CARSHARING AND MOBILITY: A TURNING POINT FOR AUTOMAKERS AND SOCIETY

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Abstract

Carsharing is already a reality in developed countries like USA, France, Germany and Japan. Nevertheless, several studies have been conducted by automakers and technology companies in these countries in order to improve business profitability. According to the projections of consultants and industry experts, the carsharing potential market for the next few decades is very positive, mainly encouraged by the growing environmental appeals and urban mobility. In this context, the objective of this paper is to present an overview of the main initiatives of the governments and automakers to develop this new market, whitin a zoom in Brazilian situation. At the end of this study it has been possible to identify the main difficulties and facilities, so as a path in Brazil in order to make a reality the use sharing vehicles in drivers' daily lives.

Keywords: Automotive Industry. Sharing Economy. Carsharing.

1 INTRODUCTION

Sharing economy is centered in the resources sharing rather than the act of owning as much as possible, that is the fundamental of traditional economy. Several traditional companies have directed part of their revenues and activities to this sector (MENDES; CEROY, 2015). Among these companies, the automotive industry plays a key role in finding solutions for urban mobility and, consequently, for the future of automobiles (PAIXÃO, 2016a).

Urban mobility is in the center of many discussions about actuality, especially those reported to big towns management and planning, where transportation reveals itself insufficient to social needings. A point that is usually proposed as one of the possible solutions for these contemporary challenges is sharing economy (MENDES; CEROY, 2015). Thus, economic, environmental, and social forces have pushed shared mobility from the fringe to the mainstream, and its role in urban mobility has become a popular topic of discussion (SHAHEEN; CHAN, 2015).

One of the main initiatives and the automotive sector's attempt to respond simultaneously to the difficulties of urban mobility in large metropolises, the challenges of shared economy and concerns about environmental issues is the shared use of vehicles (PAIXÃO, 2016a).

Many countries around the world, including Brazil, already dispose of carsharing programs on its bigger towns. These programs are managed by private companies, by the automakers, or even by public administration.

In the other hand, this new urban mobility proposal faces an obstacle: one of the most audacious point of view changes is that people will share vehicles, changing their relation of owning the car, what may cause, in consequence, sales reduction (Paixão, 2016a).

This paper will present an actual panorama of challenges and opportunities offered to the sharing economy and urban mobility question in brazilian market. It is organized as follows: section 2 describes What's sharing economy. 3rd section presents The carsharing around the world. Next section, 4th, shows the opportunities and challenges for carsharing and urban mobility in Brazil. Section 5 brings the impacts of sharing economy for automakes, followed by conclusions in 6th section.

2 SHARING ECONOMY: THE NEW PARADIGM

Sharing economy stems from the confluence of several demand side trends and most importantly, a set of supply-side technological changes. On the demand side,

growing ecological consciousness leads some consumers to choose borrowing or reusing goods over buying new ones. Urbanization is on the rise, and people in metropolitan areas can more easily find sharing and renting opportunities. Further, the Recession was a crucial catalyst: On the "consumer" side, the 2008-2009 crash raised thriftiness and imposed credit constraints. At the same time, unemployment and underemployment created a large pool of people available work in the sharing economy to improve revenus. The most important change, however, has been technological. Improved data storage and analytics make the cost of matching buyers and sellers lower than ever. And with the mass spread of smartphones, people can access web-based sharing services anywhere, at any time. Likewise, widespread Global Positioning System (GPS) tracking allows for both better customer service and more careful monitoring (RAUCH; SCHLEICHER, 2015).

The sharing economy is a socio-economic eco-system built around the sharing of human and physical resources. It includes the shared creation, production, distribution, trade and consumption of goods and services by different people and organizations. The sharing economy has spurred "micro-entrepreneurs" and facilitated the creation of new markets and economic activity where none previously existed. Most signficant segments of the sharing economy in present days are: Health, logistics, transportation, accomodation, education, household goods and financial services (ERNST; YOUNG, 2015). 7% of the United States population are providers in the sharing economy; their cut across age and household income is showed in Figure 1.

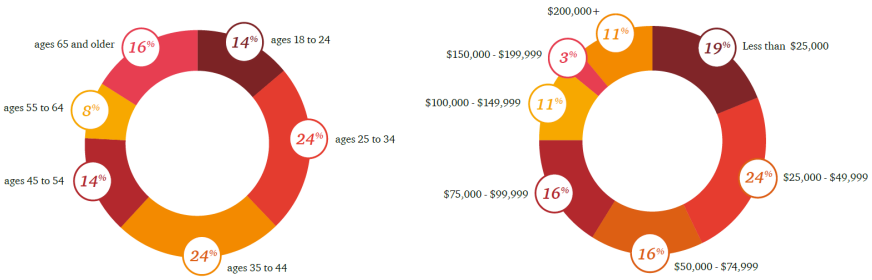


Figure 1 Cut across age and household income (in US$) of the USA population involved in sharing economy.

