An aerial night photograph of a city, featuring a prominent multi-lane highway interchange with light trails from traffic. The city lights and buildings are visible in the background and foreground, creating a blue-toned urban landscape.

The Impact of New Mobility Services on the Automotive Industry

CAR
CENTER FOR AUTOMOTIVE RESEARCH

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Emerging trends in mobility technology, such as the rise of ridehailing and carsharing services, have led many industry analysts to offer their views on how these trends will affect the automotive industry in the United States. The reports stemming from these efforts have resulted in highly conflicting visions of the future, ranging from a dramatic decline in vehicle sales to a windfall in revenue and profits.

Faced with this cloudy picture, researchers at the Center for Automotive Research decided to weigh in with their own analysis, one that is rooted in our cumulative knowledge of travel behavior, consumer preferences, and the operational characteristics of new mobility services.

Our analysis, based on sound data and summarized in this white paper, sheds light on what we believe are likely future directions. We welcome feedback on this effort and will continue to refine our viewpoint as technology, society, and service offerings continue to evolve.

The Impact of New Mobility Services on the Automotive Industry

This white paper provides a summary of a longer report produced and published by the Center for Automotive Research (CAR). The report, and hence this white paper, was prepared primarily by CAR researchers Adela Spulber and Eric Paul Dennis, with guidance and input from Richard Wallace, Director, Transportation Systems Analysis. CAR researcher Michael Schultz provided data analysis and forecasts critical to the overall effort.



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August 2016

The full report is available on the CAR website, in the Publications section.

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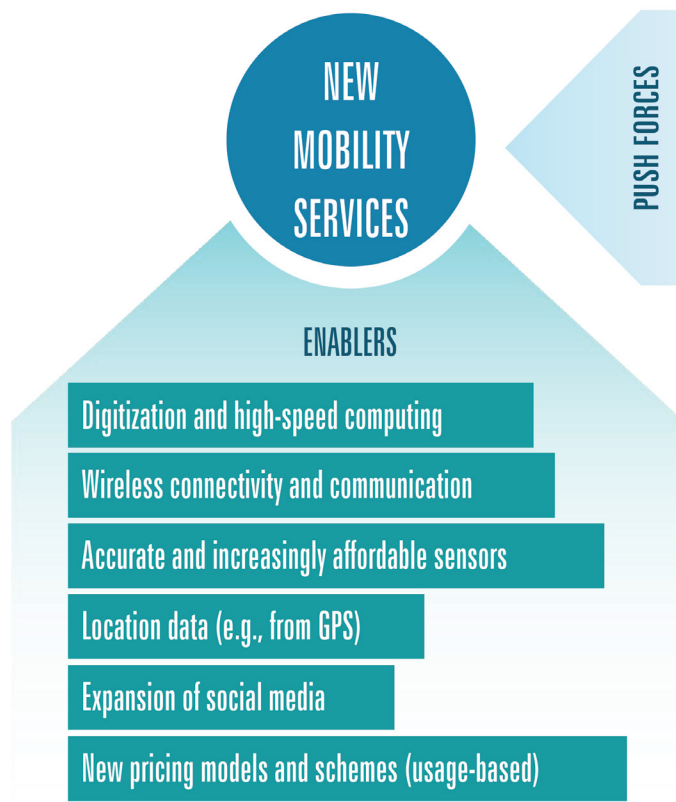
Introduction

The concept of mobility is increasingly being adopted by planners, policymakers, and industry to describe the systems that allow people to move about their world. This shift in language—from transportation to mobility—represents a shift in thinking about how a transportation system is best designed and managed. Mobility is a user-centric concept—recognizing that transportation products and services must be responsive to the needs, habits, and preferences of travelers and society.

Numerous new passenger transportation options, collectively called new mobility services (NMS), have been developing for the past fifteen years. These services offer transportation as an on-demand shared service, enabling users to have access to a vehicle (automobile, bicycle, van, etc.) for a short-term and on an as-needed basis. New mobility services often blur the lines between public and private transportation, and between what is shared and what is owned.

New mobility services are enabled by emerging technologies and wireless connectivity that allow for more convenient, efficient, and flexible travel. Carsharing, ridehailing, ridesharing, microtransit, bikesharing, and mobility-as-a-service are among the most noteworthy new mobility services currently being developed. Each has its own business model and underlying service characteristics.

Rapid urbanization, pollution, and congestion are just a few of the push forces that have prompted this wave of innovation in transportation. New mobility services are contributing to a mobility evolution. They are part of an incremental change in travel behavior, especially in urban areas, toward a multimodal system that is less car-centric. Worldwide, this gradual change will allow traditional transportation players, automotive manufacturers in particular, to adapt and maintain their market position, despite the increasing diversification of the transportation sector.



*This white paper highlights the findings of a report published by CAR entitled *Effects of New Mobility Services on the Automotive Industry* and aims to:*

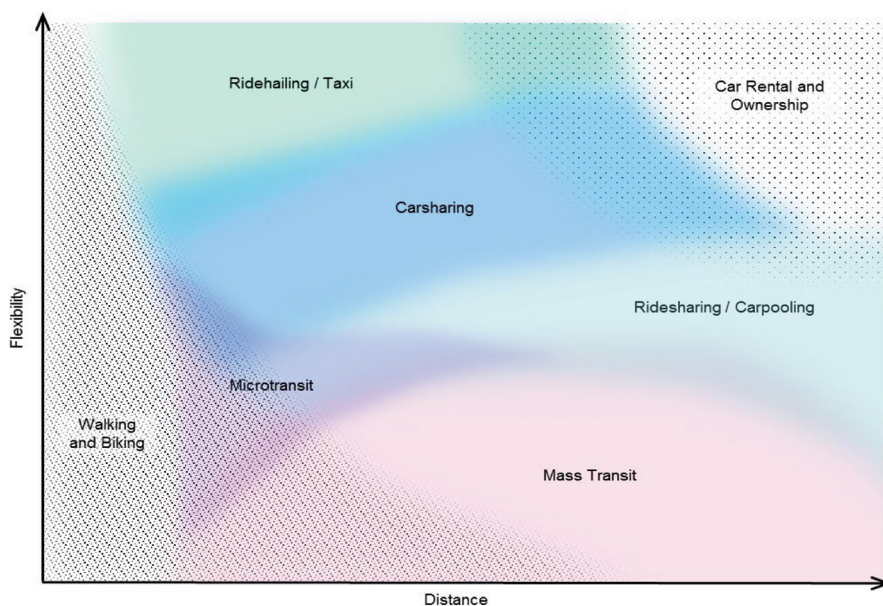
- *Identify and describe new mobility services*
- *Describe how new mobility services are changing travel behaviors*
- *Present an analysis of how those changes will affect the automotive industry*








Types of New Mobility Services

New mobility services have been characterized as more reliable, predictable, efficient, convenient, accessible, and seamlessly connected compared to established means of transportation, as well as offering easier options for payment. New mobility services also contribute to reducing parking demand, pollution, and congestion, as well as provide energy savings and transportation costs savings for users.

