

# INNOVATIONS IN VEHICLE SHARING TECHNOLOGIES



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## EXECUTIVE SUMMARY

Transportation is essential to economic and social development since it facilitates the movement of people and goods. However, burgeoning populations and growing urbanisation paralleled by the surging demand for mobility has overburdened transport networks, particularly in urban areas. Such pressures have also intensified problems related to pollution and congestion. New mobility business models, enabled through technology and accessed primarily through smartphones, have emerged in response to these challenges. In many cases, such models are upturning conventional notions of car ownership or lease, replacing them with a new wave of services ranging from carsharing, ridehailing and integrated mobility. These new models are, in the process, improving the efficiency of transportation networks and supporting the seamless integration of several mobility services, making travel within cities easier for people.

*“As technology progresses, the business models of today are likely to evolve and become more closely integrated”*



As technology evolves, the business models of today are likely to evolve and become more closely integrated with public transport services, promoting a shift towards mass and shared transport .

*“4.9 billion People will be urban dwellers by 2030 and that by 2050, just short of 3/4s of the world’s population will live in cities”*

I. United Nations, The World’s Cities in 2016 Data Booklet

## INTRODUCTION

### The Global Problem of Urban mobility

Cities are centres of innovation and yet the fundamentals of urban transport systems have remained largely unchanged over the last 50 years. However, in an environment of accelerating change and rapid technological advances, the urban mobility landscape is transforming rapidly and dramatically. A combination of population growth, consumer expectations, fiscal constraints, and environmental and health concerns together with advanced technologies is disrupting the mobility ecosystem, giving rise to an exciting set of opportunities as well as complex challenges.

## KEY MEGA TRENDS IMPACTING MOBILITY

### RAPID URBANIZATION

In the 1950’s, less than 30% of the world’s population lived in cities. Today, that proportion has risen to 50% with the United Nations projecting that nearly 4.9 billion people will be urban dwellers by 2030 and that by 2050, just short of 3/4s of the world’s population will live in cities. The United Nations also estimates that by 2030 there will be 41 mega cities—those with populations of 10 million or more—as compared to 37 in 2017<sup>1</sup>. Mega City typically refers to a city with a population of over 8 million and a nominal GDP of \$250 billion or more. Cities world over are already grappling with the environmental threats posed by congestion and poor air quality. New mega cities will give rise to new customer requirements for micro mobility solutions, car sharing and autonomous transportation among others.

Air pollution is increasingly becoming an area of major concern. According to the World Health Organisation, over 7 million premature deaths or one in eight deaths annually can be attributed to poor air quality. As a result, there has been a growing regulatory push toward more sustainable and green mobility solutions.

*“Congestion in London cost drivers £2,430 per year each and more than £9.5 billion for the city as a whole from direct and indirect costs in 2017”*

2. INRIX 2017 Global Traffic Scorecard report
3. ACEA Report Vehicles in use Europe 2017

Congestion poses another pressing problem for cities. London ranked first on the list of most congested cities with close to 74 hours being wasted in traffic. Congestion here cost drivers £2,430 per year each and more than £9.5 billion for the city as a whole from direct and indirect costs in 2017<sup>2</sup>. The EU passenger car grew by 4.5%; from 241 to 252 million between 2011 and 2015, of which cars were idle for 95% of the time<sup>3</sup>. Increased congestion has highlighted the demand for more efficient transport networks as well as more convenient mobility services. Rising population density will lead to greater utilisation of existing public transit networks and mobility assets within cities. It will also result in new mobility services becoming more viable as they begin to scale up. It will underpin developments both in public transport networks as well as in private business models.

### **Societal Shifts Impacting Consumption Trends:**

Transport demographics are changing. By 2025, 50% of the world’s working population will be millennials. One of the biggest trends in this demographic group is that they are driving less, about 18% less per day. Millennials fundamentally have a different stance toward owning cars than previous generations did at that age. Many are moving to bigger cities for jobs where the cars are unnecessary and in some cases even a liability. They prefer travelling by multiple alternative modes; wherein a car is no longer needed and all they have to do is pull out their smartphones.

