers are also at risk. For example, illegal carriers, disguised as fellow travellers, can arrange a trip with them on popular routes. As a result, the driver does not find anyone at the meeting place, drives alone, and other drivers carry passengers. These are just the risks that are related to the economic aspects of carpooling, when, in fact, there is also always a question of personal security. At the same time, the driver is responsible for the passengers. In the event of an accident, all responsibility, including for fellow travellers, rests primarily with the driver, who may not always monitor the technical condition of the car, comply with the work and rest regime, or violate traffic rules.

During registration, many services require confirmation that the car owner is not going to make money on the trip. In addition, carpooling services may ask at any time for the necessary documents and identification cards. However, they warn users in advance that they cannot guarantee full reliability of the data. That is, the safety of both the driver and the passenger so far remains their personal responsibility.

The fatal incidents that occurred in China with DiDi Hitch service (see paragraph 4.2.5) confirm this fact: the driver, who had no previous criminal record, registered using his real documents, but drove the car with fake license plates. It took an in-depth analysis and modernization of the service to re-launch it.

Nevertheless, it should be noted that similar security problems exist in other mobility services, even in public transport and taxis, where an attack on passengers is one of the most common incidents.

In November 2019, the Ministry of Transport of the Russian Federation introduced a bill[138] according to which all persons "whose work is related to driving vehicles when transporting taxi passengers, buses, trolleybuses, and trams" will have to provide a criminal record obtained from the police to the employer. Companies will be required to remove employees without such certificate from transport management. But this approach does not solve the problem of possible violence in a private car involved in carpooling.

The lack of concepts and rules for shared transportation, as well as the lack of understanding of the mechanism for monitoring such activities, along with the growing popularity of online services and social networks for searching for travel companions, show that there is an urgent need for regulation.

Taking into account a number of international experiences the following requirements are important for carpooling: to limit the amount of compensation received by the driver of the vehicle used for carpooling: the amount of such fee cannot exceed the maximum amount established by the government of the Russian Federation.[139]

[138] https://regulation.gov.ru/projects#npa=97045, in Russian.

[139] The Ministry of transport has proposed to limit the amount of payment for a carpooling trip. Ria News, 16 November 2019. Available at https://ria.ru/20191116/1561018991.html, in Russian.

5.3. The role of digital technologies in the development of effective business models

All car sharing and carpooling initiatives require advanced technological back offices for them to work effectively and efficiently. They also need simple user interfaces to facilitate take-up. Mobile applications for car sharing or carpooling are the main components of the service. For them to be effective they must have a set of characteristics:

Functionality including most of the following:

- Simple user agreements and consent to the electronic processing of personal data
- Notifications of the approval of the contract via SMS and e-mail
- The ability to link several bank cards for payment
- Information about tariffs in the application
- Map of refuelling points
- Information about the lease completion zone
- Travel history
- The ability to select a car model
- Information about the selected vehicle
- Parking address
- Distance to the car
- Rental conditions
- Level of fuel
- License plate registration number
- Car photo.

Convenience (ease of use). Where the applications should: be simple and easy to navigate, have good instructions, provide for a Help and Information section, allow for feedback and adaptation for foreign tourists.

Safety. Using specialized software, applications should be protected from possible vulnerabilities and malicious programs, allow for redundancy of requested permissions and the security of data transfer; provide for the updating of account information.

Reliability and performance. It is necessary to ensure their stability, the correctness of interface elements and calculations, to minimize the amount of downloaded information and the memory occupied, as well as start-up speed, and finally to provide smooth and quick operation. Resistance to external interruptions and the optimization of battery usage are also important.

The lack of access to mobile services for people who do not have smartphones and bank cards (credit or debit) or those who do not have experience with digital services is an issue which should be taken into account.

In the absence of mobile applications, a car sharing business model based on stationary rental points and issued smart cards can function, but this limits the potential of the service. Absent or unstable Internet and mobile communications in some regions may be another limiting factor.

In the medium term, the continued rapid proliferation of smartphones and the introduction of bank cards will largely solve the above problems. The penetration of digital technologies in Central Asia is accelerating, according to the International Telecommunication Union, and fixed-line phones are rapidly losing their popularity.[140] In Kazakhstan, there are almost seven mobile subscribers for each fixed-line phone, and in Kyrgyzstan and Tajikistan there are twenty.

Prospects for the use of innovations

Electric cars, self-driving vehicles and connectivity will change the way cars are used, as well as strategies for promoting products and additional services from car manufacturers. It is support from automakers that may become a success factor for the development of car sharing; the characteristics of the country and the preferences of customers should also be taken into account.[141]

Although car sharing cannot provide a fast return on investment, the overall added value for automakers is significant and should not be ignored. Shared mobility services allow manufacturers to gain access to new groups of customers who would otherwise have more restricted choices when buying a new car. Thanks to car sharing, automakers also have access to a representative platform for marketing and testing their innovative cars and technologies (e.g. electric vehicles), and the ability to use customer ideas for further research and development.

For example, carpooling may become much more attractive in the world of autonomous vehicles, blurring the line between private and public transport. Unmanned vehicles can be designed to take the use of carpooling into account; seats could be arranged to maximize the comfort, privacy and safety of passengers. The automated driving system could optimize drivers' and passengers' routes in real time and adjust the paths accordingly to ease the selection of fellow travellers; the cost of trips would be then reduced due to the exclusion of driver wages.

[140] Digital Central Asia: mobile phones (part two). Peter Samler, Nazik Imanbekova / CAA Network, 28 March 2018. Available at https://caa-network.org/archives/12707, in Russian.

[141] Monitor Deloitte. Car Sharing in Europe. Issued June 2017. Available at https://www2.deloitte.com/content/dam/Deloitte/de/Documents/consumer-industrial-products/CIP-Automotive-Car-Sharing-in-Europe.pdf.

6. Potential usage of the learned experience in the priority countries of Central Asia (Kazakhstan, Kyrgyzstan and Tajikistan)

6.1. Summary of the key opportunities and the lessons learned from the examples studied

Despite the relatively recent emergence in developing countries, shared mobility services are growing rapidly and gaining popularity. However, they are still very limited and niche when compared to public transport and the use of personal cars.

Asian countries are leading by the dynamics of implementing car sharing and carpooling services. Given the high levels of environmental pollution, development of electric mobility is now trending in the car sharing sector.

Lessons learned from the experience presented indicate that the factors that limit the spread of car sharing in emerging markets the most are:

- Local traditions of purchasing and using a private car;
- Lack of public and state institutions' awareness about the benefits of car sharing;
- Competition from traditional types of mobility: taxis, minibuses, car rental, two-wheeled transport, etc.;
- The need for significant investment when launching start-ups;
- Low income of the population.

The key opportunities to accelerate the deployment of car sharing services in emerging markets are:

- The desire of consumers to use cars, the spread of shared economy models,
- State policy favouring shared mobility, adoption of the necessary regulatory framework;
- Widespread adoption of digital technologies and platforms;
- Partnership of shared mobility operators and car manufacturers;
- Partnership with local authorities, obtaining tax benefits and additional incentives.

Carpooling (including its corporate forms) has significant potential for growth under conditions of legal certainty; currently, long-distance travel has become widespread; the main requirements of consumers are comfort and safety of shared trips along with keeping their price advantages.

6.2. Guidelines for the local and national authorities on the creation of car sharing and carpooling services

This section contains recommendations and guidelines from the experience of implementing shared mobility projects identified in previous chapters. Examples from the Russian Federation are detailed are the main source for these guidelines, as this country is to the Central Asian countries in many aspects similar in its approaches to normative regulation of public transport, the principles of development of transport systems, lifestyle and culture of the population. However, where relevant examples and lessons learnt from other countries can assist in developing appropriate recommendations these have been also included.

The guidelines for the creation and development of shared mobility services have been developed for use by any relevant authority and some of the recommendations may also be relevant to the actual operators. Furthermore, improvements in the

regulatory framework and forms of interaction between the public and private sectors which could contribute to innovation by ensuring the mobility of different groups of the population in the safest, broadest and most equitable way possible are discussed.

6.2.1. Shaping regulatory policy for shared mobility services

In order to solve the problems of congestion, shared mobility programs are developed and implemented not only by the authorities of some large cities, but also by governments of entire countries. Sections 3.1 and 3.2 of this report discuss several examples of such measures to stimulate the development of car sharing and carpooling services. Lessons learned from international experiences can contribute to the creation of similar services in target countries.

In order to create an appropriate environment for car sharing and carpooling schemes to prosper, consistency in implementation of car sharing and carpooling initiatives will be required from state and city authorities; recommended actions (steps) are presented in table 4.

The sequence of these actions is determined by the logic of the process of introducing new transport services to the population.

First, the authorities must clearly articulate their needs and objectives by developing or updating a sustainable urban mobility plan (SUMP). Secondly, in order to implement this plan within a certain time frame, it is necessary to develop and adopt an appropriate legislative framework. Third, shared mobility services must obtain permits to operate in accordance with the requirements set by the authorities. Finally, fourthly, measures should be provided for the development of carpooling and car sharing services and the achievement of the indicators set in the SUMP.