Each of these new mobility services fits a specific niche, but they also partially overlap with one another and with established means of transportation. Which service is best for a given trip depends on trip distance and amount of flexibility (time, destinations available) that the traveler has during the trip.








Ideal Use Cases for Different Modes of Transportation



-  **Ridehailing** services rely on smartphone apps to connect paying passengers with drivers who provide rides (for a fee) in their private vehicles. Transportation Network Companies (TNCs) design and operate these online platforms. Most TNCs function as digital marketplaces linking self-employed drivers with customers, while collecting a fee for making the connection.
-  **Ridesharing** is a type of carpooling that uses private vehicles, arranging shared rides on short notice between travelers with a common origin and/or destination. Travelers share trip costs in these systems, that organize either short- or long-distance ridesharing.
-  **Carsharing** is a short-term car rental, often by the hour. Electronic systems allow unattended access to the vehicles. Gasoline and insurance are included in this type of service. These characteristics distinguish carsharing from traditional car rental. Carsharing can be round-trip or one-way, free-floating or station-based.
-  **Bikesharing** is a system that provides free or affordable access to bicycles for short-distance trips, mostly in urban areas. Most programs are organized either by local non-profit organizations or by public agencies.
-  **Microtransit** is a wide category encompassing various private transit services that use small buses and develop flexible routes or schedules (or both) based on customer demand. Microtransit bridges the gap between single user transportation and fixed-route public transit and resembles current route-deviation services.
-  **Mobility-as-a-Service (MaaS)** is a mobility distribution model in which a person's transportation needs are met over one interface and are offered by a service provider. In general, transportation options (mass transit, carsharing, ridehailing, etc.) are bundled and the integrated solution is presented to the user through a smartphone app and is paid through a single account.
-  **Shared autonomous vehicles (SAVs)** are fully self-driving vehicles that do not need human operation, other than providing information regarding the destination of the trip.



Market Characteristics of New Mobility Services

Service	Markets	Examples
Ridehailing 	More than 75 countries globally. In the United States, 650,000 driver-partners work with the two biggest operators, Uber and Lyft	Uber Lyft Didi Ola Gett
Ridesharing 	Europe is the primary market globally. The biggest operator, BlaBlaCar, has 25 million members across 22 European and South American countries. Limited presence in the United States.	BlaBlaCar vRide Commutr
Carsharing 	26 countries in North and South America, Europe, Asia, and Oceania. 1.2 million members and 16,700 vehicles in the United States.	Zipcar Car2go Enterprise CarShare
Bikesharing 	Almost 1000 cities worldwide. 104 cities, 30,700 bicycles in the United States.	Motivate DecoBike Zagster
Microtransit 	Many development exist in Europe, where the concept was developed. In the United States, service currently is limited to six major cities.	Bridj Chariot Via
Mobility-as-a-Service 	Pilot projects in Europe and the United States. 70 cities in the United States and Canada have MaaS-like solutions from moovel N.A.	MaaS Global UbiGo Transloc Xerox moovel
Shared Autonomous Vehicles 	Technology remains in-development. Some companies are testing their technology, especially via private shuttles on campuses.	Google EasyMile Uber Ford GM



Key Trends in Transportation Choices

Push Forces for New Mobility

The introduction and adoption of new mobility services is related to several broad trends, such as rapid urbanization, economic growth, increasing road congestion, increasing pollution from the transportation sector, and changing mobility preferences.

The uneven prevalence of these trends across the globe and within the United States implies that the potential for NMS to disrupt transportation, and the automotive industry with it, is similarly variable. Overall, the transportation choices U.S. residents make will be transformed by new mobility solutions to a lesser extent than in other parts of the world. The U.S. automotive market is relatively less vulnerable to disruptive NMS services than other markets.

New mobility services will bring disruption in urban transportation, but not in suburban America

The latest trends in U.S. demographics, population growth, and user preferences will boost the growth of new mobility services in the largest and densest cities, and also in smaller urban areas and inner suburbs. However, these new mobility services are far less convenient in less densely-populated areas, where a majority of the U.S. population lives. Thus, most U.S. residents will continue to live in areas where private vehicle ownership and use will be preferable to relying solely on new mobility services and public transportation.

Millennials and Baby Boomers will dictate mobility preferences

Millennials and, to some extent, Baby Boomers will be the driving forces of the adoption of new mobility services.

Millennials are now the biggest cohort of the American population and are leading a broad shift in travel behavior among Americans. This generation is more urban and less car-focused than its predecessors. Millennials are more likely to use public transit, bike or walk. Millennials are the early-adopters of new mobility services, from carsharing and ridesharing to bikesharing. They also are more open to autonomous cars, as well as greener vehicles. Because of their lifestyle and transportation preferences, Millennials will account for much of the expansion of new mobility services.

Baby Boomers primarily live in suburbs. However, as they get older, the mobility model built around the personal vehicle will become more of a challenge for them, because age-related health issues. The mobility challenges that an aging Baby Boomer generation will have in a suburban setting means that this cohort will have increasing needs for alternative mobility services, whether they are ridehailing, microtransit, or shared autonomous vehicles.



Key Factors Affecting Travel Behavior
Demographic Trends
<ul style="list-style-type: none">• Population age structure• Population growth and density
User Preferences
<ul style="list-style-type: none">• Social preferences for mobility• Preferences for residence
Transportation Options
<ul style="list-style-type: none">• Available means of transportation (mass transit, private vehicle, etc.)
Transportation Costs
<ul style="list-style-type: none">• Fuel prices, transit fares• Vehicle ownership costs• Road congestion
Infrastructure and Planning
<ul style="list-style-type: none">• Land zoning and development trends• Traffic management systems
Macrofactors
<ul style="list-style-type: none">• Economic growth• Global warming and pollution

State of Transportation in the United States

The private vehicle has a dominant place in U.S. transportation

In contrast with Europe and Asia, in the United States private vehicles have a dominant place in the transportation system, and this directly affects the growth prospects of new mobility services. In 2013, 76.3 percent of Americans commuted to work by driving alone, and this share has been increasing over the years.