Since 1980, driver’s license ownership among the 20-25 age range has dropped 20%. Around 9% of millennials do not want to drive because they are worried about the environmental implications of using cars. These changing attitudes will drive the growth of shared mobility business models, as well as spur greater utilisation of existing infrastructure. This attitudinal shift is also evident in people attempting to make more practical decisions by prioritising access over ownership. In response, a wide range of platforms that enable collaborative consumption like peer to peer platforms for carsharing and parking as well as shared market places are emerging.

*“Mobile subscriber penetration rates in Europe are expected to grow from 84% in 2016 to 87% by 2020”*

### **Digital Revolution:**

Mobile subscriber penetration rates in Europe are expected to grow from 84% in 2016 to 87% by 2020. Smartphone adoption and mobile internet penetration rates are projected to rise from 65% to 75% and 65% to 74%, respectively, over the same time frame.

Digital technologies are changing consumer experiences across all industries and are setting expectations that will shape the demand for transport services. In other industries, such as media, marketing and retail, technology changes have resulted in significant shifts and disruption to previously well established businesses. The speed of innovation and threats of disruption will vary across the transportation industry. Changes are already evident in airlines, hotels and travel companies. Backed by digital technologies, the automotive and transport sector have also jumped onto the technology backed shared mobility bandwagon



In future, cars will be cognitive – not only will they recognise voices and be able to optimise the journey, they will also incorporate other cognitive Artificial Intelligence (AI) technologies including computer vision and machine learning.

*“Global carsharing market is expected to grow at a compound annual growth rate (CAGR) of 8% from around 22 million to 47 million members over 2017 to 2025”*

This will change the future of cars, challenge traditional business models and create immense potential for innovation. The first step in this journey is the automation of cars. There is still considerable ambiguity concerning legislation of autonomous vehicles, which will determine the pace of commercialising the technology. Fully automated cars are expected to be commercialised by 2030, presenting an annual market opportunity of \$60 billion globally.

### **Evolution of New Mobility Solutions**

Several new business models and services are being created to target the digital opportunity, blurring the lines between public and private transport. They are deploying multiple approaches - shared cars with single or multiple occupancy or integrating several modes of transport through a single provider. While emerging mobility services target niche segments or certain locations, there are several that have grown rapidly and sought significant investment to move into the mainstream.

### **GROWTH OF KEY MOBILITY MODELS**

#### **Traditional Carsharing**

- **Traditional Carsharing:** Short-term vehicle rentals usually charge by the minute or by the hour, require prior registration and drivers to be members of the service. The main business models include traditional fleet-based carsharing, whether enabling one-way travel to be concluded after a single journey, or round-trip carsharing requiring vehicles to be returned to their original location. The global carsharing market is expected to grow at a compound annual growth rate (CAGR) of 8% from around 22 million to 47 million members over 2017 to 2025, covering more than 500,000 vehicles by 2025. The largest companies in Europe are owned by vehicle manufacturers such as Car2go/DriveNow (Recently merged and jointly owned by Daimler and BMW) and car rental organisations such as Enterprise carshare or Zipcar owned by the Avis Budget Group.

- **Peer-to-Peer Carsharing:** This model works on a similar principle of short-term access to vehicles, but with the difference being that the vehicles are owned by a third party, usually private individuals, who rent out their vehicle to increase its utilisation for compensation. Drivy is Europe's largest provider and France, with more than 1.5 million members, is the largest market for such services in Europe. This is increasingly becoming an opportunity for companies and employees to monetise their fleet or company cars, enabling sub-leasing through a platform. There are several pilots underway to test its potential in business markets such as Ford Credit Link and Easycarclub in the UK.
- **Corporate Carsharing;** this model involves placing a dedicated fleet of cars at the company premises for shared use among company employees. The technology is largely the same as in fleet-based carsharing but the reservation of the vehicles is restricted to either one company or departments within that company and can be further integrated within an organisation's IT processes much like meeting/facilities reservations. The key benefits of these services are to reduce the total cost of mobility, as the vehicles have high usage rates and are cheaper than alternative solutions (e.g., taxis) and, in some cases, are used to generate incremental revenue for the company, where employees are encouraged to use the vehicles privately and pay a subsidised rate for such use. Furthermore, as the vehicles are usually technology-enabled new vehicles with low emissions, they can serve as an attractive sustainability, CSR, and staff retention tool for employers.
- **Car Pooling/Ridesharing:** With occupancy at just 1.6 persons per car in Europe, there are opportunities to reduce private vehicle trips, cost and emissions by sharing journeys with others. BlaBlaCar leads the way, combining a rated/trusted network of members to offer and book long distance trips. Commuting is also moving in this direction with start-ups such as Faxi using route-matching software, integrated parking (e.g., offering parking spaces to employees that share rides) and crowd sourcing/geofencing (to prove that two or more people shared the same journey). Such trends are becoming more widespread and are saving companies money in the process.