Source: (PricewaterhouseCoopers, 2015).

The basic premise of the sharing economy is simple: everything – every product and every service – is sharable, for a price. The sharing economy addresses and meets the needs of both buyers and sellers. Those needs can be seen as the three core principles of the sharing model: value, coverage, and trust (BERT; COLLIE; GERRITS; XU, 2016).

- Value in the sharing economy takes shape along several dimensions. For example, sharing enables users to bypass the up-front investment in an asset or service as well as the greater costs that come with ownership. Instead, they pay for the asset or service only when it's needed, and they can change the type of asset or service, or the timing of its use, whenever necessary. For a driver who needs a car infrequently and for short trips, the cost of renting for a few hours is significantly less than the T.C.O. (Total Cost of Ownership).
- Coverage in the sharing economy refers to the geographical reach of a sharing service, its availability at a given time, and the ease of user access. Availability requires that car-sharing services have relatively large fleets on the road to handle times of peak demand. In some cities, that can pose problems. In London, for example, some services are available in only a few boroughs, because companies have to negotiate terms of service with each borough council individually.
- Participants in the sharing economy must quickly build the trust and confidence necessary for transactions to move forward. In the business-to-consumer (B2C) carsharing environment, trust is usually established by the brand and reputation of the service provider, which is most often an automotive OEM (Original Equipment Manufacturer) or a well-known car-rental company.

3 CARSHARING

The shared use of a vehicle, bicycle, or other low-speed mode – is an innovative transportation solution that enables users to have short-term access to transportation modes on an "as-needed" basis. Shared mobility includes carsharing, personal vehicle sharing (or peer-to-peer (P2P) carsharing), bikesharing, scooter sharing, shuttle services, ridesharing, and on-demand ride services. Shared mobility has had a transformative impact on many global cities by enhancing transportation accessibility while simultaneously reducing ownership of personal automobiles (SHAHEEN; CHAN, 2015).

According to a TNS Sofres report, nearly 47% of people consider carsharing a future way for displacement. Certain, this percentual is less significatif then people who believes in ride sharing (60%) and public transportation improove (52%). But, It's very bigger than those who believe in personal cars (18%) (FRANÇOIS-FEUERSTEIN, 2011).

According to the respondents of a survey realized in 2004 by National Academy of Sciences (MILLARD-BALL; SCHURE; FOX; BURKHARDT; MURRAY, 2005), their reasons for joining carsharing were that:

- They liked the car-sharing philosophy: 81.2%.
- They could eliminate the hassles of owning a car 64.6%.
- They liked having another mobility option 54.1%.
- They wanted to spend less on transportation 35.5%.
- Carsharing services came to their neighborhood 35.2%.
- They couldn't afford to own/maintain/garage a car 31.8%.
- They were aware that car-sharing was now available 31.6%.

According to the experience of existing carshare operators and the views of some experts, the early adopters of carsharing are very likely young, well-educated and middleincome carless households as shown the Table 1:

USER CHARACTERISTIC	COMMON VIEW FROM EXPERT INTERVIEWS AND FOCUS GROUPS
Age	Young (18-40 years)
Education	Well-educated (junior college or above)
Income	Middle to upper-middle class
Car ownership	Non-car owners will be interested in obtaining access without car ownership. Existing car owners might be interested in replacing a second vehicle.
Occupation	Younger working professionals
Motivation	Affordability, convenience. Environmental benefits are not a powerful motivator of membership.

Table 1 Characteristic of Potential Carsharing Users.

Source: Lane, Zeng, Dhingra, and Carrigan (2015).

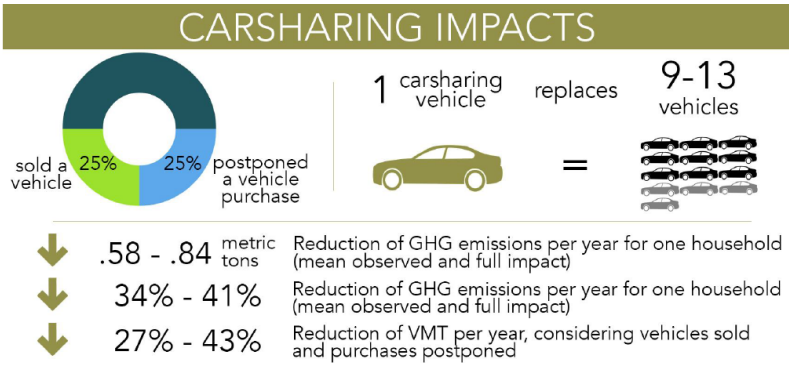
Carsharing principle is that cars may be available at fixed Stations – in effect, dedicated parking spots – located around a city, or a free-floating basis, which allows users to park their vehicle at any legal spot, where it awaits the next user (BERT; COLLIE; GERRITS; XU, 2016).