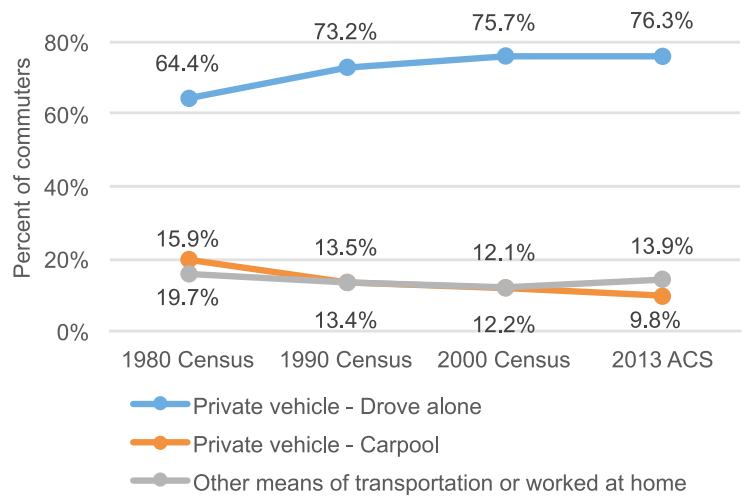
In the last 25 years, the share of people that carpooled to work fell nearly by half, dropping from 19.7 percent in 1980 to 9.8 percent in 2013. This is partly explained by the low costs of owning and operating a single occupancy vehicle. The U.S. has some of the lowest costs of driving in the world.

The use of public transit is highly concentrated in the United States within a few dense metropolitan areas. Only 5.1 percent of workers commute by public transit; however, despite the dominant place of the private vehicle, public transportation and bicycles have seen an increase in use since 2000. This trend is likely to continue in coming years.

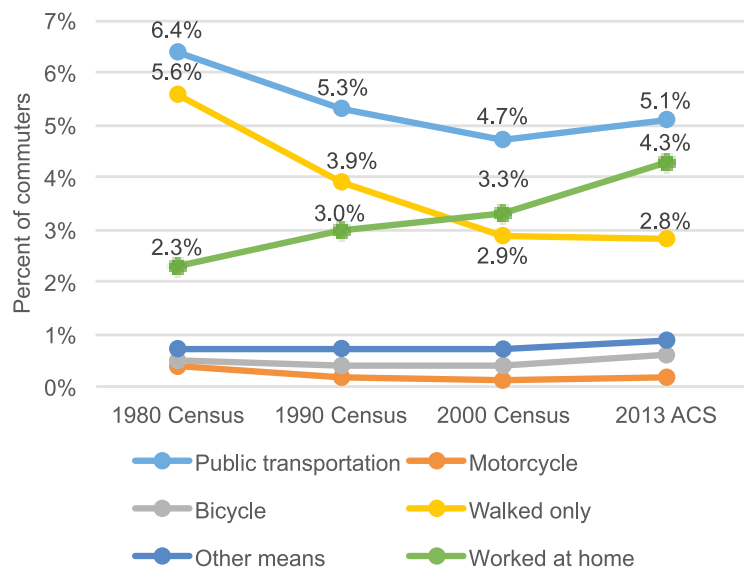
Peak car travel happened ten years ago

After the U.S. experienced “peak car travel” in 2005, the number of vehicle miles traveled (VMT) per capita started falling and the drop accelerated during the Great Recession. The lowest point was reached in the first months of 2014. After mid-2014, VMT per capita started increasing again, and in 2015 this number reached the same level as in 2001, roughly 9,500 miles. A new peak might yet be achieved in the next few years.

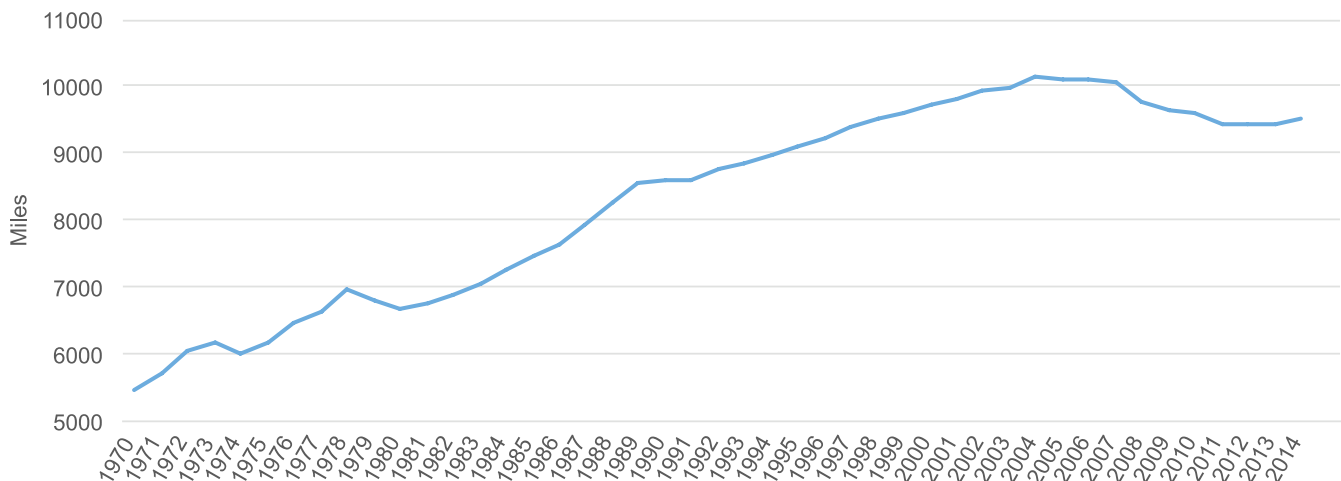
Usual Means of Transportation to Work



Usual Means of Transportation to Work



Annual Vehicles Miles of Travel per Capita in the United States



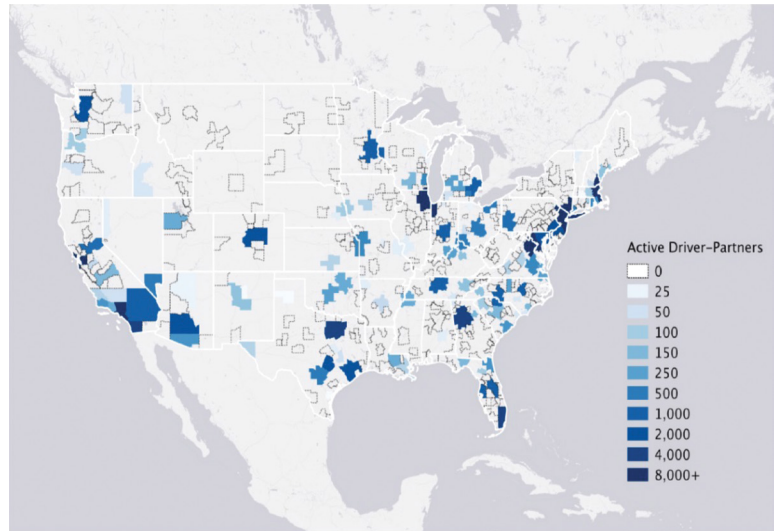
Target Users and Markets of New Mobility Services

Urban areas are the target markets for new mobility

Overall, new mobility services work best in denser and walkable urban areas with good public transportation networks. New mobility services are not used as a sole means of transportation, but instead are used in combination with other ones, especially public transit. Therefore, new mobility services are and will be used more intensively in areas with good public transit, but just occasionally in areas with little or no public transit; in such areas, new mobility services might be used for specific purposes, such as to or from an airport. In areas with low public transit coverage, a personal vehicle remains the dominant mode of transportation, thereby limiting the demand for hailing an Uber or renting a Zipcar.