*“Europe is the hub of technology-enabled car pooling, accounting for 50 million registered members of the global total of 120 million”*

- **Ride Hailing:** Several technology-enabled services have emerged in recent years; they allow customers to book a taxi (e.g., MyTaxi, Gett) or a private hire vehicle (e.g., Uber) through Smartphone apps. More than 1.6 million vehicles were estimated to be connected to such services in Europe in 2017, with millions of users of ridehailing apps. In London alone, Uber is reported to have 3.5 million active users, more than 30% of the city’s population.

Advances in vehicle sharing technologies are among the biggest drivers for these new mobility models with connectivity playing a big role in making them more convenient for customers. Data analytics are used to predict when and where demand will spike to ensure more effective rebalancing of the fleet. In some cases customers are incentivised to drop off cars in specific locations.



## KEY TECHNOLOGY DRIVERS - CONNECTIVITY AND VEHICLE SHARING TECHNOLOGIES

There has been a dramatic evolution in the solutions offered by vehicle sharing technology providers in the past 5 years. Technology providers now offer comprehensive, flexible and customisable Software as a Service (SaaS) solutions that allow shared mobility operators to accelerate their go-to-market strategies and launch in any part of the world. They are moving from simple reservation and card based access systems to more advanced solutions like app based reservations and vehicle access, in-car diagnostics and cutting edge data analytics that cater to a fast-changing market.

*“Another big shift in the market is the adoption of electric vehicles (EVs) in carsharing/ride hailing fleets. By the end of 2018, it is expected that there will be over 10 pure EV carsharing programmes globally”*

- A big shift in the market is the adoption of electric vehicles (EVs) in carsharing/ride hailing fleets and the launch of pure EV carsharing programmes. This is driven primarily by government initiatives and regulations to combat pollution in cities. By the end of 2018 it is expected that there will be more than 10 pure EV carsharing programmes globally. This is clearly indicative of the fact that vehicle sharing technology providers should also offer solutions— electric range management, charge levels management, integration of charging infrastructure and map routing—that cater specifically to electric cars.

- The ability of fleet management companies to capture and manage all the data and spend for the fleet and provide actionable suggestions for cost savings and operational improvement is the most critical need for mobility fleets today. Traditional automakers, public transport operators and technology suppliers are launching an ever-growing range of mobility options such as corporate carsharing, car pooling and Integrated Mobility Solutions. New and upcoming technologies related to fleet management will help shift the focus from total cost of ownership (TCO) to total cost of mobility (TCM). There is a massive flow of data that, if managed properly, will become the baseline for reducing TCM, by efficiently utilising the vehicle, thereby leading to more revenue for the fleet.