Carsharing is an umbrela term that covers multiple modes of sharing. It is distinct from ride sharing, which involves being driven rather than driving (BERT; COLLIE; GERRITS; XU, 2016). Four most significant carsharing modes may be highlighted (LE VINE; ZOLFAGHARI; POLAK, 2014):

- *Round-trip carsharing*: This type of carsharing is the best established commercially, and has been studied most extensively by researchers. Users generally reserve a car ahead of when they wish to use one, in general via smartphone apps or a dedicated website. In most cases, but not all, the user must specify both the time at which they wish to begin their reservation and its duration. Usage is 'round-trip' as the customer must (with few exceptions) return the car to the same place that it was accessed, and pay for the entire time between when they gain access to the car and when they return it at the end of their reservation. The fleet of carsharing cars is centrally owned (or leased) by a professional carsharing operating entity.
- *Peer-to-peer carsharing*: This model is also characterised by round-trip usage episodes. The key distinction with the round-trip model described above is that the carsharing fleet is de-centralised – owned by private individuals – not owned by a central operator. People choosing to make their private car available for use by others receive payments when it is rented out. In some cases the vehicles are equipped with telematics devices to provide vehicle-renters with remote access via smartcard, whereas in other systems the vehicle-owner must physically transfer the car's keys to the vehicle-renter at the beginning of the usage episode.
- *Point-to-point free-floating carsharing*: often referred to as flexible carsharing, enables one-way journeys within a specified geographic zone, in contrast to round-trip carsharing. Usage is typically spontaneous – ie not reserved at all, or only reserved several minutes in advance. The fleets are centrally-owned by the system operator. A contractual arrangement with the entity that manages on-street parking is generally required; typical agreements involve the payment of an agreed sum in exchange for the right for customers to park in any (or nearly any) legal on-street parking space. Though this type of carsharing allows one-way journeys, customers may also use cars for round-trip excursions. The largest operator of point-to-point free-floating carsharing services worldwide is car2go.
- *Point-to point station-based carsharing*: Some point-to-point carsharing services are stationbased, meaning that the user picks up a car from one parking station and returns it to another. Fixed infrastructure can be located at the parking stations, such as charging points for electric vehicles and kiosks for customer service. France's Autolib' is the largest point-to-point station-based carsharing system (and has plans to expand internationally); the point to point system currently being piloted by Zipcar in Boston (USA) is also station-based.

As of July 2014, there were 23 carsharing operators in the USA with over 1.3 million members and 19,115 vehicles. Studies of 9,500 people who participated in carsharing

programs in the USA and Canada documented numerous impacts: 25% of members sold a vehicle due to carsharing, and another 25% postponed purchasing a vehicle, leading to the conclusion that 1 carsharing vehicle replaces 9 to 13 vehicles among carsharing members because their vehicles were sold or they postponed purchasing vehicles. This reduction in vehicles results in notable reductions in greenhouse gas (GHG) emissions (a 34% to 41% decline in GHG emissions or an average reduction of 0.58 to 0.84 metric tons/household), as shown in Figure 2. Overall, carsharing users also walk, bike, and carpool more often, which leads to decreased monthly household transportation costs (SHAHEEN; COHEN, 2015).



Legend: GHG (greenhouse gas), VMT (vehicle miles traveled)

Figure 2 Carsharing impacts in urban mobility.

Source: Shaheen and Chan (2015)..

The number of persons thinking about possibility of sharing a car with other users rather than owning one increases any day. As in carsharing user pays only by really used time, specialists estimate that someone who uses to drive less than 10,000 km/year has no economical gain being the owner of a vehicle (FRANÇOIS-FEUERSTEIN, 2011). If European vehicle ownership coasts are considered, 46% of the compact car drivers would save money with carsharing rather than buying a private car. In case of large cars, 85% drive less than breakeven point and would save money (BERT; COLLIE; GERRITS; XU, 2016), as shown in Figure 3.

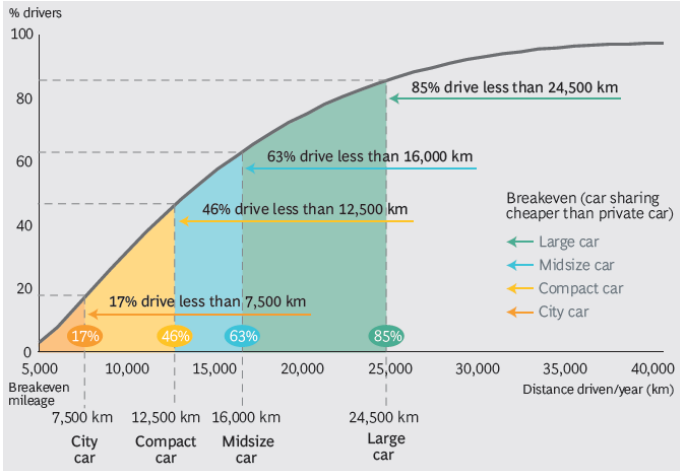


Figure 3 Percentual of drivers who would save money with carsharing.