Several government agencies may be involved in this work – ministries of transport, public transport departments, city and regional administrations, specialized agencies for the development of transport infrastructure, as well as other interested public authorities.

Table 4: **Steps recommended for governments to develop car sharing and carpooling**

Step	*Activities*	*Main objectives*
I. Develop or update a sustainable urban mobility plan (SUMP)	Development of SUMPs for pilot cities, evaluation of their performance taking into account the emergence of shared mobility services	Creating a sustainable transport environment with appropriate policy guidance on the use of shared mobility solutions including car sharing and carpooling initiatives at city or regional level
II. Shaping the regulatory framework for the implementation of car sharing and carpooling initiatives	II-a. Development of principles and areas of public regulation	Creation of car sharing and carpooling framework
	II-b. Development of the legal requirements for car sharing and carpooling operators, setting up an admission mechanism	
	II-c. Drafting the legal requirements for customers of shared mobility services	
	II-d. Development of measures to incentivize car sharing and carpooling services	

Step	*Activities*	*Main objectives*
III. Administrative procedure for issuing permits for car sharing activities	Licensing or permitting shared mobility operators to carry out business activities, issuing preferential parking permits for car sharing vehicles	Practical implementation of car sharing and carpooling initiatives
IV. Economic incentives for shared mobility operators	Development of shared mobility services in cooperation with operators	Support for shared mobility operators by economic measures
V. Monitoring the results of the measures implemented	Monitoring the established requirements for operators based on SUMP goals and the local criteria	Monitoring of development targets and the protection of consumer rights

6.2.2. Step I. Developing or updating a sustainable urban mobility plan (SUMP)

The legal framework should be developed to ensure sustainable development of the urban transport system with a focus on meeting the needs of society for mobility while minimizing the negative impacts on public health and the environment.

A sustainable urban mobility plan (SUMP) that address the needs of different population groups should consider a component on car sharing services. Whilst not being legal acts, SUMPs set out the long-term actions of public institutions and government bodies in the field of mobility. As a rule, such documents contain a set of measures necessary to make various types of shared mobility a safer and more attractive alternative to the private car.

In a subset of countries, the development of urban mobility plans is a mandatory requirement of national legislation, and the procedure for their development and adoption by municipalities is regulated. This is the case in Brazil[142], India, and many European Union countries. In other countries, sustainable urban mobility planning is carried out as voluntary urban initiatives, which allows for the flexible organization of the process. In the guide prepared by the European Platform for Sustainable Urban Mobility Plans in 2014, such documents are defined as strategic plans developed to meet the mobility needs of people and businesses in cities and suburbs, and to improve the quality of life.[143]

Within the framework of the UNDP/GEF project "Sustainable Transport in Almaty", 10 elements of sustainable mobility were identified for the cities of Kazakhstan:[144]

1. Mobility planning and management
2. Increasing the role of public transport
3. Development of pedestrian and bicycle traffic
4. Intermodality (integration of different types of transport into a single system)
5. Road safety
6. Minimizing use of personal transport
7. Implementation of the concept of effective urban logistics

[142] See more at https://www.wri.org/our-work/top-outcome/brazilian-cities-begin-reshape-urban-areas-through-sustainable-mobility-plans.

[143] Guidelines. Developing and Implementing a Sustainable Urban Mobility Plan. European Platform on Sustainable Urban Mobility Plan, January 2014. Available at https://www.eltis.org/mobility-plans.

[144] Guidelines for the preparation of a sustainable urban mobility plan for Kazakhstan cities, 2016. Prepared as part of the UNDP-GEF Almaty Sustainable Transport Project. Available at https://alatransit.kz/sites/default/files/rukovodstvo_sump2016_2.pdf, in Russian.

8. Coordination of local stakeholders and their cooperation
9. Improving the attractiveness, accessibility and safety of public spaces
10. A systematic transition to low-carbon urban development through sustainable mobility.

This list includes actions aimed at reducing the use of personal vehicles, especially for daily short-distance travel, and at encouraging the use of public transport. These recommendations should be taken into account by the pilot cities' authorities in order to improve the quality of the population's transport mobility and to gradually transition to sustainable low-carbon development.

Car sharing should be part of the global sustainable mobility policy of city authorities and can be seen as a midway between the use of public transport and a private car. It is recommended to allocate enough authorities' resources to develop the framework for the shared use of cars and shared trips.

When developing the SUMP, it is recommended to set specific targets for the creation of a competitive and resource-efficient transportation system, for example through targets on: reducing the number of regularly used private vehicles, managing the number of free parking spaces in the centre of large cities, reducing carbon dioxide emissions, cutting the number of fatal car accidents, etc. People need to be able to get to work, schools, hospitals and recreation areas safely and quickly, and the task of a transport system is to move people, not vehicles.

Sometimes, a simple change in an individual's attitude may be enough to influence their choice of means of transportation, even if the quality of transport services remains the same.

The policy of city administrations to integrate car sharing, carpooling, public transport and other forms of shared mobility will contribute to achieving the priority task: replacing the use of a personal car with various forms of shared mobility. This policy should lay the foundation for building strong public-private partnerships and attracting targeted investments to the transport system, including both public transport and other forms of shared mobility.

It should be noted that when previously unknown business models first appear in the region, a significant part of the work of public authorities and mobility operators will be associated with establishing a relationship of trust between the parties and defining common goals. That is why it is necessary to develop the basic legal rules, or the "rules of the game", ensuring equal opportunities for all players and creating a "space for innovation" before launching shared mobility services.

As setting up a SUMP is a first step in the rules of the game, the principles of its development are of interest for local agencies, a comprehensive step-by-step description of the SUMP process is provided in appropriate guidelines.[145] These European Guidelines follows the structure of the cycle of SUMP planning: four phases, each with three steps (and a total of 32 activities) as following:

Phase 1: Preparation and analysis

Step 1: Set up working structures

Step 2: Determine planning framework

[145] Rupprecht Consult (editor), Guidelines for Developing and Implementing a Sustainable Urban Mobility Plan, Second Edition, 2019. Available at https://sumps-up.eu/fileadmin/user_upload/Tools_and_Resources/Publications_and_reports/Guidelines/guidelines_for_developing_and_implementing_a_sump.pdf.

Step 3: Analyse mobility situation

Phase 2: Strategy development

Step 4: Build and jointly assess scenarios

Step 5: Develop vision and objectives with stakeholders

Step 6: Set indicators and targets

Phase 3: Measure planning

Step 7: Select measure packages with stakeholders

Step 8: Agree actions and responsibilities

Step 9: Prepare for adoption and financing

Phase 4: Implementation and monitoring

Step 10: Manage implementation

Step 11: Monitor, adapt and communicate

Step 12: Review and learn lessons.

Implementation of Step I (Developing or updating SUMP) provides the following opportunities for the creation of shared mobility services:

- It shapes urban policies, sets priorities and development targets;
- It establishes relationships between the services being created and other forms of sustainable urban mobility;
- It creates preconditions for the formation of a regulatory framework;
- It manages decisions to begin practical implementation;
- It creates public-private partnerships and attracts targeted investments.

6.2.3. Step II. Shaping the regulatory framework for the implementation of car sharing and carpooling initiatives

6.2.3.1. Sub-step II-a. Development of principles and areas of public regulation

Regulation of the activity of shared mobility operators is necessary to remove administrative barriers, ensure fair competition, security of users of services and all citizens. The different countries approach this issue in their own way. In Germany, a separate law has been adopted that extends the rights of local authorities in relation to car sharing services (see subsection 3.1.2), in the United States of America, car sharing operators in certain States enjoy tax benefits (see subsection 3.1.8). In the Russian Federation, local authorities' requirements for car sharing operators are based on obtaining preferential permission to use paid parking space (see subsection 3.1.9).

First of all, the question should be decided whether to consider car sharing and carpooling services as part of the public transport infrastructure. This conceptual issue is relevant both from the point of view of determining which regulations should be applied, and from determining whether operators can be recipients of state benefits and subsidies.

Currently, car sharing and carpooling are a kind of intermediate step between using a personal car and public transport. In the future, with the introduction of MaaS, shared mobility services will become an integral part of the transport system.

If car sharing and carpooling are directly integrated into public transport systems, it may be difficult to obtain appropriate licenses and meet burdensome licensing

requirements in the Russian Federation and Central Asian countries. At the same time, as will be shown later in sub-step II-b, it is possible to make certain requirements for car sharing and carpooling operators outside of the standard licensing procedure.

There is a need to enter a new type of service into an existing regulatory scheme that has not been adapted to it. The choice of the most suitable form of regulation is quite complicated, as the experience of the Russian Federation has already shown.

In this country, regulation of car sharing will require amendments to several legislative acts at once, in particular to the Civil Code, the Rules of the Road, and the Code of Administrative Offenses. A similar situation exists in Central Asian countries, where the main regulatory approaches are similar to rules in the Russian Federation. The detailed changes that will be needed in each of the selected countries will be studied as part of a subsequent project.