Carsharing programs are now available in most large U.S. cities. Zipcar is in 46 of the 50 largest U.S. metropolitan areas (in terms of public transit ridership), and car2go is in nine out of the 50. In 2014, ridehailing operator Uber was making most of its revenue in a few big U.S. cities (New York City, San Francisco, Chicago, Washington D.C. and Los Angeles).

Active Uber Driver-Partners in the United States



The map indicates the number of Uber driver-partners who took at least four trips in November 2014, by Census Metropolitan Statistical Areas.

Source: Hall and Krueger, "An Analysis of the Labor Market for Uber's Driver-Partners in the United States," 2015

Characteristics of Carsharing Markets

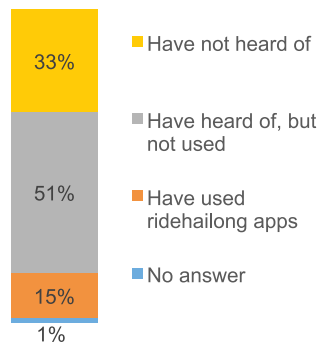
	Neighborhoods with Access to Carsharing	Regional Average
Demographics		
One-person households	51.8%	27.2%
Households with children	12.5%	32.4%
Rental households	71.5%	39.6%
Households earning more than \$100,000	18.2%	17.9%
Persons with Bachelor's degree or higher	54.6%	34.0%
Means of Transportation to Work		
Drive alone	33.0%	69.4%
Carpool	6.6%	11.6%
Public transit	30.8%	8.8%
Bicycle	2.1%	0.8%
Walking	21.9%	4.4%
Vehicle Ownership		
Households with no vehicle	40.0%	11.3%
Average vehicles per household	0.84	1.66
Neighborhood Characteristics		
Housing units per acre	21.70	

Source: Millard-Ball et al., "Car-Sharing: Where and How It Succeeds," 2005

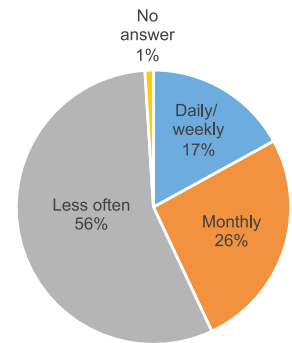
Urban dwellers with higher income and education levels are the early adopters

The users of new mobility services are mostly urban dwellers and have above average income and educational attainment levels. They also are less likely to own a vehicle and rely more heavily on public transportation, especially for the work commute. NMS users own 1.05 cars per household, compared to the national average of 2.06.

Use of Ridehailing among U.S. Adults



Frequency of Ridehailing Use in the U.S.



Source: Pew Research Center, "Shared, Collaborative and On-Demand: The New Digital Economy," 2016

Effect of New Mobility Services on Transportation

New mobility services are changing the transportation sector, either by providing entirely new mobility solutions or by reshaping traditional transportation means with technology (ridesharing with carpooling, microtransit with bus shuttles). From the point of view of the user, NMS contribute to a shift from one solution to every mobility need, the privately owned vehicle, to many custom solutions.

The more people use NMS, the more likely they are to take public transit and use and own fewer cars.

Overall, the growth of new mobility services has been associated with a decrease in the use of private cars and an increase in public transit use; however, some people also prefer NMS to public transit in certain circumstances. For example, research indicates that people prefer carsharing or ridehailing to public transit, if the transit trip takes longer or requires several changes. Overall, new mobility services substitute for more private vehicle trips than for public transit trips.

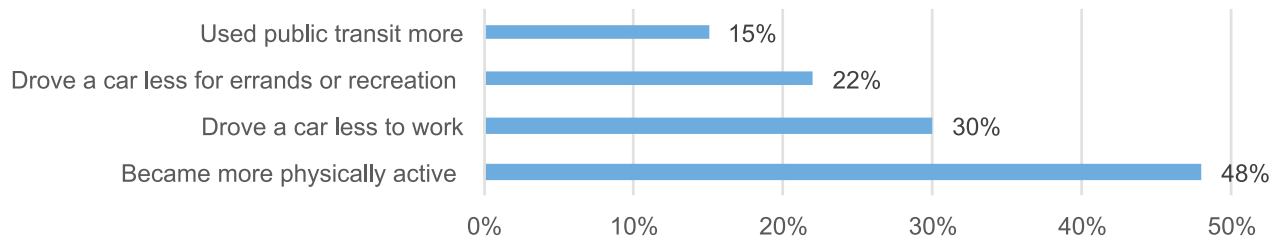
New mobility services have partly different use cases

New mobility services do not serve the exact same purposes as the private vehicle or public transit; they are partly complementary. These new transportation modes are used more often during the weekend than on weekdays. New mobility services are also associated more with leisure and social trips, than with the work commute. For example, ridehailing services are mostly used for social trips and between 8 PM and 4 AM, times when public transit service is least available and driving can be less convenient or safe.

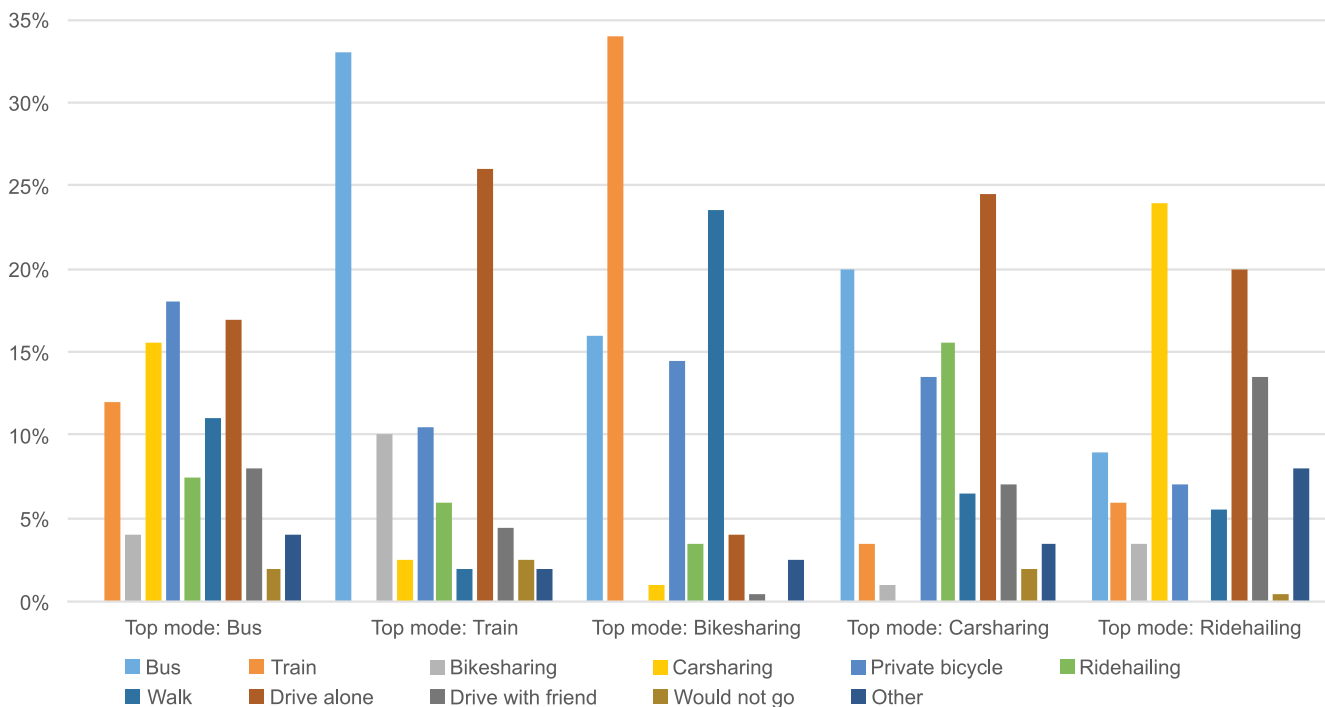
New mobility enhances multimodal transportation