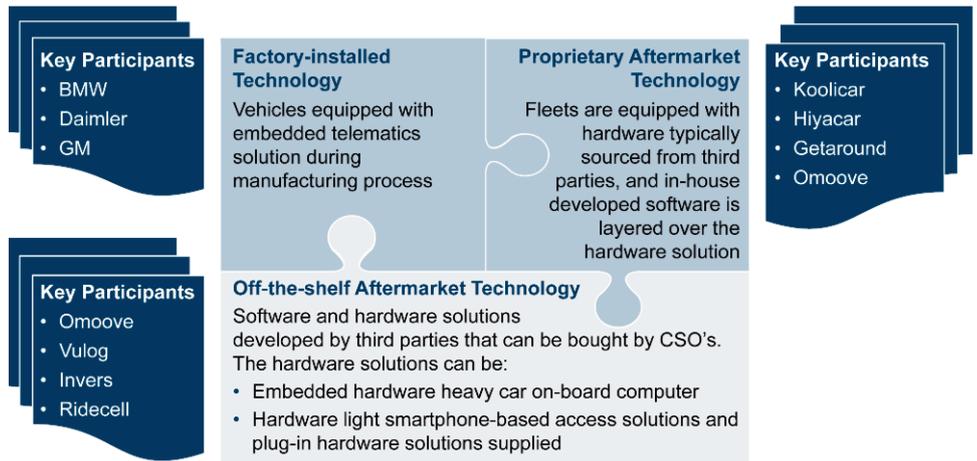
*“Carsharing platforms are expanding to include ride hailing and bike sharing while P2P carsharing platforms are broadening to include ride hailing and leasing”*

- The adage “Customer is King” still holds true and vehicle sharing technologies should improve processes and value for customers. Demands for streamlined processes with minimal people interaction, are emphasising the importance of automation. For instance, customers today do not want to talk to customer care executives to track their product order. All they want to do is enter the tracking ID to be able to get the status of their delivery. A similar analogy can be drawn with the vehicle sharing market as well. Customers want all the process to be performed at the click of a button - be it registration, reserving or locating a car. In the carsharing market, in particular, customers want the entire validation and registration process to be completed online and in a day’s time. All they want to do is scan and upload the documents online and complete the registration process in a hassle-free manner. In addition, separate registration process for tourists; for instance a leaner on boarding process would enhance the overall customer experience . We are also beginning to see the rise of touchless Rental services that allow the user to access services through automated interface tools that allow the entire booking process to be completed online. This could significantly increase customer demand due to enhanced customer experience and reduced turnaround time

- The shared mobility space is evolving rapidly. New business models are improving fleet utilisation as well as catering to a wider customer base. For example, carsharing platforms are expanding to include ride hailing and bike sharing while P2P carsharing platforms are broadening to include ride hailing and leasing. Technology providers need not only to provide solutions that can be expanded to other business models but also those that can be integrated in other words, they need to become providers of complete modular solutions.

## VEHICLE SHARING TECHNOLOGY DEFINITION

Vehicle sharing technologies have evolved over the years from simple manual systems to increasingly complex, computer based systems. From factory installed to aftermarket, there are a wide range of technology service providers to partner with carsharing operators.



*“There are more than 15 technology providers that cater specifically to the vehicle sharing technology market”*

- Currently , there are more than 15 technology providers that cater specifically to the vehicle sharing market. However, the value proposition of these providers differs significantly. Based on the value proposition, the vehicle sharing technology landscape can be clearly segmented into two categories.

- The first category comprises of providers who offer either the hardware or software solution, and partner with a contrasting technology provider to be able to offer a complete end-to-end solution. For example, Cantamen, a carsharing open source software provider, partners with Convadis and Invers to provide a car hardware solution while Zemtut, a carsharing open source software provider, partners with Convadis to provide in-car hardware solution.

*“InsurTech start-ups are combining connected technologies and insurance to offer more flexible insurance products by creating new “off the shelf” products”.*

