WHATEVER FLOATS YOUR BIKE:

Investigating Dockless Bike-Sharing Schemes in Milan

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Abstract

Free-floating bike-sharing companies have taken the world by surprise, with many authorities and citizens unprepared for their arrival and in need to develop new coping mechanisms. Through the lenses of the Multi-Level Perspective and *Staging mobilities frameworks*, the research investigates incumbent and nascent networks, discourses and practices revolving around the bike-sharing world in the Italian city of Milan. The research aimed to understand how these new mobilities infrastructures affect the cycling landscape of the city. The data was collected through interviews with experts and informal actors, first-person and visual ethnography, and supplemented by secondary sources, such as press articles. The results of the inquiry suggest that the free-floating bike-sharing schemes, despite being very visible in the urban space, have not yet managed to exert much influence on the mobility patterns in Milan on the regime level. In particular, they have not displaced the docked bike-sharing scheme as the main choice for commuters using bike-sharing. Nevertheless, a closer inspection of the niche level has unearthed a world of practices deviating from what the designers of these systems had in mind, including vandalism, nightlife 'drunken mobilities' and underground bike racing. While there is much controversy surrounding these schemes, especially concerning the sustainability of their business model and their use of sensitive data, they have disrupted some aspects of the docked system to indicate new ways of arranging such schemes. Based on our research, we propose a set of recommendations for a new, hybrid scheme that would combine the benefits of both docked and dockless schemes, while at the same time being more socially inclusive and protecting user privacy better.

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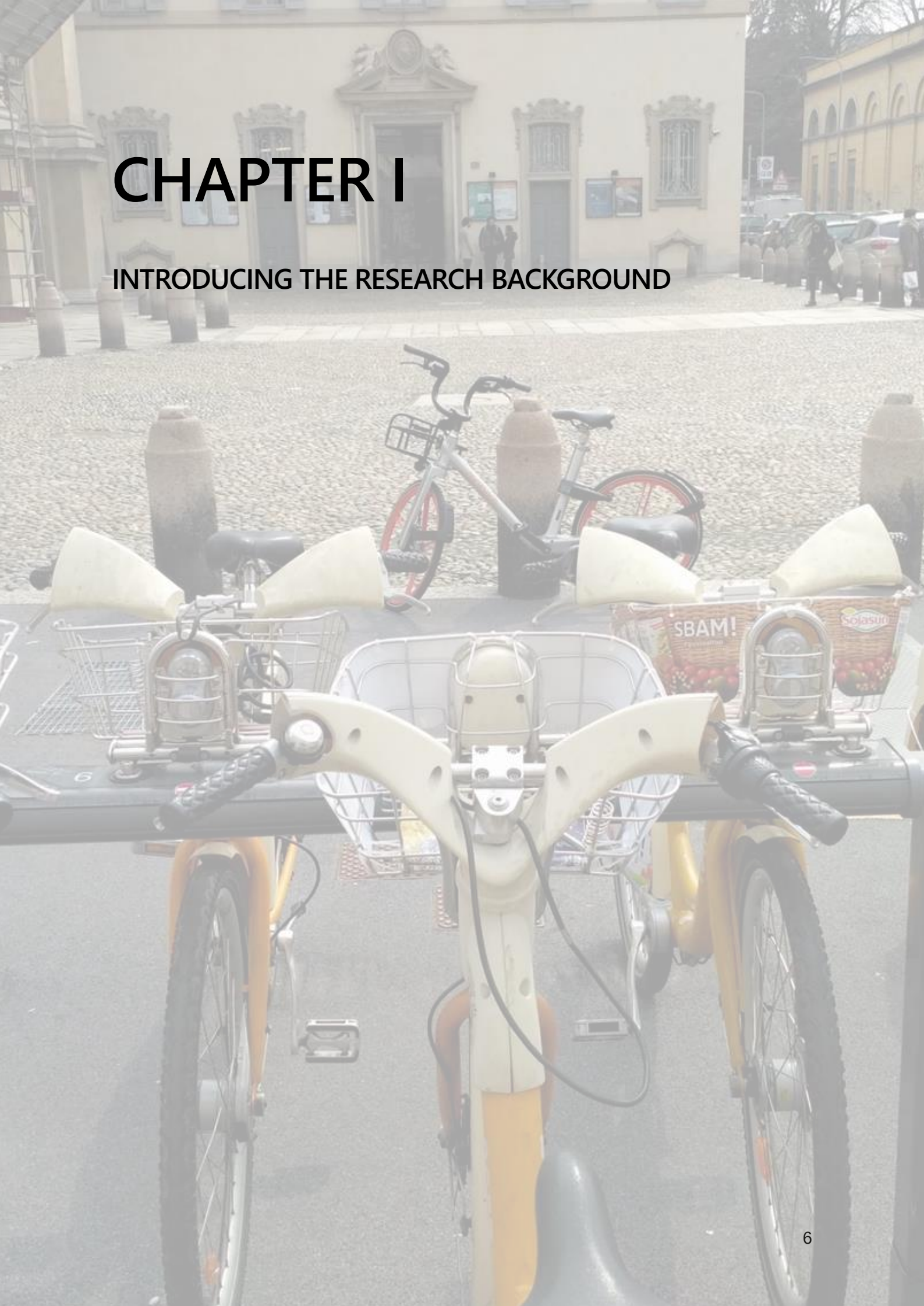
CHAPTER I

INTRODUCING THE RESEARCH BACKGROUND



Introduction

Bike-sharing schemes (hereafter: 'BSS') are often depicted as the solution to many of our cities' mobility problems. Shared bicycles don't produce CO_2 or particulate matter, they don't take up the same space as a car, there is no damage to the individual caused by theft, they provide benefits for the user's health, they are cheap and can cover a whole city easily, in the case of a free-floating or dockless scheme.

But what is a bike-sharing scheme? Today, in May 2018, English Wikipedia reads as follows:

> *A bicycle-sharing system, public bicycle system, or bike-share scheme, is a service in which bicycles are made available for shared use to individuals on a very short term basis for a price. Bike share schemes allow people to borrow a bike from a "dock" and return it at other dock in the city, as long as the two docks belong to the same system. Docks are similar to bike racks, except that all the bikes are locked into the dock, and can only be released a computer located in a kiosk at one end. The user enters their payment information, and the computer unlocks one of the available bikes. When the user returns the bike, they place it in the dock, and enter their information into the computer, and it locks the bike into the dock.*

With the onset of free-floating schemes this definition is outdated. The fact that Wikipedia is outdated, perfectly describes the novelty of the new schemes, which were born in China and appeared in Western countries only during the last year. Today, there is no longer the need for docking stations, new *free-floating* schemes offer the possibility to unlock the bicycle and pay for the service with the smartphone, and leave it anywhere in the service area, as long as it's a position accessible by other users. Adding this to the pool of benefits we mentioned above, it looks like bike-sharing schemes area a reasonable solution for the 21st century city. But is this the whole truth? What are the real impacts brought by the free-floating schemes? These questions inspired this research project, and were refined into the research question presented later. *Whatever Floats Your Bike* is a research on all the discourses, practices and actors that revolve around the world of bike-sharing mobility in Milan, a city that recently invited such schemes to operate alongside a traditional, docked BSS. In this study we investigate the truth, the myths, the political agendas and, last but not least, the citizen perspective, both users and non-users. Our approach, which we present later in more detail, is through the *Multi-Level Perspective* (MLP), and supplemented by the *Staging Mobilties* framework. Below, we present the structure of this research report, shortly describing the content of each of the chapters.

In Chapter I, we present the context we chose for the research, Milan (Italy), the European framework for BSSs (in form of guidelines) and the research question, with the set of sub-questions.

In Chapter II, we go through the literature review over bike-sharing and modal choice, trying to cover the main aspects of previous research done on the subject. Then, we discuss our Philosophy of Science and present our methodological toolbox, with the data-collecting techniques and an explanation of the secondary data sources.

In Chapter III, firstly we compare the different schemes operating in Milan, then we go through the Multi-Level Perspective analysis, looking at its different dimensions: networks, discourses and practices. We end Chapter III with a round-up of the MLP analysis and with a comparative study of four other cities, i.e. Amsterdam (NL), Paris (FR), Munich (DE) and Beijing (CN), to discover how these schemes fare in other parts of the world.

In Chapter IV, first we present a conclusion, evaluating the free-floating schemes as a global phenomenon. In what follows we put down policies recommendations for public authorities, given the outcomes of Milan's experimentation with large and different schemes. Finally, we suggest possible future research topics that we think might take this research as a starting point to produce more academic knowledge.

The Milanese context

In order to provide the reader with the context of our research, here we present general information about our study case, i.e. the city of Milan. We are going to elaborate more on some aspects in the next chapters of this work, so this section, after explaining why this city was chosen as the study case for our research, will work as a general introduction to the main topics about the city and its cycling culture.

Relevance of Milan's case

Milan is amongst the highest-polluted large cities in Europe and is in dire need of transitioning to a low-carbon economy and culture. While the city lacks a "historical" culture of cycling, like cities in the Netherlands and Denmark, the public sector is trying to push new mobility practices with innovative tools. From bike-sharing schemes, to car-sharing and even electric scooters sharing, congestion charge and low-emission zones, 30 km/h areas to Bus Rapid Transit, Milan is implementing a wide range of possible solutions. Recently, the city added e-bikes to its public BSS, and private free-floating schemes started operating as well. Due to all of these factors, Milan looks like the perfect benchmarking site to understand if these policies have an impact on the cycling culture of the city.

General introduction and pollution concerns

Milan is located in northern Italy, is the capital of the Lombardy region, the strongest region in terms of GDP in the country with € 357,200 million, according to Eurostat (2017). To put it into perspective, the sum of the 4 regions in the centre of the country (Lazio, Tuscany, Umbria and Marche) sits lower than Lombardy alone. When it comes to GDP per-capita, the region counts € 35,700, a level comparable to the western regions of Germany, Netherlands and Denmark, to list a few.

The region is highly urbanized and located in the Padan plain of the Po river valley, which is closed by the Alps along the northern and western border and the Appennines to the south. This creates a lack of air circulation, with air pollution reaching some of the highest levels in the European Union (Figure 1).

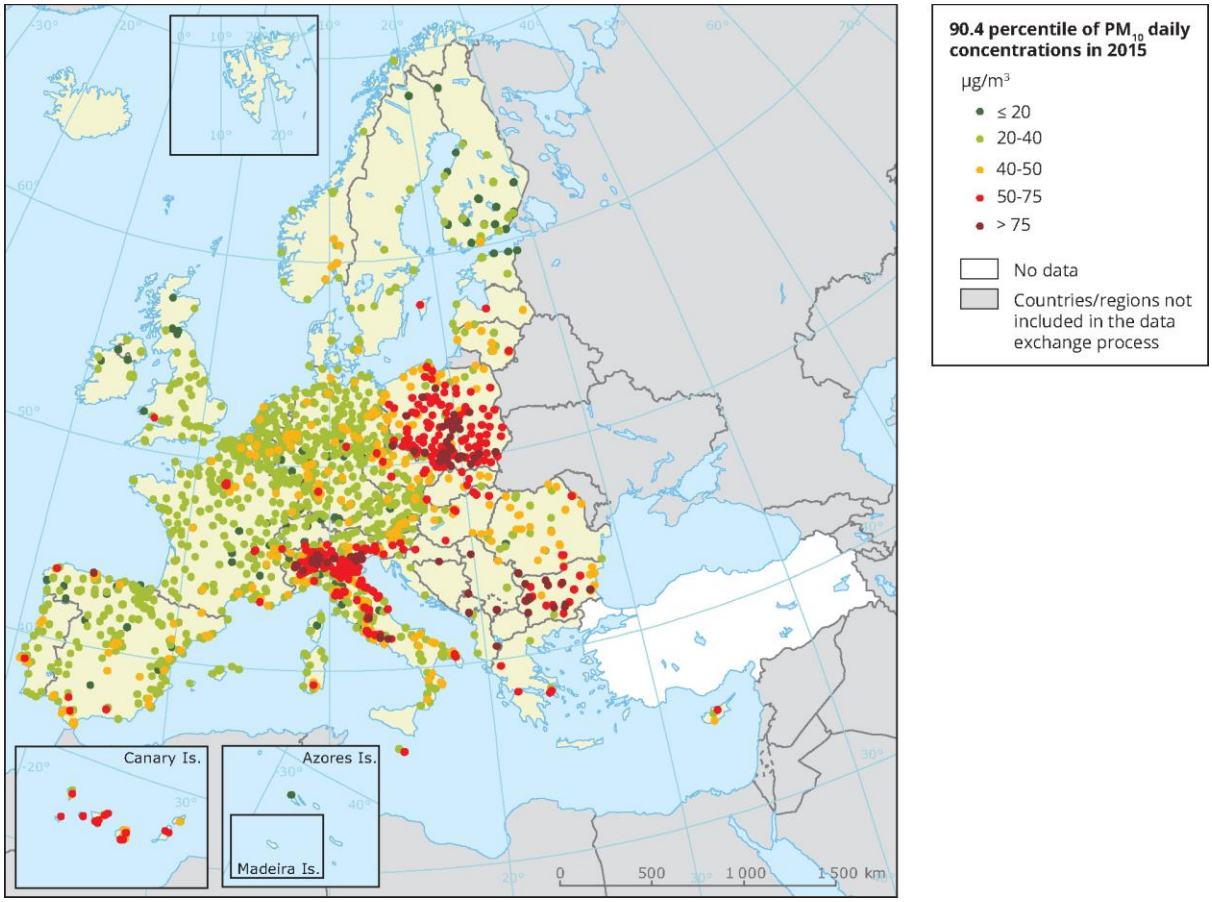


Figure 1 PM10 pollutants in the European Union (2015). Source: European Environmental Agency

Air pollution is a very pressing topic in Milan, as it appears on the headlines of major newspapers and TV news. Lombardy Region made publicly available day-to-day data about the most important pollutants on the website of the Regional Agency for Environmental Protection (ARPA), together with forecasts on air quality. The public attention towards the problem is also influenced by the impact of pollution on daily life of people in the city. Of course, there is an impact on public health: a research coordinated by the Ministry of Health shows that in 2005 there were 160 deaths directly related to PM2.5 exposure per every 100.000 inhabitants in Lombardy, as well as setting at 14 months the average lifetime expectancy lost by northern Italians due to air pollution (VIIAS, 2015).

Different sides and different authorities have fought the problem, but in this research we're mostly interested at the policies affecting urban mobility in the city of Milan. In facts, the city is expanding its public transport network by building a new subway line (following one that was recently completed), planning to implement Bus Rapid Transit systems, applying a congestion charge in the city centre and trying to involve citizens in cycling with new policies and projects. The impact of one single action is not easy, if not outright impossible to assess, as they occurred

at the same time and are interwoven with one another, together with external factors as the renovation of circulating vehicles with cleaner ones, and as air pollution does not have boundaries. Other than pollution, the city also counts a motorization rate of 505 registered vehicles every 1000 inhabitants, more than Berlin (290), London (310), Munich (350) and Madrid (480), to name a few large European cities (AMAT, 2017). The GPS-navigation devices producer TomTom International BV in its yearly Traffic Index ranking lists Milan as the 19th most congested city (above 800,000 inhabitants) in Europe, 72th worldwide, based on 2016 data (TomTom International BV).

Cycling infrastructure

Since our research focuses on BSSs, understanding the quality of cycling infrastructure is fundamental. It is clear that Milan is not Amsterdam or Copenhagen in this area. To put things in perspective, Amsterdam's marketing website *I amsterdam* states that the overall cycle network in the city (paths and lanes) reaches 767 km (iamsterdam.com), while Copenhagen in 2014 reached 368 km (City of Copenhagen, 2014). Milan's cycling network in 2017 accounted only for 215 km in length (Comune di Milano, 2017). To give a better understanding of this data, it's important to mention also the size of the cities in terms of land area and population, according to Wikipedia:

	Cycling network length	Land area	Population
Amsterdam	767 km	219 km^2	851,573
Copenhagen	368 km	86 km^2	602,481
Milan	215 km	181 km^2	1,363,180

Table 1 General comparison of Milan with Amsterdam and Copenhagen

Milan is not only lagging behind in the overall length of its cycle path network, but also in the actual spatial layout of its infrastructure. As noted in the Figure 2, the network is highly fragmented in short chunks, apart from a few main corridors. The cycling experience is further exacerbated by the typical *'pavé'* road surface (consisting of large stone blocks), the tram tracks all around the city and chaotic, or simply dangerous, car parking practices.

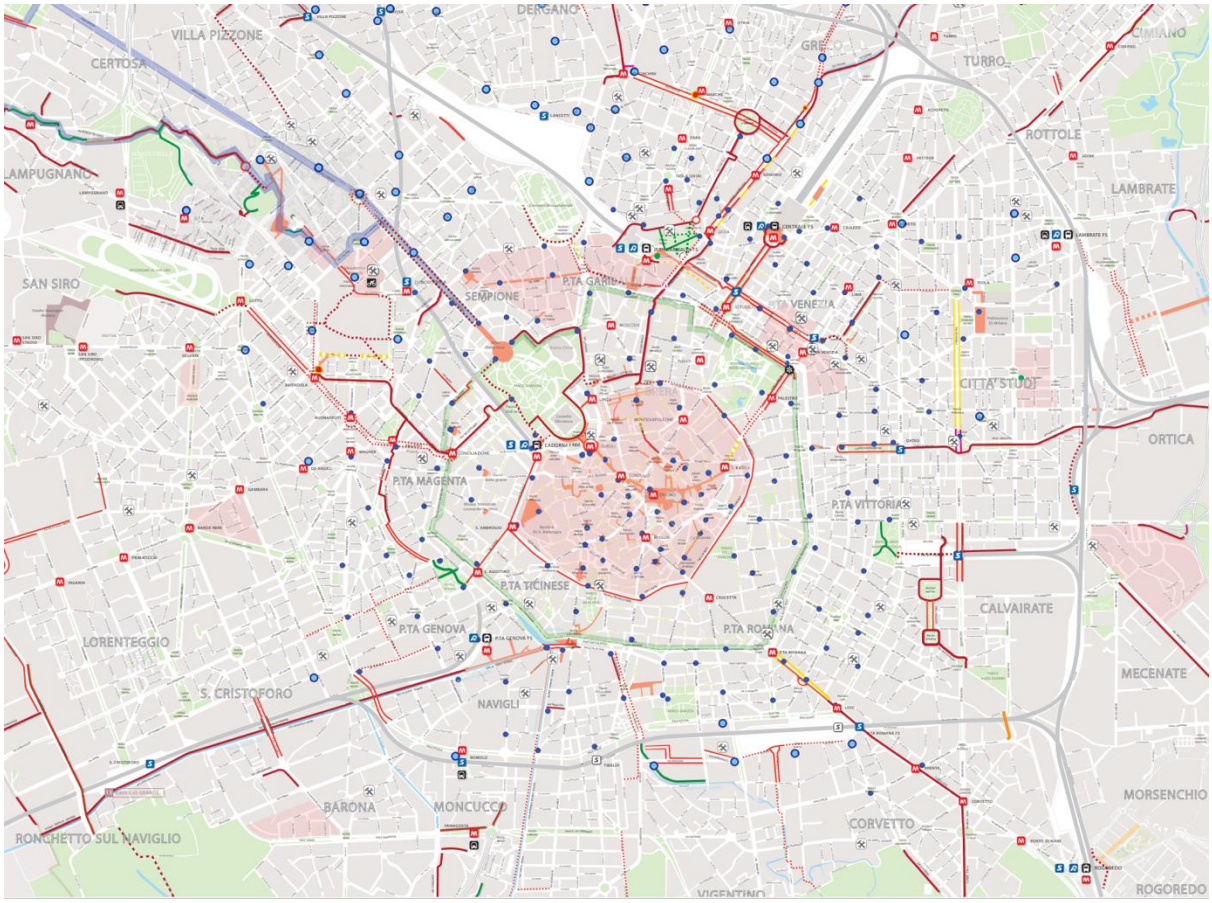


Figure 2 Milan's fragmented cycle network map (2015). Source: Municipality of Milan

The current network doesn't always comply with the standard designs used in Amsterdam and Copenhagen, as an example it's worth to mention the uproar caused during the 2011 municipal elections, when the Mayor in charge started creating bike lanes at the expense of pedestrian sidewalks, to artificially inflate the length of the network (Stella, 2011).

On a larger scale, Milan is connected through long distance cycle routes to important areas in the Lombardy region, but they serve mainly a leisure role. The routes along the three waterways *naviglio della Martesana, naviglio Pavese* and *naviglio Grande*, connect the city to the Adda river, Pavia on the Ticino river near the outlet to the Po river, and the Ticino river close to Malpensa airport. Moreover, both Adda and Ticino feature cycle paths from their respective lakes (Como and Maggiore) to the Po river, through their regional parks.

Bike-sharing schemes

The history of bike sharing-schemes in Milan is not as old as other 'pioneer' realities around Europe but we might call it a consolidated reality by now, as the first scheme will turn 10 years old by December 2018. The scheme is called BikeMi, it was activated in 2008 as a station-based service. It was first planned in the historical centre of the city with 68 docking stations, later expanded towards outer areas, following the concentric nature of the city of Milan. During the years the system grew and nowadays it counts 3,650 traditional bikes, 1,000 electric bikes, 280 stations and more than 20,000 rents per day on average (AMAT, 2017). The system is free to run for the municipality in terms of operating expenditure: the operator Clear Channel got to manage and keep the profits from advertisements all around the city's public spaces and, in turn, it takes care of maintenance and the redistribution of the bikes between stations. The municipality pays for the new bikes and for the installation of new stations.

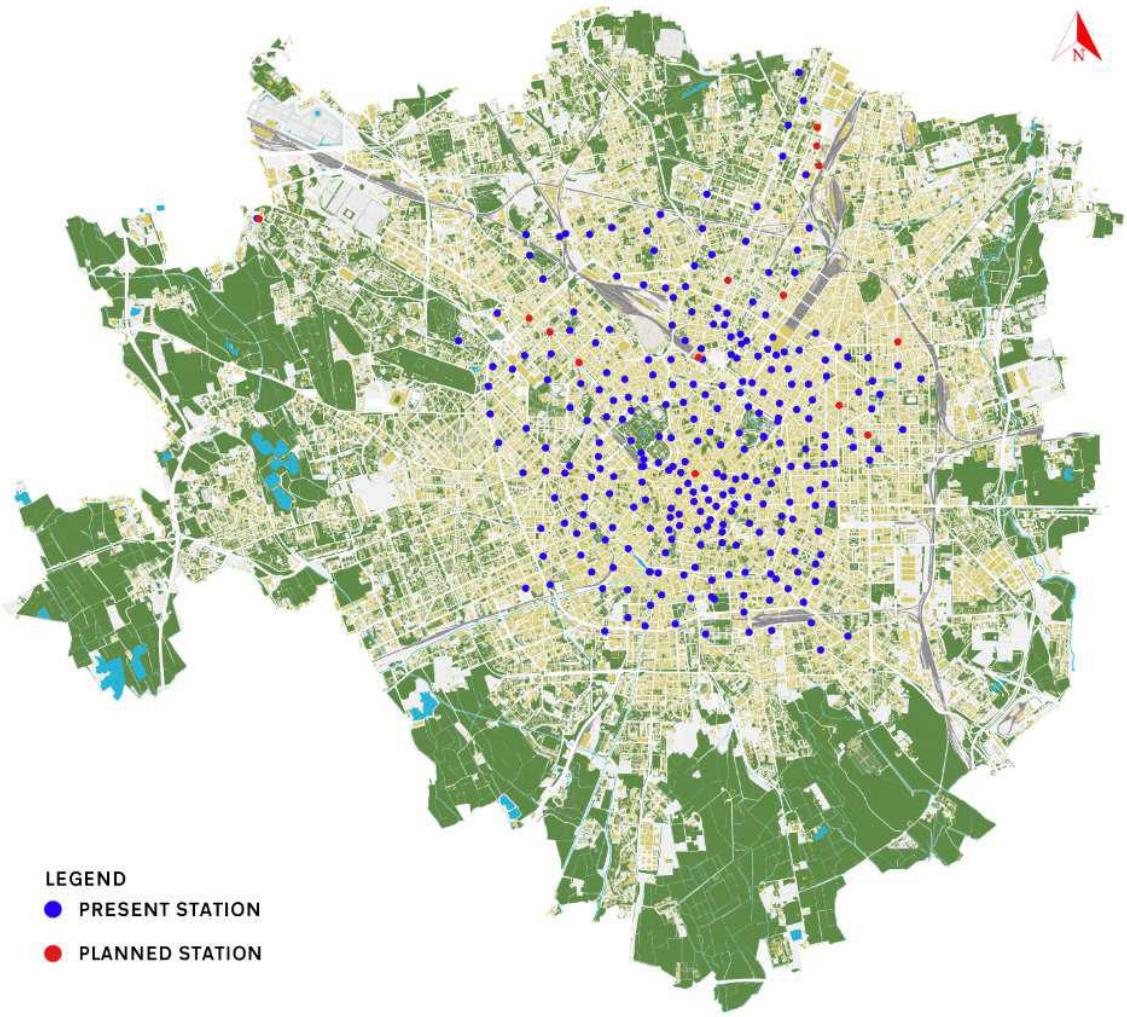


Figure 3 Present and planned BikeMi stations. Source: AMAT

In 2017, for reasons explained in Chapter III, the city launched a public tender to find operators who would run the newer generation of free-floating BSS. Following this tender, two companies, ofo and Mobike, both from China, launched their services. Bikes can be left anywhere in the Municipality of Milan, and even in some neighbouring ones, for one of the two schemes. To unlock the bikes, users have to use their smartphones, where they can localize the bikes on a map, unlock and lock again at the end of the ride, automatically paying the service fee.
Sergio Verrecchia, Clear Channel's Bike Sharing Director (for BikeMi) explained the relationship between the older and the newer schemes to the online newspaper the Submarine (Bendinelli, 2017):

> "They are systems with different functionalities. BikeMi works on intensity and continuous service, while free floating services works on land cover."

