

Car sharing integration in the City of Milan

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Abstract

This paper will present a structural summary of the reasons for implementing car sharing as a sustainable form of mobility in City of Milan. The paper will also describe the growth and development of car sharing services in Milan. It will provide an overall view of measures that have had an impact on reducing the number of vehicles, air pollution and improving the quality of life in the city.

Introduction

Milan is the second largest city in Italy, right after the capital Rome, with 1.35 million inhabitants and 3.2 million inhabitants in the metropolitan area. The population density in the city is about 7,400 inhabitants per square kilometer, while in the metropolitan area there are about 2,000 inhabitants per square kilometer. There is a 5.3 million trips every day, made by 850,000 people entering and 270,000 people leaving the town. 57% of all trips are made by public transport, 30% by car, 7% by motorcycle and 6% by bicycle. [1]

Like all other cities around the world and in Europe, the City of Milan faces the challenges of increasing mobility, reducing air pollution, reducing number of vehicles on the city streets and consequently increasing the overall quality of life of its inhabitants. Reducing the number of vehicles and traffic congestion requires a comprehensive policy that provides sustainable modes of transport. It is also necessary to bring these modes of transport closer to the inhabitants through education and promotion. Milan is a great example of how all this can be achieved in just a few years. As one of the measures for sustainable mobility, the city of Milan has implemented a car sharing system.

Main reasons for sustainable mobility

In order to reduce the number of vehicles in urban area, to reduce pollution and to improve the quality of life, City of Milan has implemented several measures over the years – from pollution charge (Ecopass), congestion charge to smart and sustainable mobility such as sharing (car sharing, bike sharing, scooter sharing, kick scooter sharing).

Ecopass started operating on 2 January 2008. This was a traffic pollution charge, as a part of the overall sustainable mobility strategy. There was 43 entrance point in 8.2 square kilometer that was controlled by an electronic system of cameras. Ecopass was active from Monday to Friday, from 07:30 till 19:30. Not all the vehicles had to pay for Ecopass. The fees were based on the vehicles emission standards, which means that the most polluting vehicles were paying a pollution charge, while some vehicle did not pay a fee at all. [2]

Unlike this model, the congestion charge, which was introduced in 2012, all vehicles (with some exceptions) entering the same area pay a fee. Area C is restricted traffic zone of the center of Milan – it has the same boundaries as Ecopass. Area C is active, as well as the Ecopass was, from Monday to Friday, from 07:30 till 19:30. There is no charge for weekends and public holidays. Vehicles that have free access are: electric vehicles, hybrid vehicles (some of them), mopeds and motorcycles. Here are also included emergency vehicles, army vehicles, vehicles used by sector of animal protection, vehicles used for transport people with serious and rare diseases. Vehicles not allowed to access in Area C are: most polluting vehicles (Euro 0 petrol, Euro diesel 0, 1, 2, 3 vehicles and from February 2017 Euro 4 diesel vehicles too), vehicles over 7.5 meters length. All other vehicles have to buy a ticket to enter Area C. Residents of Area C have 40 entry free of charge in the calendar year, after that they also have to pay the entrance. Also, there are ZTL areas (originally *Zone a Traffico*

Limitato) or Limited Traffic Area, in which access and movement for all vehicles is forbidden, with the exception of residents, specific categories of users and for particular type transport like public transport). [3]

These measures had effects – the car ownership and number of cars in general in urban area has decreased; road traffic had decreased for 29.2%; road accidents also for 26%; public transport speed had increase for 2% (for buses between 09:00 – 10:00) and for 4.4% (for buses between 18:00 – 19:00); 12% more users in surface public transport and 17% more users underground public transport. [4] Pollution was also decreasing, but not enough. That way City of Milan has introduced Area B.

Area B covers approximately 72% municipal territory and is active from 25 February 2019, from 07:30 until 19:30. Access is forbidden for the most polluting vehicles (Euro 0 petrol vehicles and Euro 0, 1, 2, 3 and 4) and for vehicle over 12 meters length. There is no fee for vehicles, which has permitted access. [5]

The implementation of car sharing as a sustainable transport mode was intended, as mentioned above, to reduce the number of car owners and improve the quality of life for all who live, work, study and visit the City of Milan, by decreasing both traffic and pollution. In this regard, it is important to note that car-sharing users do not pay access fees for accessing restricted areas.