Source: Bert, Collie, Gerrits, and Xu (2016).

Carsharing is increasing in large urban areas in developed and in emerging countries. In Figure 4, it's possible to see, focused in emerging markets, the number of members and vehicles evolution in last years.

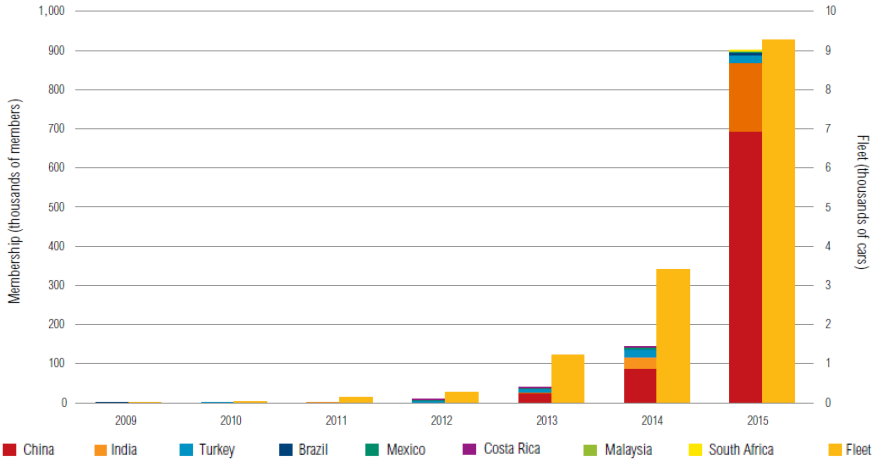


Figure 4 Growth of Carsharing Members and Fleet in Emerging Markets.

Source: Lane, Zeng, Dhingra, and Carrigan (2015).

Although the largest market in the Asia-Pacif region (including Australia, China, Hong Kong, Japan, Malaysia, New Zeland, Singapore, South Korea and Tayan), with 2.3 millin users and 33,000 vehicles, Europe (including Turkey and Russia) boasts the largest service per capita, with 2.1 million users and 31,000 vehicles. North America (including Canada and United States) brings up rear, with 1.5 million users sharing 22,000 vehicles. Together, the three regions account for 2.5 billion booked minutes per year and € 650 million in revenues (Bert et al., 2016).

Even with all these evolutions, many challenges and opportunities about carsharing still remain. Main barriers and opportunities can be saw in Table 2:

CATEGORY	BARRIERS	OPPORTUNITIES
Potential Users	■ Strong desire for car ownership and usage ■ Limited driving experience ■ *Unfamiliarity with carsharing service* ■ *Price sensitivity*	■ Desire for car access ■ *Familiarity with bike sharing (China)*
Transportation Infrastructure	■ Road congestion ■ Insufficient public transport, cycling infrastructure to provide alternatives to car use for short trips ■ *Limited parking for carsharing (on street or public garages)*	■ Public transport system improvements ■ *Poor taxi and rental car options (China)* ■ *Low rate of car ownership* ■ *Limited or expensive parking for private vehicles*
Governance	■ Lack of procedures for checking driving record ■ Lack of personal credit system ■ *Public agencies unfamiliar with carsharing* ■ *Vehicle restriction policies*	■ Air pollution concerns ■ Vehicle restriction policies (even carsharing is not exempted) ■ Clean vehicle promotions ■ High cost of private car ownership
Business	■ *High capital investment* ■ Limited access to capital ■ Difficult to reach a certain level of operational scale ■ Potential competition from intermediate public transportation modes like rickshaws and taxis and personal two-wheelers.	■ Low labor cost

Table 2 Barriers and opportunities for carsharing.

Source: Lane, Zeng, Dhingra, and Carrigan (2015).

In addition, some studies have argued that carsharing models will only succeed if they show that they can also influence users' habits in relation to more sustainable practices in general (such as the true use of vehicles by more than one person and not just one single users per vehicle or the use of carsharing services in daily life limiting the use of their private vehicles for leisure, for example) (POCACITO, 2015)

Other authors such as Consoni (2017) and Pascoal, Furtado, and Ferreira Filho (2018), warn that stimulating the production and consumption of electric vehicles (same in the carsharing mode) could increase even more traffic on urban roads in the country. That is, even if it could mean a breakthrough in the issue of sustainability will not contribute significantly to social welfare.