These new free-floating services quickly turned up on local and national media, because citizens started to vandalise the bicycles by destroying them, throwing them in canals, trees, private properties, or simply bringing them home. In February 2018 Gobee, another company operating in other cities but not in Milan, announced its will to quit the Italian market following vandalism acts ("Bike sharing, la società cinese Gobee: «Via dall'Italia, qui troppi vandali»", 2018).

Figure 4 Example of vandalism, bicycles thrown into a canal. Source: Maria Carla Rossi, Facebook

Sustainable mobility policies shaping Milan

European Union level

The actions of Milan, as a city lying in a European Union's member state, has to be understood in a wider context of the EU's mobility agenda. The EU places great hope in fostering cycling as a sustainable form of transportation, as expressed in the 2015 *Declaration on Cycling as a climate friendly Transport Mode*. This document recognises that both the bicycle and bike-sharing

schemes are a European invention and that "[c]ycling is a European success story" (Présidence du Conseil de l'Union européenne / Luxembourg 2015, 2015, p. 1). As of writing this report, no EU-wide cycling strategy has been adopted, however there are other documents that aim at promoting cycling, and bike-sharing in particular. In March 2017, the European Committee of the Regions has adopted *An EU Roadmap for Cycling*, which places highest priority on walking and cycling as means of inducing a paradigm shift in urban transport. In this document, bike-sharing is mentioned as a facilitator of intermodal journeys, that should be fully integrated into journey planning and ticketing applications. The increasing interest in shared mobility services was embodied in the 2017 *European Mobility Week Thematic Guidelines*' slogan: "Sharing gets you further" (EUROCITIES, 2017). These Guidelines see BSSs as an example of the 'Mobility as a Service' concept, while pointing out that they are "clean, intelligent, and shared", and that they "seem to be most relevant where bicycle ownership is not (yet) peaking" (pp. 7-8).

The European Cyclists' Federation, an umbrella federation for national cycling organizations, has drafted an *EU Cycling Strategy*, which has been presented to the EU Commissioner for Transport, Violeta Bulc, in June 2017 (European Cyclists' Federation, 2017). Although only a supplementary and not an official document of the EU, it can serve as a proxy of what the EU will be supporting in the coming years. Here, bike-sharing is mostly recognised as an important part of multimodal trips, serving as the last-mile solution.

Milan's Sustainable Urban Mobility Plan

The Municipality of Milan in 2012 started the process to elaborate the Sustainable Urban Mobility Plan, which plans the future of mobility in the city. Among the general guidelines, the most important for the City Council are to increase sustainability, safety, decrease the use of motor vehicles, enhance *cycle-ability* of the city, and increase accessibility for all the mobility users. The Plan is adopting choices made in PGT (Piano di Governo del Territorio, the City Urban Plan) and aims at defining the steps needed to enact them. It contains a chapter about cycling mobility, which lists some general objectives: developing the cycling network, increase parking spaces for bicycles, enhance the BSS, increase the ability to transfer between different modes of transport in the same trip, increase road safety and give priority to the cyclists at intersection. Redacted by AMAT, the city's planning agency, the plan was adopted (meaning it passed the first of the two rounds of legislative process) by the City Council in June 2017. The Plan gives a list of strategies

consisting of specific actions, presented in a hierarchical way. These strategies relate to road network, parking, bike sharing system, modal transfer, cyclist-tailored services.

Regarding the cycle paths network, the Plan calls for a review of the existing cycle paths, in order to verify their performance and upgrade to higher standards, aimed at better road safety and higher cycling speeds. It also calls for the removal of the already mentioned *pavé* road surface, in accordance with the landscape and historical context, and also the removal of the abandoned tram tracks in the city.

Regarding bicycle parking spaces, actions involve increasing the number of racks and their coverage around the whole city, increase accessibility to parking spaces, build cycle-stations with large parking spaces and maintanance facilities around the main railway stations of the city.

Regarding the bike sharing system, the aim is to create new stations in densely populated areas outside the city centre and where there could be a demand for such system, enlarge the current stations where demand of bicycles exceeds the capacity, increase the service hours and ease the registration procedures for new users.

Regarding modal transfer, actions involve extending the time of the day when carrying a bicycle on metro and suburban trains is allowed, overcome the architectural barriers in stations, build cycling service stations around the main railway stations with maintenance, shops and rental services.

Regarding cyclist-tailored services, the Plan calls to develop a public network of pumps to inflate tyres, ease the opening of maintenance, rental and cycling-related shops in the whole city, provide public transport vehicles with systems that enable the transportation of bicycles.

It's worth to mention that the Plan tries to calculate the impact of the new cycle infrastructure both in terms of motor traffic (with traffic modelling tools) and vehicles parking space (both legal and illegal ones). The main rationale behind the new cycle paths is to avoid any solution that impact public transport capacity, and to avoid decreasing the size of those sidewalks that cannot support a higher density of pedestrian flows. It is publically stated that the negative outcomes of the new cycling infrastructure would hurt only private motor traffic.

In terms of raw data, building all of the planned cycle paths would decrease the capacity of impacted roads by 15% and cut 4,000 illegal parking spaces for cars. The actions regarding cycling mobility are expected to provide a modal shift from cars to other transport modes by 2.5%, to increase bicycle trips in the city by 40% and to cut by half the number of cyclists injured in road accidents.

As a conclusion, it's very important to mention that the Plan passed only the first legislative step at the Municipal Council, while currently (May 2018) it is in the phase where the authors are evaluating the observations sent by citizens, associations or other interested actors. After this phase, it will again pass in the Municipal Council to get the second and final approval.

Research question formulation

Taking into consideration Milan's bike-sharing microcosm and its changing mobility realities, policies and practices, we elaborated the research question for the project:

How are the new free-floating services reshaping Milan's cycling practices?

In order to investigate the practices, we need to reach into a wider cultural context, which is why the main research question is supplemented by a number of sub-questions:

- What is the network of actors behind the spread of BSSs?
- What are the main discourses revolving around the world of BSSs?
- How do the users appropriate of the bicycles in their daily routine?
- Are the BSSs only providing benefits for cities or are there negative impacts coming from their implementation?
- Do the BSSs have any actual impact in modal shift and in the promotion of sustainable mobility practices?
- What are the relations and interactions between BSSs from different generations?
- What are the main themes around BSSs in other cities?

The sub-questions reach a somewhat wide array of topics, which span from the small scale of visible phenomena (i.e. user routine) to the large one of intangible elements (i.e. the discourses of BSSs). Of course, to study these different themes, we need to consider an appropriate philosophical stance and methodological tools, which will be presented in the next chapter.

CHAPTER II

THEORETICAL AND METHODOLOGICAL FRAMEWORK

Introduction

Chapter II is where previous research done on the topics of bike-sharing and culture change in mobilities is explored. Then, we proceed with the presentation of our theoretical approach, the appropriate Philosophy of Science and then our methodological toolbox, where we assess the analytic tools employed to get our primary data and the sources of secondary data.

Literature review

Bike-sharing schemes evolution

Bike-sharing schemes are typically services run by public or private actors that provide a pool of bicycles to be used within a certain urban area, which until recently was confined to the area covered by a network of docking stations. The service is designed, especially through pricing and docking stations availability, to promote short urban trips, often as a part of a multi-modal journey. These schemes date all the way back to 1960s, when a Dutch grassroot movement called the Provos set up a bike sharing system consisting of white bicycles, hence called The White Bike (Fishman, 2016). This small group of activists wanted to fight off air pollution caused by increasing car traffic, as well as counteract the spreading consumerist culture. Unfortunately, because of its anti-establishment character it soon met opposition from the authorities and police removed the bikes from the street (van der Zee, 2016). This scheme is referred to as first generation of bike sharing. It was not until the 1990s, when the second generation, inspired to a large extent by the Dutch experiences, materialised in Copenhagen where a system based on coin deposits was introduced. However, the system was vulnerable to the same problems as the first generation, i.e. low-risk of exposure in case of a theft or vandalism and full anonymity, which soon lead to the dismantling of the system. Therefore, only when a renewed interest in introducing bicycles in the urban context emerged and the technological advances enabled to hold the users accountable, could modern day bike sharing schemes be established. In the period between 1996 and 2007 cities, mainly in France, experimented with emerging smart technologies. These systems, referred to in literature as third generation, took advantage of mobile phones and were based on annual membership fees (Manzi & Saibene, 2017). However, it was only when a bike sharing scheme was devised in Paris in 2007 when the breakthrough came (van der Zee, 2016). These so-called fourth generation schemes are characterised by the existence of docking stations, tracking technologies as well as credit card payments, which have greatly alleviated the issues

facing the first two generations, even if not eliminating them completely. Thanks to the recent surge in the number of such schemes worldwide, and the continuous advances in tracking technology the fifth generation schemes were born. These are referred to as free-floating or dockless, as there are no docking stations, the bikes are tracked continuously via GPS, and the schemes offer an improved smartphone-facilitated rental experience. An increasing number of them also features integration with public transport cards and is equipped with electric power assistance. Today there are over 1,500 bike sharing schemes all around the world, with approximately 18,118,000 self-service public use bicycles and pedelecs, and with 402 cities planning to introduce such a scheme (Metrobike 2018).

Bike-sharing ownership and business models

Bike-sharing schemes are under continuous development, not least regarding the business models supporting the services worldwide. Cohen and Kietzmann (2014, p. 289) indicate the following four models:

- Street Furniture Bikesharing - funded through on-bike advertising (exemplified by Lyon's cooperation with JCDecaux);
- Publicly Owned Bikesharing - funded by local authorities (Capital Bikeshare in the Washington);
- Sponsorship-Based Bikesharing - funded by a third party (Barclay's Bank funding the London bike sharing);
- Nonprofit Bikesharing - funded partly by public authorities and partly through donations (e.g. Boulder B-Cycle);

Based on the latest developments in bike sharing, especially the free floating schemes, another model needs to be added to this list, that is privately owned bike-sharing, which is not funded with public money, not directly in any case, and only to a small extent relies on advertising. These schemes are financed almost solely on the fees paid by the users, making them a unique and potentially disruptive proposition on this market. The emergence of these privately owned BSS hints to a new development in the evolution of bike sharing schemes, i.e. the trend towards privatisation of the schemes. Whereas the first schemes were mostly publicly funded (except for the Dutch White Bike, which represented guerilla activism), with private bike rentals operating on a smaller scale in niche markets, such as rentals for tourists, the continuous advancements in

tracking technologies and popularisation of apps has enabled many start-ups to enter this market. These new bike sharing schemes are purely commercially driven and all operate as free-floating, app-based schemes, benefitting from the significantly lowered market entry requirements.

Another important distinction relates to the different stakeholders of BSS, such as promoters (usually a public entity), public space users (both users and non-users of the schemes), providers (bicycles and docking stations) and operators (e.g. day-to-day maintenance and rebalancing, advertising) (Beroud & Anaya, 2012). It is worthwhile to note that some providers are operators at the same time, this is especially the case with Clear Channel and JC Decaux, two major international advertising companies. This stakeholder mix, coupled with different business models and ownership structures (Cohen & Kietzmann, 2014), which can be placed on a continuum, where market-based and public body funded constitute the extremes, with mixed models to be found in-between (e.g. public body is only responsible for setting up the scheme, whereas a private operator is contracted to operate the system), result in varying agency conflicts. Such a differentiation also corresponds to what economists call public, merit and private goods, as underlined by the study by Cohen and Kietzmann. Public goods denote goods that are nonrivalrous, meaning that if one person uses the good it does not exclude others from using it too, and they are free of charge (e.g. national defence). Merit goods have positive externalities, are undervalued by some, and include a certain level of excludability (e.g. education, public transit). Lastly, private goods are the opposite of public goods, implying that they are rivalrous and excludable. While bike-sharing schemes operators would like to position themselves as pure merit goods, they should be seen as positioned somewhere between merit and private goods. Ultimately, this classification can be applied to analyse the level of agency conflicts inherent within the different arrangements.

Against this background, it might prove particularly fruitful to investigate the case of Milan's BSSs, as here three different BSSs coexist, including one publicly sponsored representing the fourth generation of BSS, and two brand new examples of the fifth generation, both privately owned, with no financial support from the public sector. In further chapters we shall investigate, if these different types of BSSs can be used to achieve synergies in promoting sustainable practice change, or if there is competition and even a cannibalism of sorts. The different business models behind these schemes lead to diverse objectives of the operating companies, which need to be aligned with public interest for such enterprises to be mutually beneficial.

Impacts of bike-sharing schemes

BSSs constitute a relatively new phenomenon in the urban landscape, however they have already managed to attract considerable attention from the academia. The research is most often focused on finding out whether the BSSs live up to the promises and the stated objectives. According to Ricci, these objectives include:

- To reduce single occupancy car journeys and ease traffic congestion;
- To reduce CO_2 emissions and to improve air quality by reducing other pollutant emissions from motorised traffic;
- To improve public health and increase levels of physical activity;
- To increase cycling levels, and help normalise and promote cycling (for example, by removing barriers associated with bike ownership, e.g., concerns about theft and parking);
- To improve accessibility and support flexible mobility, through enhanced transport choices and opportunities for multi-modality and inter-modality (for example, by acting as a 'first' or 'lastmile' solution in connection with public transport);
- To improve road safety, in particular for cyclists;
- To enhance the image and liveability of cities and to support local economies and tourism. (2015, p. 29)

As can be seen, the objective to reduce car journeys, and hence to alleviate congestion and air pollution are often stated as one of the first and most important ones. However, as pointed out by Fishman, "[i]mplicit in many of the benefits associated with bikeshare is an assumption that bikeshare is used to replace trips previously made by car, yet the data suggest this is seldom the case" (2016, p. 103). This discrepancy between the *a priori* held assumptions about the benefits of BSSs and the actual outcomes suggests that there is more to using BSSs for transitioning towards sustainable means of transport than meets the eye. In most of the studied cases, Fishman observes, the rate of substitution of car journeys did not exceed 20%, with BSSs mostly cannibalising trips made by public transport or walking, hence only to a small extent increasing the use of modes desirable from an environmental point of view (Ricci, 2015). Beroud and Anaya also highlighted that "[c]ar trips shifted toward Ve´ lo'v represented in 2008 less than 0.01% of all car trips for inner Lyon and Villeurbanne" and that "[f]or Lyon and all it suburbs, the percentage

diverting to the scheme was less than 0.001%" (2012, p. 295). Furthermore, Ricci (2015) points out, that most calculations that indicate that BSSs reduce air pollution, are based on the assumption that all car journeys are substituted with bicycle journeys, which as we have seen is clearly not the case. In fact, the need to rebalance the system, that is to provide even distribution across the docking stations in different parts of town, can actually lead to more overall motor vehicle use, as trucks are needed to transport bicycles from one station to another (Ricci, 2015). In this context, it is no surprise that the health benefits of introducing a new BSS are also not as big as they might seem in the first place, especially if trips made by bike substitute walking, which might even lead to a reduction of the overall physical activity of the population.

On the social level, it is clear that many of the systems are not inclusive, as they either require one to be technologically savvy, possibly use a smartphone, therefore deepening the digital divide, or pose limits on who can register by requiring the users to have a bank or credit card. Additionally, there is the question of geographical distribution of bikes and docking stations with "the offer concentrated in socio-economically active areas, near multimodal transport interchange hubs and universities" (Ricci, 2015, p. 30), or more generally in more affluent neighbourhoods (Duarte, 2016). Hence, as Fishman summarises, "bikeshare users are on average disproportionately of higher education and income, more likely to be male and white" (2016, p. 100).

This is not to say the schemes do not provide any benefits. Among these less measurable or less apparent BSSs provide what can broadly be termed as convenience, greater modal choice, normalising and legitimising the bicycle as part of the urban landscape, or increasing the motility of many urban denizens (Ricci, 2015). Specifically, Ricci highlights that "[a]ccording to user surveys conducted in different cities and countries, bike sharing can improve the experience, accessibility and affordability of personal travel, through greater transport choice, reduced journey times and reduced mobility costs" (2015, p. 31). The benefits are however often not equally distributed and some groups are more likely to benefit from BSSs than others. This might suggest that the BSSs increase the motility of people who already have a wide array of transport choices and who are most skilled in choosing the ones that provide greatest benefits in terms of cost and convenience.

Modal choice

As has been mentioned earlier, there is little evidence that the introduction of BSSs influences heavily the scale of car journeys' substitution. To better understand why this might be the case, it can be fruitful to turn to a more nuanced understanding of how practices develop and become locked in. Traditional transport economics tends to see modal choices as the outcome of optimising traveller's value of time for a given journey. However, as Lyons and Chatterjee underline "[s]ome argue that time and cost are simply the most tangible attributes to measure and risk the overlooking of other experiential aspects of a journey" (2008, p. 185). This means that the focus on what is easily measurable, might obscure the more intangible reasons behind modal choices, ones that require a different methodological approach. As Gattersleben and Uzzell underline "making transport choices involves reconciling the anticipated demands of a journey with the physical (e.g., walking and waiting), cognitive (e.g., route planning and navigation), and affective (e.g., uncertainty) resources available to the traveler" (2007, p. 418).

Some researchers have argued that having control over one's means of transport might be an important factor behind the modal choice, especially since "[i]t has been found that commuting is more stressful when there is less control over factors such as traffic congestion, time pressure or the environment within the vehicle." (Lyons and Chatterjee, 2008, p. 185). In contrast, Gattersleben and Uzzell, who have investigated the affective appraisals of the daily commute, found that "[o]nly a few of those who did not experience any commuting stress (i.e., cyclists and walkers) mentioned control or flexibility, such as not getting stuck in traffic jams, as one of the most important positive aspects of their journey." (2007, p. 428)

While car commuters share some of the nuisances with BSSs users, they do however have more control over both the vehicle itself and the environment within the vehicle. In comparison, it might be argued that users of BSSs, who wish to use it for their daily commute might share some of the benefits of commuting by car, while also suffering from many of the drawbacks of public transport. On one hand, they might benefit in terms of control over one's means of transport, just as cyclists using their private bikes do, but on the other hand they are exposed to a risk of not finding any, or at least a working, bike, which might reduce the overall convenience and increase the stress level. Hence, they experience the insecurity related to unreliable service, which can be associated with some forms of public transport. This might be a major deterrent for non-users, since as Fishman indicates, "the major barrier to bikeshare, at least for this rather small

sample of Brisbane-based non-bikeshare users, was the fact that driving was seen as too convenient" (2016, p. 100).

Kent (2015), who investigates our emotional relationship with the car as a commuting tool, argues that the decisions about the way people commute are not based on purely rational considerations, where the actors weigh in the amount of time it will take them to get to their destinations, and decide for the means of transport which will do the job fastest. Rather than looking at such choices as merely instrumental, Kent proposes an understanding, following Mimi Sheller's line of thought (2004), where the practice of car commuting is both developed and reinforced through positive affective response to the journey.

In a similar vein, in his 2017 book *The Psychology of the Car,* Stefan Gössling points to two types of barriers to a more sustainable transport future (Gössling, 2017). First, there are institutional or structural factors that inhibit change, including the inefficiency and inflexibility in admitting change. On top of that, there are individual or agency-based factors, which might encompass personal viewpoints and preferences of decision makers (p. 229). In this book, Gössling argues that "'automobile' form can only be undone by considering the underlying psychology of car dependence" (p. 232). Based on this assumption, Gössling discerns between what he calls "real" and "perceived" dependencies, the first stemming from more or less "real" transport needs, and the latter being shaped by emotions, eventually leading to the creation of affective and symbolic values. These values, he further argues, are more difficult to change than instrumental values that arise from the needs to move from one place to another (p. 233). Here again, we see that it is not the rational or purely instrumental values that shape modal choices. Rather it is the very intricate affective relationship that people form with the automobile, therefore any attempt to dismantle the automotive system, needs first to break up our love affair with the car.

Practice change, the Multi-Level Perspective (MLP) and Staging Mobilities

To better understand how this practice change is being introduced by the stakeholders involved in Milan's BSSs, we will also refer to an analytical framework outlined by Mimi Sheller in *The Emergence of New Cultures of Mobility: Stability, Openings and Prospects* from 2012. This framework, originally conceived by Arie Rip, René Kemp and Frank Geels, called the Multi-Level Perspective (hereafter referred to as 'MLP'), helps to track the changes that occur in the socio-

technical practices (Rip & Kemp, 1998; Geels, 2011). As we have seen in the earlier paragraphs, particularly in Kent's and Gössling's affective analysis of our relationship with automobility, it is the practices of commuting that need to be redeveloped to encourage change. In its initial form, the MLP distinguishes three levels at which socio-technical changes occur, i.e. landscape, regime and niche level. The landscape level denotes the exogenous socio-technical environment, regime level, which can be understood as the mainstream ways of doings things or in the words of Geels "the locus of established practices and associated rules that stabilize existing systems", whereas the niche comprises of emerging practices that have yet to leave the incubators of radical technologies (2011, p. 26). Sheller has refined this framework by adding another dimension that would help unearth the cultural underpinning of the socio-technical change. To this end she has proposed to include the notions of practices, discourses and networks that affect each level in the MLP. Such an approach enables to flesh out the main cultural forces shaping current mobility cultures. In her piece analysing the American mobility culture, Sheller argues, resonating with Gössling's remarks on the automobility culture, that car use is:

> "as much about irrational aesthetic, emotional and sensory responses to driving (or passengering or walking) at the niche level; locked-in, or at least relatively durable, dominant cultures of automobility, decision-making networks, political discourses and practices at the regime level; and the normalization of wider sets of cultural practices, networks and discourses which act as master frames and shape material cultures at the landscape level." (2012, p. 186)

In the context of using BSSs by mobility planners as a tool in transitioning towards redevelopment of a predominantly car-centred culture, this understanding can help us elicit the main barriers, as well as the drivers behind a less car-dependent city.

Lastly, in our thesis we shall also turn to the *Staging Mobilities* perspective as developed by Jensen (2013). This framework investigates both how the planners intended and design the mobilities systems to work ('staging from above'), and how the end-users actually interact with and appropriate these systems to suit their everyday needs ('staging from below'). Here we can understand the material and technological infrastructures as the scenes where people play out different scenarios, some of them according to the intended or prescribed ways of doing things, other less so, generating unintended consequences. Such an approach may be particularly fruitful when looking at the practices of using the bike-sharing schemes. In fact, it is these unintended (mis)uses of these schemes that have attracted our attention in the first place, with pictures of

bikes thrown into canals or onto trees, exemplifying the most extreme cases of users' appropriation. However, as Jensen (2013) notes, not all practices performed 'from below' should be seen as emancipatory, just as not all designs and infrastructures are dominating or necessarily oppressive. The adoption of this framework in our work will be reflected in the methods, as we shall both look at how the mobility planners stage the use of BSSs 'from above', in particular through expert interviews, and at the ways people actually use these schemes exerting their influence on the system 'from below', which shall be investigated through observations and visual ethnography.

Our theoretical approach

The MLP framework coupled with the *Staging Mobilities* theoretical approach, with a strong emphasis on the cultural underpinnings of mobility cultures, and a particular interest in the affective relationships people form with their means of transport, will serve as the magnifying glass to investigate the Milan's petri dish of emerging bicycle mobilities practices. The insights presented in this chapter will help us analyse, what is the role of BSSs in effectuating the behavioural and practice change in Milan. Based on Ricci's and Fishman's review of the effects of BSSs, we know that these schemes do not always live up to their promises or objectives, and that their role in transitioning towards more sustainable transport futures is not well documented. Particularly their impact on modal shift has been rather modest in most of the investigated cases. It is our understanding that, if these schemes are to substitute trips made by car, they need to offer an opportunity to build equally strong, to use Gössling's term, "coidentities", that will reflect more broadly accepted societal dreams and aspirations. Moreover, looking through the *Staging Mobilities*' perspective will hopefully prove itself a useful tool in eliciting the unintended consequences arising from the coexistence of three different BSSs in Milan.

The gaps in knowledge that have been identified prior to undertaking this research include lacking information about how these new schemes are different from the traditional BSSs and how do they influence mobility practices. In this context mobility managers are posed with a number of new issues that might lead to new agency conflicts. Other arising questions touch upon the extent of social inclusion, presumed expansion of service areas, and data-mining on a scale not seen before, facilitated by GPS tracking and obscure data privacy practices engaged by the free-floating operators.

Philosophy of Science reflection

Our research concerns the analysis of a practice change occurring in Milan after the introduction of two new free-floating bike-sharing schemes. Since our theoretical framework is based on the MLP framework, coupled with insights from the *staging mobilities* framework, our methodological approach needed to be flexible and reflect the multidisciplinary nature of our research. To this end, as we describe in the following section, we have deployed a varied methodological toolkit, enabling to gather both qualitative and quantitative data. Since any attempt at strict classification of the research approach to only one chosen philosophical line of thought is doomed to fail, we believe that our approach is positioned between American pragmatism and critical realism, with both philosophical stances finding reflection in our approach. These two philosophical stances encourage the greatest extent of multidisciplinary research, both are open to new methods that could help unravel additional layers of reality, however we wish to understand it.

Since pragmatism is inherently connected to the practices or behaviour (Greek word 'pragma' denoting action), it is well suited to approach the world of bike-sharing practices. With a pragmatic approach we look at what the new bike-sharing systems mean by investigating how they are being used, and therefore what sort of new practices are being developed and new meanings being created. The pragmatic emphasis on *doing* as a way to interact with reality and establish new knowledge is reflected in our first-person ethnography, where we have gone through the whole process of using a bike-sharing system, from registering, through renting out, cycling and returning the bicycle. This also reflects the pragmatic focus on embodiment of practices and the role that the body (understood holistically, not as separate from the mind) plays in appropriating new technologies. Additionally, since there are many unknowns relating to the business model and the actual usage data about the new bike-sharing systems, in our reasoning we relied upon abduction, or what could be termed the 'qualified guess', to draw conclusions about how these schemes affect cycling practices. By adopting a relational (to one another, to general cycling practices and infrastructures) and processual (the systems are constantly 'in the making', as they are being negotiated by their users and other stakeholders) understanding of the bike-sharing schemes, our position further adheres to what the proponents of American pragmatism have to offer.