Evidence suggests that new mobility services are generally used in combination with public transit and that they can extend the catchment area of public transit. By addressing the first-and-last mile issue related to public transit access, NMS can potentially contribute to bridging gaps in existing transportation networks and encouraging multimodality.

Changes in Personal Travel Behavior Since Using New Mobility Services



Alternative Transportation Mode Users Would Take if Their First Choice Was Unavailable



Source: Feigon and Murphy, "Shared Mobility and the Transformation of Public Transit," 2016

State of New Mobility Industry and Potential Growth

In the last decade, new mobility services have seen a substantial growth and expansion throughout the world. Their growth prospects are positive, because societal attitudes and public policy have become more supportive of new mobility services in the past years and this trend will likely continue. New mobility services have a bigger market share potential in areas where public transit is present and more used, such as in Europe and Asia. Thus, there is a bigger growth potential for NMS in Europe and Asia than in North America. Even in urban areas, NMS, like public transit, will not be suitable replacements for private vehicles for certain use cases: drivers that take pride in their vehicles or value extra comfort or privacy, parents transporting young children, and drivers who require special accessories in their vehicles, for example.

Ridehailing is expanding rapidly but faces regulatory headwinds

Since their beginnings in the late 2000s, ridehailing services have expanded at an extremely rapid pace within the U.S. and to all the other continents. Uber, by far the most international of the TNCs, is now available in about 75 countries and counting. Up until mid-2013, the main U.S. transportation network companies registered a 25-percent monthly increase in users. By mid-2014, however, the growth rate had slowed to a 10-percent monthly increase.

The growth of the ridehailing business is boosted by a high consumer preference, the ability to fill transportation needs not well met by other modes, and a yet ill-defined regulatory framework. Given their high growth potential, investors have taken an interest in ridehailing. Nonetheless, TNCs face significant obstacles in their growth, as competition among them stiffens, markets become saturated, and regulatory frameworks are better defined. Ridehailing has also been banned or restricted in several countries and cities. As such, TNCs are involved in various legal battles concerning a variety of aspects crucial to their business models (e.g., licensing fees, driver status and benefits, insurance, and passenger safety).

Ridesharing is expanding in Europe and South America, less so in the United States

In the U.S. real-time ridesharing has had a slow growth since its beginnings in the early 2000s, despite the 400 local services available as of July 2011.

New mobility solutions have expanded much more in Europe and South America. Specifically, long-distance ridesharing has become increasingly popular over the past years in Europe. For example, since its creation in 2006, the long-distance ridesharing community BlaBlaCar has expanded to 22 countries.

Bikesharing has experienced constant growth since 2000. Globally, nearly 1000 cities are now equipped with bikesharing systems.

Microtransit, Mobility-as-a-Service, and shared autonomous vehicles are in various phases of pilot projects across the globe. These developing new mobility services may prove to be as impactful, or more so, than more established models.



Carsharing is growing steadily in the United States and more rapidly in Europe and Asia

Europe is the biggest carsharing market, with about 2,206,000 members in 2014, followed by North America (1,625,000 members). By contrast, the Asia–Oceania region has registered the fastest growth recently and reached 1,006,000 members in 2014.

The biggest drivers of the carsharing growth are the increase in population density, the slight decline in vehicle ownership, the improvement of public transit networks, and policies aimed at multimodal transportation. Some of the biggest challenges for carsharing are parking permits, high initial expenses (acquiring vehicle fleet), insurance, and adapting to the differences between cities (density, transportation networks), and brand recognition.

As the carsharing market matures, operators are undergoing a process of consolidation, multi-nationalization, and mainstreaming. The carsharing space is transitioning from a multitude of nonprofits, co-ops and a few established businesses to an industry dominated by for-profit operators. Despite this, peer-to-peer carsharing might continue to grow.

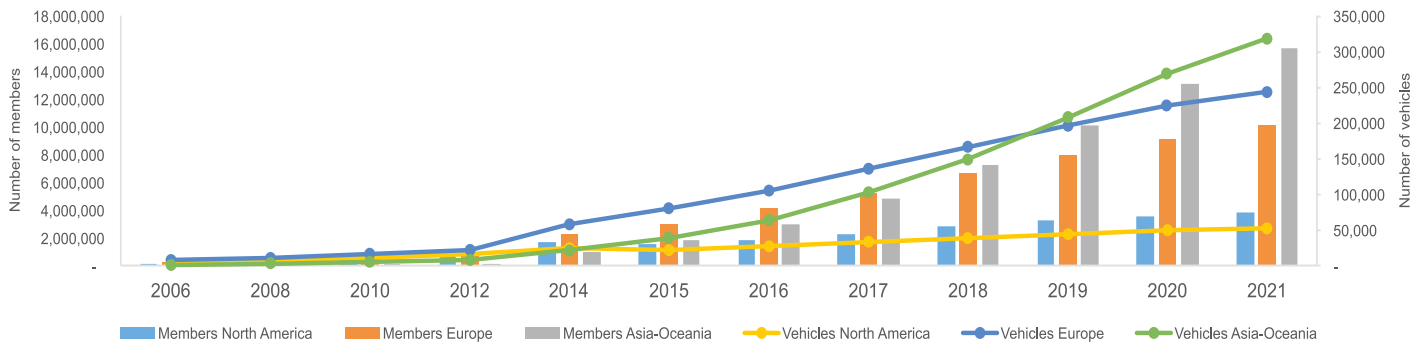
CAR estimates that by 2021, North American carsharing programs will reach 3.8 million users and 50,800 vehicles. Membership growth will be steady, but will gradually decrease as the market matures and saturates, from 23 percent in 2016 to 6 percent in 2021.