Car sharing development in City of Milan

Iniziativa Car Sharing (ICS) plays an important role in promotion and implementation of car sharing services both in Milan and throughout Italy. When it was established on the initiative of Ministry of Environment, in May 2000, to spread the concept of this sustainable form of urban mobility, car sharing was almost unknown in Italy. Through ICS, Car sharing services were popularized and incorporated in the whole country and society. ICS offers: technical and legal consultancy, project support for designing the system and the service, communication and promotional support on a national level, promotional, communication and marketing support on a local level, call center services, technologies for the management of the fleet and the service and assistance during the initial operational period [6]. Today the ICS represents a network of 38 municipalities, major cities and provinces, coordinated by the City of Milan.

The first car sharing system in Milan, Car Sharing Italia, is in fact a pilot project of car sharing which was presented in 2001 in cooperation with the environmental association Legambiente. GuidaMi is a second car sharing service that launched in 2004. It was, as well as Car Sharing Italia, station based car sharing system. [6]

In 2013, the Municipality of Milan launched a public tender to bring new private operators and spread free-floating car sharing services – and they succeeded. [7] In just a few years, six new private service providers were operating on the streets of Milan. All of them brought new operational model of car sharing – free floating. This model of car sharing has been received by users very well, because it is giving people the flexibility to collect and return cars where they want.

Figure 1 presents the timeline of car sharing history in Milan. Today, there are five car sharing providers in Milano – two of them are station based and three are free floating.

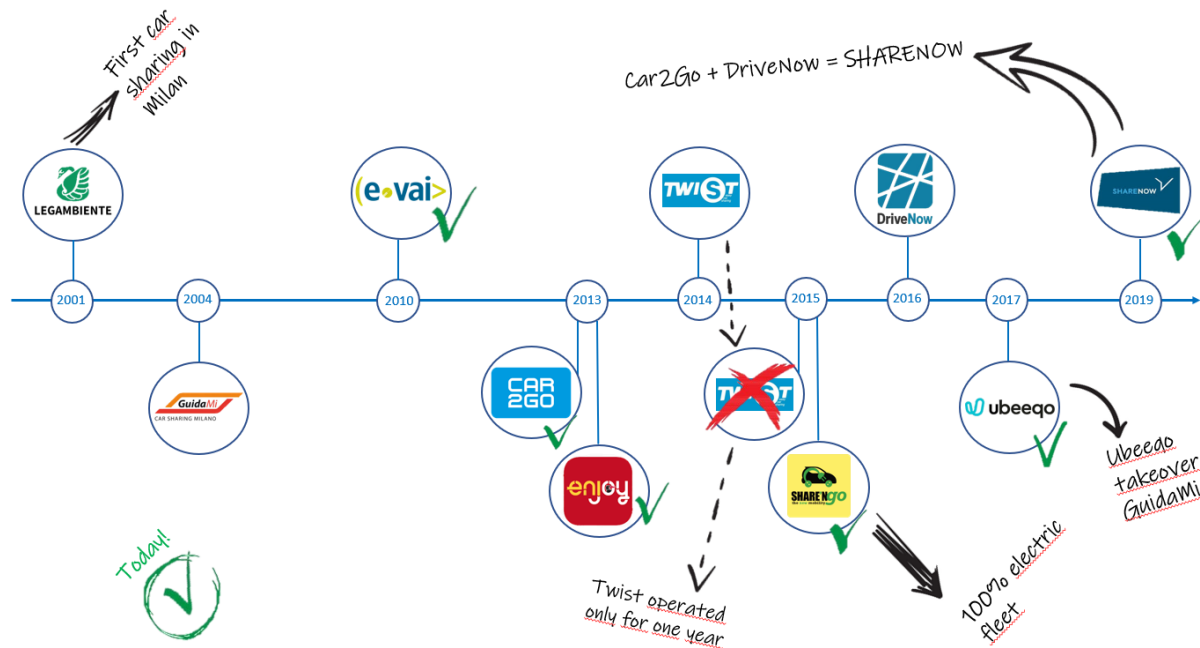


Figure 4. Timeline of car sharing history in Milan

Source: [Author]

UbeeGo and E-vai are car sharing providers with a station based system. UbeeGo was launched in 2017, with acquisition of GuidaMi, the historical Milan's car sharing service originally founded by the Municipality of Milan and company for public transport ATM. [8] It has 154 vehicles (7% electric vehicles) and 5,000 users. [4] E-vai started operating in 2010. It is a first regional car sharing service, which is fully integrated with Lombardy's railway services. The service isn't limited only on the city area, but it is also allowed to drive the vehicles anywhere in Lombardy. E-vai now has 33,000 users [4], who are driving 104 vehicles (92 of them are electric) [9]. There are over 100 parking spaces located in airports, stations, city squares and universities.