However, traces of critical realism can also be found in our approach. This is particularly visible in the way we investigate the cultural dimensions of the Multi-Level Perspective. By looking not

only at the practices, but also at the networks and discourses that inhabit the societal realm, we acknowledge that there are more domains of reality than that what is directly observable. This is in line with the distinction made by critical realists, who see the reality as made up of observations, events and causal powers (Bhaskar, 2013). In this context, discourses and networks, or power relations, that are not directly observable and require a qualitative methodological approach, have an impact on the practices of bike-sharing in Milan. In this sense, the practices are emergent or based upon discourses and networks, i.e. they can be seen as the tip of an iceberg. Naturally, the causal relationship is bidirectional with the practices affecting the discourses and networks just as much as the two latter affect the former. This assignment of causal powers to both agents and social structures is also a characteristic feature of critical realism.

Methodological toolbox

In the following section, we present the range of analytical tools and methods used in this project, given the philosophy of science previously illustrated. In order to collect the empirical material for our research we resorted to a wide variety of research methods including:

1) Direct observations
2) Visual ethnography
3) Interviews
4) First-person ethnography
5) Secondary sources reviews

In the following sections we first present these methods in detail, showcasing how data collection was set up, and then indicate the possible limitations of our study in the context of our research question.

Observations

To investigate the practices involved in the use of bike-sharing schemes, we decided to make use of direct observations on the streets of Milan. These observations were carried out on March 22, 2018, with good weather conditions. The setting consisted of cyclists at a busy intersection in the centre of Milan, on the corner of corso Venezia and via Palestro (Figure 5). Corso Venezia is an important avenue leading to the centre, which features cycling lanes, several BikeMi stations

along its route (one being in close proximity to our chosen intersection) and metro line M1 running underneath.

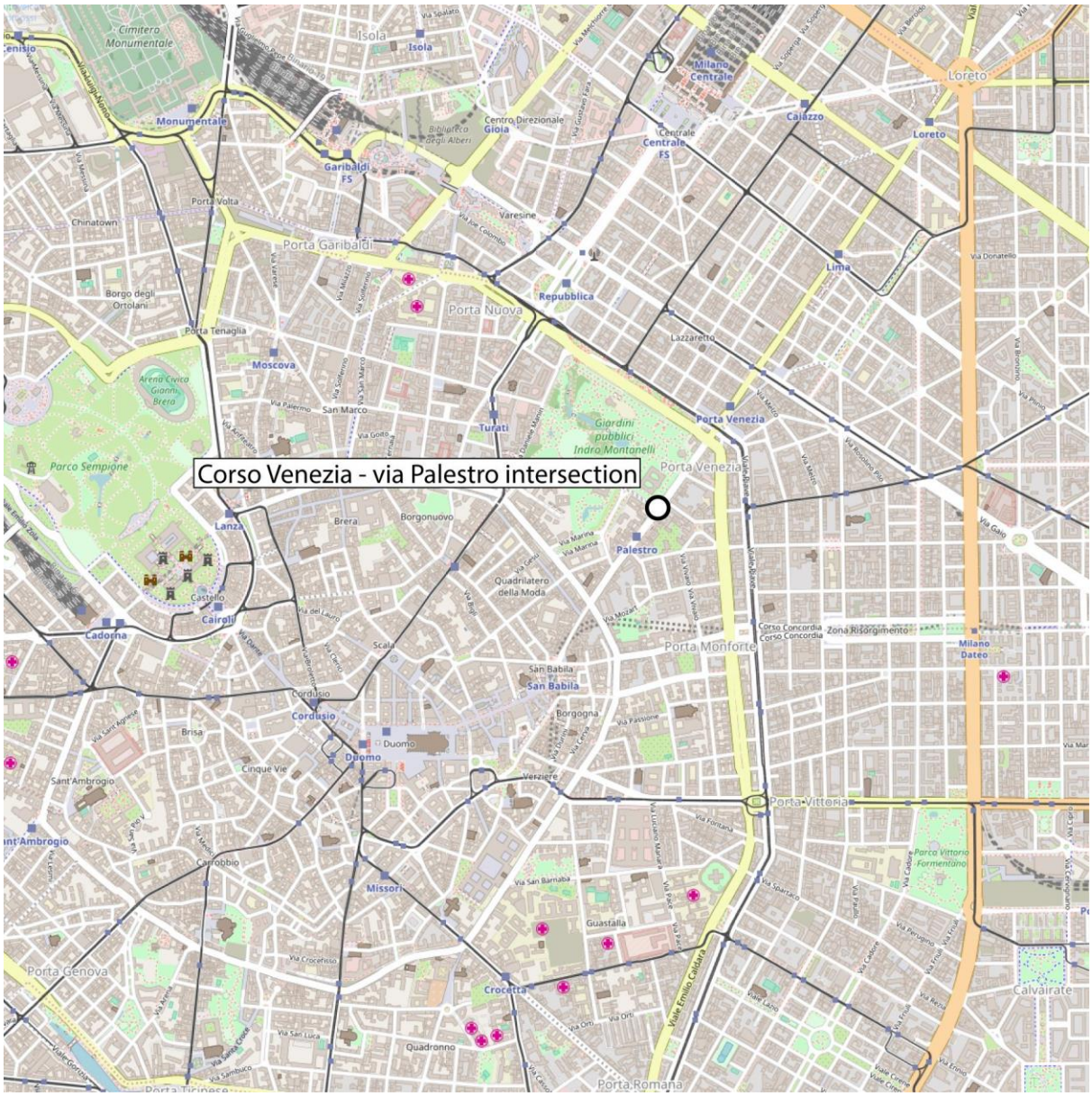


Figure 5 Location of corso Venzia - via Palestro intersection

The purpose was to see how many people use the different BSSs, or their own bicycle, and who these people are. We didn't stop anyone to ask for their personal information, because we carried the observation during the morning (7:40-8:40) and afternoon (16:55-17:55) rush hours and also because we wanted to have the largest pool possible, by simply taking notes of every cyclist passing by. There are obvious limitations with our approach: to deduce someone's age or wealth by its appearance and clothes is making use of stereotypes and the observer's own prejudices.

Still, we think that for our purpose this method provides useful data. During observations we took notes about their gender, age and possible socio-economic status, based on the following categories: Schoolchildren, Student, Working class, Lower middle class, Middle middle class, Upper middle class and Pensioner (see Appendix for the observations chart and CD for .xls file containing the data).

Visual ethnography

To investigate how people park the shared bicycles, which was a major cause of chaos in the public space in other cities, we carried out a visual ethnography study. This was conducted on the same day, March 22, 2018, in-between the two rounds of the observations in corso Venezia. Following the reports on newspapers and the interviews we had the previous days, we decided to scout the historic centre to take pictures of parked free-floating bicycles, using the schemes' apps to find cluster of nearby bicycles while walking in the city centre. The purpose was to investigate, catalogue, and gather insights on users' habits in terms of parking practices, understand how they appropriate the urban space by leaving the bicycles in certain positions after use, e.g. hindering pedestrian pathways on sidewalks or using spaces more separate from the main flows on the sidewalks and plazas.

Interviews

As mentioned earlier, interviews play an important role in this research, as the statistical data and visual ethnography concerning the cycling practices in Milan alone cannot fully describe the different phenomena that are emerging in the city. In particular, the theoretical framework adopted in this research, that is the Multi-Level Perspective and the *Staging mobilities* framework, necessitate a wide array of research methods in order to achieve holistic results. This theoretical approach requires that the research relies not only on what is immediately available to the eye, but also to look deeper into the discursive layer, to better grasp the underlying discourses and values. By adopting the *Staging mobilities* framework, we intend to look not only at how the users appropriate the three BSSs, but also investigate how these systems were meant to function in the eyes of urban planners and mobility managers. By assuming this framework, we aim to understand how these systems are adopted and contested 'from below', but also how they are designed 'from above'. Through the data collected during the interviews, we also aim to better

understand the dynamics of the relationships between the public authorities and the private operators, which should help us elicit the potential agency conflicts arising from the different business arrangement between the public and the private actors.

In the light of this, we decided to approach, meet and interview the actors, who working together, are shaping the alternative mobility future of Milan. The interviews were conducted as semi-structured, in order to catch themes that were brought up by our interviewees and give us the flexibility to investigate in detail those personal elements, narratives, opinions that often represent a more interesting addition, rather than being answered with standard "press-release" statements.

Below we present a list of the entities and people we contacted, explaining the reasons for why we contacted them, shortly describing their role in Milan's cycling environment (more extensive description can be found in Chapter III. MLP - Networks) and noting if we got to actually meet them in person. We present them starting from those shaping the mobility system 'from above' to those on the receiving end, i.e. representing the 'from below' perspective, or to use the Multi-Level Perspective vocabulary, from the regime to niche level.

AMAT

AMAT is Milan Municipality's agency responsible for monitoring, designing, analysing, planning, exchanging know-how with international actors and proposing policies in the fields of urban planning, mobility and environment. In the context of bike-sharing, AMAT serves as the advisory body and as the monitoring unit, therefore exerting a strong influence on how bike-sharing systems work in Milan. Hence, interviewing AMAT would help us to better understand the regime level, that is what are the prevailing discourses of those who set the rules or stage these systems 'from above'. Thanks to our personal knowledge of the agency, we contacted directly the person in charge of monitoring the mobility sharing services (both cars and bikes). Here we interviewed Adriano Loporcaro, in charge of monitoring the sharing mobility services, and his director Valentino Sevino.

Edoardo Croci

The city's Mobility advisor under Mayor Letizia Moratti (2006-2011). During their government, the city launched BikeMi and the first version of Area C congestion charge, at the time called Ecopass. Now Croci is a professor at Bocconi University in Milan. Since our interest lies in the interaction

between the incumbent bike-sharing scheme, i.e. BikeMi, and the new free-floating ones, it was fundamental to understand the rationale behind BikeMi, and how it could be affected by the competition. As Croci was personally responsible for many of the design decisions for BikeMi, interviewing him would offer us a broader and historical perspective on the regime level. He replied shortly after we sent him an email immediately suggesting a date and time to meet.

Clear Channel

Clear Channel is the operator of the public BSS, BikeMi, therefore one of the primary actors we wanted to interview. Apart from understanding their motivations and how the company sees its role in Milan's mobility mix, the aim of the interview was to understand their perspective on the developments taking place in Milan with the introduction of the new free-floating systems. As the incumbent company, which held a monopoly for bike-sharing services in Milan until last year, the introduction of two new companies, potentially competitors, Clear Channel was well positioned as an actor, who could have a critical attitude towards these contenders. As we contacted them, the company immediately showed interest in meeting us and answering our questions, asking us to send the questions, in order to find the more appropriate employee to interview. After this step, they did not manage to meet us in person, however, they answered our questions by e-mail.

Giancarlo Manzi

Manzi is an Associate Professor at the University of Milan at the Department of Economics, Management, and Quantitative Methods, who was responsible for conducting an extensive satisfaction survey among BikeMi users. This offered us the opportunity to learn more about the users of BikeMi, about their attitudes and behaviour, but also collect Manzi's insights on how the new bike-sharing services might affect BikeMi's operations. Manzi did not permit to record the interview, therefore, we were only able to take some notes during the meeting.

Mobike

One of the two companies running a free-floating BSS in Milan. In interviewing Mobike representatives we were hoping to better understand their business model, the way they process sensitive data, how they see themselves in relation to BikeMi, what their initial experiences were with the users and vandalism. The customer service replied that they forwarded our email to the

dedicated company's department. Unfortunately, no one replied, which is also telling in terms of this company's openness to disclose information. Therefore, any citation of Mobike representatives come from secondary sources, such as Mobike's website, press releases and articles.

ofo

The other of the two companies running a free-floating BSS in Milan. The motivations to interview ofo were similar to those in the case of Mobike. Similarly, we were unable to conduct the interview, as we did not receive any reply. To make up for this lack of first-hand data we have analysed ofo's website and press articles relevant for this study.

Ciclobby

A local cycling lobbying association engaged in the promotion of cycling in Milan. Through interviewing Ciclobby we were aiming at gathering information from a party representing the niche level and the user perspective. Although, as we found out later, Ciclobby cooperates to some extent with BikeMi, therefore their views might be slightly biased towards this scheme. We asked to meet representatives in Milan. After a positive first contact, no one agreed to have a meeting. To compensate for this, we have reviewed Ciclobby's media outlet *Notizie*.

Ciclo Ignoranza

At the extreme end of the niche level, we have stumbled upon an informal group of people engaging in alternative and "out of the schemes" mobility practices, that is Ciclo Ignoranza. After having encountered their Facebook profile, which contains videos showing cycling races with cheap bicycles and Mobike bicycles, we have decided to meet the people behind this initiative to better understand, what their motivations were and how they as users perceive the new bike-sharing schemes. We were not able to record the interview, however, we took notes from the meeting immediately after.

All the interview transcripts and notes from meetings are available in the Appendix.

First-person ethnography

Since our study has a strong focus on how the practices around Milan's bike-sharing are being affected by the introduction of new actors on the market, it is crucial for us as researchers to have a comprehensive understanding of how these services work. This is especially so, taking into consideration our focus on the affective side of modal choices and our pragmatic philosophical stance. While there are numerous reviews available on the internet, including those in the Google Play Store, which provide exhaustive descriptions of the pros and cons of these services, there was still a need for us to establish a personal report with the object of study. Such an approach is in line with what is termed the 'reflexive turn' in social sciences. In this methodological setup "[s]cholars are drawing on the use of the self to generate insights, establish patterns, and bring the voice of their research subjects to light" (Venkatesh, 2013, p. 4). As cycling is an embodied practice, involving a body-bike assemblage, understanding what it feels like to use the service, that is go through the registration and rental process, as well as cycle and return the bike after completing the ride, constitutes a crucial element of the data collection.

In order to collect this type of data we needed to first register ourselves in these services. In the case of both ofo and Mobike this process is mediated by an app, as these services in general are indistinguishable from the apps themselves. In the case of BikeMi, the registration process was more traditional, with an extensive information form (including questions about occupation), and the requirement to register with a credit card. Even here, we were confronted with inequality of access to the service, as only one of us had a 'proper' credit card. Therefore, only one of us ended up with having an account for the BikeMi service, with the other having access to Mobike, and both having an account with ofo. This way, we finally managed to have access to all the services and were able to try them all out. In order to make the test as real as possible we simply used the bicycles as our means of transportation during the data collection week (March 18 - 24). Our itineraries mostly included the central area of Milan. Unfortunately, because of the very low reliability of the ofo service, despite approaching a number of bicycles, we were not able to unlock any of them, as most of them were 'out of service'. However, one of us managed to use the bicycle during an earlier period, so this gap was not as important. Nevertheless, the negative experience with renting out the bicycle has also provided valuable data about this service level of maintenance, and hence reliability. In contrast, we were both able to cycle both BikeMi and Mobikes. The findings from the first-person ethnography have been included in the analysis of

niche level practices, were they are used to supplement the users' perspective of using the services. The description of these experiences is available in the Appendix.

Secondary sources review

Other than our own data collection from observations, interviews with involved actors and first-person ethnography, we relied on a range of secondary sources, to get data that would have been hard for us to get due to time constraints or other difficulties. The purpose of this section is not to make a list of all the sources, but to describe the categories of the different sources we used and what they brought to this research.

Official documents and reports

In this category we find documents from either public administration (e.g. Milan's Sustainable Urban Mobility Plan), bike-sharing operators, cycling-promoting groups, research groups and so on. These category of sources provides a range of quantitative data and also many insights on the discourses revolving around the cycling culture in Milan, from the many different actors. Moreover, sources in this category also helps describing the relations in the networks of actors.

Press articles

Press articles are useful in reporting official statements by the different actors involved in the network dimension but also at depicting the practices and how users appropriate the new shared bicycles and use them in the urban space. The former is better covered by the main national newspapers, while the latter by smaller and more local news websites that often relies in the citizens offering materials like pictures, videos and narrations.

Apps reviews

The reviews of the bike-sharing schemes' apps on Google Play Store offered us a way to easily find people's opinions and feedback about the schemes. In facts, in the reviews we didn't only find feedbacks about the apps themselves and their functionalities, but also about the bicycles, the business models and also opinions about behaviours by other users. These sources provide interesting opinions, useful to compare the different schemes and to learn about strengths and weaknesses that we couldn't have found ourselves due to time constraints.

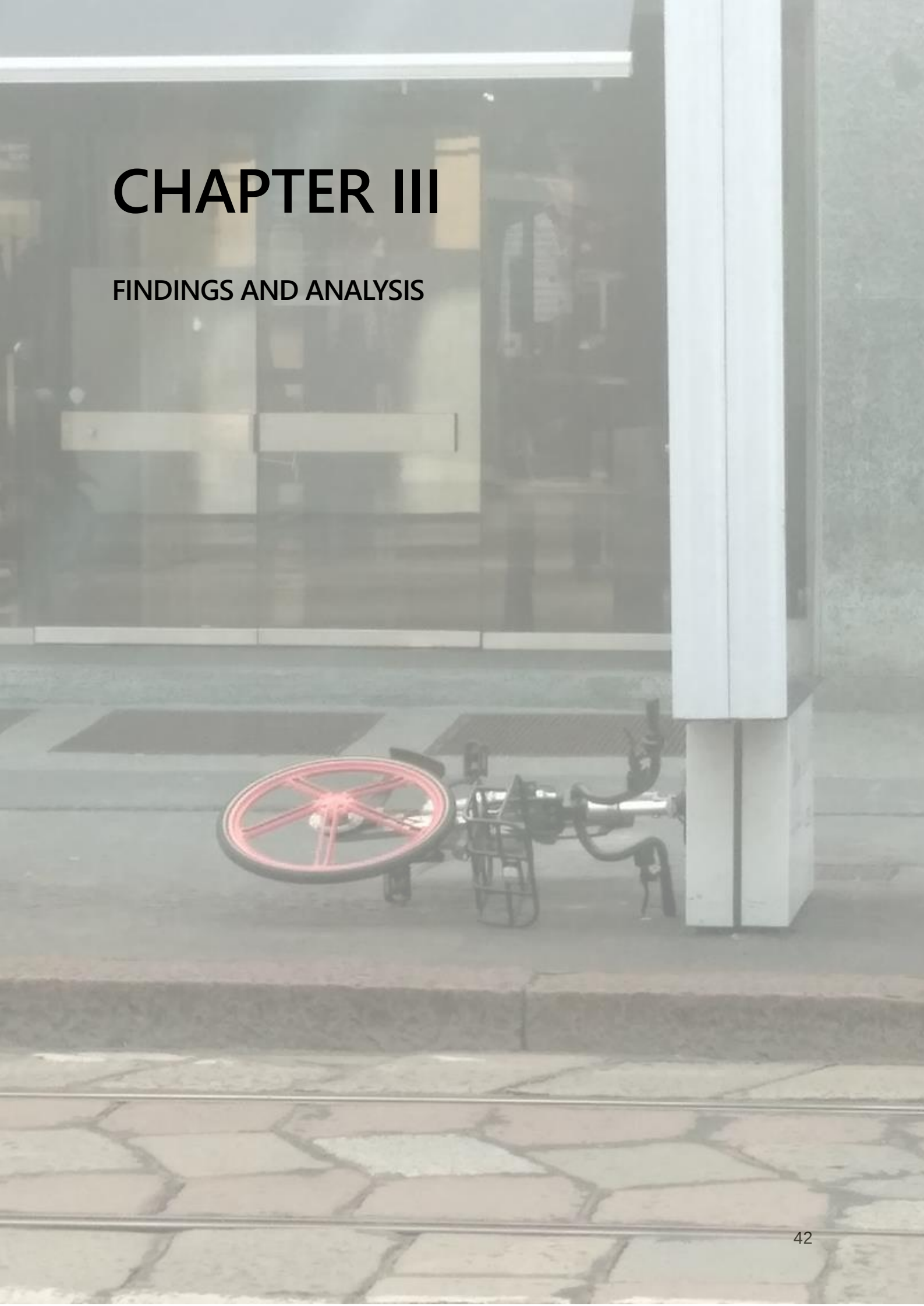
Limitations of the study

As already mentioned, the Multi-Level Perspective framework requires a very comprehensive methodological toolbox to investigate networks, discourses and practices. While we have attempted to ensure that our methodology enables to collect the empirical material sufficient to investigate the abovementioned dimensions, certain areas worth of investigation have certainly remained in the grey zone.

Firstly, apart from the already mentioned limitations with observations, despite our best attempts we did not manage to interview all the actors we have originally intended to, in particular the representatives from the two free-floating companies, ofo and Mobike. This has obviously limited our insights into their perspective, and we had to supplement this with their official statements found in press articles. The somewhat obscure nature of these companies makes it difficult to fully understand what their business model is and how they actually handle sensitive data. Because of this, we are aware that we might be misrepresenting how they operate, even though we have attempted to fill in the gaps with all publicly available material.

Furthermore, due to time-constraints we decided to rely on user feedback found in different press articles and in the reviews available in Google Play Store, rather than try to recruit people for an interview. While we admit that this could be recognised as a shortcoming, since the interviews could have been more in-depth and give us a better understanding of who the users are, we do believe that given the complexity of our study, especially its multi-dimensionality, our approach has enabled us to collect valuable insights in a less time- and effort-consuming manner.

Other topics that exceeded the resources at our disposal during the writing of this thesis include answering, if and how these new bike-sharing systems have influenced the modal split in Milan. While answering this question would undoubtedly bring valuable insights, it was well beyond our capacity, and as it turned out also beyond the capacity of Milan's mobility agency, AMAT, who also did not conduct any such research.



CHAPTER III

FINDINGS AND ANALYSIS

Introduction

In the following chapter we shall present the material collected through the methods described in Chapter II. We shall first present a general comparison of the schemes, including the scheme type, business model and ownership structure, followed by visualisation of the service areas, pricing policies, and finishing with app and bicycle review. This section serves to give the reader a better understanding of how these BSSs operate and how they are viewed by its users. Here we draw upon the official websites of the respective operators, press articles, app reviews from Google Play Store, and our own experiences with using these schemes.

This section is followed by the main analysis which follows the Multi-Level Perspective framework, and is divided into three main subsections i.e. networks, discourses and practices. We start with networks to give the reader an insight into the power relations shaping the bike-sharing world in Milan. Each actor is briefly described as to their role within this system. In what follows, we present the discourses that are used or avoided by those actors, which we attempt to deconstruct and indicate what interests they might be serving. Finally, we present how the new free-floating systems have reshaped the world of bike-sharing practices in Milan. This section draws upon the data collected through interviews, secondary sources review, visual ethnography and observations.

The chapter is rounded off with a summary of the MLP analysis, indicating how the new dockless BSSs have impacted the landscape, regime and niche levels of the Milanese bike-sharing microcosm.

Comparison of schemes

Here we draw all the differences between the different schemes. Some might be obvious as the dock vs. free-floating, while others might be subtler, or even unconsidered before one tries the three different schemes on one's own. So it's important to not only highlight the differences in the business model and prices, but also explain how the apps work, what can they do while being on the move and also what it feels like riding very different bicycles: height, weight, gears, balance, wheel sizes all matter when riding on the road. This is especially true in a city like Milan, "bike-unfriendly" as the mobility advisor under Moratti's administration stated in our interview. Cobblestones, potholes, traffic, cars parked everywhere, pedestrians on cycle paths, cold weather

in winter (below-zero temperatures are common) and terribly hot in summer (more than 40 °C of apparent temperature are common as well). To get more insights on the user's opinions on the different bicycles and apps, we used reviews from Google Play Store, where the apps from all the three schemes are available.

Scheme type, business model and ownership structure

BikeMi

BikeMi is owned by ATM, the Municipality-owned public transport company, and operated by Clear Channel, an advertising company, which also operates a number of BSSs in Europe (e.g. in Barcelona and Stockholm). The deal between the Municipality and Clear Channel consists in the city paying for the bicycles, the dock-stations and the batteries for the e-bikes while Clear Channel bears the operational expenses of running the system. In fact, subscription fees are collected by Clear Channel, which is also entitled to install advertising billboards and screens in public spaces on the streets. This business model was a 1-1 copy of a bike-sharing system in Lyon, and constitutes a rather common business model for BSSs throughout Europe (e.g. also used by rival advertising company JCDecaux in cities where it operates). BikeMi consists of 3,650 traditional bicycles and 1,000 electric bicycles in a network of 280 stations. According to the Municipality's website the localization of the stations was determined based on proximity of intermodal nodes, such as rail and metro stations, enabling the integration with other transport modes, and popular places as public offices, schools, universities, theaters and cinemas. At first, the stations where in the historic center of the city, as the time passed new stations were installed further away from the Duomo cathedral, following the concentric nature of the city.

ofo

ofo, established in 2014, is a Beijing-based bike sharing company operating in many chinese cities and starting to expand in other countries. It has a global fleet of more than 10 million bicycles, more than 200 million users spread across 250 cities in 21 countries, and a market valuation exceeding US$2 billion. Its main shareholders include a ride-hailing company Didi Chuxing, and the e-commerce giant, Alibaba. It won one of the three lots in the Municipality's tender, granting it the deployment of 4,000 bicycles.

Mobike

Mobike is another of the two chinese dockless bike-sharing giants, who are slowly monopolising the market, with rumours of a possible merger between the two. The company has recently been bought by Meituan-Dianping, a group buying website for local consumer goods and retail services, for US$2.7 billion. Meituan itself is a company backed by the chinese telecommunications company Tencent. Mobike won the other two lots of the Municipality's tender and deployed 8,000 bicycles, again adopting a free-floating scheme.

Service areas

As shown in the map (Figure 6), the three schemes differ in their service areas. BikeMi is the less extended, serving mainy the area inside the 'circonvallazione esterna' (the ring road designed by the 1884 Beruto Urban Plan that acted as the city bounduary until World War I), with the exception of the northern side of the city, with stations nearby the railway ring. Then comes Mobike, covering the entire Municipality of Milan. Lastly, ofo stretches to the Municipalities of Peschiera Borromeo, San Donato Milanese, San Giuliano Milanese and Settimo Milanese.