It is virtually impossible to regulate this progressive industry by individual amendments – a framework law and by-laws will be required. The concept of car sharing in the legislation of Central Asian countries does not yet exist. As with transport services, the concept of "aggregator" is missing. For example, the bill on the activities of passenger taxi services is still under review in the Russian Federation.[146]

Therefore, it is more appropriate to develop a comprehensive law aimed at achieving the goals of sustainable transport development and regulating this area of activity in addition to introducing specific requirements for individuals. At the same time, independence of shared mobility operators from the state should be ensured to fulfil commercial requirements. This should be accompanied by a system which promotes business development.

Specifically, on car sharing, by analogy with the laws of other countries (see section 3.1 of this report); it is recommended that the framework law introduce the concept of a shared vehicle. Such vehicles must be registered with the authorities and identified as car sharing vehicles.

In the law it is possible to define the concepts of forms and models of car sharing, including a free-floating car sharing model and a model based on stationary points of delivery/reception of vehicles. This will allow the local authorities to customise their requirements according to a set of key principles. It is advisable to determine the general rights of drivers of car sharing vehicles, provided that they comply with the requirements for road safety (more on this in sub-step II-c).

The framework law on shared mobility may include an additional provision that explicitly allows local authorities to reduce or cancel parking fees for car sharing operators where subsidiarity principles apply within countries. For example, in the Russian Federation, parking fees are set by regional government bodies (Article 6 of the Law on the Organization of Road Traffic of 29 December 2017 N 443-ФЗ).

In the same way, the framework law under discussion, should provide a legal definition of carpooling in order to exclude this activity from the scope of regulation applicable to commercial passenger transport. A number of definitions have been included in previous chapters according to different national requirements. States should define carpooling according to their requirements while ensuring the principles of the service are maintained (e.g. not for profit, etc.). Experience from a number of countries shows that costs to be recovered can either be set in law or a specific value can be prescribed. Government authorities are encouraged to follow these approaches. The law could contain a reference to official rates (tariffs)

[146] Available at https://sozd.duma.gov.ru/bill/481004-7, in Russian.

determined by authorized bodies that establish the cost of operating various models of cars per kilometre. The presence of tariffs established at the central level will help to distinguish between shared payment of expenses and profit.

The law may also permit only vehicles with no more than eight passenger seats (category M1) to be used for carpooling, limiting the number of trips that such a car can make for a certain time, transfer and receive payment for trips only by bank transfer or through an app, that will allow controlling the excess of the fee limit.

The task of achieving effective integration of car sharing and carpooling in the legal field is complicated by the fact that in Central Asian countries, the responsibility for regulating public transport and road safety is often assigned to various authorities (the Ministry of Transport and the Ministry of Internal Affairs, respectively).

The development of regulation measures for the implementation of shared mobility services will require coordination of the actions of these state and local authorities. Without waiting for the adoption of national regulations, local authorities, within their powers, can take measures in advance to prepare for the emergence of shared mobility services, for example by informing citizens and all interested parties about the economic and environmental benefits of car sharing and carpooling.

To implement the provisions set out in the next section, it is important to first empower the city Department (Agency, Department, etc.) to allow for car sharing or carpooling. For this purpose, the relevant regulations on the work of the authorized Agency need to be developed or amendments need to be made to current regulations.

The implementation of sub-step II-a at the Central government level provides the following opportunities for the creation of shared mobility services:

- Introduction of shared mobility;
- Determining the role of shared mobility services in the public transport system;
- Definition of general rights and obligations of organizers and clients of shared mobility services, adoption of other framework regulations;
- Ensuring coordination of actions of the Central government and city authorities;
- Defining the competencies of various levels of government.

6.2.3.2 Sub-step II-b. Development of the legal requirements for car sharing and carpooling operators, setting up an admission mechanism

Specific legal requirements for car sharing and carpooling operators should be set considering the principles and areas of state regulation set forth in sub-step II-a. It is assumed that at this point the legal status of the shared mobility services will have already been established, their position in the urban public transport system will already be recognised in law.

International experience in organizing road transport shows that the creation of a developed and effective licensing is fundamental to good operations. Licensing is necessary to prevent damage to the rights, legitimate interests, life or health of citizens, the environment, cultural heritage, defence and security of the state. Licensing can come in many forms but is always based on a strict system of requirements that an applicant must meet to work in a particular segment of the transport market.

Thus, at this step, it is necessary to set up a mechanism for admitting car sharing and carpooling operators to commercial activities, which should ensure the safety and quality of the services they provide. The specified mechanism assumes there are

clearly established criteria (licensing requirements) and control over compliance with them.

The following requirements can be considered as such criteria for car sharing operators:

- The presence of a sufficient number of vehicles in the operator's fleet. As a rule, the cars must be new or at least manufactured not more than three years ago that comply with the latest United Nations safety and emissions regulations;
- Vehicles must meet the established requirements (dimensions, ecological class according to Euro emissions standards, electric or hybrid powertrain, etc.). They should be painted according to the operator's colour scheme and have the operator's distinctive signs and/or logo, so that the city services responsible for parking can easily identify them;
- Vehicles must have certain types of equipment (satellite navigation, Internet connection, remote controls, etc.) that must be certified;
- Evidence of vehicles regularly undertaking technical inspection and maintenance according to United Nations regulations;
- Evidence of a customer service centre available around the clock by telephone or via the Internet;
- Documents confirming the establishment of procedures and processes necessary for the protection of clients' personal data and guaranteeing their safety;
- Mandatory Motor Third Party Liability (MTPL) insurance for each vehicle;
- Free access to software that allows the client to book a car;
- Evidence of efforts to make sure the system is secure from cyber security threats;
- Provision of data on location of the operator's vehicles and their usage status to the city traffic control centre;
- Evidence of status of good repute of the company (e.g. no legal cases open against the company);
- Evidence of the payment of all relevant taxes and social security for its staff;
- Registered office in the host country;
- Absence of gross violations in the field of ensuring road safety, no liquidation procedures or bankruptcy.

In addition to the above, there may be other requirements that the city authorities deem necessary in accordance with the goals of the SUMP.

The presence of state licensing requirements for road passenger transport, which may have an impact on car sharing initiatives, should also be considered. The transport legislation of priority countries (see subsection 3.3) provides for monitoring the road carrier's compliance with licensing requirements. Monitoring is carried out by the body that issued the license, through scheduled and unscheduled checks of documents, vehicles and drivers.

In the target countries, the concept of "car sharing" is not included in the legislation, so car sharing licensing is not required, but local authorities should be able to monitor compliance with their legal requirements. A monitoring mechanism needs to be developed; human and financial resources should be allocated for monitoring and control (see subsection 6.2.6).

Within this framework it is also important to ensure that there are clear standards and requirements for operators to use public parking spaces. The local authority needs to enter into an agreement (which it may or may not charge for) with operators on the use of these spaces so it needs to have a policy on how it will do this.

When commencing services in pilot cities of the priority countries, it is recommended to follow the list of documents provided in accordance with table 3 (subsection 3.1.9) as a guide and take country specifics into account.

If the operator violates the requirements set by the local authorities, various administrative measures may be applied. For example, in Moscow, preferential parking permits may be cancelled in the following cases:

- If the owner of the vehicle has at least three overdue administrative fines for violations in the field of traffic or parking rules;
- If the owner of the vehicle has violated service standards, requirements and conditions;
- If the owner of the vehicle has not paid a fee for preferential parking of a car sharing vehicle;
- If the right of ownership or the right of possession and use in relation to the vehicle for which the permit has been issued has been terminated;
- If the owner of the vehicle fails to report to authorities and to meet the requirements of the administrative regulation for the issuance of parking permits.

The compliance with service standards, requirements and conditions can be monitored by checking documents and using special automatic equipment with photo and video recording functions.

Carpooling regulation

Since shared trips can only be made on a non-commercial basis, the concept of carpooling as a commercial activity does not exist. The carpooling operator must not allow drivers to use the service to search for passengers for commercial purposes. Licensing of carpooling operators is not necessary for this requirement to be met.

At the same time, as indicated earlier in subsection 4.3.2, other requirements might be imposed on carpooling operators. For example, an agreement on information exchange between the carpooling operator and an authorized public body might be required. This agreement provides for the exchange of information necessary for verification of drivers and vehicles. In the Russian Federation, it was also proposed to equip carpooling vehicles with the national GLONASS satellite positioning system.

Monitoring of compliance with the rule of law is also an issue for carpooling. While the driving related actions of the individual drivers are subject to the rules of the road and as such are enforced by the police authorities. Authorities may recommend that carpooling platforms implement specific tools in their services to prevent unjustified profit making and ensure the safety of users. These tools may include:

- A recommended amount of payment per kilometre that is applicable to any driver who publishes information about the trip on the service platform;
- Limiting the ability to increase or decrease the payment to cover the expenses of the driver (for example, no more than 50% of the recommended amount). This will allow drivers who want to attract more passengers to offer a lower fee, while those with an expensive car or a car with fewer seats will be able set a higher fee;

- A limit on the number of passengers who can participate in a shared trip. As a rule, the number of seats that a driver can offer is limited to eight (vehicles of the M1 category);
- Secure on-line payments using applications integrated into the platform;
- The ability to track the arrival of the car at the meeting point and to exchange information about the trip, location and estimated time of arrival with interested parties;
- The ability to publish customers' reviews about the driver and fellow travellers in real time which is an important element of safety so as to ensure the safety of the driver and fellow passengers, the maximum possible measures should be taken, including, but not limited to, face recognition for drivers to avoid unauthorized use of the service;
- The carpooling platform should meet the highest standards of computer security and be tested periodically to make sure it is reliably protected against hackers;
- The carpooling operator is encouraged to declare its readiness to assume obligations related to public safety, criminal offenses and disputes that will directly affect the platform.