The most significant innovation of car sharing services was introduced in 2013. That was Car2Go - first free floating car sharing service in Milan which was launched with 829 vehicles (none of them is electric) in a 114 square kilometers area. The same year Enjoy came, service provider which today has 982 vehicles (none of them is electric) and 392,000 users. In 2015, Share'Ngo arrived – it has 700 electric vehicles and 60,000 users. In 2016, Drivenow came to market with 473 vehicles, operating in a 126 square kilometers business area. It has 93,000 users. [4] Finally, last year Car2go and Drivenow have announced that they are united forces under one name – Share now.

Trends in car sharing

The number that illustrates the positive effects of car sharing in Milan best, is the car motorization index. According to the Observatory on sustainable mobility in Italy, in 2006 Milan has had 565.3 vehicles per 1,000 inhabitants. In 2018 that number was 502.7 vehicles per 1,000 inhabitants. Decreasing trend of car motorization index is shown in Figure 2.

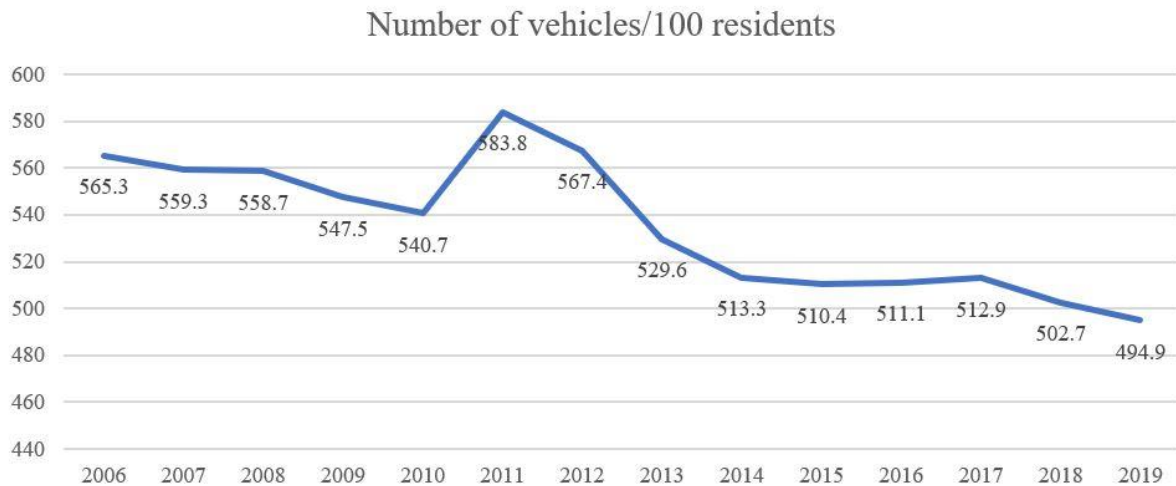


Figure 2. Decreasing trend of car motorization index in Milan

Source: [10]

The increase in the number of car sharing vehicles had a direct impact on the decline of privately owned vehicles. Car sharing vehicles number increase is shown in Table 1. The fleet has 3.394 vehicle, with an electric vehicle share of 28% in 2018 [4].

Table 1. Comparison of vehicle quantity and number of users for the period 2013 – 2017

Year	2013	2014	2015	2016	2017
Number of vehicles	993	2.018	2.562	2.988	3.290
Number of users	40.256	244.387	394.013	522.578	639.000

Source: [11]

According to Third National report on sharing mobility 2018, the number of daily usage of car sharing services have been progressively growing since 2013, and have reached a daily average of around 15.000 in 2017. This is a six and a half - fold increase in five years. In comparison, we see a slower, three – fold increase in number of shared cars for the same period. Every single car in the fleet was, on average for year 2013, used 2.3 times per day. For year 2017, the daily number of uses per car rose to 5.1. The overall productivity of the service doubled within five years, as the average driving time stayed relatively stable - approximately 20 minutes per use. The number of users has also continued to increase in this period, which is shown in Figure 3. As reported for the year 2018, fleet growth rate was lower in comparison to the period mentioned, but the average daily use of a single car doubled. It grew to 5.6 (2018) from 2.3 (2013). [9]