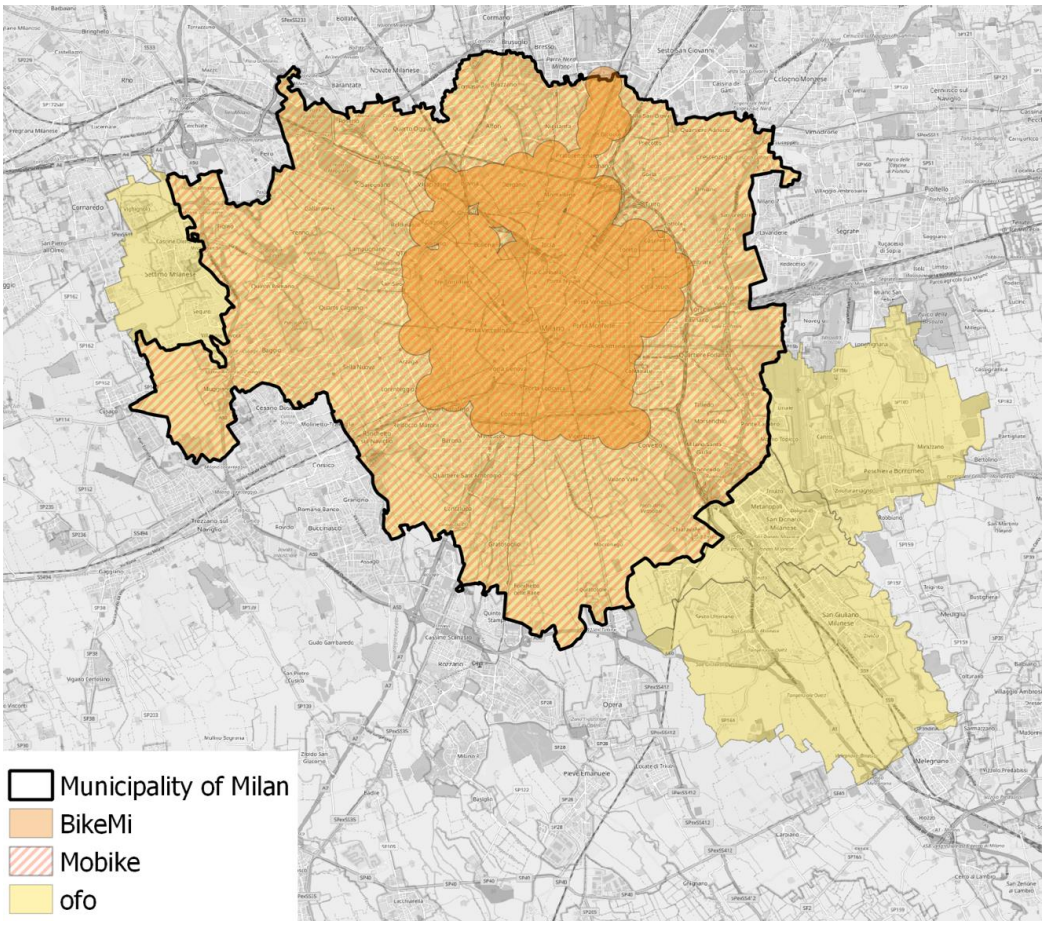


Figure 6 Operating areas of BSSs in Milan. Source: own elaboration.

Prices and fees

BikeMi

BikeMi is available only through subscription, the shortest one being 24 hours at € 4,50. Weekly subscriptions come at € 9 and yearly at € 36, unless having also an ATM (public transport) yearly subscription, which brings down the BikeMi price at € 29. The subscription lets the user pick as many traditional bicycles as they want for free, granted they put them back on a dock in less than 30 minutes. If used for longer, BikeMi starts charging fees according to the table from the official website (Figure 7). To enhance the 'public use' of the scheme, using the same bike for more than 2 hours in a row is forbidden, if said time is surpassed three times the subscription is revoked. Such a pricing policy is clearly aimed at short-term usage and a high turnover, so that each bike gets used as much as possible.

Regarding the payment method, it's important to mention that the scheme only accepts 'traditional' credit cards. No debit cards, no prepaid credit cards, no virtual credit cards are accepted. Given the general banking attitude in Italy to provide these 'traditional' credit cards only to customers with a certain minimum amount on their accounts, this make it impossible for ultra-low income population to access the service, even if they could afford the subscription. It formally closes the service also for minors (which are usually using prepaid credit cards), formally because they still can access the scheme through their parents' accounts.

	TRADITIONAL BIKE		ELECTRIC BIKE	
	time cost	Total	time cost	Total
fist half hour	Free	€ 0,00	€ 0,25	€ 0,25
second half hour	€ 0,50	€ 0,50	€ 0,50	€ 0,75
third half hour	€ 0,50	€ 1,00	€ 1,00	€ 1,75
fourth half hour	€ 0,50	€ 1,50	€ 2,00	€ 3,75
every additional hour or fraction	€ 2,00		€ 4,00	

Figure 7 BikeMi fees. Source: Clear Channel

ofo

ofo initially adopted a purely 'pay as you go' system, without the possibility of subscribing. ofo passes were added on February 5th 2018, at € 5 for 7 days and € 20 for 30 days. The subscriptions offer the possibility to use as many minutes as the user wishes, the only limit being the single ride limited at 60 minutes. The pay as you go fees are € 0,50 every 30 minutes, with a daily cap at € 5. Payment methods include debit cards, traditional credit cards and prepaid credit cards. ofo's pricing policy is clearly aimed at the more occasional user, as the 30-day subscription costs half of the yearly one from BikeMi. Therefore, if someone was to rely on ofo for everyday cycling during 12 months, the total cost would amount to € 240, or six to eight times as much as the BikeMi subscription, and more than enough to simply buy a second-hand bicycle.

Mobike

Mobike adopted the possibility to subscribe since the beginning of the service, and also to use the 'pay as you go' system. Mobike offers more subscription options than ofo, starting from 30 days (€ 5) to 90 days (€ 10), 180 days (€ 50) and 360 days (€ 100). The pay as you go system works exactly as ofo, costing € 0,50 every 30 minutes with a daily cap at €5. Mobike accepts the same payment methods as ofo (debit cards, traditional credit cards, prepaid credit cards) but they are used to top up a personal account (with a minimum top up of € 5) that is then used to pay for the rides. This forces first-time users to either give up trying the scheme or having to top up a minimum of 5 hours of rides in their accounts. Similarly to ofo, the long-term subscriptions are clearly not as attractive as BikeMi's, even though, in contrast to ofo, Mobike actually offers 90, 180, and 360 days subscriptions. In Table 2 we have presented the main results of the comparison of the schemes.

	BikeMi	Mobike	ofo
Slogan	No slogan	Let's Mobike!	'The bike sharing that follows you' (Italy) 'Choose a better bikeshare' (global)
Generation of BSSs	4th - docking stations system	5th - free-floating/ dockless	5th free-floating/ dockless
Ownership structure	Public, with a private operator	Private	Private
Business model/ Main source of revenue	75% - advertising 25% - user fees	User fees, potentially data-mining revenues	User fees, potentially data-mining revenues
No. of bikes	4,650 (incl. 1000 pedelecs)	Up to 8,000	Up to 4,000
No. of registered users	57,000 annual subscriptions 300,000 daily or weekly subscriptions ("Clear Channel festeggia San Valentino con BikeMi", 2018)	200,000 active users (no separate data is available for the public)	
Average trip length	2 km ("Superati 55mila abbonati al BikeMi nel 2016", 2017)	1.35 km (Bettoni, 2018b) (no separate data available)	
Rebalancing model	Motorised redistribution. Vans run on methane ("BikeMi: superati 15mln di prelievi, sempre più utenti ed ecco i nuovi furgoni", 2016)	Motorised redistribution.	Motorised redistribution
Arrangements with the local authorities	Municipality receives 23% of revenues from pedelecs use. Municipality	Municipality receives €30 on an annual basis from each bike put on the streets.	Municipality receives €30 on an annual basis from each bike put on the streets.

	purchases both bikes and docking stations.		
Pricing format	Subscription only	Pay as you go or "flat" subscription	Pay as you go or "flat" subscription
Subscriptions	Daily: €4.50 Weekly: €9 Yearly: €36; €29 for ATM (public transport) subscribers	30-day: €5 90-day: €10 180-day: €50 360-day: €100	7-day 5€ 30-day 20€ Ofo pass
One-time Fees	These subscriptions include free first 30 mins. Thereafter the fee is 50 cents/half-hour There is no free first 30 minutes for e-bikes and higher hourly fees apply	30 cents/ 1st half-hour 50 cents/ next half-hours Capped at €5 per day	20 cents/ 1st half-hour 30 cents/ next half-hour 50 cents/ each next hour Capped at €5 per day

Table 2 Comparison of main characteristics of the three bike-sharing systems in Milan

Apps, websites and digital infrastructures

BikeMi

BikeMi users can either use on a physical RFID card or type in their user number and PIN code in the terminal to activate the docks and start using the bicycle. The daily and weekly subscription, aimed at occasional users, provide a PIN number to be inserted on the dock's terminal to gain access to bicycles. The website offers the possibility to subscribe, manage one's own account and see the current state of all the docking stations: number of traditional and electric bicycles available, number of free docking spaces.

The app provides the exact same functionalities as the website, proving that the service itself has not kept up with the technological developments. That also means the lack of any smartphone-specific functions, like a simple geolocalisation of the user on the map with the stations, making it hard to use especially for tourists or users with a lack of knowledge of the city streets. This was also one of the main complains that we found among the reviews of the app on Google Play Store, together with the lack of a 'report' function for malfunctioning bicycles, as stated by this user:

The app doesn't give someone's location, the bikes are often malfunctioning, gears, saddle and brake, the malfunctioning reporting should be added to the app, given that every bike has its own number. It happened that I went to 3 columns where bikes where available but it was impossible to take them. The service is cheap but is terrible, bikes are too heavy, in other cities or even in San Donato bikes are normal and lightweight and the subscription is cheaper. (1-star review)

This user, again, complains about the lack of a GPS localization, specifically to find the closest station:

What does it take to add GPS?!?!?!? A good service paired by an average app. It's incredible that in 2017 they have yet to implement GPS to search for the closest station. (2-stars review)

The third user is a little more positive, rating 3 stars, and would like also to have stations' icons colored according to the available docks:

Useful app, certainly could be improved (history, gps, finding the closest station, malfunctions reporting, coloring after the number of docking spaces available, ….) (3-stars review)

Another user complaining about the lack of a report function:

It's stupid to not give the possibility to give feedbacks, also because the bikes maintenance is poor and it would be very easy to report when something is not working (saddle, brakes, wheels, e-bike motor …..). If it goes on like this it's better to migrate to similar services by other operators. (2-stars review)

And another requesting the GPS localization, together with a more seamless procedure to unlock a bike through the smartphone:

Great service! It would be nice to unlock the bikes directly from the app. And that in the docking stations' map it would show the current GPS location (4-stars review)

This last user is suggesting something different, he would like the app to have data about cycle infrastructure and use it in a turn-by-turn navigation system. Moreover, he suggests to implement a way to show statistical data to the user:

Is it useful? Yes. Can it be improved? Yes. For example? Show the cycle paths, add a navigator-style functionality, improve the rent history and the personal profile, adding general statistics on the number of bikes used, km rode, saved COS2 and burned calories (4-stars review)

ofo

ofo's service has been developed as an app-mediated service from the very beginning, which helps explain the differences with BikeMi's app, which has only been added after the system was already in place and which is not central to the service. ofo's app offers a far greater variety of functionalities, as it is used to unlock bicycles by scanning the QR code on the it, to locate available bicycles on a map, to set paying methods, buy subscriptions and report malfunctions. Although the app was working fine, we haven't been able to unlock a single bicycle in 4 different tries. Also the reviews tell that the app is often defective. The first one, for example, complains about the localization of bicycles being way off and about connection problems:

> *The app is impractical! The localization system is very inaccurate. It is often impossible to contact the server and the APP stops responding. Bikes always broken, also difficult to find. I bought a monthly pass, but very often I cannot use it because it is impossible to find the bike. A true disaster. I'm sorry I bought the monthly pass !!!! (1-star review)*

This second review is again complaining about bicycles appearing on the app but not being there in the real world, to the point he is no longer willing to use the service:

> *Two kilometers on foot, two non-existent bikes on the marked points. Consequence:, missed appointment and lost train. First unique and last experience with this service. (1-star review)*

The third user has even worse problem with the map, he reports bicycles disappearing and reappearing when moving and complains about being unable to book the bike (useful if the bike is not very close by):

> *Localisation service is defective, icons disappear from the map even if you move by 1 mm, doesn't give you the closest bike and you can't book a bike like with the competition, some bikes are defective, I already reported it many times, at night unlocking with the smartphone's flash is hard, it's a pity because the service it's perfect for me, being 1.85 m tall, bikes are more fluid, light pedalling with the right gear ratios. Just fix these little things. (3-stars review)*

The last user is again complaining about localisation and the updates' refresh rate on the map:

> *I don't give 5 stars because geolocalisation is often not precise or it doesn't update the availability of bikes in short times. Regarding the incivility of the animals that break or steal parts from the bikes, I suggest an alarm system like the one from Mobike. I don't think it could solve the problem completely but it's a start. (4-stars review)*

It should also be mentioned that the default zoom level when opening the app in not particularly user-friendly, as it is zoomed-out too far and shows the closest bicycles too cluttered at the middle of the screen, leaving a large chunk of empty space on the display. The screenshot (Figure 8) shows the default zoom level of the app centred on Duomo square in Milan.

Figure 8 ofo app screenshot.

Mobike

Mobike's app works exactly the same way as ofo's, offering unlocking by QR code, lotacing bicycles, setting payment methods. Apart from the annoying policy that forces users to top up at least € 5, it does not pose any problem during the rental, while we found one particular review of a user having some problems with the unlocking process:

> *This afternoon I tried to unlock something like 30 bikes and did not really work. Result is a 5km walk to reach my daughter at school exit. (1-star review)*

The default zoom level is more zoomed-in than ofo's, showing more clearly the location of nearby bicycles. Again, the screenshot (Figure 9) was taken centred on Duomo square in Milan.

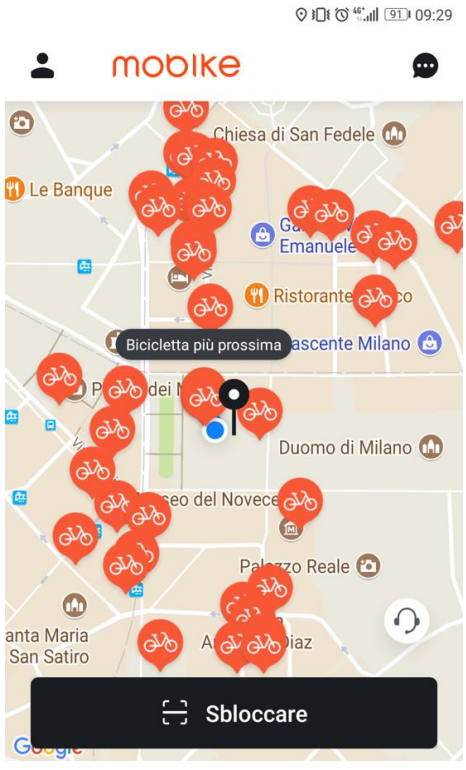


Figure 9 Mobike app screenshot.

Bicycles

BikeMi

Figure 10 BikeMi docking station with bicycles. Source: own.

BikeMi offers two different bicycles: standard and electric, respectively yellow and red. They are well-sized, even if tall people might find them a little small, even with the saddle at its top height. Bicycles are relatively heavy but the center of mass is low, making the bicycles agile. During our own rides, we found a large difference in performance between different non-electric bicycles caused by differences in maintenance levels. Some bicycles rode perfectly, others were harder, sometimes the gear change was defective, leading to unsmooth pedalling, sometimes the brakes didn't perform well. According to Croci, the bicycles were chosen after investigating the scheme already in place in Lyon, France, and changing a few details based on their weaknesses.

ofo

Figure 11 ofo bicycle. Source: hellogreen.it

We haven't been able to test a single ofo bicycles because, as mentioned before, we were unable to unlock them with the app. However, one of us was able to try a bicycle few months before we started working on the project, finding the bicycle a little small but still acceptable, the three different gear ratios available too similar to each other but still useful. The saddle can be set at the desired height. Through the Google Play Store, we were able to find reviews centred on the bicycles rather than the app itself. The first one is complaining about the service being too expensive, but it's stating ofo superiority over Mobike in terms of bicycles:

> *50 cents fee is a robbery. The service becomes unusable: lower the fees or at least charge every 5-10 minutes, not every 30. Bikes are worse than bikemi but better than those from mobike- (2-stars review)*

This other user it's positive about the bicycles, being comfortable even for taller people:

> *Localisation service is defective, icons disappear from the map even if you move by 1 mm, doesn't give you the closest bike and you can't book a bike like with the competition, some bikes are defective,*

I already reported it many times, at night unlocking with the smartphone's flash is hard, it's a pity because the service it's perfect for me, being 1.85 m tall, bikes are more fluid, light pedalling with the right gear ratios. Just fix these little things. (3-stars review)

This last review is praising the company for the use of different gear ratios on the bicycle:

Having the gears lets you ride more swiftly through traffic without getting rammed! (5-stars review)

Mobike

Figure 12 Mobike bicycle. Source: Trucioli.it

Mobike bicycles show the biggest issues, as of writing. Both from our personal experience of the system and from the reviews of the app on the Google Play Store, it is evident that the bicycles themselves are the weakest part of the whole scheme. In fact, the bicycles are too small for the average European adult, the wheels are hard and unable to absorbs vibrations and the typical 'bumpiness' of Milan's roads (cobblestones are a common road paving in the city), the single gear ratio is too soft and makes pedalling a tiring and sweating activity. The size and the gear ratio, in particular, give the feeling of riding a child bike or, to use our own words from the first-person experience, give the feeling of being 'a hamster on its wheel'. The height of the saddle can be changed but even at the highest setting is still too low. In contrast, the bike itself is sturdy,

durable, the transmission mechanism doesn't make use of a traditional drive chain but uses a drive shaft which is expected to be more resistant and less prone to failure. Even the wheels are designed to lower the possibility of failures and reduce maintenance costs, using solid tyres instead of the standard air chamber tyres. As mentioned before, the users explain their critiques over the bicycles on Google Play Store though the reviews of the app. This one here is reporting what it feels like to ride these bicycles in the urban setting:

> *Very beautiful aesthetically, but to ride around Milan is nothing short of impossible. These bikes are so heavy, a lot of effort is required only to go slow. Perhaps those who created them have never cycled in their lives. P.S. I ride a road bike, I also do the mountains and in town I was overtaken even by old women, these are harder to use, and it's a real shame. (1-star review)*

This second review is again comparing how negative his experience was in comparison with his own bike:

> *Useful idea, unfortunately the bikes are quite "hard" in the pedaling, small wheels, airless and heavy ... I tried the same route with my mountain bike and with this and I put the triple time .... also cost a bit too high (2-stars review)*

The third user states that walking requires much less energy than cycling on these bicycles:

> *It is less tiring to walk. If you improve the bikes the idea is excellent (2-stars review)*

This one is again focusing on how energy-efficient is to use the Mobikes to move through the city:

> *Great service. To review the type of bikes: too small and tiring to use (3-stars review)*

The last user only complains about physical pain perceived while riding, possibly because of the airless tyres, but approving the system after all:

> *Everything is fine but a** hurts after a while (5-stars review)*

On the other hand, new bicycles were launched recently, providing a size more fit for Europeans and three gears, although their number has not been disclosed, so it is difficult to evaluate their impact.

Figure 13 New Mobike bicycles. Source: MilanoToday

Multi-Level Perspective analysis

In the following sections we present the findings according to the MLP framework, from networks, through discourses and to practices.

MLP – Networks

Here we analyse the network of actors involved in shaping the mobility practices revolving around the bike sharing schemes in the city of Milan. According to the Multi-Level Perspective theory that we adopted in this research, the network of interacting actors has a plurality of levels, from the broadest to the most particular: landscape, regime, niche. The last one represents the level in which new practices, uses and behaviours are born, it's the incubation space for radical innovation. The second one, is the level that provides the tools, builds on the innovation's foundation to open a wide array of new uses and brings the innovation in the mass world. The first one is the context, where the slow, steady, push for transitioning to new practices is generated. In this section, we assign these roles to the different actors that form the world of bike-sharing in Milan. The analysis of networks will also serve as a ground for investigating potential and existing agency conflicts between the public and private actors involved in the socio-technological assemblage of bike-sharing. Since our microcosm is limited to Milan, we have placed the municipality of Milan at the landscape level, as for the other actors involved this is the reference for their actions. Both the operations of AMAT of ATM, the public bodies responsible for transport in Milan, as well as Clear Channel, ofo and Mobike have only as much elbow room as the municipality grants them based on their political goals and ambitions. While cycling itself can be seen as a niche practice in Milan, the fact that the municipality of Milan endorses bike-sharing schemes, and hence these are anchored or legitimised within municipal planning, we treat the bike-sharing companies as part of the regime level. Furthermore, these companies are part of large, multinational corporations, with billions of USD in revenues, therefore it cannot reasonably be assumed that these are niche actors. For this reason, the niche level actors are those, who engage with bike-sharing without any official anchoring within the decision-making system of Milan. Naturally, mapping all the niche level actors in Milan would pose enormous difficulties, because of the often ephemeral or underground character of such often informal organisations, or lobbying groups. With this in mind, we decided to focus on two actors, first, the

Ciclobby, a local cycling lobby organisation, and secondly Ciclo Ignoranza, an informal group of cycling enthusiast, who organised a series of night racing events, taking advantage of one of the free-floating bike fleets.

Landscape

Municipality of Milan

Milan, as the industrial center of the country, quickly grew in a vibrant metropolis after WWII. The city soon started to modernize its own transportation system, building two metro lines and transforming its space to allow more cars: closing the water canals to build more roads, cutting tram lines, building highways and urban high-flow roads. The city turned into a polluted, grey, messy urban agglomeration filled with car traffic, similarly to many other European cities during the same period. The tides started to change in the 1990s, when the administration launched new infrastructural projects to strengthen the public transport network, like a third metro line and a commuter rail tunnel crossing the city underground. As explained by Croci (mobility and environment advisor for Mayor Letizia Moratti) during our interview, Moratti's administration (2006-2011) wanted to lower the motorization rate (the ownership of private vehicles) in the city. To push the change, new metro lines, suburban rails and general public transport expansion were thought as needed but not enough to enhance the culture change needed. More alternatives to private cars had to be put in place. One of these alternatives was Ecopass, a pollution charge covering the historic center of the city, later turned into a congestion charge by the following Giuliano Pisapia's administration (2011-2016). Another tool was the first car sharing system launched in the city that, following Croci's opinion, didn't become popular mainly for technological restrictions that were overcome only with the advent of smartphones. One of the tools (most interesting from this research perspective) was the BikeMi bike-sharing scheme, launched in 2008, one year after the pollution charge.

Before its launch, the city administration, through its agency AMAT, studied the international examples, especially the one from Lyon, France and developed its own system, assigned its ownership to the public transport company ATM and launched a tender to find an operator. JCDecaux and Clear Channel were the two contestants but the former dropped its interest after the initial data from its Parisian BSS came, showing high costs caused by vandalism. Clear Channel won the tender and, from Croci's interview, they showed satisfaction over the low vandalism rate

affecting the BikeMi scheme. In the wider picture Moratti and the previous Albertini administrations gave the city two new metro lines (one still under construction), a new suburban railway system, new metro extensions, car and bike sharing, pollution charge, new brownland high-density developments and the World Expo 2015. In 2011, the city changed its political color, shifting from center-right to center-left, with the election of Mayor Giuliano Pisapia. The political color changed but the administration's trajectory didn't, and the objective of fighting the private car culture to increase the quality of life in the city stood. Pisapia's administration turned Ecopass pollution charge into Area C congestion charge, imposing the fee on every car entering the city's historic center. It also overhauled the night-time public transport network, expanded BikeMi with new stations and electric bicycles, succesfully launched new car sharing schemes and approver the new city plan, the 'Piano di Governo del Territorio', which set the long-term trajectory of the city towards sustainability. Under both Pisapia and the following Mayor Giuseppe Sala, the city elaborated, through AMAT, the Sustainable Urban Mobility Plan, started in 2012 and currently in its final phases of the approvation process, going through the open consultation phase.

As can be seen in the description above, through the actions of the municipality of Milan a network of actors around the bike-sharing system was created. With so many actors involved agency conflicts were to be expected, despite having a contract with the operator that seemed to be clear about the extent of responsibility of both the public and private counterparts. In general, however, it is worth underlining that despite a changing political scene, and having three different Mayors within the period BikeMi has been in operation, the Municipality, at least to some extent, has created conditions that favour the demotorisation of Milan, equipping other actors with instruments to induce a change in mobility behaviours. Naturally, these actions have to be seen as part of a more broadly changing political landscape in the recent years, both in the EU and Italy itself, where much more attention is being paid to active modes of transportation.

Regime

AMAT

AMAT stands for Agenzia Mobilità Ambiente e Territorio (Mobility, Environment and Land Agency), is owned and controlled by the Municipality of Milan, represents the technical consultancy firm used by the Municipality on the fields of transportation, mobility, environmental and urban plans and policies. It works on specific requests done by the Municipality and employs

a wide range of professional figures: traffic modelists, economists, planners, law experts, spatial analysts, computer developers. Requests span different fields and dimensions, from consultancy over new parking facilities, regulating traffic lights, monitoring public transport performance, analysing effects and trends of policies, to elaborating city-wide plans as the aforementioned Piano di Governo del Territorio and Sustainable Urban Mobility Plan. It's not a public authority and only acts as an advisor of the Municipality and its political organ, therefore it's not publicly well known and all its plans, designs, solutions and policies are only officially adopted as Municipality's own acts. This does not however mean that AMAT is merely a bystander, as its voice is usually heard in the Mayor's office and its solutions are implemented. Within Milan's transport planning and management, even if not directly responsible for the totality of Milan's mobility policies, AMAT is very much the power behind the throne.