3.1 Worldwide initiatives

Since June 2015, simultaneously, Ford, General Motors and BMW lounched sharing programs in Europe and United States – with each manufacturer claiming to be the first to let car owners earn money by renting out their new vehicles to other drivers. Opel (General Motors' European brand at that time) allows drivers to rent out their cars via a dedicated Opel app for smartphones and tablet computers. Ford has also launched a six-month pilot scheme to allow 12,000 customers in and around London who have bought cars through its financial services arm to rent out their vehicles, using easyCar Club, an online peer-to-peer platform. BMW allows customers buying a Mini to choose to rent out their cars. The program had initially be available in the US and later in european cities such as London (SHARMAN, 2015).

In the beginning of 2016, GM announced the creation of a brand to regroup all the mobility services offered by the company in partnership with technology enterprises. Maven starts with shared cars in United States and Germany. In this system, the use of the car is paid by hours, from US$6 to US$12, according to the kind of vehicle (PAIXÃO, 2016b).

Still in 2016, PSA Group, owner of Peugeot, Citroën and DS, has lauched a new brand: Free2Move. It unites all of the PSA Group's new mobility solutions, with the aim of satisfying the full spectrum of consumers' transport needs. This includes car sharing, leasing, fleet management and smarter, connected cars (INGRAM, 2016). PSA Group has also bought two startups: Koolicar e Travelcar. Citroën and Travelcar Citroen and Travelcar made the leasing available to the public at zero euros per month: This system allows the long-term lease of a Citroën C1, with zero cost, provided that the car is made available for sharing (PEROU, 2017). Daimler already has a car brand, Car2Go, which leases Smart Fortwo in 29 cities across Europe and North America (PAIXÃO, 2016b). Fiat has Enjoy: entreprise which Works in Italy with a "cinquecento" and "cinquecento L" fleet (PAIXÃO, 2016b). A summary of the main initiatives of carsharing already implemented or in study worldwide can be saw in the Figure 5.

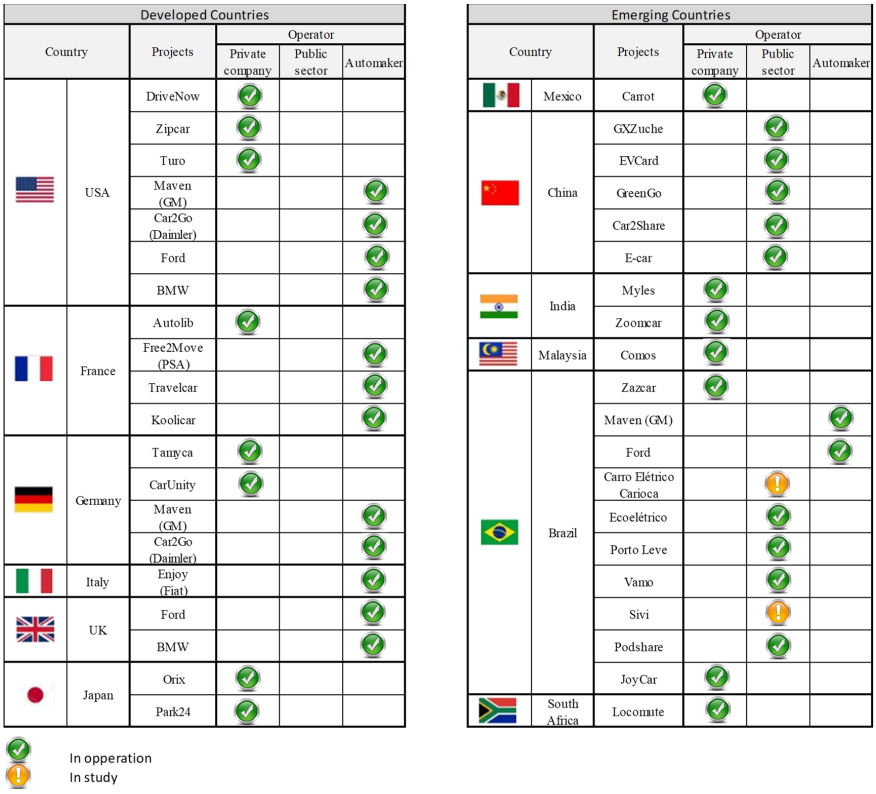


Figure 5 Carsharing main initiatives worldwide.

Source: Authors.

4 CARSHARING X URBAN MOBILITY: OPPORTUNITIES AND CHALLENGES IN BRAZIL

Driving a car is often the easiest, most straightforward mobility option for many urban residents. There are a laundry list of reasons people just can't seem to live without cars in cities: because they don't feel that public transport or bicycling are safe, comfortable, or convenient; because infrastructure for biking or walking isn't adequate; because the quality of public transport service is low; because they have to be able to move young children; or even the simple reason that the car is easier and

always available. At an individual level, these reasons are understandable. But as a collective decision made by billions of urbanites every day, reliance on cars has become an immense environmental, economic, and social burden on society (ZOTTIS, 2015).