According to Milan's Sustainable Urban Mobility Plan, the modal split of people movements during the next 10 years is expected to change very significantly; it is expected that public transport will be used for 63% of domestic trips in Milan and the expected decline in the use of private vehicles is - 24%. The goal is to reduce car motorization index to 460 vehicles/1000 inhabitants. The estimated daily number of car sharing service use should climb to 30,000 for the year 2022. To enable this level of service operation, the number of shared vehicles should increase to 5,000. [11]

Mobility as a Service

Mobility as a Service (MaaS) is the integration of various forms of transport services into a single mobility service accessible on demand. To meet a customer's request, a MaaS operator facilitates a diverse menu of transport options, be they public transport, ride-, car- or bike-sharing, taxi or car rental/lease, or a combination thereof. For the user, MaaS can offer added value through use of a single application to provide access to

mobility, with a single payment channel instead of multiple ticketing and payment operations. For its users, MaaS should be the best value proposition, by helping them meet their mobility needs and solve the inconvenient parts of individual journeys as well as the entire system of mobility services. A successful MaaS service also brings new business models and ways to organize and operate the various transport options, with advantages for transport operators including access to improved user and demand information and new opportunities to serve unmet demand. The aim of MaaS is to provide an alternative to the use of the private car that may be as convenient, more sustainable, help to reduce congestion and constraints in transport capacity, and can be even cheaper. [12] In other words, MaaS is a service that provides customers a unified offer of all available transport services in a certain area, for their individual travel. City of Milan is constantly working to implement such a service. There are two applications that are a few steps away from that achievement – ATM application and Urbi.

ATM, fully named Azienda Trasporti Milanese is a public transport company in Milan. It has a network of metros, trams, trolleybuses and buses. ATM operates on a territory of 46 municipalities spread on 657 square kilometers. In 2018, ATM transportation vehicles travelled 157 million kilometers, carrying 776 million passengers. Milan's metro network with 4 lines, 113 stations and 96.8 km in length, is the longest metro line in Italy. The tram network consists of 19 lines with length of 180.2 kilometers. There are 4 trolleybus lines, operated by 137 trolley buses on a 38.8 kilometers network. The bus network is 1,155.60 km long and a total of 1,399 buses operate on 131 bus lines. [13]

ATM mobile application is diversified with different functions and services:

- route calculation which displays the ticket cost for each of the selected travel options;
- possibility of finding ATM stops, railway stations, parking, ATM Points, parking meters, ticket resales and other places of interest such as airports, BikeMi stands and cycling lanes (managed by ATM);
- possibility to view the route, stops, schedule and waiting times for one or more lines;
- possibility to buy, store and use all tickets (via SMS or via direct debit on mobile phone);
- possibility to save the stops, addresses and points of interest;
- traffic information;
- general information. [14]

A new development project of ATM mobile application is ongoing. The project is focused on the inclusion of information related to sharing services: location of car sharing vehicles, bike stalls with bike sharing indicator, the availability of bicycles, cycling path routes, departures and arrivals at railway stations and airports. Mobility as a service is aim – integration of all available services in the city. Figure 4 shows a summary of services which should be included with the project.



Figure 4. Towards an integrated mobility – MaaS

Source: [4]

Another application that provides similar services is Urbi. Urbi is an application that allows users to access all sharing mobility services – car, bike, scooter and taxi, as well as public transport. Unlike ATM app, which provides information about their own services (for example BikeMi, which is ATM's bike sharing system), Urbi provides all available cars, bikes (also BikeMi) and scooters in the area. But with this application it is not possible to pay for service. Application shows all available vehicles in the area, but for vehicle reservation user is being redirected to the application of car sharing provider. Then, in provider's application. Users reserve a vehicle and start a trip. Through Urbi application it is possible to reserve and pay a taxi service (Wetaxi). [15]