ATM

Azienda Trasporti Milanesi, ATM is the public transport operator in Milan, owned and controlled by the Municipality. According to our interview with Croci, the Moratti administration wanted to turn ATM into a multi-modal mobility management company, other than a public transport company. The idea was to add to its portfolio the GuidaMi car-sharing service (dismissed in 2015), the BikeMi bike-sharing scheme (operated by Clear Channel), the technical management and toll collection of the Area C congestion charge, parking control activities in the city of Milan. Thanks to its highly specialised knowledge, ATM has been able to expand abroad and now also operates the metro services in Copenhagen (Denmark) and Riyadh (Saudi Arabia). According to Croci, as with any major organisational change, the company's executives were initially reluctant about becoming a multi-modal mobility managing company, as they believed that they should focus on their core business, i.e. operating bus, trolleybus, tram and metro services. Nevertheless, since bike-sharing should be treated as part of the public transport offer, it was only reasonable that ATM should take ownership of this new mobility tool. The first cracks in the relationship with the operator was appeared with the financial crisis and falling advertisement revenues, which obliged the public owner to partake financially in keeping the system afloat. This decision, has redefined the relationship, as the system ceased to be financially sustainable on its own, as it had originally been conceived, and began to rely, if only in a small percent, on the subsidy from the ATM. This gave birth to an agency conflict (Cohen & Kietzmann, 2014) that was to bear more far-reaching consequences for both parties.

The second major dispute followed the decision to introduce the electric bikes, which were not originally conceived in the BikeMi contract. Because of a political decisions related to the Expo 2015, which was held in Milan, the owner of the system decided to introduce a pedelecs. This was thought to become a valid mode of transport for the visitors of Expo 2015, because of the considerable distance between the city center and the main Expo 2015 exhibition area. Although there is little evidence that the bikes were actually used during the Expo 2015, they became part of the fleet ever since, bringing along unexpected maintenance costs, which turned out higher than initially budgeted. According to our interview with AMAT, the BikeMi operator, Clear Channel, requested the public authorities to pay for the replacement of electric bicycles' batteries, even though according to the contract it was Clear Channel's responsibility. Should the public owner decline to support the system, the operator announced that the scheme would face a shutdown. The city eventually found the economic resources but this episode was, for the public authorities, the main reason behind the swift launch of the new free-floating schemes, ofo and Mobike. The new tender was issued under the new Mayor Giuseppe Sala, elected in 2016 after administering the World Expo, and its main aim was to reestablish the power balance between the municipality and the BikeMi operator, by means of increased competition, partly based on experiences from the car-sharing industry in Milan, where there are multiple companies offering the services. We shall take a closer look into the consequences of this decision in the next chapters, although it is still early to draw any definite conclusions about the outcome of this conflict management strategy.

Clear Channel

Clear Channel is part of a worldwide media group (iHeartMedia Inc.), with businesses spanning radio, television, and, most importantly in the context of this research, outdoor advertising. Clear Channel itself is an advertising company that uses urban furnitures and services as a part of its portfolio of solutions to conquer the market, similar to JCDecaux (i.a. bike-sharing operator in Lyon). Clear Channel was chosen by the Municipality of Milan to operate the bike-sharing scheme BikeMi, in exchange Clear Channel gets exclusive advertising spaces in areas of very high-demand within the city center, where strict advertising regulations are in place. It also operates BSSs in Barcelona, Oslo, Verona, Antwerpen, Mexico City, Stockholm. As explained by both Croci and AMAT, its business model makes it difficult for the Municipality to expand the scheme to the outskirts. In fact, in said areas, the pool of advertising space is both larger and seen by less people,

meaning that the space itself is less valuable, hence potential clients of the advertising company have less interest in finding new spaces for billboards.

The already mentioned agency conflict that arose was interpreted by the Municipality as a consequence of having a monopolistic operator in the bike-sharing services in the city, which threatened to shift the balance of power in favour of the private company. Despite these recent setbacks, Sergio Verrecchia, the bike-sharing director at Clear Channel, is optimistic about the future of bike-sharing in Milan (Verrecchia, 2017). The free-floating bike-sharing is often touted as disruptive, with pundits predicting it could become the future of bicycle mobility in cities, replacing the older systems based on docking stations. This view, perhaps unsurprisingly, is not shared by Verrecchia, who sees these new companies as providing merely complimentary services, and therefore posing no threat to BikeMi's business model and its bottom line (Magnani, 2017). Verrecchia does not seem to be worried by the reduction in the number of subscriptions, which fell by 5% in September 2017 (AMAT suggested it was closer that total operations of BikeMi fell by 15%), that is since the introduction of the new competitors (ibid.). There is, however, at least some evidence that BikeMi did not take the new competition particularly well, and actively tried to undermine these companies as its facebook account shared two stories about dockless bike-sharing schemes, presenting them in less than favourable light (Mingoia, 2017).

As we can see, the decision of the Municipality to introduce competition on the bike-sharing market has created some tension, and shifted the balance of powers towards the public authorities. Notwithstanding, it remains to be seen, just how viable this competition is, particularly having in mind that neither ofo nor Mobike have yet proved to be financially viable in the long-run, as they still very much rely on the investment money from its shareholders.

Mobike and ofo

Mobike and ofo are two chinese companies working solely in the field of bike-sharing schemes, contrary to Clear Channel, which is mostly an advertising company. The tender by the Municipality of Milan assigned three differents market lots, each of 4.000 bicycles, for a total of 12.000. Mobike won two, ofo one. The tender also set standards for bicycles' design (requiring them to be ride-able by people at least 1.50 m tall) and service quality (limiting malfunctioning bikes to 5% of the pool). Their business model is officially based only on paid rides done by its users, but their apps generate location data of each individual trip of each user. This data is stored and managed by the two companies in China, rising concerns about their use and the privacy of

their users. It is worth underlining, that there have been many doubts regarding the long-term viability of their business models, since they are aggressively expanding thanks to enormous cash influx from their shareholders, mainly Meituan Dianping (itself financed by Tencent, a telecommunications company), an all-in-one consumer service (Mobike) and Alibaba, the Chinese e-commerce giant (ofo). These broader investment trends might indicate that bike-sharing is supposed to become just part of a much larger lifestyle app, that will steer not only the way we move around, but where and what we eat and do in our free time.

These companies have not had a particularly smooth landing in Europe, especially since their arrival was preceded by many press article reporting on the chaos they introduce in the urban centers, and the bicycle graveyards, which proved that the services are poorly maintained and the bicycles themselves of poor quality. To avoid a negative stance from the local authorities in Europe, ofo and Mobike usually cooperate with the municipality in order to establish the rules that should govern the service. This has enabled them to build mutually beneficial relationships, where the city not only receives cash payment per each bike per year, as well as a vast amount of mobility patterns data, whereas the operators have the possibility to operate their businesses, as long as the service is well maintained and does not become nuisance to the inhabitants. One can clearly see the many benefits municipalities receive thanks to their presence, however as Alessandro Felici, the director of the Italian branch of Mobike noted, "[h]ere in Italy you make the mistake of seeing bike-sharing as a big gift from China (...) instead we have to create models of economic sustainability", and adding rather ominously a warning that "[t]he money is not infinite and Chinese investors can exit the model as fast as they entered" (Magnani, 2017). It is therefore, not at all unimaginable that, if the service is not as profitable as expected, the companies might decide to leave the business, even though they are contractually obliged to provide these for at least three years, and would risk losing the deposit they needed to pay for each bike to the Milan municipality.

Lastly, even though Clear Channel claims that the services of Mobike and ofo are merely complementary, and AMAT sees them as a way to provide bike-sharing to the more peripheral areas of the city, which do not have BikeMi docking stations (we will return to this theme when analysing the practice dimension), it is clear that in many cases these Chineses companies pose direct competition to BikeMi. The biggest threat to BikeMi is that, even though it receives very favourable reviews from its own users (Manzi, 2018), the sheer volume of the new bikes (12,000

compared to BikeMi's 4,650) and an attractive service they provide, might reduce BikeMi's profit margins, which are already rather thin, and ultimately force them out of competition.

Niche

FIAB Milano Ciclobby

Ciclobby is a local lobbying organisation, part of the Federation of Friends of Bicycles (FIAB), and of the European Cyclist Federation, whose main purpose is to promote cycling in Milan. Ciclobby plays the role of a watchdog, indicating any inadequacies of the local policies and plans. The main goals stated on its website, among others, are promoting cycling the bicycle "as a daily transport, environmentally friendly, economical and effective way of transport, which especially if properly integrated with the public transport system, offers a competitive alternative to the motor vehicles" ("Bicycling in Milan", n.d.). Ever since the inception of BikeMi, Ciclobby has been mostly positive about the scheme, stating in one of its 2009 articles that it has been a success story, proving that such schemes can also work in Milan (Galli, 2009). Nevertheless, some objections have been made, especially regarding the focus the municipality placed on the BikeMi as the major tool in promoting cycling, whereas other measures were seen as secondary or not worth investing in, e.g. appropriate network of cycle lanes, parking facilities. In the networks of actors relating to bike-sharing in Milan, Until now, the association has not presented their views or opinions about the new free-floating schemes, whereas it has printed the views of Sergio Verrecchia, BikeMi's director, and is in close cooperation with BikeMi.

Ciclo Ignoranza

Ciclo Ignoranza is an informal group, formed around a social media profile under the same name, which began organising Mobike races in autumn 2017. The name denotes not only ignorance defined as the lack of knowledge about a specific topic, in this case cycling, but among young people it acquired the definition of being out of line, crazy wrong, exaggerated and being proud of these 'qualities'. The races with Mobike bicycles began as a prank or a joke, with the founders of these races comparing them to racing with golf carts, or something else looking ridiculously. These bikes were less comfortable and didn't have gears compared to ofo's, ensuring a more level playing field for all. The idea to set up the first race came from another group of cycling enthusiasts who were already doing races both with fixies and with small bikes, with wheels

smaller than 20". These races were parallel to the Red Hook Crit race in Milan, the local grand prix of an international fixie bike championship organised by video game producer Rockstar Games (famous for Grand Theft Auto serie). This gave the founders an idea to take advantage of the free floating bikes, so that everyone who could afford to rent and knew how to operate the Mobike service could participate. However, as we learned, the races were also meant to have both a promotional and educational value. The founders were hoping that through such one-off, fun experiences with this bike-sharing scheme people will get used to riding bikes and maybe continue into their everyday lives. In our interview, the two founders reported that they got contacted by Mobike, which learned of the group through one of their repairmen who participated in one of the races. Ciclo Ignoranza was scared at first, but then Mobike showed their interest, offering free minutes as a prize for upcoming events. This shows how even such informal groups are not free from influences of these bike-sharing operators, and how something that started off as a non-commercial enterprise, quickly became consumed by the market forces, looking to turn any such undertakings into profit.

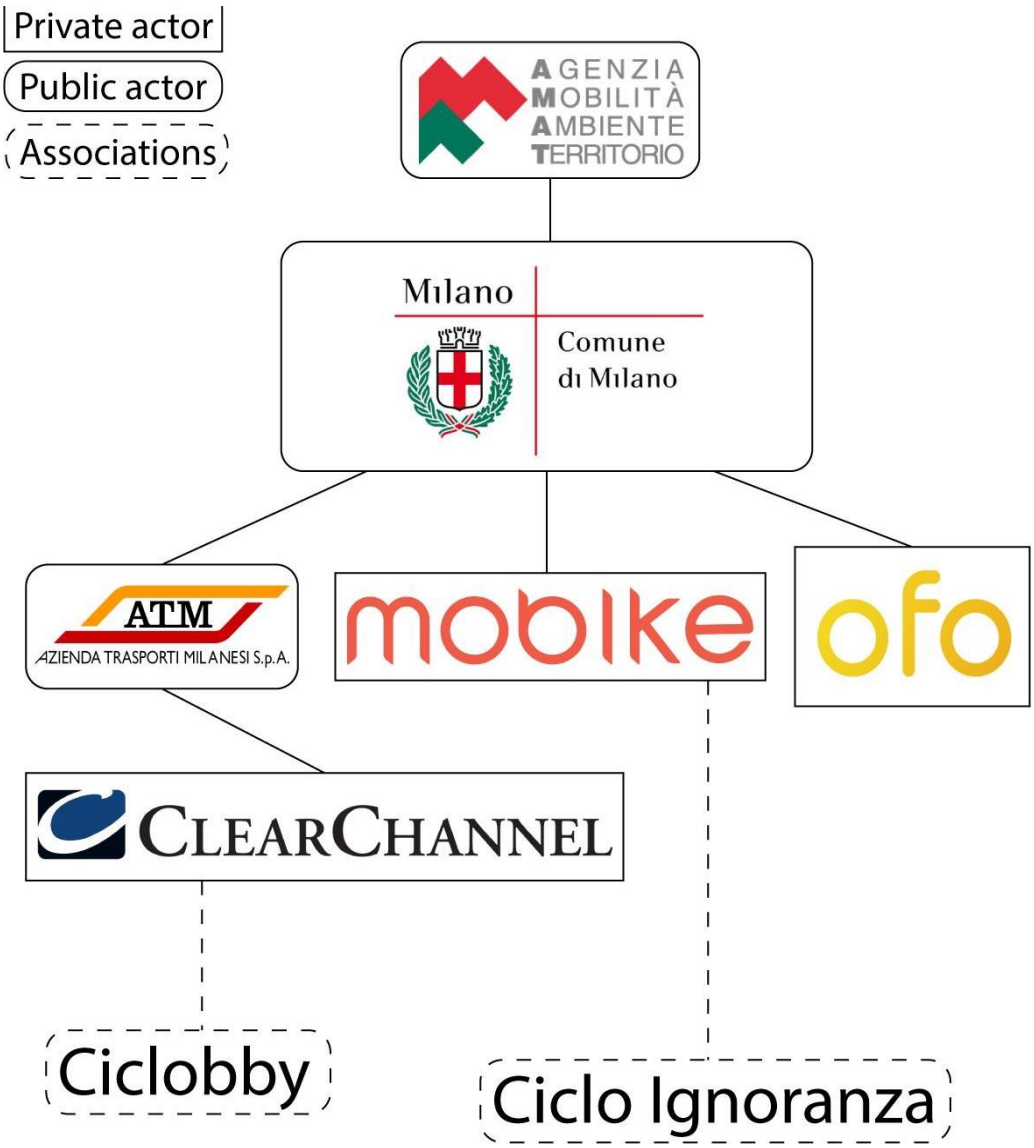


Figure 14 The network of actors involved in Milan's bike-sharing. Source: own

MLP – Discourses

Modern bike-sharing systems are entangled in a plethora of discourses that coexist, compete with or reinforce each other. These discourses, defined by Maarten Hajer as "a specific ensemble of ideas, concepts and categorizations that are produced, reproduced, and transformed in a particular set of practices, and through which meaning is given to physical and social realities" (Geels & Verhees, p. 912), exert a profound impact on the stability or establishment of a given cultural practice, in this case using the BSSs. Among the many discourses surrounding BSSs from its inception are those of reducing congestion and pollution, improving flexibility and modal choice, normalising cycling in the cities, or improving social inclusion, to name the most evident ones. In the following passages, we shall look closer into how these discourses are shaped and invoked by different actors. Through the lenses of MLP and *Staging Mobilities* frameworks, we hope to elicit some of the more inconspicuous, if not at all innocuous discourses that populate the niche, regime and landscape levels. Naturally, the border between each of these levels is characterised by a certain degree of porosity, which on the one hand enables the discourses to pass from one level to the other, but on the other makes the categorizations as to the level to which a given discourse pertains at times somewhat arbitrary. We are aware of this limitation and wish to make these limitations visible to the reader as well. There will be cases of discourses which penetrate through the borders and are summoned up by different actors, more or less formally anchored within the system, to serve their specific needs and interests. This might be particularly the case, when discourses that originated at the niche level are appropriated by more powerful agents to pursue their own, often purely economic interests, while positioning themselves close to grassroot or otherwise bottom-up initiatives. The empirical base for this analysis comprises of interviews, press and scientific articles, blog and apps' reviews, as well as websites of the respective actors and official documents and strategies of the policy makers.

Landscape

"For personal behaviour you use your car, you have a car, a beautiful car, you drive it"

As has already been explained Milan is a city that, like so many other European cities, succumbed to the allure of the motor vehicle, and the streets are flooded with cars parked on every corner.

This development has obviously been accompanied by a change in discourses surrounding the everyday mobility, with the narrative steadily shifting towards the necessity of having a car to navigate the modern life. As Valentino Sevino, the Mobility Planning Director at AMAT, stated, "[b]ecause for personal behaviour you use your car, you have a car, a beautiful car, you drive it. Maybe it's changing with the new generation. When I was 18 years old my first ambition was to get a driving license, the young generation in this moment maybe get the driving license at 25 years". As can be seen, the car not only served to fulfill, what Gössling terms, the instrumental values, that is those related to the lack of viable alternatives, therefore creating 'real' car dependency, but also to a large extent what he terms affective and symbolic values. These latter values, contrary to those more instrumental lead to 'perceived' car dependency, and ultimately to car addiction. Just as Sevino, other interviewees have also indicated the car-centric culture as one of the main reasons and obstacles for a more sustainable local modal split. With Italy boasting a powerful automotive industry, and Milan itself being the seed of Alfa Romeo, there can be little wonder that car manufacturers easily managed to tap into this 'perceived' need to own a car.

At the same time, after WWII the bicycle has faced stiff competition from its more technically advanced cousin, and a stepping stone, before getting hands on a car, i.e. the *motorino*, a type of small moped that until this day populates the streets of Italian cities. In this circumstances the bicycle was forced into oblivion as an urban mode of transport. Where the bicycle remained prominent in the Italian culture, is within professional cycling and as a leisure time activity.

Cycling as a leisure time activity and as professional sports

Italy is the seed of some of the most competitive professional cycling teams in the world, hosting one of the three most important cycling races in the world, *Giro d'Italia*. Milan itself is host to one of the five classic cycle races, with Milan-Sanremo, a one-day race, also referred to as *The Spring Classic*. As hypothesized by Anthony Cardoza cycling has played an instrumental role in establishing the Italian national identity, as one of the first mass spectator sports, which emerged between 1900 and 1950 (2010). Even though the industry has been hit by many doping scandals over the years, the *Giro* still occupies an important place among the major sports events and continues to attract large audiences. This narrative has been underlined by the members of Ciclo Ignoranza, who themselves are fans of cycling, and who decided to replicate some of the spectacle of racing through their night Mobike races, if only on a very small scale. Nevertheless,

it does not seem that there is any linkage between professional cycling and promotion of the bicycle as a mode of transport, as Horton and Parkin observe (2012, p. 308):

> *"Enthusiasts of cycle sport see its promotion as key to building cycling's status. High-profile cyclists can act as role models in promoting cycling. This may be true, although cycling's elevation as a sport does not straightforwardly equate to its status as an ordinary way of moving around. Interest in cycle sport is high in France, Italy and Spain, yet cycling as an ordinary practice in citizens' everyday lives is generally absent."*

Moreover, the great media exposure professional cycling receives reinforces the image and perception that cycling is predominantly a sport, and something to be looked upon rather than participated in (Horton & Pirkin, 2012). This results in a perception of cycling as a leisure time activity, which requires one to be both very physically fit, as well as possess professional cycling equipment, epitomised by lycra clothing.

Another facet of this discourse might be associated with the attitudes the BikeMi users express towards using a private bicycle. Giancarlo Manzi, a researcher responsible for a large satisfaction survey of BikeMi users, underlined that the customers of BikeMi do not perceive themselves as cyclists. In other words, the quality of 'being as cyclist' does not constitute part of their identity, despite the continuous and regular practice of cycling with the BikeMi. The building of co-identities and coherent self-narratives as part and as a result of mobile practices is not to be underestimated in the persistence of the automobility system, as indicated by Gössling (2017). The apparent ineptitude of the BSS in producing such a co-identity might limit the extent to which practices related with this mode of commuting have a spill-over effect on the users' general mobility practices, and therefore limit its potential to act as a trampoline for boosting private bicycle use. This might also confirm that BikeMi users only assign instrumental values to this mobility service, whereas the affective and symbolic values are assigned elsewhere. What is more, Manzi expressed a view that using the BSSs might actually reinforce the perception of the bicycle as merely a tool for the 'first' or 'last' mile, rather than a mode of transport capable of covering the whole commute.

Regime

The main discourse legitimising the existence and continuous expansion of the BSSs in Milan is that of flexibility and giving commuters a greater variety of options to choose from when

planning their journeys. The decision to introduce a BSS in the first place came as part of a larger environmental actions package, with thirty measures altogether (with road pricing playing the main role), and as Croci explained:

> *"Looking at experiences of other cities in Europe, we looked the bike sharing systems, which was introduced in December 2008, one year after road pricing. We decided it was part of a package to give the users alternatives to private cars"*

The same view is shared by Valention Sevino, who stated that:

> *"We think that in order to obtain the modal shift, it is needed to have a very wide panorama of possible transport system to use. If we have only bike sharing or only car sharing, we can't achieve the modal shift. It's about the combination of different possibilities. In this moment the city of Milan has an important possibility to reduce the motorization rate, which is among the highest in the large european cities. The main tool is to have shared mobility systems. But not one or two. We need to aggregate all the sharing services, it's our idea of the mobility as a service system that we are developing together with ATM."*

What becomes clear from this is that, BSSs need to be part of a larger mobility package to achieve any meaningful results. While it would prove to be a tedious, if not outright impossible task, to establish causality between the BSS and a reduction of the per capita number of private cars taking place in Milan in recent years, both Croci and Sevino argue that, if seen as one of the cogs of the mobility toolkit, BikeMi shares some of the responsibility. Naturally, not all citizens could enjoy the same level of increase in 'motility', i.e. the potential and actual capacity to be mobile both geographically and socially, characterised by three main features - access, competence and appropriation (Kaufmann, Bergman, & Joye, 2004). As will be discussed in the following passages, not everyone can become a BikeMi, ofo or Mobike user, whether because of payment method requirements (access) or simply because of a digital divide (competence). Therefore, it is not flexibility for all, but rather flexibility for those who already enjoy a high level of motility in the society.

Chaos and order

One very prominent discourse that preceded the arrival of dockless bike-sharing to Europe was that of introducing chaos to the urban space. A myriad of press articles were accompanied by pictures of these bicycles stacked-up in piles on the corners of the streets, or more ominously on

bicycle graveyards. This led many cities in Europe to be very cautious about this potential nuisance, and as AMAT explained, Milan was just as alarmed as any city considering to invite these operators on their ground. In regards to this, the Municipality of Milan, as mentioned by Sevino, is planning to define 'mobility areas' in which people would be encouraged to leave sharing vehicles, cars or bicycles. The goal is to create areas where people can immediately find sharing vehicles, softly enforce a rebalance of their positions throughout the city and also limitate chaotic parking in the urban space. Some cities already struggling with limited parking space for bicycles for their residents, such as Amsterdam, decided to preemptively ban the free-floating operators from coming to their cities (Kneuts, 2017). As Croci mentioned in the interview:

> *"But actually there is chaos. When we decided for the docking stations, we also studied the free-floating systems and the idea was at the time that free-floating had some negative aspects. The first one is that you're not guaranteed to cover the right areas when there are peaks in demand. Of course with a fixed station you have a continuous service of redistribution to allow for the local demand at the right time of the day. With free floating, if some of the bikes go to a peripheral area of the city, they stay there for two weeks. The other problem is the disorder and the chaos in the city. I think it's a big problem for a city like Milan with small streets and a high concentration of activities in the city center. It would have been better to introduce the system with set parking racks and to force the users to park in these racks. And then of course we have problems of vandalism and so on. I'm not saying that it was a wrong idea to put in competition the system but for sure it had to be studied better, now some problems are really evident."*

In Croci's opinion, the free-floating systems introduce chaos on two levels, first in terms of service reliability, and second in terms of disorder in the urban space, partly as a result of vandalism, which has also caught the headlines of many media outlets around the world. The companies themselves have also recognised this problem, and created a credit-scoring system that is supposed to promote good practices when leaving the bike after a ride.

In its 2017 *Common Position Paper on Unlicensed Dockless Bike Sharing*, the European Cyclist Federation has issued a number of recommendations in this respect, stating that:

> *"As much as possible, the onus should be put on the bike share operators to take greater responsibility and ensure orderly streets. This could be helped through implementing measures to incentivise good parking behaviour (e.g. demerit/credit system, geofencing) and by having users report offending bikes. Cities should also consider having bike share operators provide functional public bike parking spaces to accommodate the additional bicycles and limit bike parking to specific drop zones in high-usage locations to better organise public space."*

Clearly, an orderly public space is ranking high among the preoccupations list towards dockless bike-sharing, although the solutions might risk to make these systems less flexible in terms of drop-off areas, therefore making them more like the docking systems, albeit without the physical presence of a docking station.

But there is another facet of this order vs. chaos discourse, not relating to the bicycles themselves but to their users. While it is clear that neither BikeMi nor ofo or Mobike are all-inclusive in terms of who can actually become a member, least because of the physical demands cycling requires, the payment methods introduce yet another border wall, protecting these systems from unwanted users. This feature is particularly apparent in the case of BikeMi, which during the entire period of operation only allowed people with credit cards to become its users. This feature, as Croci pointed out, was intentionally built into the system, and therefore 'staged from above' in a particular manner, adding that:

> *"I think that the identification of the user through the payment system is essential, you have to know who is using the bike and you have to be able to take the money out of his pocket if he steals the bike, let's say. I think it's essential. But of course there is a digital divide problem. Not everybody, especially in Italy, have credit cards."*

Undoubtedly, such identification method has clear benefits for the operator, as it leads to much greater accountability of users, hence preventing vandalism and misuse of the bikes. Nevertheless, it is important to remember that in case of BikeMi the operating company is an advertising company, which clearly benefits from preselecting an affluent user group with greater consumption potential. Additionally, if the credit card data, such as transaction history, is coupled with location, the potential advertisers are equipped with a fairly accurate picture of how their customers move around, and perhaps more importantly where they work and live, if only approximately. As Duarte notes "each credit card transaction triggers a powerful apparatus of data collection and analysis", and further adds that such "information is valuable for marketing purposes" (2016, p. 106). While there are some who believe that focusing on the credit card or being 'banked' should not be of main concern for BSS operators when thinking of making the system more socially-inclusive (Corbin, 2015), it is clear that these systems assume a certain vision of an 'orderly' user, or citizen more generally. The concentration of the service within the central areas of the city, as is the case with BikeMi in Milan, is clearly preferable from a mobility manager point of view, as this is where congestion is most pressing, it does however, reinforce such

unequal access to the service. Similar observations were found by Duarte, who states "[b]y locating BSS docks in more upmarket neighborhoods, BSS operators are not only targeting richer (credit-card holders serve as a proxy) potential users, but also richer consumers who do not need to ride bicycles, but who welcome the BSS as a sign of an environmentally friendly and modern lifestyle" (Duarte, 2016,p. 112).