The transport sector is one that benefits the most from the logic of the sharing economy. Indeed, in recent years, there has been a visible break in the world over traditional car rental services and private transport of people, which includes taxis and private drivers. This rupture was possible thanks to platforms that, based on the pillars of the sharing economy, reinvented such services. The best-known example in this industry is ride-sharing which permeates, through its smartphone application, interested individuals to locate the nearest registered drivers. The charge for the race is made directly on the passenger's credit card, previously registered in the application. There is also the carsharing service, where interested individuals rent a car by charging a subscription, in addition to the time value used (SCANDIUZZI, 2016).

As a response to congestion and air pollution problems associated with rapid motorization, emerging markets such as China, Brazil, and Mexico have implemented vehicle ownership and/or usage restrictions in some cities – suggesting both barriers and opportunities for carsharing. Vehicle restrictions could make carsharing an attractive alternative to a household's first or second car (LANE; ZENG; DHINGRA; CARRIGAN, 2015).

In this context, the carsharing is a viable alternative to the problem of mobility of large Brazilian metropolises, since it would allow the use of shared transportation means, facilitating parking issues, urban traffic itself and reduction in environmental and socioeconomic costs (MENDES; CEROY, 2015).

Mobility is a necessary part of urban life; the challenge is to make it more efficient. Collective transport solutions like dedicated bus lanes, Bus Rapid Transit (BRT) networks, bike share systems, and others already exist in many Brazilian cities and are gaining in popularity. But so far, Brazilian cities are only just beginning to explore car share programs as viable alternatives to private car ownership. Car sharing has the potential to transform the relationship between people and cars because it substantially reduces the space dedicated to parking and eliminates the need to be responsible for a vehicle when you're not even using it (ZOTTIS, 2015).

4.1 Private CSO (carsharing operator) initiatives in Brazil

Brazil was the first emerging market country to introduce carsharing. Founded in 2009, São Paulo's Zazcar was the first carsharing system in South America. In August 2012, Zazcar operated 60 vehicles serving around 1,100 members; membership had grown to over 3,000 members by early 2015.13 After many years with only one CSO (CarSharing Operator), Brazil has experienced a recent expansion in the industry. Since 2013, five new CSOs have launched at least pilot operations in five different Brazilian cities (LANE; ZENG; DHINGRA; CARRIGAN, 2015).

Since 2105, Prime Fraction Club offers luxe cars rental and sharing. Company is responsible for maintenance and assurance of the vehicles. Clients pay a quote and so may use the cars for 3 years paying only fuel. Groups of three associates are allow to use 10 days/month one of the cars, for exemple, a Jaguar F-Type or a BMW M6. Prime Fraction Club estimates, based on its market experience, that their clients reduces 25% of the costs, comparing with owning a luxe car (CARVALHO, 2016).

4.2 Public administration initiatives

Two northeastern cities and two south cities of the country are pioneers in carsharing in Brazil: Recife, Fortaleza, Curitiba and Porto Alegre:

- The northeastern city of Recife inaugurated at Septembre 2015 the Project Porto Leve and it began offering a small fleet of cars for a monthly rate of US$30 – extremely affordable when compared to the total cost of car ownership. An additional feature of this program is that it encourages people to share trips together to reduce costs and optimize collective traveling (ZOTTIS, 2015).
- The city of Fortaleza in the state of Ceará inaugurated at Septembre 2016 the Project Vamo and it began offering a small fleet of electric car sharing system, an initiative that combines environmental conservation and innovation. The project includes 20 electric cars and 12 charging stations strategically placed around the city. To make this project come true, Enel company, a distributor of electricity in the state of Ceará, responsible for the platform that measures and follows the charging process at the stations, which is integrated with the billing service of its energy distributor. Using the cars is quick and easy: through the "Vamo" app on smartphones users can register, pay a monthly fee and choose their desired vehicle based on each station's availability (ENEL, 2017).
- The Project of the city of Curitiba called EcoElétrico, aims at establishing a smart mobility network, providing a connected, integrated and sustainable transport system in the city. The project was divided into four phases, from 2014 to 2020 and its initiatives are focused on the management of a network of Electric Cars charging stations, on the implementation of a corporate car-sharing system and on smart urban logistics. An Operations Monitoring and Control Centre for Smart Mobility was deployed in Curitiba. The partners of this project are: ITAIPU Binacional (the second largest operating hydroelectric facility in the world), Municipality of Curitiba, the Renault-Nissan Alliance and CEiiA (a Centre of Engineering and Product Development from Portugal) (CEiiA, 2014).
- At the opposite end of the country in Porto Alegre, a similar initiative is in progress. Students of the Federal University of Rio Grande do Sul (UFRGS) came up with the idea for an Intelligent Vehicle System (Sivi), an application

that will unlock select vehicles on one campus and allow students to return them on another. The project is experimental and will only serve two campuses in the testing phase, but has the chance to expand to cover the entire city if trials prove successful (ZOTTIS, 2015).