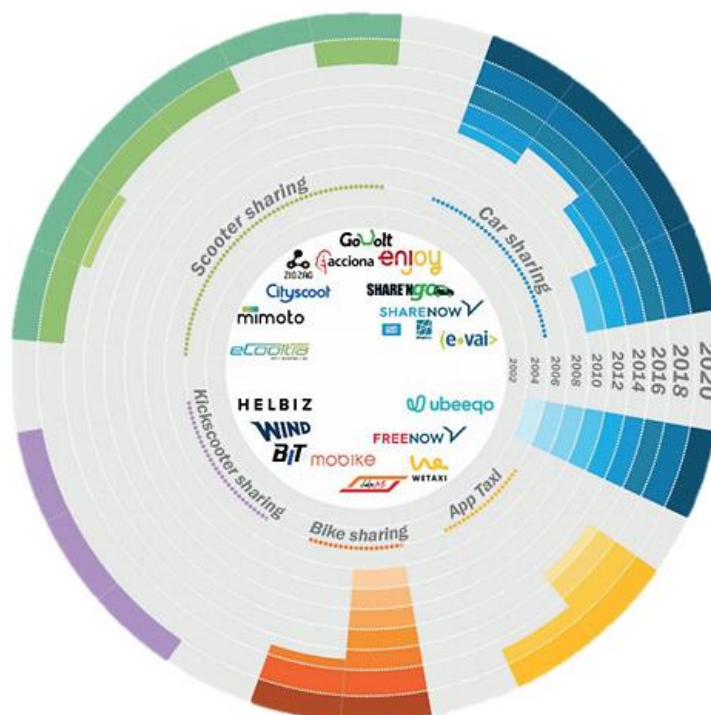


Figure 5. All types of sharing services in Milan implemented by years
Source: [16]

Impact of Covid-19 pandemic on car sharing

The world was hit by Covid-19 pandemic this year. More precisely, the pandemic continues to spread globally. There are no areas and sectors that have not been affected and damaged by the pandemic. Italy was the first country in Europe that imposed a national lockdown. The lockdown has lasted over two months. During these two months everything has been stopped, including mobility too.

The city of Milan was one of the areas hardest hit by the pandemic. The impact of the pandemic on car sharing is also huge. In the last week of February, demand for car sharing started to decline 26% per week. In two months later, the decrease in demand for the service is 90% [17]. At the end of April, the number of daily rentals was approximately 1,800, while in the same period of the previous year the number of daily rentals was 16,000. Before the pandemic, each vehicle was in use ten times a day. At the beginning of May only twice.

Some car sharing companies have recommended their customers to wear gloves and masks during the drive. Companies pay special attention vehicles cleaning maintaining high hygiene standards. In some cases, cleaning is up to four times more frequent than before the pandemic, which is a financial and logistical challenge for companies.

Although the city of Milan has implemented some measures related to urban mobility, for example suspension of the Area B to reduce the pressure on public transport, there is no information on how the city will help and whether the city will help at all car sharing companies and car sharing services.

Conclusion

Increasing mobility, reducing the number of vehicles and reducing air pollution are the main challenges for the City of Milan. To improve the quality of life of its inhabitants, Milan has introduced various measures.

The first measure, which was directly related to the reduction of pollution and at the same time to the reduction of vehicles in the city and the reduction of car ownership, was the introduction of the Ecopass in 2008. Ecopass was a traffic pollution charge covering an area of 8.2 square kilometres. It was replaced by the Area C in 2012. Area C is congestion charge and it covers the same area as Ecopass used to. All vehicles that enter Area C have to pay a fee. The city also has the ZLT zone (originally *Zone a Traffico Limitato*), in which access and movement of all vehicles is completely forbidden, with a few exceptions (residents).

The first car sharing service in the city of Milan was launched in 2001. Over the years new car sharing services have been launched, some existing services have been taken over by other services, while others have joined forces and operate under one name. Today there are a total of five car sharing service providers in Milan – two of them are station based and three are free floating. The car motorization index is decreasing over the years, while the fleet of car sharing and car sharing subscriptions is growing. As the number of vehicles on the streets of Milan grows, so does the number of car usage.

ATM – public transport company and Urbi – aggregator application provider are constantly developing their application to provide users a service that integrates different (all available) forms of transport into a single mobility service, accessible on demand. The main goal is to provide a service that through the use of a single application provides access to mobility with a single payment channel instead of multiple ticketing and payment operations – Mobility as a Service.

This year is challenging for everyone. Covid-19 pandemic has a huge impact on car sharing services in Milan and on mobility in general. Milan residents, according to the results presented in this paper, have accepted car sharing as a sustainable mode of transport, not just as an alternative mobility, but as an equal member of public transport such as tram, metro, etc. Covid-19 will certainly continue to impact the car sharing services, but the residents of Milan will still know how to appreciate and recognize all the benefits that car sharing services provide.

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