Compared to BikeMi, ofo and Mobike are more open to new users as they accept other payment methods, such as debit or pre-paid credit cards, therefore opening up to a much larger target group, which is understandable since their business model relies to a greater extent on users' fees than on advertisement revenues. In this sense, these services are more equitable than BikeMi, becoming available to a larger number of potential users who do not hold a stable, high-income job that would allow them to have a 'proper' credit card, even though those 'unbanked' are still left out of the service. In ofo's and Mobike's eyes, the preselection of users comes down much more to tech-savviness and having a smartphone connected to the internet. Nevertheless, such market segmentation, leaves those less well-off only eligible for a service that is more expensive on a per ride basis, not only because of the monetary cost, which is anyway higher, but also because of the much more extensive amount of tracking and private data risks involved in these new BSSs. On a final note, it is worth underlining that, one of the reasons why the municipality of Milan decided to invite the dockless bike-sharing operators was to expand the area covered by BSS in Milan, without the need to invest in the costly construction of new docking stations in areas with considerably lower expected level of bicycle usage. We will return to this aspect in our analysis of practices to see if the reality lived up to these expectations.

The analysis of the chaos and order discourse reveals a number of worldviews held by different actors involved in the operation of BSSs in Milan. These two clashing discourses bear semblance to the discussions of nomadism and sedentarism present in mobilities studies, with BikeMi advocates presenting a more sedentary outlook, whereas those behind the new free-floating systems tap into a more nomadic point of view. Ultimately, the question remains, how to create an orderly BSS that is as social-inclusive as possible, or in other words, how to make those less well-off fit "the BSS technological construct" (Duarte, 2016, p. 107). To its credit, Milan has already recognised some of these challenges and included in its Sustainable Urban Mobility Plan that it will extend the area of operation of the BSS, so that a much more peripheral parts of the city are covered, reaching a total number of 13,500 bikes, translating into one bike per 100 inhabitants,

including more social groups, and looking into making more payment methods available, other than a credit card (SUMP, 2017, p. 240)

Bike-sharing is good for the environment

While AMAT and Edoardo Croci, one of the founding fathers of the BikeMi, based on their knowledge of the systems, do not consider that the BSSs, at least on their own, have any meaningful effect on the the environment in terms of reducing congestion and thereby pollution, the operators seem much more keen to tap into this narrative to profile themselves as 'green' companies. BikeMi describes itself on its website as "an easy, practical and ecological system that helps to improve the quality of the environment and your physical well-being". Already in this statement the company claims to be 'ecological' and 'improve the quality of the environment', and this message is reiterated in many press releases, which state that:

> *"This means that BikeMi users have cycled more than 203 times the circumference of the Earth with savings of over 1 million 600 thousand kilos of CO_2" ("BikeMi, record nel 2016", 2017)*

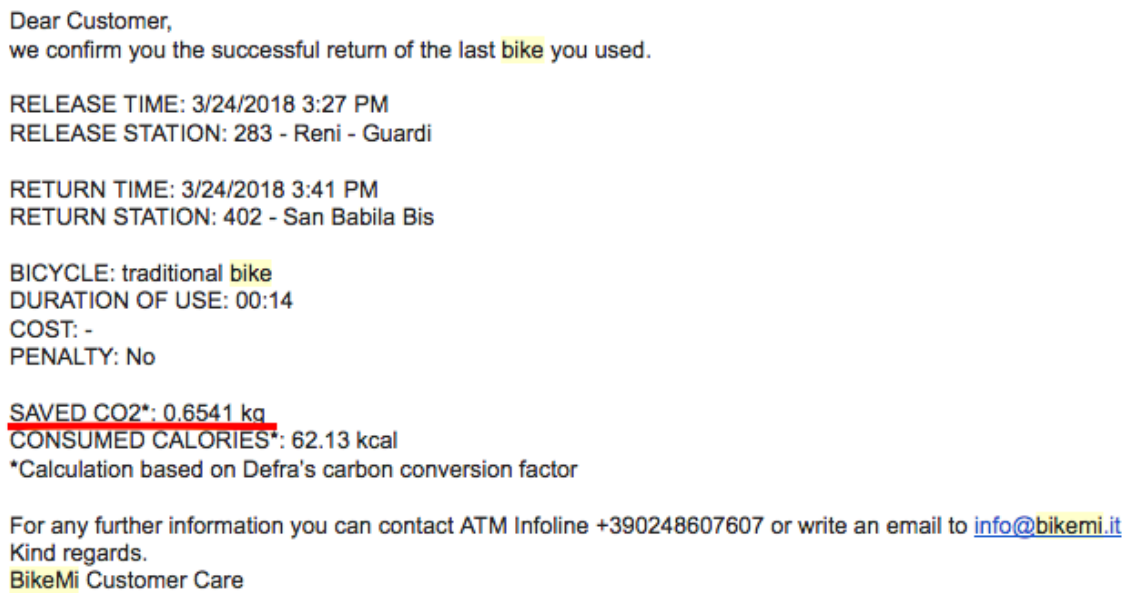
> *"And to benefit from it is the air that in the Lombard capital is breathed: it is estimated that 5 million 400 thousand kilos of CO_2 have been saved and the good practice of the Milanese, who are increasingly using the bicycle" ("Il BikeMi di Milano fa 674 giri intorno alla terra", 2016)*

While these articles reinforce the perception that BikeMi is saving massive amounts of CO_2 emissions, the BikeMi operator has been cautious not to be mentioned as the source for these calculations and the journalists hedge their utterances by stating that 'it is calculated' without referring to any source or methodology for these calculations. It is, however, easy to imagine that it is Clear Channel, the BikeMi operator, who is behind such calculations as after each ride, the user is notified on the amount of CO_2 savings resulting from the undertaken trip (see Figure 15). No such claims can however be found on BikeMi's website, perhaps because the operator wishes to avoid any potential legal disputes on this matter, at it is well aware that these hypothetical CO_2 emissions relate to a counterfactual state of the world that has never existed. This is because, in its calculations BikeMi assumes that all trips undertaken on its bikes are substituting trips made by private cars, which as we have both seen in the literature review and in the interview with AMAT, just isn't the case. The vast majority of BikeMi users, or any BSSs for that matter, are not people who substitute their car trips, much more likely those are public transport users or pedestrians. Therefore, any such calculations are misleading by design and serve to perpetuate

a narrative of BSSs helping to reduce the emissions, while no such reduction is actually taking place. It is quite illuminating that during nearly 10-years of BikeMi's service, no data has been gathered on the users' modal shift, while numerous general satisfaction surveys have taken place, presumably exactly because the findings would invalidate this very assumption and disavow any credibility one might endow to the 'green' discourse pursued by this company. Croci, stated that:

> *"using these apps is a game, they give you some idea that you're saving CO2, it's positive, it's a good message, but if you look at the contribution for mitigation from only bike sharing, it's not so big. At the big picture, it's something different.*

In his view, even though such information might not be accurate, to put it mildly, they might still serve a purpose of promoting more sustainable transport behaviours, as they give the user a positive feedback on their actions, therefore nudging them to use a bike more often.



Dear Customer,
we confirm you the successful return of the last bike you used.

RELEASE TIME: 3/24/2018 3:27 PM
RELEASE STATION: 283 - Reni - Guardi

RETURN TIME: 3/24/2018 3:41 PM
RETURN STATION: 402 - San Babila Bis

BICYCLE: traditional bike
DURATION OF USE: 00:14
COST: -
PENALTY: No

SAVED CO2*: 0.6541 kg
CONSUMED CALORIES*: 62.13 kcal
*Calculation based on Defra's carbon conversion factor

For any further information you can contact ATM Infoline +390248607607 or write an email to info@bikemi.it
Kind regards.
BikeMi Customer Care

Figure 15 Example of BikeMi's post-rental communication. Source: own

Naturally, BikeMi is not alone in pursuing such a discourse, with ofo and Mobike using the very same tactics, with ofo displaying a calculator of pounds of saved CO_2 emissions on its website praising the benefits of ofo for cities (see Figure 16). Although Mobike is less explicit about this issue on its website, it nevertheless states that "Mobike is green, reduces congestion, and continually strives to improve the quality of city life". In its press release accompanying the introduction of Mobike to the Italian market, not only states that "Mobike users cycled over 2.5 billion kilometres, equivalent to a reduction in CO2 emissions of more than 610,000 tons based

on calculations by the WWF China, or equivalent of taking over 170,000 cars off the road for a year", but also boasts about receiving the WWF's "Climate Solver Sustainable Urban Mobility Special Award". In a more recent *White Paper*, Mobike seems to have taken a more careful approach to such claims noting that their calculations are "based on the assumption that 15% of mobikers who previously use private car or taxi to commute" (compare Figure 17). While there is no information on where this number is taken from, what research this percentage is based upon, and taking into account the differences between cities worldwide, it does indicate that Mobike places lower value on its environmental impact, instead focusing on underlining other potential benefits it may bring to cities, such as increased job opportunities or more social inclusion.

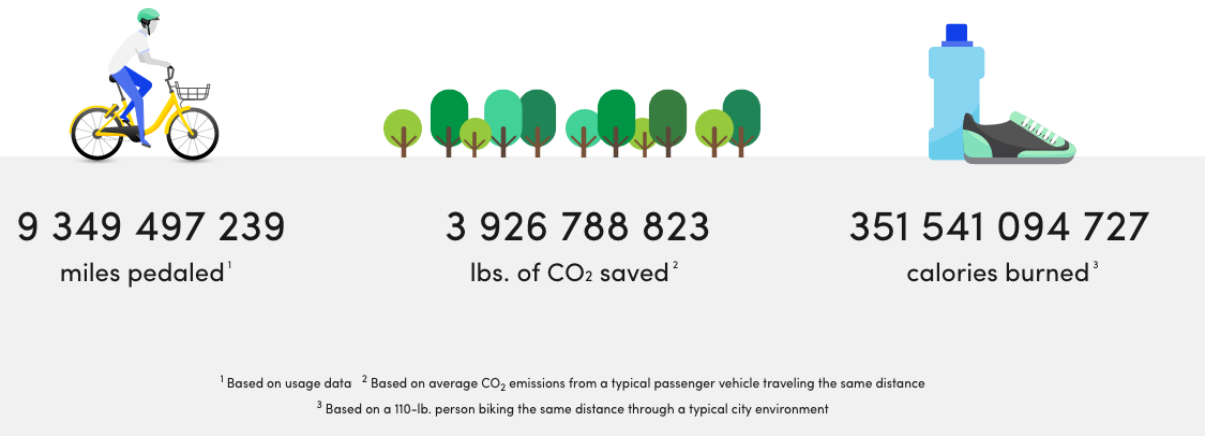


Figure 16 ofo's emissions calculator. Source: https://www.ofo.com/us/en/for-cities

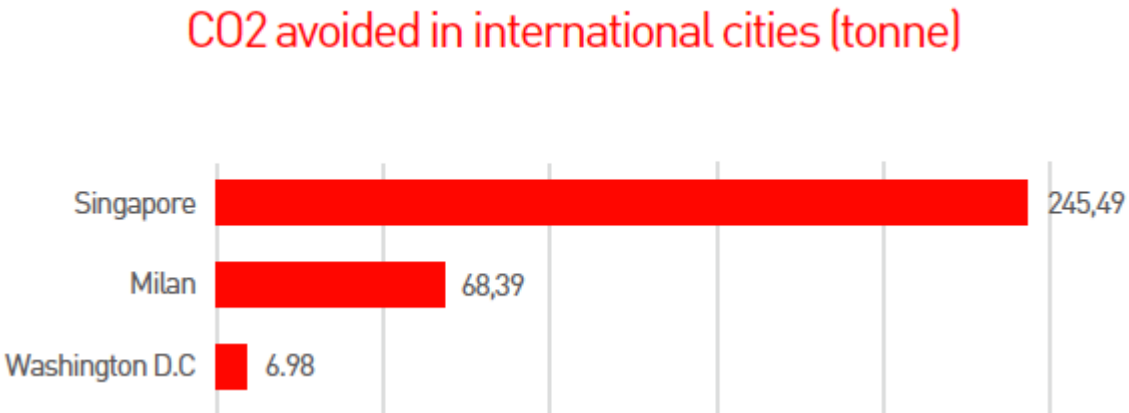


Figure 17 Mobike's avoided CO2 calculations (Mobike, 2018)

As can be seen, even though the municipality itself does not consider the environmental impact of BSS to be little more than marginal, all three companies actively resort to this 'green' discourse, albeit with Mobike placing somewhat less importance on this aspect. Nevertheless, the lack of any serious research into this theme on the side of the operators, does seem to indicate that they

benefit from this apparent absence of proof, which enables them to either engage in 'greenwashing' (Smith, 2011) on behalf of some of its sponsors, as is the case with BikeMi, or obscure the more troubling discourses revolving around data privacy or chaos in the urban space.

Other discourses pursued by the bike-sharing operators

It is clear that the bike-sharing operators engage in many of the same discourses that surround the use of private bikes, and with good reason for that. Because of the service is exclusively available as a smartphone app, it is clear that the main target group belongs to the younger cohort. Therefore, it is not surprising that both ofo and Mobike use the images of millenials to promote their service. The pictures present young, fashionably dressed, perhaps exceedingly so, as in ofo's materials people wear wide rim hats, which are not very convenient when cycling. Through this imagery ofo and Mobike are able to create a perception of a fashionable, convenient and environmentally-friendly service.

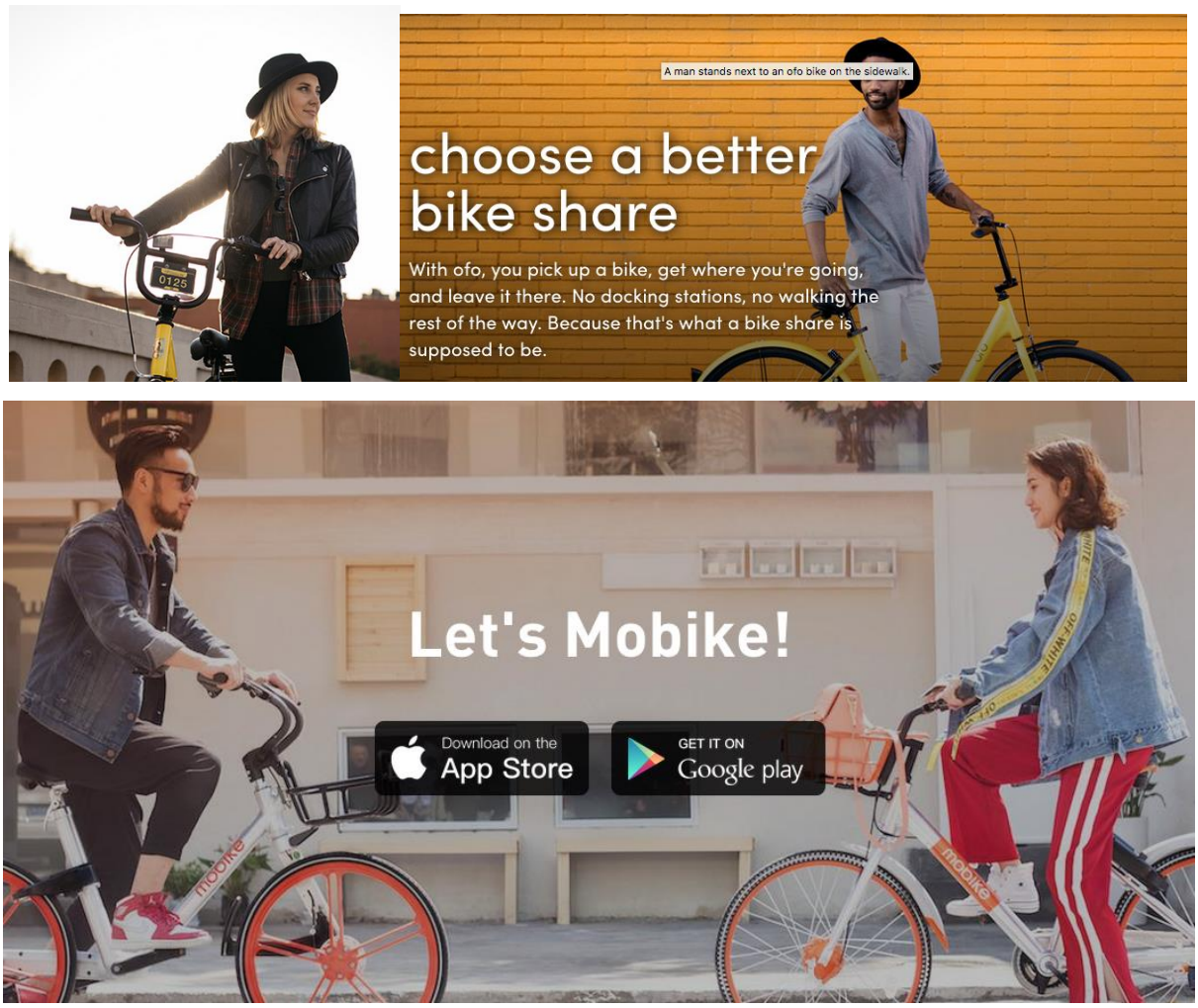


Figure 18 Examples of ofo's and Mobike's promotional visual materials. Source: ofo.com; mobike.com

As it turns out, ofo's and Mobike's rhetoric doesn't end here, since both claim to bring substantial improvements in terms of social inclusion, with ofo using the catchphrase: "Mobility for all". It is needless to say, that this slogan is clearly not true, and even though the majority of adult population owns a smartphone, there remains a digital divide in terms what specific age cohorts can actually perform with these. On ofo's website we can also find statements, which underline that "[p]eople shouldn't have to struggle to get to work or school because of where they live. ofo is a step towards social equality and inclusion for any city that adopts it." In this way, ofo presents itself as a provider of equal opportunities for all inhabitants, again tapping in to the emancipatory values traditionally ascribed to the bicycle. Similar discourses are to be found in Mobike's White Paper, where a set of maps is shown, purportedly presenting how many job opportunities or number of schools within a certain reach are made available thanks to the service, obviously based on many silent assumptions, such as the one that mobility is the only underlying reason for the differences in life-opportunities availability. This discourse is part of what positions these services close to a public utility, and therefore builds a perception of a service desirable from a societal point of view, overshadowing any potential issues that might otherwise arise.

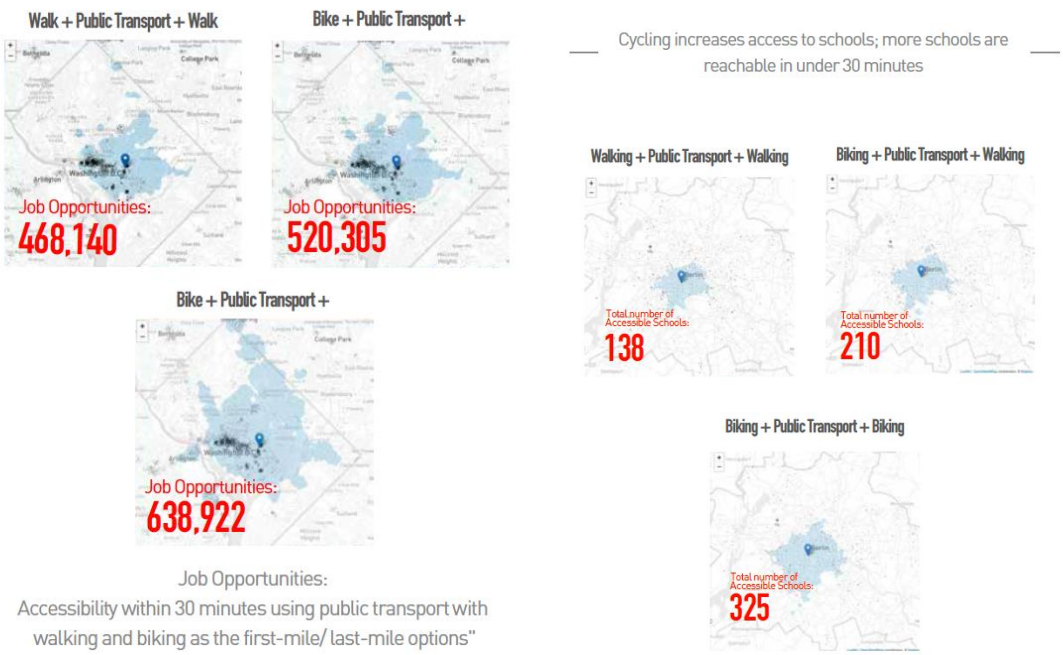


Figure 19 Mobike's alleged influence on job and educational opportunities (Mobike, 2018.)

The imagery invoked by Mobike and ofo bears a close resemblance to the visual language often exploited by the car industry, that is of freedom, with wide streets, without any signs of

congestion, riding into the sunset. It is illuminating that these companies do not present the users on actual cycling infrastructure, but rather on regular streets, with the cyclists behaving as though they were driving a car, e.g. occupying the whole width of a street. Naturally, because of the business model, and a global expansion plans, which assumes little adaptation to the new markets to reduce the costs (as we shall see in the analysis of practices, this leads to potential issues), the images are supposed to appeal to people all over the world, with varying degree of cycling infrastructure available.

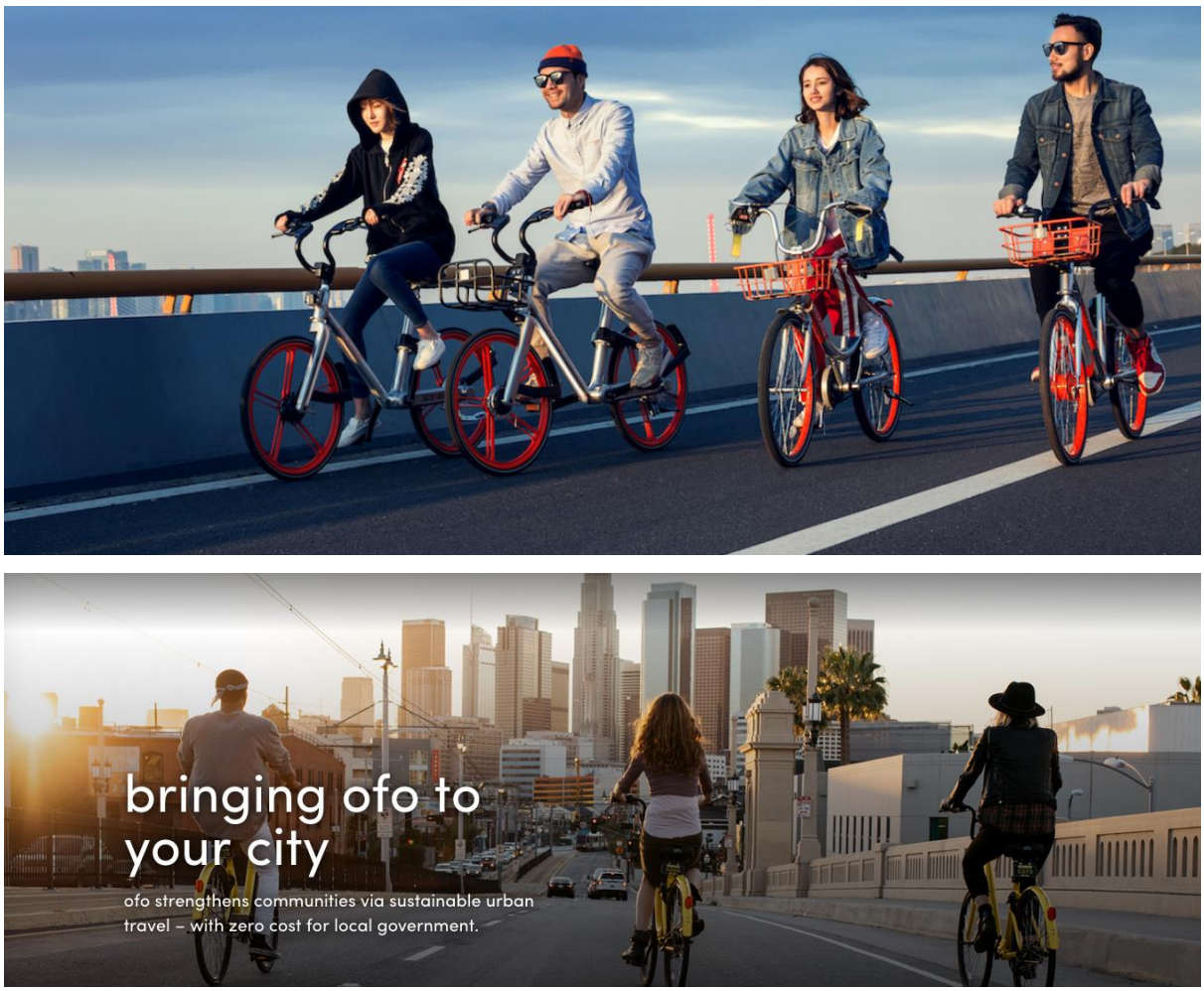


Figure 20 Examples of Mobike's and ofo's freedom visual discourse. Source: ofo.com; mobike.com

Niche

The emergence of new free-floating BSSs has triggered varying reactions at the niche level, where first adopters ventured to appropriate the bikes offered by ofo and Mobike. Here we concentrate on a discourse about the 'goodness' of the new dockless operators' business models, especially

in the context of the potential exploitation of sensitive data. We have classified this discourse as pertaining to the niche level, since it is neither a discourse the regime level actors use to legitimise and sustain the system, nor does it belong to the landscape, rather it is only slowly making its way to the surface.

The 'good' business model and big 'data'

The new free-floating companies have managed to present themselves as having a 'good' business model, that is they profit from something that is perceived to be a socially desirable outcome, i.e. increasing the level of cycling in the cities. While it is still unclear that these companies can actually live up to their promises and return a steady stream of profit, since as of now, they are still heavily reliant on external financing from large venture capital investors, they have successfully deployed the image of environmentally-friendly companies seeking to improve the urban landscape. This has certainly facilitated the wide adoption of these systems, as being 'green' belongs to the virtues of a modern-day, exemplary citizen. Notwithstanding, behind the allure of this image, lies a more obscure discourse, which has emerged during our interview with Ciclo Ignoranza, that of data privacy and surveillance. Should the companies disclose more information about their business models and should it become more widely known and understood what this business entails, people might question just how 'good' this business model is.