Carpooling regulation is a complex issue, and it is hard to imagine that local authorities can solve it without the support of the central government. At the same time, local authorities can officially support any activity favouring and promoting both carpooling and the use of different public transit options.

Implementation of sub-step II-b provides the following opportunities for the creation of shared mobility services:

- Setting up a legal mechanism for the registration of car sharing and carpooling operators (licensing, permit system);
- Developing requirements for car sharing and carpooling operators for their admission to commercial activities.

6.2.3.3. Sub-step II-c. Drafting the legal requirements for customers of shared mobility services

There are a number of conditions that customers of shared mobility services must meet to be able to use these services. These can be both unconditional requirements arising from the legislation (for example, a valid driver's license, compliance with traffic rules, etc.) and those that are set by the shared mobility operators themselves (these mostly set the minimum age and driving experience). Currently, a number of companies have introduced a mandatory system of visual identification of users' faces to minimize the risk of unauthorized use of the account (fake accounts).

At the legislative level, attempts are being made to tighten the requirements for car sharing customers. Some amendments could make it much more difficult for customers to access cars. For example, in the Russian Federation, it was proposed to oblige car sharing operators to verify clients' personal data for security reasons either upon a visit to the operator's office (as is the practice in traditional car rental services) or through online identification on the official website of the State Service. So far, this proposal has not been accepted. Other operators internationally are going the other way and reducing the verification requirements. The choice of approach depends on national identification requirements.

Previous chapters have identified what should happen in the event of an illegal act taking place caused by the user. Some systems limit interventions (at a platform level) to banning the user, while others go further. It is clear that traffic offenses need

to be handled by the competent authorities (usually the Police departments) but there also needs to be coordination and exchange of information between the various departments to ensure the correct measures are taken.

The Traffic Police of the Russian Federation (GIBDD) for example proposes to prohibit traffic rules violators and those whose driver's licenses have previously been revoked from using car sharing. The agency plans to create a single database of known offenders and provide operators with this data to verify potential customers. This proposal arose after a series of accidents were caused by drivers of car sharing vehicles.[147]

According to the law, every person who has received a driver's license becomes a fully-fledged road user, since the state recognizes this person as qualified enough to gain control of a vehicle. However, car sharing companies set their own limits, arguing that it is driving experience that determines a driver's expertise and this is what increases traffic safety (and reduces the risk to car sharing operators).

As a rule, most car sharing companies require at least two years of driving experience and set the minimum age of 20 (which can increase for more prestigious vehicles). However, in a number of smaller companies, a car can be rented by users with no driving experience, starting from the age of 18. Recent experiences in the Russian Federation point to this requirement reducing.[148] However, at least in the initial phases of setting a new service, it is important to require at least two years of experience. In those countries that have a points system tied to their driving licence it is recommended that authorities require car sharing operators to grant use only to those drivers that have not lost more than one-third of their points.

Other requirements for drivers imposed by service operators are determined by the specifics of the car sharing business and the technologies used. Below are some of the typical ones that authorities may require operators to observe:

- Do not smoke in the car;
- Do not end the rental session outside the coverage area;
- After the end of the rental session, do not leave the car in an underground parking or the parking of a shopping centre (unless it has been agreed as a designated parking area for the car sharing operator;
- Keep the inside of the vehicle clean;
- After the end of the rental session, do not leave the car with a fuel tank filled below the permissible level, etc.;
- Authorities should require operators to publish all these additional requirements in detail on their website and on an information card within each vehicle.

In addition, authorities may wish to allocate to operators additional benefits and privileges aimed at incentivising the use of car sharing, in addition to the parking permits discussed above.

Authorities may require carpooling operators to ensure that drivers who participate in carpooling meet certain requirements, primarily aimed at the safety of fellow travellers. For example, such requirements may include: a national driver's license, minimum driving experience, no criminal record or outstanding fines etc.

147 https://www.autonews.ru/news/5cfdf6f79a794748a96e0212, in Russian.

148 https://vc.ru/transport/42466-servis-karsheringa-delimobil-snizil-trebovaniya-k-vozrastu-i-stazhu-voditeley?from=rss, in Russian.

Implementation of sub-step II-c provides the following opportunities for the creation of shared mobility services:

- Setting unconditional requirements for customers of shared mobility services;
- Defining the requirements and rules that can be set by operators of shared mobility services and that are determined by the specifics of the business and the technologies used.

6.2.3.4. Sub-step II-d. Development of measures to incentivize the creation of shared mobility services

The local authorities should consider what measures to implement (as set out in section 3.4) to complement the creation of car sharing and carpooling initiatives.

The specific structure of the package of incentives for the introduction of shared mobility in the priority countries should be based on sociological studies and (or) modelling of transport demand.

Implementing an incentive package to promote shared mobility may result in an unintended effect: decreased use of public transport, which may not be beneficial in terms of reducing traffic congestion and carbon dioxide emissions.

A recent experimental study also shows that free-floating car sharing is a strong competitor of public transport.[149] Therefore, incentive measures should ensure that car sharing does not replace trips made by public transport and other forms of sustainable mobility. This problem may be particularly important for developing target countries. Turkish researchers have drawn attention to this issue [48, Canıtez 2017]. A solution could be that local authorities take measures to integrate car sharing systems with urban public transport systems. For instance, it is possible to organize car sharing parking lots within walking distance of public transport stops and transfer hubs.

Implementation of sub-step II-d provides the following opportunities for the creation of shared mobility services:

- Adoption of administrative support measures (restricting the movement of vehicles in certain areas, the introduction of paid parking lots, traffic management, etc.);
- Adoption of financial support measures (tax incentives and subsidies).

6.2.4. Step III. Possible administrative procedure for issuing permits for car sharing activities

In some countries, for example, in India, a license for passenger transportation is required to operate car sharing, as well as to offer taxi services (see subsection 3.1.5). In Tajikistan, taxi transportation is subject to licensing, and car sharing will need a license unless the legislation is changed. But as mentioned earlier, the procedure that provides preferential parking permits for car sharing vehicles is actually also a procedure of admitting operators to commercial activities in cities.

One possible approach for issuing and obtaining parking permits is the measure implemented in accordance with the administrative Regulation – appendix No. 12 to Moscow Government Decree No. 289-ПП "On the organization of paid city parking lots in the city of Moscow" dated 17 May 2013; it can be considered an example of the procedure for filing applications for parking permits. According to this regulation, eligible applicants are individual entrepreneurs and (or) legal entities

[149] Carrone V. et.al. Understanding car sharing preferences and mode substitution patterns: A stated preference experiment. Transport Policy, 2020. https://doi.org/10.1016/j.tranpol.2020.03.010.

engaged in the provision of cars for short-term (up to 24 hours), per minute, rental to individuals for purposes not related to commercial activities conducted by such individuals. This activity is called "car sharing", which is currently the only legal definition of shared mobility in the Russian Federation. Applicants must comply with the service standards, requirements and conditions set up by the relevant paragraphs of the Moscow Government Decree No. 289-ПП. Administrative procedures and/or actions established by these Regulations are carried out based on uniform requirements for the provision of public services in the city of Moscow, established by the Mayor's office. The processing time for granting permits may not exceed 10 working days, assuming that the application is complete. If the application is not complete or incorrect a refusal is issued. Once issued, permits are entered into a specific electronic register.

Implementation of step III provides the following opportunities for the creation of shared mobility services:

Setting up administrative procedures for issuing licenses and permits for operators being admitted to conducting commercial activities.

6.2.5. Step IV. Economic incentives for shared mobility operators

This step considers the possibility of introducing economic support for car sharing and carpool services. It is important to note that direct financial support is not the norm; the analysis of business cases conducted in chapter 4 showed that there are a number of cases where no subsidies were necessary.

As a rule, financial support may be required at the initial stage of the project and only if the city authorities consider it necessary, based on the goals and objectives of the SUMP. If no operator has a potential interest in developing shared mobility initiatives, a wide range of financial support measures can be offered, from tax incentives to loan guarantees and direct subsidies.

Start-up companies are especially dependent on financial assistance before they have gained a certain number of customers. Achieving a significant level of market penetration is a difficult task, especially in places with smaller urban population and lower parking costs. If authorities supplement or replace their own corporate fleet by using car sharing vehicles, this can help to increase the activity of operators, as well as provide them with a stable source of income. Moreover, local governments could reduce the cost of business travel, improve the management of their own fleet, and encourage other companies to switch to car sharing and carpooling. At the same time, the potential business customers may adopt a wait-and-see attitude, starting to participate in shared mobility only after the concept has been embraced by a renowned corporate or institutional leader.