- The second category covers providers—Omoove, Vulog, Invers, Miveo and Ridecell, among others—who offer complete frontend/backend software and hardware modular solutions. Carsharing operators generally prefer partnering with these providers as they do not have to be concerned about hardware and software integration issues or deal with multiple stakeholders.
- To stay ahead of the competition, however, technology providers need to move beyond being just end-to-end providers and, instead, offer additional value added features to shared mobility operators. Omoove, for instance, has clearly succeeded by providing a wide range of solutions and add on features like insurance telematics, parking solutions like MySmartPark and solutions like MySmartEV dedicated to EV carsharing fleets.
- Efficient fleet management and optimal utilisation is one of the biggest pain points for carsharing operators. As a free-floating carshare operator, one of the largest expenses pertains to the cost of relocating the fleet. If carsharing operators do not take the necessary steps to reduce this expense and make the fleet relocation process as efficient as possible, it would make it very difficult for them to be profitable. Considering this, relocation software can help predict real-time demand using algorithms based on historical data. Another ongoing concern is the maintenance of the fleets and reducing the downtime of vehicles. Effective fleet management systems with predictive maintenance and repairs will help address these issues
- The sharing economy has also brought about a cultural shift in the traditional insurance sector. And for these new models to work dynamic data based insurance is required to provide the peace of mind for both the carsharing operators and car renters. InsurTech start-ups are combining connected technologies and insurance to offer more flexible insurance products by creating new “off the shelf” products.

*“Efficient fleet management and optimal utilisation is one of the biggest pain points for carsharing operators, which can be addressed with effective fleet management software”*

The usage of Insurance telematics can help retrieve data from the car sensors, which can provide close to 10 to 12 percent reduction in the total cost of ownership of fleet insurance due to better claims management, crash detection and efficiency in getting vehicles repaired and back on the road. Companies like Omoove will be key in the future due to their capability to provide insurance, as well as fleet and vehicle sharing management needs, under one integrated platform.

**KEY VEHICLE SHARING TECHNOLOGY PROVIDERS – AN OVERVIEW**

Company	Card Unlock	Smartphone Unlock	Front end Solution	On-board Computer	Fleet Mgmt Solution	Supports Electric Vehicles	Cloud Hosting	Smart Parking	Insurance Telematics	Solution for Multiple Business Models
Omoove	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Ridecell	✓	✓	✓	✓	✓	✓	✓		✓	✓
Vulog	✓	✓	✓	✓	✓	✓	✓			✓
INVERS	✓	✓	✓	✓	✓		✓			✓
CUP	✓	✓	✓	✓	✓		✓			
Rent Centric	✓	✓	✓	✓	✓		✓			✓
Miveo	✓		✓	✓	✓	✓	✓			
Mobility Tech Green	✓		✓	✓	✓	✓				✓
Convadis	✓	✓	✓	✓	✓					✓
Openfleet	✓	✓	✓	✓	✓	✓	✓			
Fleetster	✓	✓	✓	✓	✓	✓	✓			
Qwekee	✓	✓	✓	✓	✓		✓			
Ubee	✓	✓	✓	✓	✓	✓	✓			
Zemtu	✓	✓	✓	✓	✓					
Cantamen	✓	✓	✓	✓	✓					✓
Fleetbutler	✓	✓	✓	✓	✓					✓
Clem.mobi			✓			✓				✓

✓ In-house    ✓ Feature Available Through a Partner Supplier

- The table above is a comprehensive competitive benchmarking of key vehicle sharing technology providers. At present, Omoove, Vulog, Invers and Ridecell are leading the pack by constantly listening to the market needs and tailoring their solutions to customer needs. OEMs and venture capital firms are beginning to take notice and have started investing in these companies.

## THE OMOOVE SOLUTION – A CASE STUDY

Omoove wholly-owned by Octo Telematics, is the largest and most experienced insurance telematics company in the world. They have a well-established presence with over 10 carsharing services covering 15 cities. At the end of March 2018, the company has over 200,000 connected vehicles and scooters, 900,000 registered users and more than 400,000 rentals per month.

Omoove’s innovative technological offerings, including its pioneering ‘triple play’ solution, has made it a frontrunner in the European mobility market. Its solutions target vehicle sharing operators and car rental companies and span the gamut from fleet management and insurance telematics to end-to-end shared mobility solutions. Companies today are more focused on Total Cost of Mobility (TCM) as opposed to Total Cost of Ownership (TCO) that is calculating the cost per mobility user. Omoove does exactly that with its triple play solution – the fleet management and vehicle sharing solution (TCO to TCM) with the added advantage of considering TCR (Risk underwritten by insurance partner) with its insurance Telematics solution.