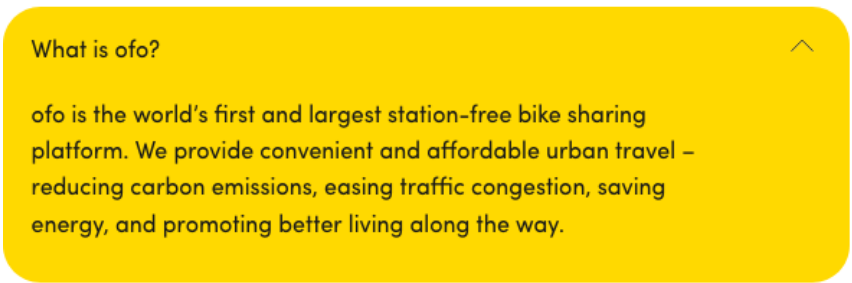


Figure 21 ofo's and Mobike's descriptions from their respective websites. Source: ofo.com; mobike.com

Just as BikeMi's core business is advertising and not operating BSSs (ad revenues constitute 75% of total revenues, with only 25% coming from user fees), the new free-floating bike-share companies might actually be convenient vehicles for collecting sensitive and precise geo-

localisation data about its users. Some business and urban planning experts believe that their business model is "a mixture of capturing and selling data on their users, collecting membership fees, advertising, and major funds from venture capital firms" (Gardiner, 2017). Mark Wiseman, global head of active equities at BlackRock, a global investment management corporation, was less hesitant in pointing the real value seen by the investors, stating that "[t]he value in the business isn't really in the bicycles themselves, the environmental benefit or their potential to ease pressure on public transport but in the information they produce" (Onoszko, 2017). Although during a Smart Land Cremona conference, Alessandro Felici, head of Mobike Italy, stated that today the business of bike-sharing is solely based on the user fees and the data collected is not used for profit, although this is possible (Wired Italia, 2018). Others indicate that these companies might also profit from interest on the vast pools of money collected through deposits, with Mobike reportedly managing around USD 6 billion in deposit cash only (Han, 2017). All this leaves one wondering as to the true nature of these enterprises. Nowhere on the websites of either ofo or Mobike can one find that these companies are in the investment or data-mining business, and yet seen from a purely revenue-based perspective this might be a much more accurate description of what these companies are. While we saw that this is nothing new, since Clear Channel, the BikeMi operator, is a global advertising company profiting from selling commercial space located on the bikes and by the docking stations, these new entrants on the BSSs market are significantly less open about their business models. Two major shareholders in ofo and Mobike are Alibaba and Tencent respectively, both well know not only for their data-mining practices, but also for their close cooperation with the Chinese government and their work on China's social-credit pilot testing (Larmer 2017).

Even though ever since the very first major, modern-day BSSs operated by advertising companies, data collection was an important part of the business, allowing operators to sell their ad space based on highly accurate customer profiling, these were never able to locate the user with so much precision, nor were they able to use apps to the same degree as the new competitors. In this sense, as highlighted by Duarte, "BSS is not a final artefact, but actually a convenient medium for catalysing broader technological assemblages" (2016, p. 112). This has also redefined what cycling in a city is, as Boullier and Crepel observed when analysing the Parisian BSS, "[b]iking is no longer simply using a bike, it means being tracked down for each segment of one's trip (the basic fee limits the use to 30 minutes) and accepting it" (2014, p. 50). While the recent outrage at the extent of personal invigilation through Facebook, revealed in the

aftermath of the Cambridge Analytica data-abuse scandal, suggests that data privacy constitutes a major concern for the general public, little seems to indicate that people are actually willing to give up the convenience brought by the Internet and smartphones to better protect their personal data. According to a survey of American internet users, more than half did not know what a privacy policy is, believing it meant that the company would protect any personal information disclosed on a website (Smith, 2014). As Ketelaar and van Baalen underline in their study of people's attitudes towards smartphone embedded-tracking technologies (2018, p. 175):

> *"[u]ser privacy is protected by long, complicated privacy statements, set up by profit-oriented companies. This causes many people to just accept these statements without reading them, while questioning whether their personal information is really safe."*

As we can see with the free-floating bike services, there is a clear benefit from allowing the operating companies to have access to some of our personal information in exchange for a better or more personalised service ('price for convenience'), the discomfort about just how much we are letting on, leads to what scholars term personalization-privacy paradox (Ketelaar & van Baalen, 2018).

Meanwhile, people working in urban planning departments all around the world are more than keen to get an insight into the patterns of cycling in their cities. The following enthusiastic quote from a World Bank transport expert is a clear expression of this exact sentiment (Canon Rubiano, 2018):

> *"While it's too early to tell what the future holds for DBS, they provide exciting opportunities to collect mobility data and plan urban transport with unprecedented clarity. In the era of smart mobility, traditional pen-and-paper surveying is quickly starting to feel like watching TV in black and white. The mutually reinforcing processes of innovation in mobility systems, data generation, and its use for better and more powerful planning analysis naturally point to a more nuanced, high-definition data landscape that will help cities make informed decisions about how to manage travel demand, how to build better transport…"*

On the face of it, such data should provide clear benefits for the municipality, which receives very accurate data about the behaviour of a selected group of people using a particular mode of transportation, in this case the bicycle. In this way, the municipality gains knowledge that otherwise would have not been captured, as there is no way of precise tracking the routes covered with traditional bike-sharing services, or let alone those of private cyclists. Here urban

planners become equipped with a God-like view of flow and patterns, potentially handing them over the perfect tool to evaluate the quality and appropriateness of the existing infrastructure, as well as plan for any expansions, based on newly discovered patterns of mobility. This is why, the main concern of the local authorities might be to ensure that the new entrants share the collected data, rather than ensure that this is not further shared with other third-parties, whose intents are much more obscure. In this sense, if the true business model of the free-floating operators is to collect, mine and sell data, it is only through turning a blind eye and consenting to reducing people's privacy that mobility planners might gain access to a world of data that will facilitate creating better mobility solutions. Notwithstanding, one important reservation needs to be made, that is between 'data', i.e. the true facts of life, regardless of whether they are observed by any measurement tools, and 'capta', i.e. the subdivision of data that can be measured, mined, stored or visualised (Greenfield, 2017). As we have noted, there is very little 'capta' pertaining to private cyclists, their patterns of mobility, as the collection of such information would be extremely cumbersome and possibly require a bureaucratic way to obtain people's consent to track such information. In contrast, there is what one could term 'big capta' pertaining to the mobility patterns of free-floating bicycles users. AMAT, responsible for overseeing the new free-floating bike companies, already plans to take advantage of this data, to plan for new cycle paths. While there is no denying that patterns of flows of BBS users are to a large extent overlapping with those of private bike users, there is a need to recognize this difference as the behaviour of these two groups of users will vary, particularly in terms of cycle path length. Apart from a considerable amount of white noise in the gathered information (e.g. tourist using the bikes, underground night racing groups, or one-off users simply trying out a new gimmick), before any meaningful conclusions might be drawn, there is a need to account for the reasons behind a particular pattern outcome, and for the type of user (as a rule of thumb these are younger, with higher digital literacy). A clear example of this is when cyclists prefer to use a smaller, residential road parallel to major thoroughfare, just because there is no cycling infrastructure available next to the latter one. If one looks only at the heatmaps visualising chosen routes this might suggest that there is no need for better infrastructure along the main road, whereas the exact opposite conclusions should be drawn. This abundance of 'capta' might therefore lead to reinforcing a particular urban landscape, rather than unearthing true factors shaping a particular mobility pattern.

This discourse of data privacy is somewhat overshadowed or compensated by the perception of these companies as ones providing a service akin to a public utility, seemingly enabling to fulfill a public goal. From a mobility manager point of view, there is little to complain, as long as there is no vandalism or chaos in the urban space, especially since these companies offer one additional benefit for the municipalities. Whereas the prior generations of BSS usually required at least some sort of co-financing from the public authorities, these companies actually pay a per bike fee to the municipality for the right to place the bicycles in the public space. This is no trivial matter for the cash-strapped public sector, which is more than willing to divert these resources to other tasks that rank higher up the political agenda. Nevertheless, there is some preoccupation about the long-term viability of the business models of the free-floating bike-share operators and the trustworthiness of data about ridership they provide to municipal coordinators (e.g. in Aurora Colorado in the US, ofo reported vastly higher numbers of trips per bike per day than were actually true, i.e. 2.5 trips against the real 0.18 trips) (Schmitt, 2018), and it remains to be seen if they endure the coming years and become one of clogs of a mobility-as-a-service urban transport machinery.

Summary

The discourses surrounding the three BSSs in Milan play a crucial role in shaping the perceptions and practices. As we have seen, the overall or 'landscape' level narrative is part of a larger car-centric culture, where cycling is seen merely as a leisure time or sports activity, with car occupying the role of the dominant mean of transport. On the regime level, both the municipality of Milan and the three bike-sharing operators invoke a number of discourses to legitimise the use of BSSs as a tool towards more sustainable transport systems. These discourses range from giving a 'panorama of choices' and enhancing flexibility and motility (if only of a preselected group of users), through environmental and societal benefits, to those of chaos and order, with the former representing the BikeMi and the latter ofo and Mobike. Lastly, we have tried to show, that beneath these two dominating levels of discourses, there lies another, 'niche' level, which is mostly populated with concerns about privacy and the true inclusiveness and equality of these systems.

MLP – Practices

With the practice dimension, we analyse the mobility phenomena revolving around the world of bike-sharing in Milan. Again, through landscape, regime and niche, we consider mobility practices shaped by the users, inhabiting the city and beyond, in the metropolitan area. How do they actually move to get to work, school, shops, family and friend, the daily routing of commuting and moving around with different transport modes around the city of Milan. In this section practices will be understood as 'embodied, materially mediated arrays, and shared meanings' (2001, p. 3), or, as Shove puts it, as 'the active integration of materials, meanings and forms of competence'. Here we investigate both the run-of-the-mill behaviours, shaping the regime level, as well as those that were not designed 'from above' by the operators and municipal authorities that inhabit the niche level.

Landscape

When considering the landscape level related to the bike-sharing mobility practices, we are looking at the over-time and environmental factors that are shaping said practices. These are elements not only, and not immediately, related to bike-sharing: in fact, these are more general trends related to the way people move in the city through many means of transports.

General mobility practices

Milan is a strongly concentric city, evolved since the ancient times around a small core without any noticeable physical features blocking its growth in any direction. The origin of its latin name, Mediolanum, also recalls its position 'in the centre of the plain'. The city grew in circles with a few radial directions. Apart from few polarities, the most important activities of the city are located in the centre. The transport networks evolved in the same way, the road grid is extremely concentric, metro lines connects neighbourhoods diametrically intersecting in the centre, railways coming from other cities are connected through an outer ring 'cerchia ferroviaria', the 'tangenziali' beltway circle around the city in the same way. Commuting not only from the nearby suburbs but also from distant cities is common for workers and students alike, by train, car or bus.

Falling of the motorization rate

The Municipality, with the present and past administrations, independently from the political affiliation, kept pursuing the goal of decreasing not only motor traffic and the number of trips made by cars in the city, but also the ownership rate of said mean of transport. According to AMAT (2017), the motorization rate in Milan fell from more than 700 cars per 1000 inhabitants in the '90s to 505 in 2015. The Sustainable Urban Mobility Plan is expected to reduce the motorization rate from 518 (2013 data) to 460 cars per 1000 inhabitants by 2024 (Commune di Milano, 2017). Many actions helped this trend: investments in public transport, congestion charge in the city centre, parking fees and a reduction of parking spaces available on the roads, in order to keep the same proportion between the city's vehicle pool and the overall parking available. Also the sharing services played their role, offering the citizens the possibility to move in a shared bicycle or car reduced the dependency on someone's own car, even for tasks requiring to carry heavier weights and/or bulkier items (where the bicycle might show some limits).

Cycling in Milan

Of course cycling practices in the city are also influenced by the status of the infrastructure and by users choosing different means of transport in the same road infrastructure. As already illustrated in the introduction chapter about the Milanese context, cycling infrastructure in Milan suffers from being underdeveloped compared to other cycle-friendly European cities, both in terms of quantity and quality. In fact, not only is there a lack of cycling infrastructure in many parts of the city, but the existing infrastructure, as shown in the aforementioned chapter, is disconnected, fragmented in very short chunks, often narrow passages, with poles often placed along the paths and sometimes even made with paving stones, that become dangerously slippery when wet. Apart from the infrastructure, and more tied with the topic of this section, are the other road users' practices. Milan in particular, and Italian cities in general, is a place where cars are parked all along the roads, usually even on sidewalks and in-between the trees in tree-lined streets and boulevards. Of course, cycling tracks, lanes, bicycle racks and BikeMi docking areas are often targeted by car users as parking spaces. Sometimes bicycle users react, as shown in Figure 22.

Figure 22 BikeMi bicycle parked on car parked on BikeMi station's area. Source: MilanoToday

But the conflict is not only with car users. Even pedestrians and bicycle users often engage in conflict, with bicycles (illegally) riding on sidewalks and pedestrians (illegally) walking on cycle tracks. This conflict is exacerbated by some decisions taken by the Municipality as well, like building cycle lanes on sidewalks without any separation, replacing pedestrian trails in boulevards' green areas with cycle track without offering alternatives to pedestrians or placing BikeMi stations at the same road level as cars' parking spaces (as in the picture above) and not on sidewalk, or separated, level. This last problem was addressed with the latest-installed stations, but many still face the problem.

Regime

Since we are looking at the microcosm of bike-sharing in Milan as our frame of reference in the multilevel perspective, the regime level contains the practices that are supported by the Municipality and that reinforce bike-sharing as a practice. At the regime level, these practices include normalised behaviour, sanctioned by the operators of the systems. Among others, we shall look at the extent to which the different bike-sharing bicycles are present among the cycling

commuters, if Milan's streets are plagued with these bicycles parked in ways obstructing normal flows of traffic and pedestrians, and if the bike-sharing service area has been expanded as much as hoped by the Municipality.

Bike-sharing and the commute

In order to better understand the ways bike-sharing services are used in Milan we have investigated one of the busiest thoroughfares in Milan, Corso Venezia, both in the morning and afternoon rush hours (more details can be found in Chapter II). As we have seen in the comparison of the three BSSs, the average distances covered by their users varies from little over 2 km for BikeMi to 1,35 km for ofo and Mobike. This clearly indicates that the bikes are predominantly used for short, first/last mile trips, presumably as part of a multi-modal trip, where the other leg is covered with public transportation. The statistics of BikeMi usage clearly indicate that the periods of highest usage correspond to morning and afternoon rush hours, showing that the scheme is being integrated into commuting to and from work or educational institution.

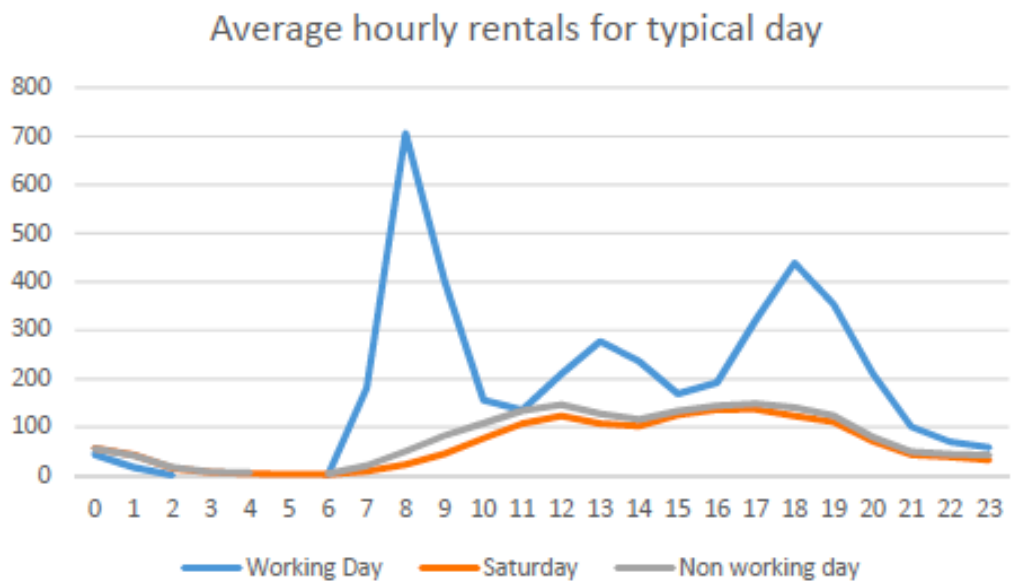


Figure 23 BikeMi usage statistics (hourly rentals). Source: Shared Mobility in Milan: current situation and future developments, Meeting with Grand Lyon, Milan, 20 December 2017

Before analysing the practices facilitated by bike-sharing in detail, it is worth looking at just how prevalent bike-sharing is among all those who cycle in Milan. In order to do so, we will look both

at the data collected during our own observations, as well at those collected by Ciclobby, the Milan cycling lobbying group (see Figure 24).

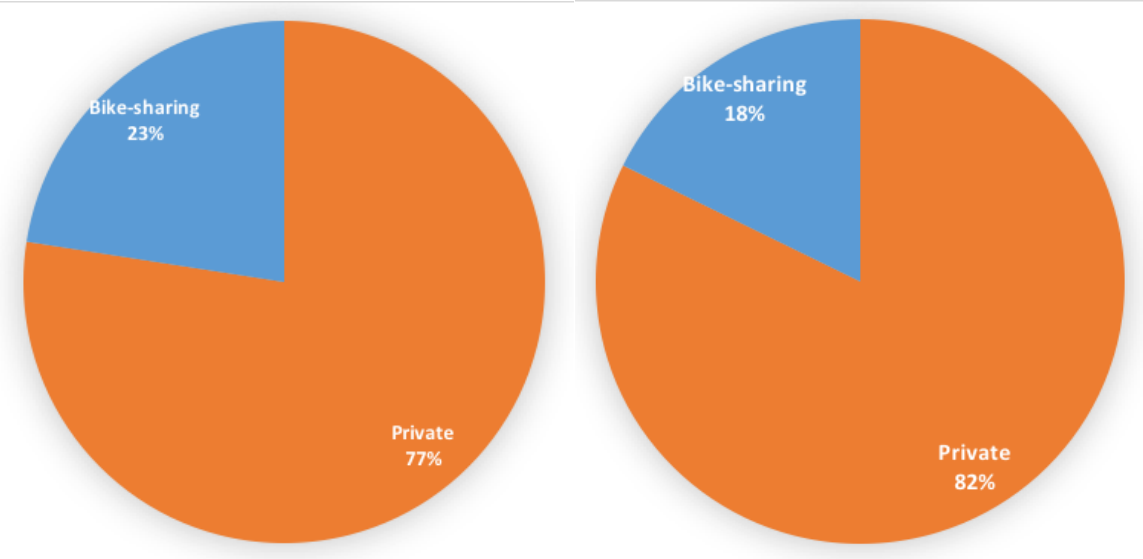


Figure 24 Division by bicycle type (own data – left; Ciclobby, Censimento dei ciclisti 2017: i primi dati - right)

As shown, the majority of cyclists in Milan use their own bicycles, rather than the shared one, nevertheless the share of BSSs in total bicycle traffic is quite significant varying between 18% (Ciclobby data) and 23% (our own data). Unfortunately, the data collected by Ciclobby does not discern between the different BSSs in Milan and only a global number is available, even though the new schemes have already been in operation during the observation period.

Therefore, assuming that the new BSSs were to fulfill the same role in transportation as BikeMi, and having in mind that the number of bicycles in the new free-floating services is almost three times as high as BikeMi's (12,000 vs. 4,650), it could be expected that there will be considerably more people cycling on the new bicycles, even if accounted for their larger service area and hence reduced density and availability of the bicycles. Below we present the results from our observations during both the morning and afternoon rush hours, which have been undertaken with the new schemes operating already for 6 months, therefore any effect of novelty should have worn off by this time, allowing for a more accurate reflection of the actual adoption of the schemes by the Milanese.

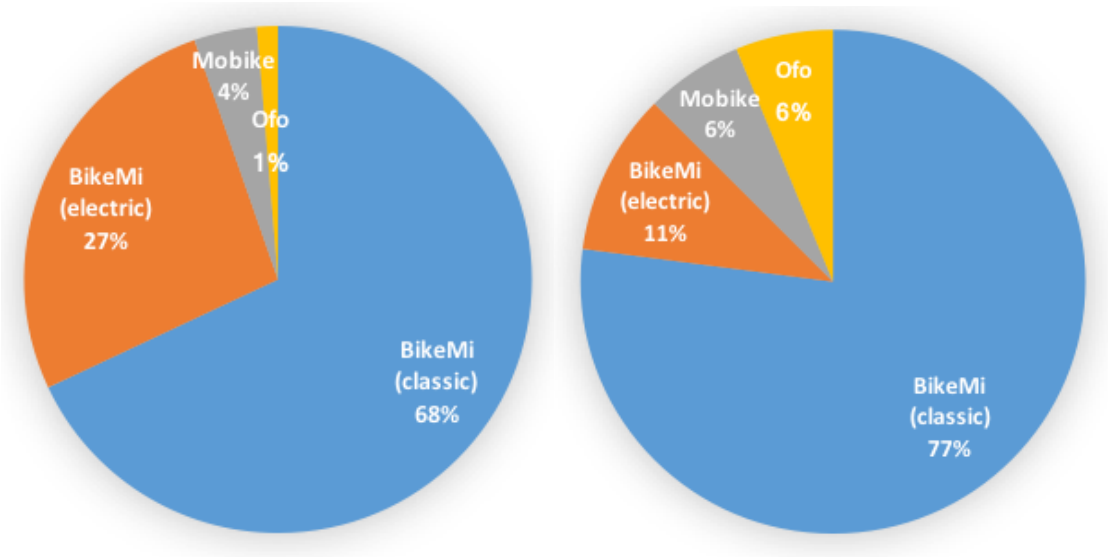


Figure 25 Shares of the three BSSs during morning and afternoon rush hours. Source: own

As can be seen in Figure 25, BikeMi continues to be the most popular service by a large margin, with ofo and Mobike gaining a bigger share during the afternoon, presumably because the afternoon commute is to a lower degree shaped by time-pressure and therefore a need for reliability of the service. It is worth noting, that overall the usage of the BSSs in the afternoon was significantly lower than during the morning rush hour (48 and 75 observations respectively). This is probably a reflection of the more complicated commute back home, with more social obligations shaping the commute. Nevertheless, what these numbers seem to suggest is that among those commuting, especially during the morning rush hour, the new bike-sharing services have not managed to displace BikeMi as the leading service. The explanation of this phenomenon is multifold. First, it needs to be noted that the observations were conducted in an area covered by BikeMi stations, which was a necessary requirement to collect comparative data, but which also meant that it would be fairly convenient for the users to encounter BikeMi docking stations and bikes. Secondly, there is a clear economic advantage to using BikeMi, as has already been pointed out (see Chapter III), if one commutes regularly, as the the long-term subscription is considerably cheaper, especially if using the discount for public transport subcribers. In this sense there was little incentive for those already using BikeMi to change the service provider. Thirdly, knowing that convenience, reliability and comfort are the major factors attracting users to a particular mode of transportation (for more on this see literature review on modal choice in Chapter II), what these results suggest is that BikeMi scores higher on these factors, which is also supported by our own experience with these services. The convenience and reliability of BikeMi

can be explained both by the comparative, if somewhat counterintuitive, ease of finding a bicycle near a transportation node, as well as the better level of maintenance, as BikeMi bicycles rarely are broken to the point that they cannot be used, which is a plague for the ofo service. In terms of comfort, while ofo is on pair with BikeMi, Mobike's bicycles are clearly not suitable for a majority of typical bike-sharing users, i.e. men (see Figure 27 BikeMi users gender distribution). Both our personal experience as users of the Mobike service, and the app reviews from Google Store, that we have cited earlier, suggest that the bicycle is uncomfortable to the extent that it is rendered useless. This evaluation will most probably change, however, since Mobike has decided to deploy larger, three-gear bicycles starting mid-April 2018, therefore addressing many of the issues indicated in the reviews.

Users

Looking closer at, the kind of users and non-users of these different bike-sharing systems, a number of trends might be observed. Figure 26 presents the shares of different socio-economic groups in the total cycling traffic volume, as per our observations. The set is clearly dominated by people who we classified as middle class (whether lower, middle or upper), which dominate the observations with a nearly 77% share. This group was followed by students (12%) and working class (6%), with pensioners and schoolchildren occupying the last spots (3% and 2% respectively). Notwithstanding, if we look at only those who use bike-sharing services, a different picture emerges. Firstly, it is still the broadly defined middle class that dominates the picture, with 82% of all observations, however, the share of upper and middle-middle class grows at the expense of lower middle class. Secondly, while the next biggest group remains the same, actually increasing its share by 4 p.p., there is a total absence of the representatives of the working class and pensioners among the bike-sharing users. There is a number of factors that might help explain these differences. While there could be some sampling bias as a result of our observations timeframe selection (7:40-8:40 a.m. and 16:55-17:55 p.m.), affecting the observations number of the working class (e.g. they start work earlier than white collar workers) and pensioners (e.g. fewer reasons to ride during rush hours), other explanations could also be deployed. As hypothesised by Duarte (2016), the technological assemblage of bike-sharing is not designed to accommodate the less well-off, which could help explain the underrepresentation of the working class. Similarly, pensioners might be confronted with technological barriers arising from the digital divide.