Local authorities may wish to provide subsidies for the purchase of the latest vehicle models. Their goal may be to reduce the average age of private vehicles and air pollution, in particular, by expanding the supply of electric vehicles, such as in Shanghai (see subsection 6.2.6).

Another example is Moscow city, where authorities also provided several benefits for car sharing operators:[150]

(1) The tax on movable property for companies was cancelled in 2018 (later completely abolished across the Russian Federation on 1 January 2019);

[150] Decree of the Government of Moscow No. 405-ПП "On urban support for taxi services and car sharing services in the city of Moscow" of August 31, 2011, with amendments, in Russian.

(2) Since 2014, preferential parking permits for car sharing services, one year before the launch of the "Moscow Car sharing" project.

The Decree of the Government of Moscow [137] provides the possibility of giving subsidies to taxi and car sharing operators to reimburse part of the lease payments, as well as part of the interest on loan agreements concluded with the aim of acquiring new cars. In order to receive subsidies, the cost of the vehicle should not exceed 1.5 million rubles ($24,200) and it should be assembled in the Russian Federation. For reference, the maximum amount of subsidies per car sharing operator could rely on when purchasing a car is 221 thousand rubles ($3,600).

It is also important to emphasize that such measures should be temporary because they are reducing business risks for certain operators and do not contribute to the development of a competitive market. Lack of competition or unfair competition can potentially reduce the quality of the service because operators will be less willing to develop their start-ups and bear risks at their own expense.

Implementation of step IV provides the following opportunities to support the development of shared mobility services:

- Selection of optimal financial support options (if any);
- Support for individual shared mobility initiatives or shared mobility as a whole.

6.2.6. Step V. Monitoring the results of the measures implemented

The main content of this step is to monitor the achievement of the planned results and the subsidies provided, as well as to improve the mechanisms for supporting business entities.

Understanding and learning from the outcomes of any intervention is of fundamental importance. That is why it is essential that clear targets are set in relation to car sharing and carpooling and that these targets are monitored. Both the goals and the targets need to be included in the SUMP or in equivalent planning documents. For example, the city of Shanghai in 2016 set targets for car sharing to be achieved by 2020 in relation to points of delivery and acceptance of cars, and the necessary number of new electric vehicles (NEVs) and the installation of charging points. These targets are set out in subsection 3.1.5. In order to ensure that these targets were met, annual subsidies were granted in the amount of €5,180 for one NEV.[151] The setting of the goals and the monitoring of the results should be done using internationally recognised methodologies.

The above scheme of subsidies in Moscow was unsuccessful as no Moscow-based car sharing operators did not apply for subsidies in the reporting period (to mid-2018). The Moscow Department of Transport believes that the most significant barriers to providing subsidies were:[152]

- Use of foreign-made cars in the fleet;
- Use of premium segment cars in the fleet;
- Administrative barrier (costs of collecting and providing documents);

[151] The Chinese government uses the term "New Energy Vehicles" (NEVs) to denote electric vehicles eligible for government subsidies, and includes battery-powered electric vehicles (BEVs), plug-in hybrid electric vehicles (PHEVs), and fuel cell electric vehicles (FCEVs).

[152] Department of Transport of Moscow. Report on the results of the assessment of the actual impact of Resolution No. 405-PP dated August 31, 2011, available at https://www.mos.ru/upload/documents/files/1037/ZakluchenieobOFVPPM405-PP.pdf, in Russian.

- The presence of debts of various nature;
- Lack of preferences for small and medium-sized businesses.

This example shows that where subsidies are necessary it is important to have a robust subsidy scheme. In particular, for this example, by:

- Elimination of the requirement for the use of cars assembled in Russia;
- Reduction of the list of required documents;
- Making the procedure for providing subsidies clearer.

In addition to the earlier accepted SUMP goals, the following criteria may be applied to guarantee the social relevance of car sharing:[153]

- The cars are located in the users' immediate vicinity;
- The cars are available day and night;
- The costs for participants largely depend on the use of the car except for an entry and subscription payment (if any);
- The system is easily accessible and simple to use;
- Tariffs are made to ensure longer rides as well as short trips, so that private cars can be replaced completely by the car sharing service which results in a long-term relationship between operator and user;
- There is cooperation with public transport providers;
- The user can choose from different types of cars;
- The operator has a modern fleet.

In order for car sharing and carpooling schemes to be successful it is important to ensure that there is multilateral dialogue between representatives of various stakeholders: politicians, urban development and transport planning specialists, scientists, the business community and local residents. Public awareness of the benefits of car sharing and carpooling should be a cornerstone of any action.

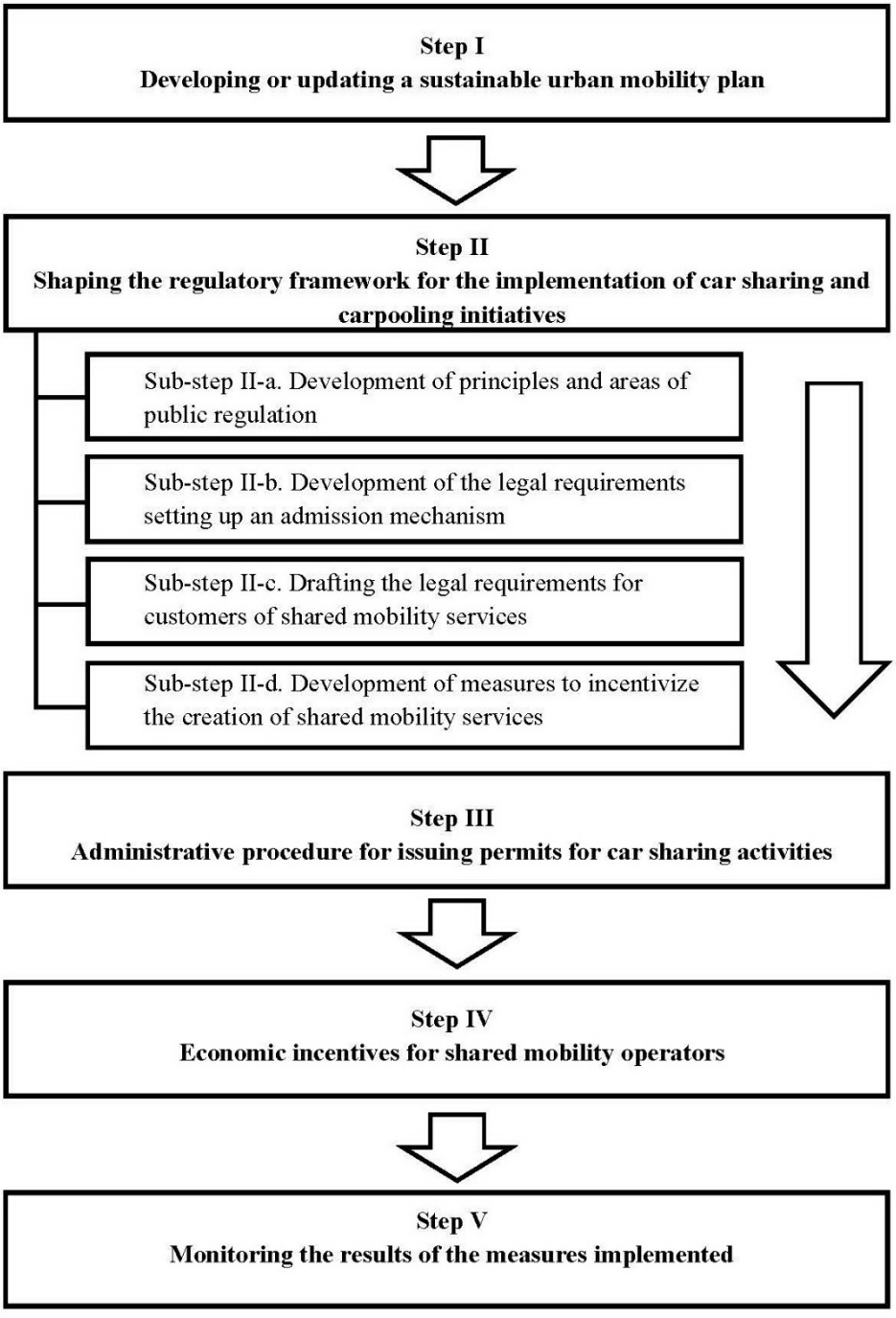
Implementation of step V provides the following opportunities to support the development of shared mobility services:

- Monitoring of development targets;
- Analysis of the results of implemented pilot projects;
- Identification of perspectives for the further sustainable development of shared mobility.

A summary of the above steps (actions) of the authorities for the development of car sharing and carpooling are shown in the figure 17 below.

[153] Vanhee J. More options for energy efficient mobility through Car-Sharing. Available at: https://ec.europa.eu/energy/intelligent/projects/sites/iee-projects/files/projects/documents/momo_car-sharing_car_sharing_guidelines_for_public_authorities_en_en.pdf.

Figure 17: **A summary of the steps of the authorities for the development of car sharing and carpooling**



More detailed guidelines on the setting up of car sharing and carpooling schemes for operators is set out in appendix 2.