4.3 Automakers initiatives

Brazil has be second country in the world to adoptate GM's carsharing program, Maven. In Brazil, it exists since mars 2016, and allows costumer to lease a vehicle paying by hour, for a house-to-work ride, for exemple (SILVA, 2016).

In september 2016, Ford lauched its pilot carsharing program dedicated to employes with a six month duration. According to the automaker, it is first carsharing program adopted by Ford in Latin America (PAIXÃO, 2016a).

Since 2017, Audi Share allows employees of companies installed in the WT Morumbi condominium, in São Paulo, where the brand headquarter is located, to rent luxe cars. Who works there may choose among Audi A3 Sedan, A4 Sedan, A6 Sedan, Q3 and TT Coupé. Reservations can be made by hour, day or weekend and include a full tank and insurance. Audi says it intends soon to extend the service to other regions of the country (CARVALHO, 2017).

4.4 Brazilian National Policy on Urban Mobility

The Brazilian National Policy on Urban Mobility (Law 12.587of 2012) states that all Brazilian cities with a population over 20,000 must draft and present an urban mobility plan which should serve to reduce inequality, promote access to services, improve mobility, promote sustainable development, and strengthen democratic institutions in the city.

Although this policy does not expressly address the issue of car sharing, it is important to emphasize that the text of the law itself calls for openness to technological innovations in order to stimulate the development and improvement of new methods related to urban mobility issues (MENDES; CEROY, 2015)

In addition, the car sharing proposal is in line with several other principles and central directives of the Brazil's National Policy on Urban Mobility, such as (MENDES; CEROY, 2015):

- the "sustainable development of cities, in the socio-economic and environmental dimensions" (article 5, II),
- the search for "efficiency, effectiveness and effectiveness in urban circulation" (article 5, IX) and,
- "mitigation of the environmental, social and economic costs of people displacement" (article 6, IV).

As a result, the incorporation of the the car sharing model into this law is perfectly in line with the National Policy on Urban Mobility cited before (MENDES; CEROY, 2015).

4.5 Some barriers to adoption and expansion carsharing in Brazil

Even so, many barriers are found to scaling up carsharing in a way that could meaningfully contribute to a sustainable future of the urban mobility in Brazil. For example,

- a lack of public policy;
- the enormous traffic jams In the large urban centers;
- a lack of on-street parking regulations;
- competition with well-established taxi services;
- limited market awareness;
- cultural aspirations for car ownership;
- fear of sharing;
- technology;
- immature financial systems for cashless payment;
- a lack of insurance regulations; and
- safety.

This way, scaling up carsharing will require more action from governments (local, state and federal) and entrepreneurs to innovate, measure societal impacts, and tackle policy, market, and transport system barriers in Brazil (LANE; ZENG; DHINGRA; CARRIGAN, 2015).

5 SHARING ECONOMY X FUTURE IMPACTS TO AUTOMAKERS

At the same time as the acquisition volume of some goods is reduced, individuals those would not have access to a kind of product in traditional market will be able to consume it (SCANDIUZZI, 2016).

Dan Ammann, president of GM in may 2015, outlined the dilemma for city-dwellers who rarely use their cars. “It’s the last thing you should do because you buy this asset, it depreciates fairly rapidly, you use it 3 per cent of the time, and you pay a

vast amount of money to park it for the other 97 per cent of the time," he said in an interview with the Financial Times.

There have been apocalyptic warnings that the rise of car sharing would decimate carmakers' revenues, at a time when investment needs are increasing because of environmental regulations. With carsharing increase, revenues should decrease beacause current and future clientele will be less interested in owning (and also buying) cars. The car industry realizes that at some point their business model will change from direct-to-consumer towards a business-to-business model, not selling cars to end users but selling them to fleets or running their own fleet of shared cars (CALEM, 2016).

In the other hand, the more cars get used – i.e. shared – the faster they wear and need to be replaced. So pooling and sharing is not necessarily negative (Sharman, 2015). However, selling cars to individuals is profitable, and so automakers fear diminishing it. They are not fully committed to a new services-oriented business model yet (CALEM, 2016).

Carsharing will have a very bigger impact in Europe and Asia-Pacific region. North America Automakers shall loose around 52,000 vehicles/year sells for clientes those will migrate to carsharing until 2021, however, this loss will be partially replaced by 44,000 vehicles/year sells for sharing fleets. So, the net loss will be of only 8,000 vehilces/year within a cost near of US$ 500 millions (REUTERS, 2016).

According to international previsions, autonomous vehicles shaw be present in towns since 2025, when they must represent 4% of all vehicles sold in the world. And its penetration will fast progress, arriving to 75% of global Market near 2035 (PASCOAL; FURTADO; SILVA, 2016). Massachusetts Institute of Technology (MIT) and Stanford studies have shown that driverless cars could further reduce cost of car sharing services by enabling intelligent coordination to minimize congestion, keep the driverless fleet in balance and better serve anticipated demand. These advantages leave ample room for driverless-car-enabled business models that give significant savings to passengers (over individual ownership and driving) while enabling hefty profits to service providers (MUI, 2016).