European programs are expected to grow to 10 million members and 242,600 vehicles. Likewise, annual membership growth will slow, from 35 to 10 percent between 2016 and 2021. It is expected that Germany will remain the largest European sub-market.

The Asia–Oceania region has the biggest growth potential (70 percent expected in 2016, gradually slowing down to 20 percent in 2021) and is likely to arrive at 15.7 million members and 317,000 vehicles.

Based on the current market potential, travel behavior trends, and historic growth patterns of existing operators, CAR estimates that carsharing programs will reach almost three million members and comprise more than 39,100 vehicles in the United States by 2021.

Carsharing: 2006 - 2014 Growth and 2015-2021 Projections





In the last few years, new mobility services have started to capture the attention of transportation users, the media, public authorities, and transportation sector in general. Through their innovative ways of improving mobility, NMS are gaining some control over the narrative of transportation. Just five years after the launch of NMS, two-thirds of Americans have heard of ridehailing apps, even though only 15 percent are using them; this is strong evidence of the broad reach of the concepts that are at the core of NMS.

The growth of new mobility services around the world and in the United States has many implications for the automotive industry, some of which are already visible today, others that have yet to fully reveal themselves. Increased use of new mobility services could reduce car ownership for people that do not use a private vehicle as their main mode of transportation, and instead use public transit, bike or walk. The shift towards new mobility services and away from the private vehicle will be responsible for some losses in sales of new and used vehicles, but these losses are likely to be very small compared to the overall number of

transactions involving vehicles every year. In addition, services like carsharing and ridehailing will contribute to a greater vehicle turnover and a shorter vehicle life expectancy, partly counteracting forces that decrease vehicle sales.

The most important impact that new mobility services will have on the automotive industry will not be on the volume of vehicle sales, but rather it will be on how customers interact with vehicles, their expectations for vehicles, and their uses of these vehicles.

New mobility services are changing the way people use, value and relate to personal vehicles. NMS are changing people's expectations about vehicles. New mobility services will likely contribute to a change in preferences, away from vehicle ownership and towards "vehicle usership," exploring new business models that do not involve the user owning a vehicle and having all the inconveniences associated with that.

New Markets and Opportunities for Automakers

The increasing expansion and adoption of new mobility services are already prompting vehicle manufacturers to rethink their existing business models, as well as explore new ones.

The mainstreaming of new mobility services is an opportunity for automakers more than it is a threat. As transportation preferences slowly evolve, the automotive industry is trying to show customers they understand the shift toward on-demand shared mobility and have relevant new products and services to offer.

Some vehicle manufacturers have already announced their intention to become mobility companies, offering new services alongside the established core business of manufacturing vehicles. A few automakers have created subsidiaries in charge of mobility solutions or launched carsharing programs.

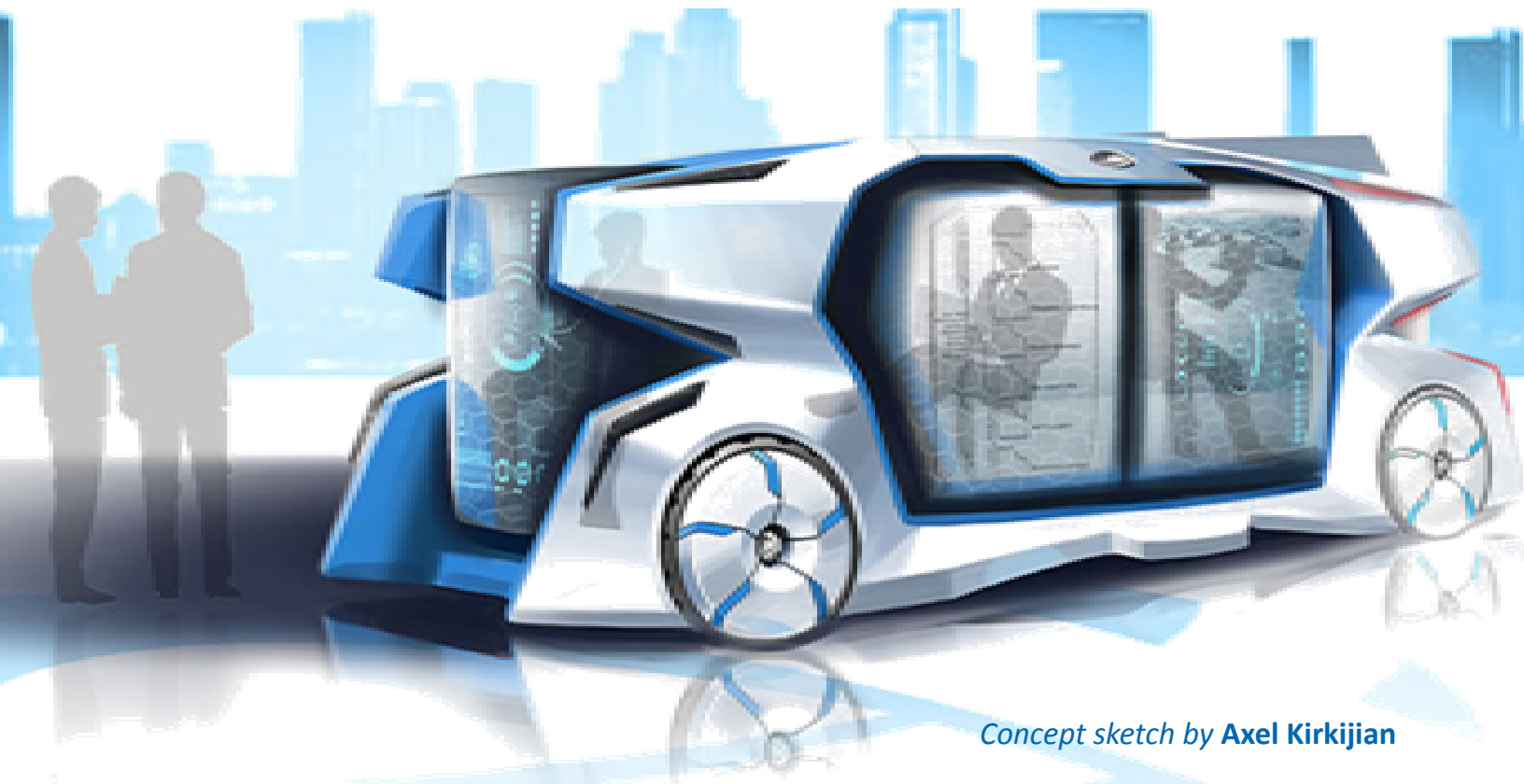
Opportunities for the auto industry:

- *Partnerships with new mobility and technology firms*
- *Investments and venture capital in mobility startups*
- *R&D and experiments on mobility solutions*
- *In-house mobility services*
- *Fleet sales to mobility providers*
- *New vehicle financing models*

In the last several years, automakers have started investing in, partnering with, or acquiring new mobility companies. Building relationships with NMS is an opportunity for vehicle manufacturers to diversify their activities and, especially, to strengthen their market share in urban areas and with the younger generations. Partnerships with NMS companies give automakers increased visibility to mobility users (that may one day become car buyers), as well as access to valuable consumer data and analysis. New mobility companies also have an interest in these deals, that come with an access to auto industry engineers or discounts on vehicles.