7. Conclusions

An increasing number of people, especially in urban areas, are ready to change their travel habits in favour of a more sustainable solution. However, statistics show that the number of people sharing cars is still very small and does not exceed a fraction of a per cent. Life without constant use of a personal car is possible only when a person can rely on convenient and safe mobility alternatives. Therefore, the development of traditional public transport along with the new types of shared mobility is an important task for public authorities.

Car sharing and carpooling initiatives can help local communities contribute to the reduction of congestion and pollution and increase the sustainability of transport. On-demand shared mobility is being increasingly promoted as a key tool in addressing urban transport challenges in large and fast-growing cities. The appeal of this form of transport is largely attributed to its convenience, ease of use, and affordability made possible through digital platforms and innovations.

Convenience is the key decision-making criterion for customers who consider car sharing a mobility option. For example, it is important that there is a free car sharing vehicle within walking distance from a customer, usually at less than one kilometre. Therefore, increasing the fleet of shared transport and the density of parking lots is one of the ways to make the service more convenient and increase the frequency of its use. Being a short-term lease, car sharing creates convenient opportunity for customers to start using electric mobility, whose development is only possible with the implementation of a set of public policy measures. When combining this with a simple user interface and a lower cost than the use of the private car, car sharing and carpooling initiatives can be a winning solution.

For such initiatives to be effective though, the role of central and local public authorities is the key. Laws and regulations at a national and local level need to support the development of the sector and provide minimal barriers to its growth, while at the same time ensuring the safety of users and the achievement of the wider goals of the authority.

Public authorities should make clear decisions on policies that affect urban mobility, including the importance that each mode is given, the role of key players and how its financial resources are allocated across the different modes. These policies need to be integrated into clear long-term planning documents that define the shift towards sustainable transport solutions and incorporate car sharing and carpooling initiatives.

In particular, the following steps need to be followed to ensure the effective development of car sharing and carpooling initiatives:

1. Developing or updating a sustainable urban mobility plan;

2. Shaping the regulatory framework for the implementation of car sharing and carpooling initiatives, including:

    - Development of the principles and areas of public regulation;
    - Development of the legal requirements for car sharing and carpooling operators, setting up an admission mechanism;
    - Drafting the legal requirements for customers of shared mobility services;
    - Development of measures to incentivize the creation of shared mobility services;

3. Administrative procedure for issuing permits for car sharing activities;

4. Economic incentives for shared mobility operators;

5. Monitoring the results of the measures implemented.

Local authorities are encouraged to take specific actions to reduce the use of private cars, especially for daily short-distance trips in support of these initiatives. These efforts should be supported by measures to ensure that car sharing does not replace trips made by public transport and other forms of sustainable mobility.

As international experience shows, car sharing and carpooling have great potential for improving the quality of life of the population and traffic conditions in the cities. Central Asia countries can use the guidelines proposed in this study to accelerate sustainable development of the transport sector and to create comfortable travel conditions for all groups of population.

Appendix 1

The web resources and additional information on a number of well-known car sharing and carpooling platforms

Car sharing

Name and web-address	*Countries*	*Model*	*Fleet size*	*Quantity of stations*	*Quantity of cities*	*Quantity of clients*	*Features and/or slogan*
SHARE NOW www.share-now.com	Inter (International)	Free-floating	20 500		30	3 000 000	A company created at the merger of car2go and DriveNow
Flinkster www.flinkster.de	Germany	Stationary	4 500	2 500	400	80 000	Founded by the railway and logistics company Deutsche Bahn
Cambio www.cambio-carsharing.de	Germany Belgium	Stationary free-floating	2 900	1 000	23 49	115 000	It can be booked online or by phone. Access with a chip card
Stadtmobil www.stadtmobil.de	Germany	Peer-to-peer	1 000	4 000	100	63 000	A group of seven regional companies with a common brand, marketing, website, booking system, etc.
Book-n-Drive www.book-n-drive.de/	Germany	Stationary	10 600		14	50 000	More than 300 Flitzer vehicles complete the fleet, which can be left anywhere after use
Miles https://miles-mobility.com/	Germany	Free-floating	300		3	50 000	Slogan: Under time pressure? Not with MILES! We calculate in kilometres instead of minutes, so that you can reach your destination without stress
Oply www.oply.com	Germany United Kingdom of Great Britain and Northern Ireland	Stationary	1 000		30	50 000	March 2019 – Oply acquires Co-Wheels and expands service to the United Kingdom of Great Britain and Northern Ireland
Green Wheels www.greenwheels.com	Germany Netherlands	Stationary	1 800	100	110		Greenwheels also worked in London as Greenwheels United Kingdom of Great Britain and Northern

Name and web-address	*Countries*	*Model*	*Fleet size*	*Quantity of stations*	*Quantity of cities*	*Quantity of clients*	*Features and/or slogan*
							Ireland until 1 March 2013
Enjoy https://enjoy.eni.com	Italy	Stationary	1 800		6		Service of the energy company Eni, offers exclusively Fiat 500 cars
Ubeeqo https://www.ubeeqo.com/en	United Kingdom of Great Britain and Northern Ireland Belgium France Italy Germany Spain	Stationary					Replaced Autolib. Ubeeqo Joins Europcar Group in January 2015
E-vai www.e-vai.com	Italy Inter	Stationary					E-Vai is electric car sharing in Lombardy
Getaround www.getaround.com	Inter	P2P				1 000 000	In April 2019 acquired the Drivy platform
Citiz https://citiz.coop	France		1 250	500	100	1 200	
Free2Move https://fr.free2move.com/	France Inter					8 000	500 electric cars by Peugeot and Citroen, PSA brand
Zipcar www.zipcar.com	United States of America Inter (e.g. Turkey)	Stationary	12 000		500		Access with a chip card
Enterprise CarShare www.enterprisecarshare.com	United States of America Canada						Slogan: Reserve. Ride. Return. Enterprise has the world's largest and most diverse fleet of vehicles
HERTZ24/7® https://www.hertz247.co.uk/uk/en-gb	United Kingdom of Great Britain and Northern Ireland Inter		1 000			85 000	An example of a car sharing service from a rental company
Turo https://turo.com/	United States of America Inter – 56 countries	P2P	350 000		5 500	10 000 000	Like the Airbnb model, car owners advertise and rent their cars from trucks to luxury cars

Name and web-address	*Countries*	*Model*	*Fleet size*	*Quantity of stations*	*Quantity of cities*	*Quantity of clients*	*Features and/or slogan*
YoYo http://driveyoyo.com/	Turkey	Stationary				20 000	Operated by a leading MENA car dealer
Zoomcar www.zoomcar.com	India	Stationary P2P	6 500		45	48 000 000	Plans to expand the fleet to 25 000 cars
Myles www.mylescars.com	India	Stationary	1 000	250	23		This is the subsidiary of India's first service Self-Drive. Cars offered by Myles range from fuel-efficient hatchbacks to SUVs
Getaround Inc. www.getaround.com	United States of America Inter	P2P	1 000+		300	5 000 000	In April 2019 acquired the Drivy platform
GoFun https://www.shouqiev.com	China	B2C	30 000		80+		GoFun is one of a growing number of cars sharing service providers worldwide
EvCard www.evcard.com	China	Stationary	50 000		39	6 000 000	The service offers only electric cars. One of the first car sharing services in China
BelkaCar https://belkacar.ru/	Russia	Free-floating	4 000+		Moscow Moscow region Sochi		Serves the Moscow region and Sochi
Делимобиль https://delimobil.ru/	Russia	Free-floating	6 000+		11		Belongs to Carsharing Russia LLC, works in the Russian Federation since 2015
Яндекс Драйв https://yandex-drive.ru	Russia	Free-floating	11 500+		Moscow region Saint Peters-burg Kazan		It has been operating since February 2018 Belongs to Yandex search engine
Doscar https://doscar.club/	Kazakhstan	Stationary P2P			1	4 000	The operator serves only in the territory of Almaty and 200 kilometres in the vicinity
Anytime https://anytime.kz/	Kazakhstan	Free-floating	500+		1		Branch of Russian car sharing Anytime

Carpooling

Country	*Name*	*Features and slogan*
Italy	BePooler www.bepooler.com	BePooler corporate carpooling provides companies and individuals with a fast and secure way to ensure the mobility of their employees. It has contracts with many large companies, such as Allianz, Axa, Covisian, Mediaset, Sia, Mondadori, Mediolanum, etc. BePooler has been selected as a partner of the 2024 Summer Olympics in Paris.
International Australia Europe Southeast Asia America	SkedGo https://skedgo.com	SkedGo, a global mobile software company. SkedGo provides personalized travel planning, corporate mobility, and other MaaS technologies for start-ups, corporations, and governments. The mobile application TripGo offers multimodal travel planning and booking – this means that all modes of transport can be combined in travel chains to create the most profitable route for users. The application allows to compare and even combine any type of transport, such as train, bus, taxi, metro, tram, own car, bicycle, motorcycle.
International	Waze www.waze.com	Waze is a free social navigation application for mobile devices that allows to track the situation on the roads in real time, plot optimal routes, find out about the location of speed control radars, receive information and warn other users about changes in road conditions, obstacles, police, communicate with other users. Maps in Waze are created by users themselves. Waze was created in Israel. In June 2013, Google bought Waze for $1.1 billion. Based on it, Waze Carpool was created, which has already united more than a thousand cities and 115 million drivers. Many public sector institutions work with Waze. Waze Beacons provides location services, enhanced driver safety and better visibility of traffic flows in tunnels. Partners can access this data through Google Cloud.
Europe	GoMore https://gomore.dk/	GoMore is a resource from Denmark; it has been operating since 2011, and now it is especially popular in Scandinavian countries such as Sweden and Finland. GoMore offers route planning and private car leasing with a rental model. Over 800,000 users in Spain, Denmark, Norway and Sweden. In Spain, operates under the Amovens brand.
Inter	CarpoolWorld https://www.carpoolworld.com/	CarpoolWorld is an online website that provides travel search services in real time. Users enter the addresses of their location (home) and destination, and the system shows them a list and travel map of other users. Users communicate with each other by phone or email to arrange a shared trip. The service has been operating since 2000, in 2004 the first United States of America patent in the field of carpooling was obtained, and today it continues innovations. It has approximately 700,000 registered users and claims to work worldwide.