*“Omoove Has Over 200,000 Connected Vehicles and Scooters, 900,000 Registered Users and More Than 400,000 Rentals per Month”*

### Omoove's Triple Play Solution



Source: Omoove

*“Omoove has integrated facial recognition in its EasyOpen – that’s grants access to the car through a Selfie”*

The Omoove shared mobility platform is highly flexible, cost-effective and easy-to-use. It enables both individuals and companies with fleets of all sizes to rapidly access and deploy the platform. This technologically advanced solution lends itself to multi-modal and multi-user applications as its two—‘station based’ and ‘free-floating’—variants facilitate all types of carsharing and corporate carsharing. In addition, it is geared toward multi-vehicle use; onboard devices are ready for installation across diverse vehicle modes ranging from cars, scooters and bicycles. A further attribute is that it of multi-engine applicability. The solution can work on different engines including thermal, hybrid and electric. Omoove’s technological proficiency is evident in that its hardware light platform supports complete recovery of all vehicle data at the end of each vehicle use.

**Omoove Solution: Key Features**

<b>Vehicle Sharing</b> 	<b>Enhanced Vehicle Management</b> 	<b>Insurance Telematics</b> 
 Car Sharing	 Vehicle Tracking	 Driving & ECO behavior
 P2P Car Sharing	 Fiscal Reporting	 Geofencing
 Corporate Car Sharing	 Trip Analysis	 Crash information
 Ride Sharing	 Maintenance management	 Theft information
 Car Pooling		 Stolen Vehicle Recovery
 Ride Hailing		

In addition, Omoove has been consistently ahead of the curve in terms of innovation. 'Sharemine', its Web based shared mobility platform, offers significant advantages to owners and operators of small and medium vehicle fleets in particular. The platform helps small operators and communities to quickly create and manage online communities for carsharing or ridesharing. It helps parents coordinate trips to school and friends organize travel to common destinations. The community manager feature is fully configurable while the dashboard monitors the number of active users and vehicles as well as ongoing bookings, rides, and travel. Moreover, rental and ride revenues can be tracked according to rates determined by the community manager. Insurance telematics capabilities can also be included via Sharemine. The aim here is to promote safe driving behavior.

In partnership with IDEMIA, Omoove has integrated facial recognition in its EasyOpen solution. This technological breakthrough uses a smartphone to register ID documents and create the identity of the driver. Subsequent access is through a selfie based on IDEMIA's facial recognition solution.

Finally, Omoove has underlined its credentials as a leader in shared mobility innovation by partnering with Silence, the Spanish electric scooter company, to target the scooter sharing market. The focus here is on electric and connected offerings. For instance, the new Silence S01 model will be equipped with connected technologies when it rolls out of the factory premises. The front end solution, built on a web based platform, will be offered as a SaaS. It will encompass a suite of critical functionalities needed to effectively manage a scooter sharing service.

## CONCLUSION

Shared mobility markets are expected to grow exponentially driven by the need for more effective and efficient transport systems, as well as by the shift toward more sustainable mobility solutions. Globally, revenues generated by carsharing and ridehailing are expected to grow at CAGRs of 15% and 11% between 2017 and 2025, respectively, to reach \$7.8 billion and \$1042 billion.

A challenge for auto industry stakeholders is transitioning to the new world of shared autonomous mobility. Looking into the future, automakers might still be making cars and suppliers might still be selling components. In the meantime, however, they should accelerate their efforts to attain the capabilities needed to stay relevant in an era of shared mobility services. Technologies—automated, connected, and electric—will be key to enabling new mobility solutions, and new business and revenue models that have the potential to alter the way consumers interact and use cars.

*“Globally, revenues generated by carsharing and ridehailing are expected to grow at CAGRs of 15% and 11% between 2017 and 2025, respectively, to reach \$7.8 billion and \$1042 billion”*





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For information regarding Frost & Sullivan's whitepaper, please write to:

**Shwetha Surender**

Industry Principal, New Mobility, Automotive and Transportation, Frost & Sullivan  
E: ShwethaS@frost.com

**Geraldine Priya**

Team Lead, New Mobility, Automotive and Transportation, Frost & Sullivan  
E: AlbertP@frost.com