Automakers see the opportunity to turn ridehailing and carsharing companies into reliable customers for their vehicles.

With fleet sales, manufacturers are also hedging their bets on potential losses in private sales or changing structure in clientele. Selling to fleet managers represents not only a steady revenue stream from sales, but also an advertisement for their brand directed to carsharing or ridehailing users that may be tempted to buy a car one day. Ridehailing and carsharing companies could become reliable customers specifically for fuel-efficient, electric or luxury vehicles.



Concept sketch by Axel Kirkijian

Cost Comparisons between NMS and Private Vehicle

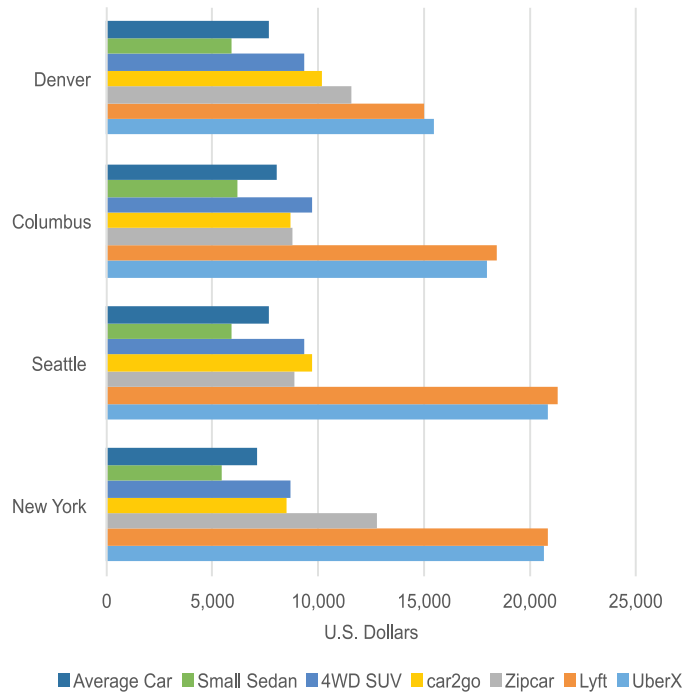
Overall, when new mobility services are used in combination with public transit, they are more cost competitive than the private vehicle. This is one of the key benefits leading to the success of NMS in the last years. For example, one study estimates that after joining carsharing, U.S. households save between \$154 and \$435 in transportation costs per year.

The costs and benefits of new mobility services as part of a multimodal solution are highly specific to a particular type of user. In order to broadly analyze costs, CAR compared the costs of using a personal car, on the one hand, and using only carsharing or a ridehailing service, on the other hand. This provides a rough estimate of the potential savings available to customers. The comparisons are either local, based on four case studies, or national, as detailed below.

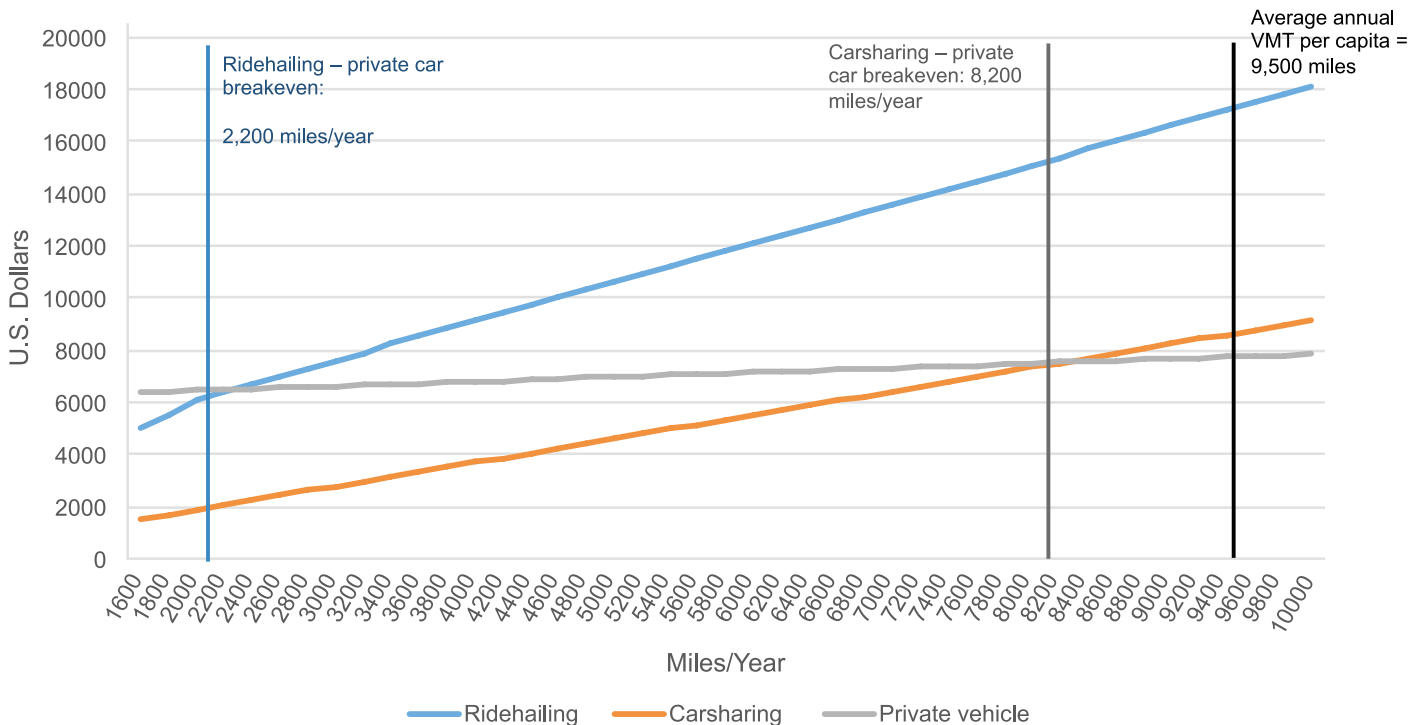
Using solely a ridehailing service is 1.5 to 3.8 times more expensive than owning and operating a private vehicle in the four cities used for this comparison. Overall, the breakeven point between ridehailing and the privately owned vehicle is at 2,200 miles traveled per year.

The analysis reveals that carsharing is more cost efficient than car ownership for drivers that own larger vehicles or have a low annual mileage, because of the high fixed costs of vehicle ownership. Overall, carsharing is more cost efficient than the private vehicle if the user travels less than 8,200 miles annually.