Country	*Name*	*Features and slogan*
Inter	BlaBlaCar www.blablacar.com/	BlaBlaCar is the world's largest international online carpooling service. It was founded in 2006. Basically, the service works for intercity travel, and travel costs are divided proportionally among all trip participants, however, in 2017, the BlaBlaLines service was launched, created to organize shared trips over short distances and daily city or suburban routes. Serves more than 50 million people in more than 20 countries.
India	CarSawaari https://carsawaari.com/	CarSawaari is a mobile application that allows riding in a group or individually.
Turkey	TAG (Tek Araba Gidelim) www.tekarabagidelim.com/	One of the first Turkish technology start-ups, a MaaS service provider funded by the European Union. The main place of business is the 18 millionth city of Istanbul.
Italy	Jojob https://www.jojob.it/	Jojob appeared at the end of 2014 – a service designed to meet the needs of passengers who daily travel on the home-work route. Today it is the leader of Italian carpooling in the corporate fleet sector. The goal is to make commuting to and from work a real alternative to public transportation.
Germany	Fahrgemeinschaft.de www.fahrgemeinschaft.de	Fahrgemeinschaft.de, in collaboration with ADAC-club and Pendlernetz.de annually serves about 1.5 million users and places 2.5 million shared travel announcements. This is one of the largest free carpooling services in Germany.
United States of America	Zimride https://www.zimride.com/	Zimride is an American carpooling platform that allows to find shared long-distance trips for drivers and passengers through private social networks. The service offers universities and enterprises selection services for travel companions.
France	Mobicoop www.mobicoop.fr	Mobicoop – offers a cooperative model of carpooling, as an alternative to BlaBlaCar. 350 000 users.
Russia	Довезу. URL: www.dovezu.ru/ (accessed: 27 October 2019) (in Russian)Доедем вместе. http://www.doedemvmeste.ru/Search_Driver.php (accessed: 27 October 2019) (in Russian) На попутке. http://napoputke.com/ru (accessed: 27 October 2019) (in Russian) Попутчик. http://www.poputchik.ru/ (accessed: 27 October 2019) (in Russian) Поехали вместе – сервис поиска попутчиков // Попутчики.ру. URL: http://www.povm.ru/ (accessed: 27 October 2019) (in Russian) Попутчик72//Car72.ru. https://www.car72.ru/poputchik/ (accessed: 27 October 2019) (in Russian) Попутчики Санкт-Петербурга//ВКонтакте. https://vk.com/topic-87070302_32702342 (accessed: 27 October 2019) (in Russian)	

Appendix 2

Business guidelines on the creation of car sharing service

The following section provides an insight into the key success factors based on car sharing activities in some countries of the regions of Western Europe, Asia and North America. It can be useful for private companies as well as for public authorities willing to learn about specific of businesses in shared mobility.

Note: The sequence of guidelines below is conditional in nature, to some extent can be assumed that they correspond to a phased plan for the development of a B2C-type car sharing company, taking into account the fact that separate steps may be absent or combined. The usual steps of company's development such as registration, office rental, attracting investors, analysis of competitors, drawing up a business plan are not considered here.

A1. Access to information technologies

Access to information technologies is a prerequisite for the use of most shared mobility services. First, a wide penetration of smartphones, mobile Internet, electronic payment systems into the target market are necessary. The lack of such technologies is considered a limiting factor for the widespread use of car sharing (as well as carpooling).

The lack or unstable operation of mobile Internet in areas with poor cellular coverage can be a problem for customers of the operator and result in losses for all parties.

The level of income of the population and their experience with digital services should also be considered. The results of such an analysis will determine the choice of a car sharing business model.

A2. The study of a public opinion and the detailed analysis of a potential market

During preparation for the launch of car sharing project, it is important to study its public perception, the demand for the service, and the willingness of people to use such model of mobility.

To study the local market, a survey of potential customers is required. The degree of people's awareness and the likelihood of adopting the new forms of mobility depends on the already existing forms of shared mobility (bicycles, scooters, etc.). The more people participate in some form of shared/collaborative economy, the greater the likelihood they will join car sharing.

As experience shows, the target group of car sharing consumers in emerging markets is similar to the same groups in mature markets. These are, as a rule, urban residents of young and middle age, well-educated, not owning a personal car and having an average income. The market's readiness to accept car sharing depends on the availability of alternative mobility options, such as motorized two-wheeled vehicles, auto rickshaws and taxis etc.

When analysing a potential market, attention should be paid to the state of public transport and the risks associated with the poor quality of transport services. Poor public transport is a factor contributing to the switch of its users to personal vehicles, which, in turn, leads to road congestion, increasing accident rate, growing emissions of pollutants and greenhouse gases.

At least three target cities – Bishkek, Dushanbe and Shymkent need to consider this factor (see section 3.3). In these cities, the key providers of public transport services are passenger operators using minibuses (jitneys), rather than standard buses. Small private carriers may be able to satisfy transport demand quantitatively, but not qualitatively. They provide the necessary transport performance, but the comfort and the safety of the transportation are low. In consequence, personal transport in these cities is highly appreciated and very common.

Another important factor contributing to the success of car sharing is the introduction of paid parking which significantly reduces the number of people wishing to use personal cars.

In the cities of Almaty and Nur-Sultan, paid parking systems have already been launched; their zones are constantly expanding and adjusting. It is planned to launch a system of smart parking in Shymkent. Similar projects are being discussed in Bishkek (a City hall resolution has already been proposed) and in Dushanbe.

Restrictions on the vehicles' registration and on driving, high costs of owning a car, limited availability of taxis, etc. are not typical in priority countries, but may have a significant impact on other markets. Moreover, taxi services are ubiquitous in all major cities of the priority countries, so the risks associated with the opposition of traditional carriers to the emergence of competitors are to be considered.

The interests of female users should be taken into account, the main of them are the security of the services provided and additional amenities – rental cars within a walking distance, availability of child safety chairs, high quality cleaning of the cabin etc.

A preliminary study of public opinion is also necessary to determine the readiness of potential customers to accept environmentally friendly electric vehicles. Of course, this is possible only if the charging infrastructure is available, or if there are specific plans for its development.

A3. Choosing the type and the model of car sharing

Drivers can use vehicles of a car sharing organization (type B2C), or private cars (type P2P). Each type of car sharing has its own unique characteristics and it is necessary to determine the relevancy of a particular model in target cities. For example, in the United States of America, some countries of Western Europe and Asia, drivers are willing to rent private vehicles, while in the Russian Federation P2P car sharing is practically absent.

Obviously, there are potentially far more P2P cars than B2C cars available, but incentives and benefits are needed for the private car owners to involve them in vehicle sharing. The people should understand the benefits that they gain from shared mobility initiatives and realize consequences in case of adoption of sustainable consumption model.

The type of B2C car sharing will most likely be dominant in priority countries; it has a higher vehicle utilization rate than type P2P based on private cars. This means that since B2C cars are used more intensively, they will also have to be replaced sooner. This allows to implement more energy-efficient and less polluting models, so car sharing operators (CSOs) may decide to invest in electric fleet.

By convenience for the customers, the so-called free-floating model is certainly leading – the car can be taken and left in any permitted place (in areas set by operators), including paid parking. At the same time, some CSOs organize a stationary model that is easier to implement at the project's launch stage.

The right combination of car sharing types and models is the key to successful launch of car sharing in areas that cannot be immediately covered by operators' services, for example, in less urbanized regions or in areas directly adjacent to megacities.

A4. Development of a website, mobile application and necessary software

The website is a working platform for the service. The client should have a convenient opportunity to register, download a mobile app, top up an account, etc., it is possible to provide additional services, such as searching for and booking the cars nearby.

A mobile application is an essential component of a car sharing service, its safety, security and usability are the key issues affecting user satisfaction. Section 5.3 provides the basic requirements for success of mobile application. For priority countries, it is recommended to develop applications in several languages – apart the national one, to have the Russian and the English versions and thus to increase the number of potential clients, among which are many foreigners.