Thus, automakers and specialists consider that ride sharing (like Uber and Lyft) and car sharing will converge soon into the same thing, which we call Cars as a Service (CaaS) or an autonomous on-demand network of cars. IHS forecasts that the autonomous CaaS market will emerge in the early 2020s, and accelerate in 2025. By 2030, as much as 1.9 percent of the world's urban population, or 101 million people, will use these services, which will comprise 10 million vehicles. "There's a big potential for it and the reason automakers are interested is they're always looking for ways to flatten out their revenue curves (CALEM, 2016). This virtuous cycle, that will change the way people see cars and so will modify automakers business, is represented in Figure 6.

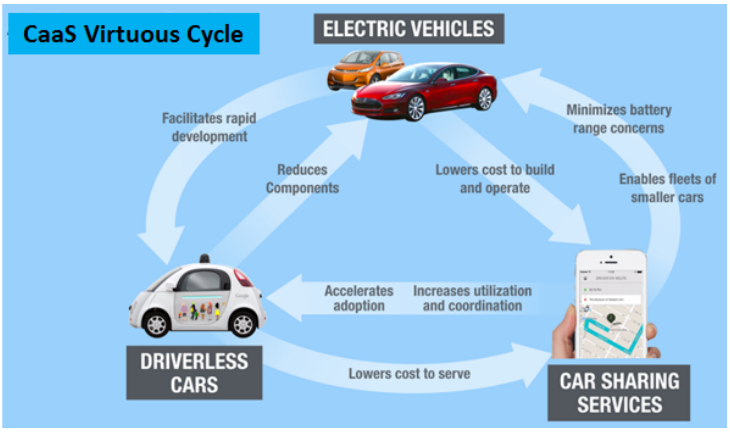


Figure 6 Virtuous Cycle between driverless Cars, electric vehicles and carsharing services.

Source: Adapted from Mui (2016).

6 FINAL CONSIDERATIONS AND CONCLUSIONS

The potential of sustainable urban mobility looks like limitless according to the innovative solutions those are currently being developed around the world, but it still requires leadership to break trough the traditional economy and society paradigms, especially the points identified in Chapter 3.

The different initiatives already implemented or under development in the main countries of the world demonstrate the importance of shared economy in the issues of urban mobility, especially through the popularization of the model called carsharing. Complete transition will be that integrating public transport, cycling, walking, and carsharing into a cohesive system, expanding the range of mobility options and giving people possibily to choose how they move in their cities.

Following the world trend, in Brazil, even in a more modest way, there are some initiatives of the application of the carsharing model to the issues of urban mobility. Some major capitals already have programs in progress.

Technology, as it does worldwide, is helping Brazilian cities to develop carsharing programs. However, the broad development of carsharing in the country still faces certain difficulties, among them the lack of federal public incentives. So, city leaders and politicians need to be ready to support the sharing culture as an alternative to car ownership. In addition, from the regulatory point of view, carsharing is not considered

in the current National Urban Mobility Policy, which should be updated in consonance with the specificities and requirements of this new economy model.

In a business model perspective, as the current transportation system has several shortcomings and does not meet the population by comfortable and safer means of movement, carsharing in the Brazilian scenario has an important potential for growth, both for public power and private initiative. Thus, the application of the business model based on sharing economy presents great potential for the Brazilian automotive industry, a fact that would make possible the introduction, no longer on an experimental scale or projects exclusively sponsored by the public power.

Finally, carsharing emerges as a Turning point in the business model of automakers, which in the not too distant future can stop selling cars and start selling mobility services.

COMPARTILHAMENTO DE VEÍCULOS E MOBILIDADE: UM PONTO DE MUDANÇA PARA AS MONTADORAS E A SOCIEDADE

Resumo

O compartilhamento de veículos é uma realidade em países desenvolvidos, como os Estados Unidos, a França, a Alemanha e o Japão. Ainda assim, diversos estudos vem sendo realizados por montadoras e empresas de tecnologia nesses países a fim de aprimorar a rentabilidade do negócio. De acordo com as projeções de consultorias e especialistas da indústria, o mercado potencial de compartilhamento de veículos é muito positivo, estimulado tanto pelo aumento do apelo ecológico quanto pelas novas tendencias de mobilidade urbana. Nesse contexto, o objetivo deste artigo é apresentar um panorama das principais iniciativas de governos e montadoras para desenvolver esse novo mercado, com um foco para o contexto brasileiro. Ao término do estudo foi possível identificar as principais dificuldades e facilitadores, assim como um caminho para que se possa tornar o compartilhamento de veículos uma realidade cotidiana dos motoristas no Brasil.

Palavras-chave: Indústria Automobilística. Economia Compartilhada. Compartilhamento de veículos.

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