Annual Transportation Costs by Mode (City Level)



Annual Transportation Costs by Mode (National Average)



Effect on Light Vehicle Sales

As stated previously, most households that use carsharing services do not own a vehicle. Also, some carsharing members tend to sell their vehicles over time as a result of using the programs, or to forego or postpone the purchase of a vehicle.

In North America, 41 percent...	of carsharing members affirm they have foregone or postponed a vehicle as a result of using a carsharing service
In Europe, 32 percent...	
In Australia, 28 percent...	

One survey of carsharing members found that households that reduced their number of vehicles after joining a carsharing service tend to be: single households, own more than one vehicle prior to joining the program, or live in rental housing.

Given the carsharing growth projections and the propensity of some carsharing members to forego purchasing their own vehicle, CAR estimates that in 2021 one car shared will replace 7.7 private vehicles in the United States and in North America. One shared vehicle is likely to replace about four private vehicles in Europe and the Asia – Oceania region in 2021.

In 2021, one carsharing vehicle will replace ... private vehicles

7.7	in North America
4.0	in Europe
3.8	in Asia - Oceania



The impact of carsharing on new and used vehicle sales will be partially offset by sales into carsharing fleets, which will be replaced at a rapid pace (likely about three years). In addition, if competition among operators increases, carsharing fleet operators have an incentive to provide their members with the newest and most attractive fleet.

Therefore, CAR estimated the loss in new or used vehicle sales induced by carsharing over a longer period of time, taking into account the replacement of the carsharing fleets. To calculate vehicle sales avoided because of carsharing, CAR used the number of private vehicles one shared car replaces and the historic and projected sizes of carsharing fleets. To account for carsharing fleets purchases, CAR estimated that a third of the fleets are replaced with new vehicles every year.

Carsharing will have a relatively small impact on new and used vehicle sales

CAR estimates that between 2010 and 2021, 137,507 sales will be lost in the United States (an annual average of 12,663 units) because carsharing members no longer need to buy their own vehicle. By comparison, 55 million new and used vehicles were sold annually in the U.S. on average in the 2010 – 2015 period.

For the whole of North America, an estimated 164,606 new and used vehicle sales will not be made between 2010 and 2021 as a result of carsharing, at an annual average of 15,163 units. The amount of lost sales is projected to be bigger in Europe (267,533 units) and especially Asia – Oceania (398,712 units in total). That would bring the global total to 830,850 lost sales due to the use of carsharing for the entire period between 2010 and 2021.

Net Loss of New and Used Vehicle Sales Due to Carsharing, 2010 to 2021

Region	Annual average	Total (2010 to 2021)
North America	15,163	164,606
United States	12,663	137,507
Europe	28,844	267,533
Asia - Oceania	49,213	398,712
Total	93,220	830,850

Broader Impacts and Policy Considerations

The mainstreaming of new mobility services will have broad implications, not just for the automotive industry, but also for the economy, personal mobility, and public policy.

New mobility services can be a potential for economic development, not just through direct contributions, but also by being a catalyst for innovation in domains beyond transportation, such as technology, communication, retail, etc. Even if the use of new mobility services will be limited to urban areas and a certain type of users, the concepts that are at the heart of NMS will serve as an inspiration to improve transportation policy in general and public transit in particular.

New mobility services are an innovation catalyst for the entire transportation sector

Many established modes of transportation have started borrowing concepts from NMS and using them to make their services more attractive to customers.

- Faced with the fierce competition from TNCs, traditional taxi companies have made steps to modernize and offer customers the same level of on-demand convenient service. Many of them have started using smartphone apps or websites for reservations, called 'e-hailing' apps.
- Carpooling has been transformed by technology and wireless communication. By becoming real-time and dynamic, carpooling is a viable and convenient alternative for the work commute.
- Using a bicycle has been made more simple and convenient in cities by bikesharing programs.
- Traditional car rental companies are adopting more carsharing technology at all stages of their business to make it more streamlined and on-demand.

New mobility services also represent an opportunity for public agencies to bring innovation to their transportation systems, in terms of public transit, parking policy, traffic management, etc. Already, an increasing number of municipalities and transportation agencies are partnering with new mobility service providers. Increasingly, transportation agencies are seeing NMS as an opportunity to provide more transportation options to their users and strengthen public transit by providing first-and-last mile options and bridge gaps in the service, for example during the evening and night, or in low density areas.



Conclusions

The rise of new mobility services is part of a mobility evolution, a bigger and long term gradual evolution of transportation preferences, towards on-demand shared mobility and a multimodal system that is less car-centric.

More users will choose to use new mobility services instead of, and in combination with, public transit and private vehicles. New mobility services also represent an opportunity to make transportation more efficient and affordable.

The growth of new mobility services will be limited to urban denser areas that offer a variety of transportation options, and to a certain type of users (urban dwellers with higher levels of income and educational attainment), especially in the United States.

Even if these new transportation options will not represent a substantial share of trips in the medium term, they will have a profound long term impact on the way society and the individual think about transportation, on their expectations, on the way transportation is organized and paid for.

Concepts at the core of new mobility services will profoundly impact the use of private vehicles.

New mobility solutions indisputably represent a catalyst for innovation in the automotive industry. While, in the medium term, losses in sales of vehicles linked to the use of NMS will be relatively small, new mobility services are prompting automakers to innovate, by developing mobility solutions of their own and experiment with new business models and revenue sources.

Thanks to the gradual change in travel preferences, traditional transportation players – automakers in particular – will have time to adapt and maintain their market positions, despite the increasing diversification of the transportation sector. The automotive industry needs to take advantage of the great potential for innovation brought by new mobility services.

New mobility opportunities for the automotive industry, bringing new....

- *Services*
- *Vehicle concepts*
- *Vehicle functionalities*
- *Ownership models*
- *Business partnerships*

The mainstreaming of new mobility services will have broader implications, not just for the automotive industry, but also for economic development.

New mobility services also represent an opportunity for public agencies to rethink their transportation systems and make them more efficient, affordable, and relevant for the needs of their citizens. Public authorities need to adopt the key concepts and modes of functioning that make NMS so appealing to their users. Partnerships with new mobility companies are one of the best ways of bringing innovation into transportation policy.

There is an opportunity to improve public transportation, making it more...

- *Relevant to the user*
- *Cost efficient for society*
- *Affordable for the user*
- *Flexible to the needs of the user*





An aerial night photograph of a city, showing a complex highway interchange with multiple overpasses and ramps. The city buildings are illuminated with lights, and the overall scene is dominated by a blue color palette. The highway interchange is the central focus, with several lanes of traffic visible. The surrounding urban area is densely packed with buildings, some of which are brightly lit, creating a contrast with the dark night sky.

The Center for Automotive Research's mission is to educate, inform, and advise stakeholders, policy makers, and the general public on critical issues facing the automotive industry, and the industry's impact on the U.S. economy and society. CAR produces industry-driven research and analyses; develops forecasts; fosters dialogue and convenes forums; and publicly disseminates our research through conferences, events, and the media.