Particular attention should be paid to security and prevention of possible vandalism, and to the fight against fake accounts. Otherwise, serious consequences are possible, for example, a car that is fraudulently rented to someone else's name, can be delivered to some distant place and cannibalized for spare parts.

All major CSOs work on their own technologies, so in the long run it is highly recommended to develop the own platform. The car sharing web platform should include the special software for dispatchers – an interactive map on which the actual locations of all vehicles are marked.

The experience of foreign colleagues may be useful. For example, a major player in the United States of America car sharing market – Zipcar (see subsection 4.1.4), allows epy customers to access the car only with a special card (Zipcard). This card cannot be activated using the Zipcar mobile application. This may make the service less convenient, but significantly increases security.

The car sharing web platform and mobile app can be important factors to consider the user experience (UX) and to improve the service efficiency. In addition, customers may be interested in multimodal transport platform that implement links with other modes of transport to ensure personal mobility.

A5. Purchase or leasing of vehicles, their preparation for work in car sharing

This phase of development is the costliest and requires thorough calculations; it is necessary to determine the busiest public transport routes, the minimal and optimal fleet size and rental completion zones. Each region has a unique transport infrastructure and it should be taken into account at all steps of the creation of service.

Finally, the business model is being selected. An experience shows that the return-trip model (returning to the point where the car was rented) is the most feasible scheme for implementing car sharing in developing countries. This model is also suitable for an electric fleet, as it ensures that trips ends near charging stations. The one-way model is somewhat more difficult to implement and requires a larger fleet to meet customers' demand. Free-floating model is undoubtedly a great prospect, but it further increases the cost of logistics and allocation of the vehicles to parking lots.

Some CSOs enter the market with a small fleet, launching a service with 10–50 cars and trying to adapt in real time, considering customers' feedback. This approach is fraught with high costs and poor demand for the service in the future.

Only a relatively large platform with a sufficient choice of cars in terms of quantity and model range can attract and retain many users. In large cities, the trend is obvious – most users are expected good service, they simply do not want to install applications of operators with a small fleet. A small client base leads to increased downtime. An option to solve such a problem is a united platform or an operators' pool, where each service can offer its cars for a single application. However, the difference of CSO's in business approaches and in financial situation makes such a pool difficult.

Increasing the fleet is critical. For the CSO owners, it can be difficult, since expansion requires heavy investments. However, experience shows that the number of clients will grow only if the services are guaranteed. Collaboration between CSOs can improve the quality of services. An example is the merger of the BMW's DriveNow and Daimler's Car2Go, which have increased the potential availability and quality of service for its users.

In order to minimize the "start-up costs" the cars have to be used since the moment of contract. It is necessary to attract a large number of users at the launch phase, because the leasing payments start from the very first day.

Car sharing business is characterized by a high start-up cost and significant running costs, low payback, and high competition. In fact, car sharing has characteristics similar to infrastructure project. While most innovation start-ups raise funds through the short-term venture investment market (and have several rounds of financing), the infrastructure business requires long-term investments.

Car sharing creates additional opportunities for automakers; they can get new groups of potential customers or advertising, so it is wise for start-up to apply for support. Such support might take the form of the provision of additional discounts for a fleet or on maintenance, improvement of warranty service conditions, etc. Support from local automakers can be an additional factor of success for the development of car sharing.

Insurance is a separate issue, since high accident rates are an acute problem of car sharing. Insurance and leasing companies are still wary of car sharing; they fear that the collective use of a vehicle significantly increases the risk of damage and even theft. It is desirable to foster the emergence of new or hybrid products (for example, per minute MTPL insurance, cumulative discounts for drivers with a good rental history, etc.).

A6. Staff recruitment and training. Advertising campaign

The need to expand the car sharing business, to increase the customer base, requires significant investments not only in the fleet, but also in human resources.

A team of specialists is created on this project phase; it is necessary to have the key qualified employees – technical director, fleet manager, software developers, advertising and marketing specialists, as well as other technical specialists – mechanics, technicians, electricians, and, of course, drivers.

Each position has its own specifics, for example, CSOs need the drivers who can move cars to rental points or deliver them to the car wash at night, when the popularity of the service is not so high. Typically, this category of employees will not only drive cars, but also monitor their condition and perform minor repairs.

One of the key positions in a car sharing company is a dispatcher (or user support manager). A support manager is a specialist who provides informational support to the clients and helps them to solve technical problems. The dispatcher monitors the cars on an interactive map, answers users' calls, can open and close a car, starts and ends a rental session upon request, in case if the user's phone has a bug with a mobile application or is discharged. In the event of an accident, he can call the police at the scene of a crash and send the company's representative to draw up the necessary documents.

The support manager has a particularly important role when launching projects in developing countries as he serves as the main link between the client and the company. When the operator's rules are unclear to the user, the dispatcher consults on many questions regarding registration process, terms of rent etc. The duties of the dispatcher also include coordination of the service personnel. At the initial phase, it is possible to use the outstaffing services, however, experience shows that full-time employees should occupy the key positions. There is a need for HR manager who can implement a policy aimed at developing and motivating employees.

At this phase, there is a strong need for partners – auto repair shops, garages, parking operators, fuel companies etc. For example, the partnership options could include advertising of retail chains in exchange of a small discount for the car sharing clients.

The information and promotional campaign is starting, the role of which for car sharing service could hardly be overestimated, since this form of mobility is quite new for the priority countries. Although many people believe that word of mouth is the most effective form of advertising, finding ways to promote car sharing projects is a separate and difficult task that marketers and advertising people should deal with. The campaign has to be comprehensive, but because the target audience consists of active Internet users, the priority should be given to various forms of online advertising.

With a great deal of confidence, it can be argued that raising the awareness of potential clients about the sharing services, informing them about the benefits of car sharing, will be a decisive factor in the success of the new form of shared mobility.

A7. Work after launch. Lessons learned from the users' experience. Tariffs and discounts

It is difficult to assess the market reaction to the offer of new services related to innovation, if potential customers do not have experience with these products. Even with a competent marketing strategy, it is not easy to determine the demand for shared cars in advance, as this implies some revision of the client's lifestyle. Consumers use personal cars not only for ordinary trips, but also for other purposes – transportation of heavy items, vacation travel, etc. The attitude to the personal car and its consumer's value varies greatly among different people. Well-coordinated advertising policies can encourage people to try a new mobility service. However, only a real and successful experience can make them reconsider their attitude to using cars

Car sharing leads to a partial abandonment of personal cars, but it will probably never lead to a full one. The percentage of older people who are conservative may be rather high in priority countries. Here, the public prestige is important (the car ownership means a certain status), the territorial and climatic conditions of these countries favour car use, and the vehicle maintenance costs are relatively affordable. Therefore, car sharing, as a full-fledged alternative to personal transport, is most likely to be in demand in the centre of large cities, where the obvious benefits for users can be created: no parking fees, elimination the risk of theft etc.

The analysis of the operator's own statistics data can help to clarify these aspects. Car sharing can generate many different data and their analysis could achieve better match of supply and demand for the services offered. Therefore, after car sharing launch, work with existing customers comes to the fore. It is necessary to constantly study user experience, identify customer complaints and problems.

Withdrawals from a client's account, penalties for the actions of previous users, refusal to provide services without explanation, all these are the parts of the typical problems that users face. The technical component of the service also has problems: some cars may be in unsatisfactory condition, there may be disadvantages of technical customer support.

Many clients point out that the significant barrier to car sharing might be the unreliability of the service. The most important issue is reliability. Users should trust the operator; they should know that they can always rely on car sharing to meet their mobility needs, moreover, when it is necessary. In addition, improving the quality of services is usually required in the following areas:

- Ensuring the availability of cars within walking distance
- Ease of booking (usability of the mobile app), safety process
- Providing faster access to cars,
- Increasing the attractiveness of cars (clean exterior and interior, good technical condition etc.).

Accordingly, the following circumstances should be avoided in car sharing:

- Interruptions in the service, mobile application
- Requirement for too early booking
- Location of the vehicle in a distant or unsafe place
- Blocking significant deposit to secure the booking
- Incorrect or unfriendly support service.

When using the free-floating model, the clients always positively perceive the expansion of the permitted parking zone. For example, in Moscow, the parking zone is often limited to areas near metro stations, and many operators do not yet work outside the Moscow Ring Road. As long as there are too many restrictions, shared cars will be used only as an additional mode of transport. Most clients use a car sharing to move over short distances and it is advisable to allow the completion of a session anywhere in the city, in compliance with traffic rules.

It should also be borne in mind that apart to increasing the number of users, the growth potential of car sharing also is in increasing the frequency of service use.

The high costs of operating the fleet, including leasing payments, depreciation, fuel costs, insurance, vehicle recycling, repairs and maintenance, paid parking, as well as expenses associated with paying salaries to employees, reduce the profit of the car sharing business. Profits are also adversely affected by possible vandalism and thefts. At the same time, constant investments are needed in advertising, marketing and in IT infrastructure that must be maintained and developed.

The flexibility of tariffs is required – for example, there may be morning tariffs, dynamic tariffs, tariffs with a fixed cost of a trip, weekend tariffs, the tariff "Intercity" (between cities where the service works), etc. The different models of car sharing can develop jointly or vary by region for the same operator.