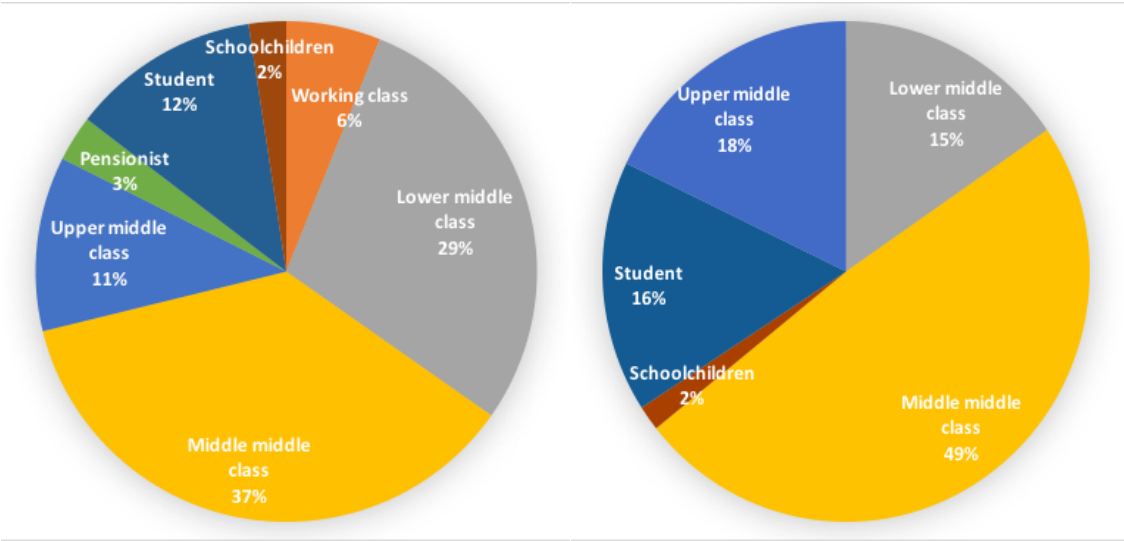


Figure 26 Division by socio-economic status (all observations - left, bike-sharing only - right). Source: own.

As we have seen in the previous chapters, bike-sharing is predominantly used by white, middle class, men with higher education. Milan's BikeMi is no exception in this regard, with 64% of the users being male, and according to a satisfaction survey conducted by the University of Milan in 2016, at least 72% had some sort of tertiary education and 95% at least a high school education ("Questionario sulla soddisfazione del cliente BikeMi 2016", 2017). The average age of the users is 40.71, with men being slightly older than women on average. More than 50% of the users reported being office clerks, managers or executive directors. The low share of students and pensioners, who constitute slightly over 10%, can be explained by the low level of credit card ownership in these two groups (Manzi, 2017, p. 259).

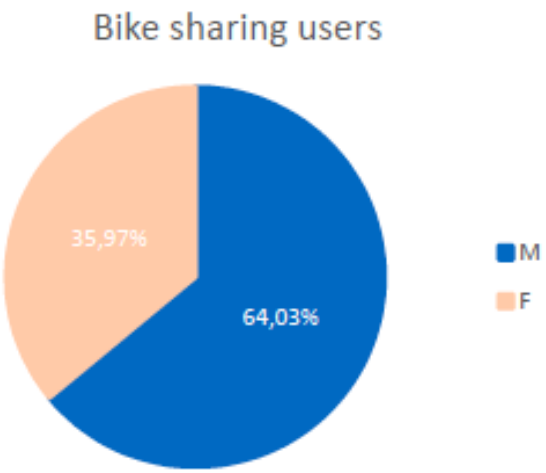


Figure 27 BikeMi users gender distribution. Source: Shared Mobility in Milan: current situation and future developments, Meeting with Grand Lyon, Milan, 20 December 2017

These general data on BikeMi are reflected in our own observation data, where male users constituted an even larger part of all the bike-sharing users, including ofo and Mobike. During our observations the share of male users ranged between 67% in the morning and 71% in the afternoon.

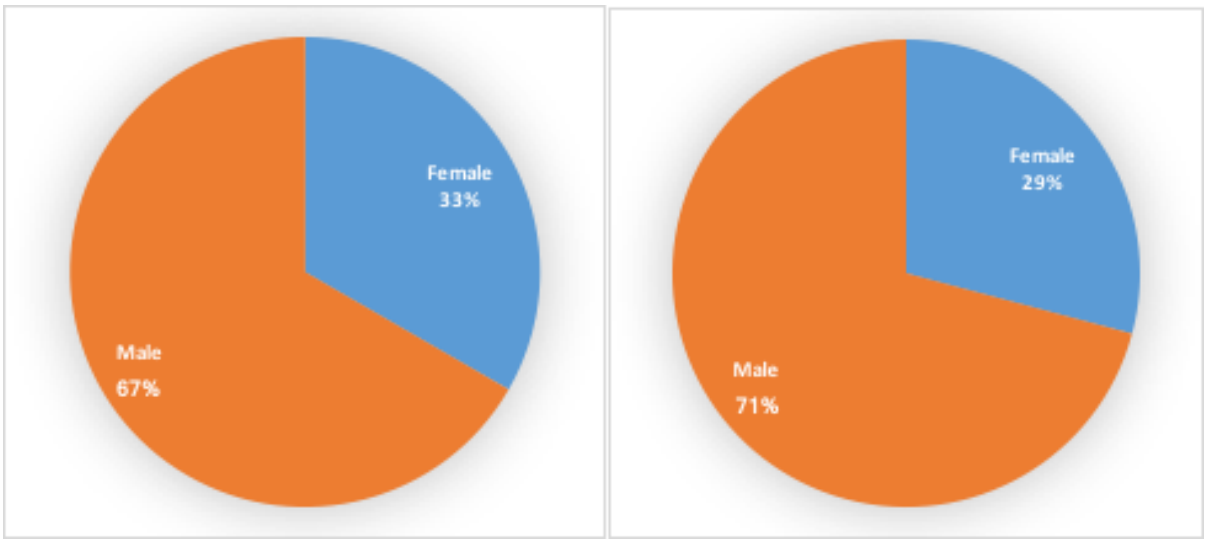


Figure 28 Gender distribution of bike-sharing users, incl. BikeMi, ofo and Mobike (morning - left, afternoon- right). Source: own.

In terms of the average age of the users of different schemes, our own observations have shown that indeed the average user of the BikeMi service is close to the age of 40, although our observations have also revealed that the average for the users of the electric bicycles is somewhat lower in the vicinity of 30 years of age. Unfortunately, the sample for both ofo and Mobike users was very small, and therefore the evidence is only anecdotal, but it seems that in general the age of their users is somewhat lower than BikeMi's (see Table 3).

Morning		Afternoon	
Bike-sharing service	Average user age	Bike-sharing service	Average user age
Ofo	20.0	Ofo	30.0
BikeMi (classic)	37.1	BikeMi (classic)	41.1
BikeMi (electric)	31.3	BikeMi (electric)	28.0
Mobike	30.0	Mobike	33.3

Table 3 Age average of bike-sharing services users. Source: own.

Expansion of the service area

As we have indicated in the previous chapters, the decision to introduce the new bike-sharing services was both motivated by an agency conflict between the municipality and the incumbent operator, as well as by a will to expand the service area to the more peripheral districts of the city. We would now like to investigate, if this has been achieved. Unfortunately, we only have two maps illustrating the use of Mobike at our disposal, that is a heatmap of the journeys and travelling purposes. No such data is available for ofo.

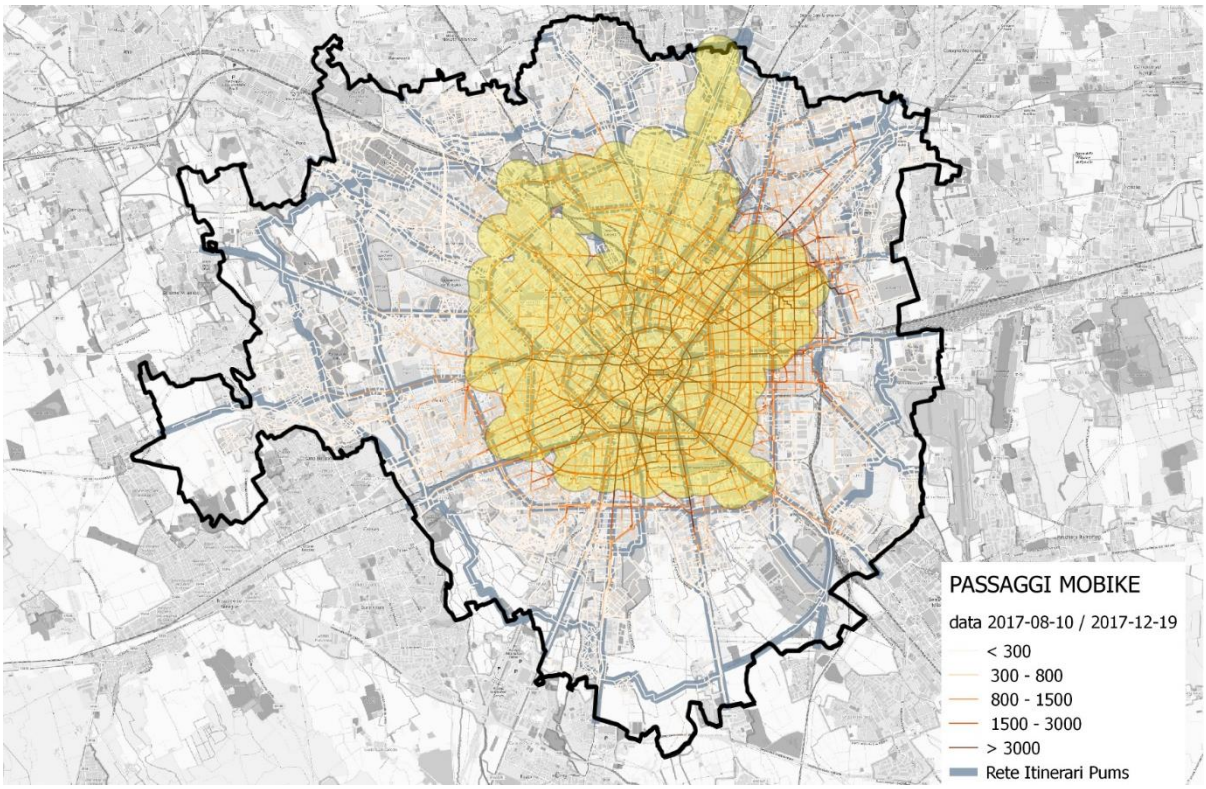


Figure 29 Mobike journey heatmap, BikeMi service area in yellow. Source: AMAT

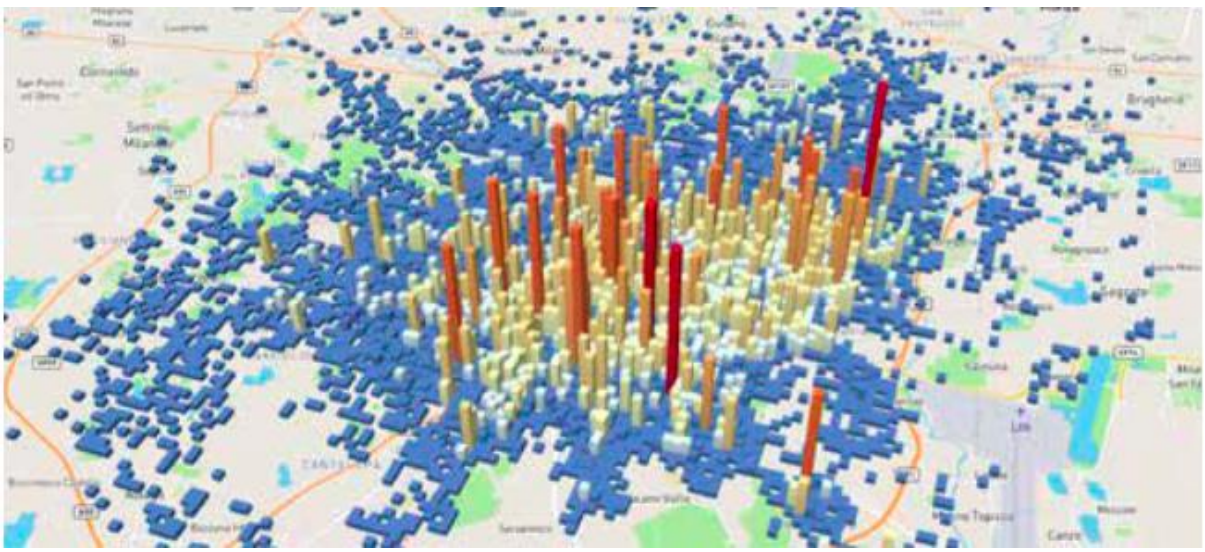


Figure 30 Mobike travelling purposes in Milan. Source: Mobike (2018)

What these two maps suggest is that, the main activity occurs within the city centre, i.e. in the same area that is already well serviced by BikeMi. This can be seen as part of staging from below in the use of these services, where users predominantly. Nevertheless, there are some areas outside of BikeMi's reach that have benefited from Mobike's presence, even if only to a smaller extent. These areas include e.g. Dergano, Bovisa, Turro, Gorla, Lambrate or Quartiere Mazzini, i.e. areas adjacent to the BikeMi service area. This feature has been promoted during the recent Fashion Design Week, called Fuorisalone, which takes place in various areas around the city, including Lambrate, an area unserved by BikeMi. ofo has offered a special subscription during these events to capture some of the increased traffic and some of the geolocation data about people interested in fashion. In this sense these services might be seen as a flexible addition to the public transport system during periods of increased demand, even though they may not be playing a central role in facilitating last mile commuting in the city centre.

Parking practices

As we have underlined earlier, Edoardo Croci, the person responsible for setting up the BikeMi service, expressed serious concerns about the chaos the new free-floating services introduce in the city. His concern stemmed from an assumption that, if there is no docking station for the bicycle, people would park the bicycle with little consideration for other road users, especially pedestrians, as the bicycles are usually left on the sidewalks. This feature has also be taken into consideration by AMAT when preparing the tender for new bike-sharing services. In order to investigate, whether these concerns or prejudices were justified, we have gathered visual documentation of the ways in which these bicycles were parked. In the following passages we shall present both our own photographs and those found in other secondary sources.

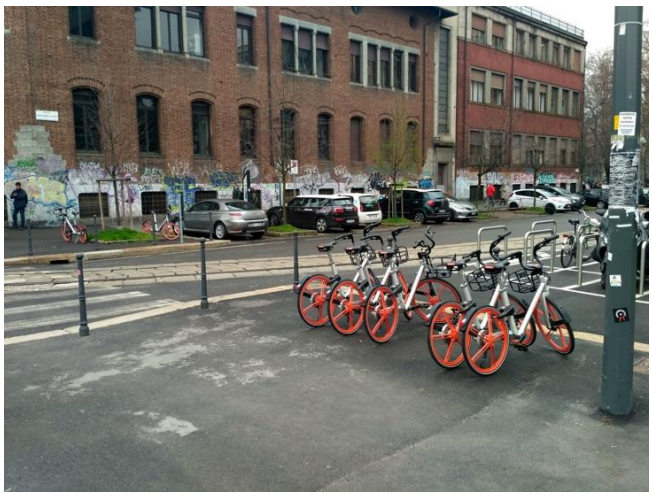


Figure 31 Bicycles placed by the operator

Based on this material we could identify a number of ways to park the bicycle. Naturally, some of the bicycles were simply put in place by the operator in regular rows as part of rebalancing of the system (Figure 31.).

From this research perspective it is, however, more interesting to look at the ways the bicycles are parked by the users. Here a number of parking practices can be identified, including:

1) Parking close to road signs or lanterns, a practice similar to that of private bike owners face with a lack of proper parking facilities.

Figure 32 Example of parking practices (#1). Source: own.

2) Parking close to street furniture such as ad posts, bins or planters.

Figure 33 Example of parking practices (#2). Source: own.

3) Parking next to a bike rack or next to a BikeMi docking station.

Figure 34 Example of parking practices (#3). Source: own.

4) Parking on the sidewalk close to a building façade.

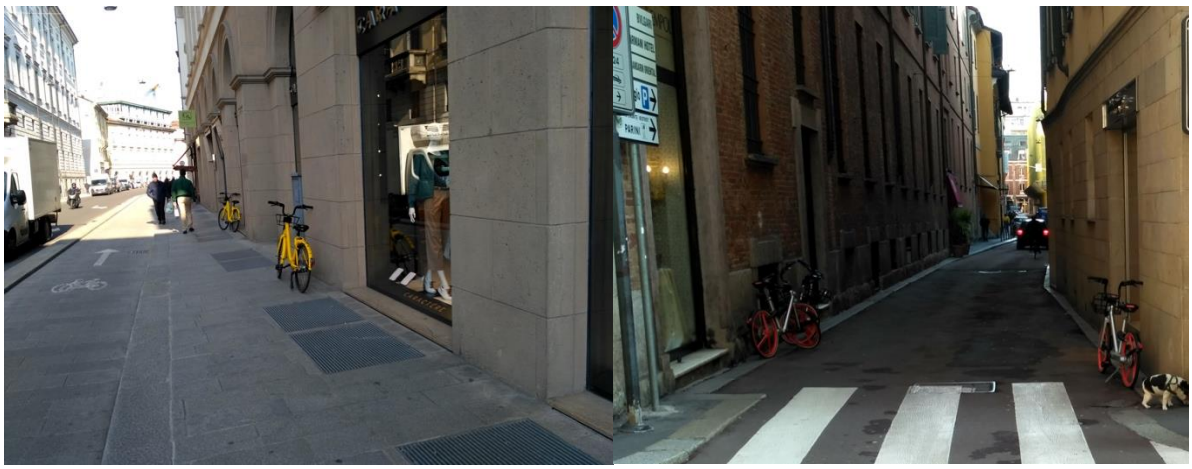


Figure 35 Example of parking practices (#4). Source: own.

5) Parking in the middle of the sidewalk.

Figure 36 Example of parking practices (#5). Source: own.

6) Parking inside of a building.

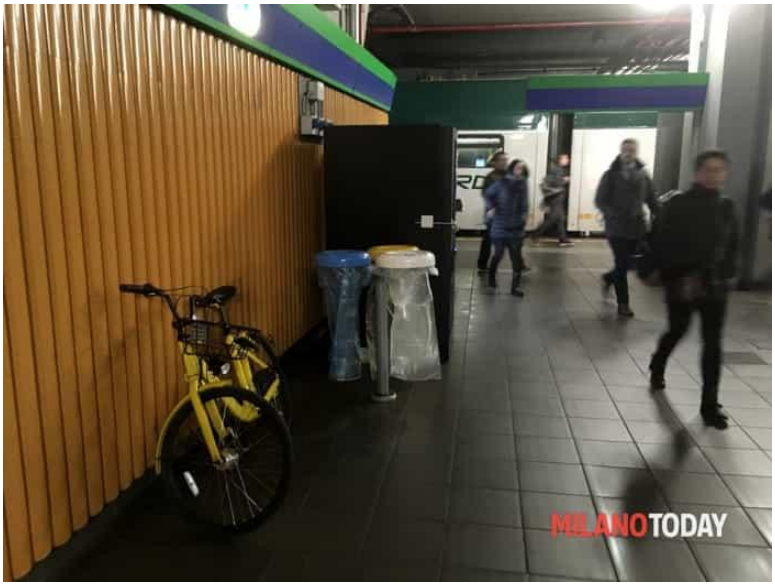


Figure 37 Example of parking practices (#6). Source: MilanoToday

Based on our own observations, the vast majority of cases fall into categories 1) to 4), and only few belong to category 5), whereas category 6) is an extremely rare case. Compared to the parking chaos created in the Chinese cities or to some European cities, where these bicycles were vandalised (e.g. forcing Gobee to pull out of Paris), Milan comes out as very orderly, where the users pay attention not to cause nuisance to others. It is disputable if this could at least in part be attributed to the efforts from the operators who actually indicate suggested parking areas on a map, as few users will look at the map prior to returning the bicycle after a ride (see Figure 38). It is worth noting that, as we have been informed by Edoardo Croci, when the first bike-sharing system was set up in Milano, i.e. BikeMi, there were also many concerns about vandalism,

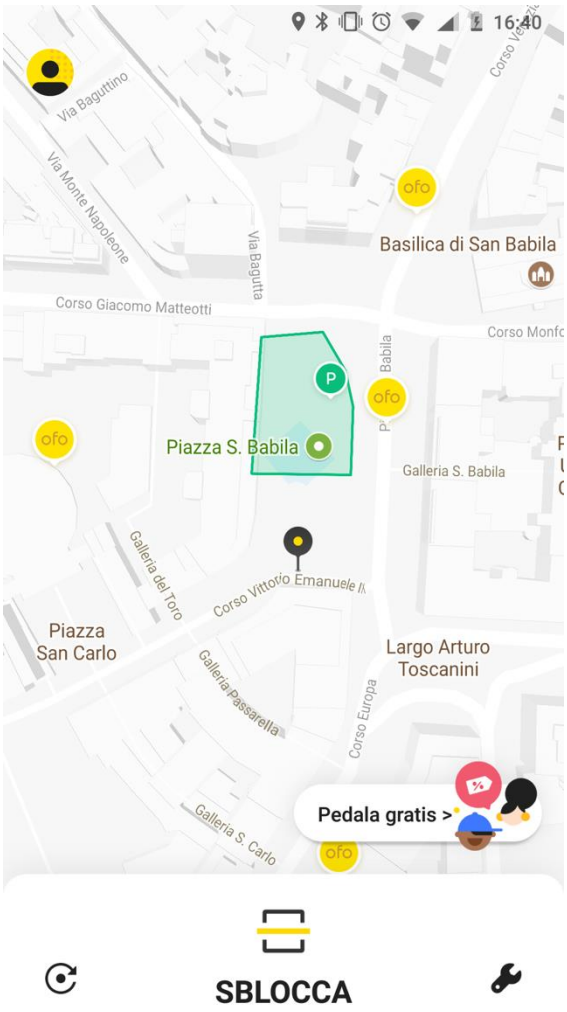


Figure 38 ofo's suggested parking areas

particularly looking at the French experiences. However, when the system was up and running in Milan, comparatively low level of vandalism was reported, which might suggest that there is a higher level of civic culture as compared to those places where vandalism was more prevalent. Naturally, there is a number of factors that need to be accounted for when comparing the situation in Milan and the Chinese cities, where there were hundreds of thousands bicycles deployed, compared to only 12,000 in Milan.

Changing practices on the regime level

When analysing the impact of the new-free floating operators on the bike-sharing practices, a number of tendencies can be observed. Firstly, these services did not manage to displace BikeMi as the commuting tool of choice, even if accounted for the limitations of our data. It does however seem, that it enabled those excluded by the BikeMi sign up requirements, particularly the young, to gain access to an alternative mode of transport. At the same time, they do nothing to alleviate the digital divide, as they require users to be even more adept at using modern connected technologies. They also don't seem to impact much the level of automobile use, since the average journey is little over 1 km, hardly a distance that is normally covered by a car. Therefore, a more plausible explanation is that these new schemes attract those who otherwise would have cycled, used public transport, or simply walked. Looking at the morning commute data, it does seem that those who need a reliable service still turn to BikeMi, which might suggest that those who use Mobike and ofo do it only occasionally. Furthermore, the activity seems to be concentrated in the city centre, which contradicts one of the main premises that AMAT indicated for inviting Mobike and ofo in the first place. This fact, coupled with the near absence of Mobike and ofo among commuters, might additionally indicate that these services are to a large extent used by tourists. In this context, it is worth underlining that Milan is one of the main attractions for Chinese people coming to Italy, and since these tourists already know the services from their home countries, where these are much more abundant, they might be more inclined to use these services instead of BikeMi. Hence, although we do not possess any data on which kind of subscriptions have suffered the biggest loss in revenues at BikeMi, it is reasonable to assume that it is predominantly the short-term subscriptions, especially the one-day subscription. In general, despite these companies' claims about their environmental impact, social inclusiveness and expanding the service area, the evidence we have managed to collect, suggests that these

benefits have largely been overplayed, remain marginal, and have had little impact on changing the bike-sharing, let alone the cycling practices in Milan.

Niche

Within the microcosm of bike-sharing in Milan, the niche level refers to those actions of both users and, just as importantly, non-users, that deviate significantly away from the practices designed into the system. These unintended consequences of the reality-clash, are not necessarily always to the detriment of the system, and some might actually support it, even if that wasn't the main purpose of undertaking such practices. In the following passages, we shall first look at vandalism, which like in many other cities around the world has also been present in Milan, and then, we shall look at an example of a positive, at least from the point of view of the operators, user appropriation, the *Ciclo Ignoranza* community.

Vandalism

As reported by Croci and Clear Channel, BikeMi got targeted by vandals only in a few single episodes and only when it expanded towards the peripheral neighbourhoods of the city, reporting one of the lowest vandalism rate among the systems operated by Clear Channel in Europe. In contrast, free-floating schemes suffered repeated attacks since they started deploying their bicycles in the city. Local newspapers and social media reported pictures of ofo and Mobike bicycles thrown on top of trees and phone booths, in canals and fountains, or simply destroyed, with parts broken or taken away (Figures 39).

As a counter-act, the apps have a 'behavioural score' system built-in, a system that could serve as a small scale demonstration of the Chinese social-credit scoring system. In the case of Mobike, a user starts with 100 point and is awarded 1 point for every single ride and cut 20 points for misbehaviour on parking the bicycle. Upon losing points, the user is charged more and more for the service until the account is completely blocked. But this solution is totally ineffective against vandals that aren't registered or don't specifically activate the targeted bicycle, in particular those might be non-users, who for unknown reasons decide to destroy the bicycle. As a consequence, Mobike decided to employ private security to overlook the bicycles in the areas with the higher levels of vandalism (Bettoni, 2018a). As of writing, this initiative just started and effects on

vandalism are unknown, although it does indicate that there is a problem with financial consequences exceeding the cost of establishing those patrols. In any case, the owners of the free-floating systems usually assume in their business models as certain acceptable threshold of vandalism. As we have seen, the different ways in which these bicycles are parked in the public space, especially when they obstruct pedestrian flow, might provoke non-users, who have little interest in taking care of these systems, to engage in behaviours destructive for the system. While we have underlined the near omniscience of the systems, thanks to their extensive data collection, vandalism proves difficult to eradicate with modern technological advancements, especially since assigning guilt to any actual user might prove impossible, if only because of the inherent GPS data inaccuracy.

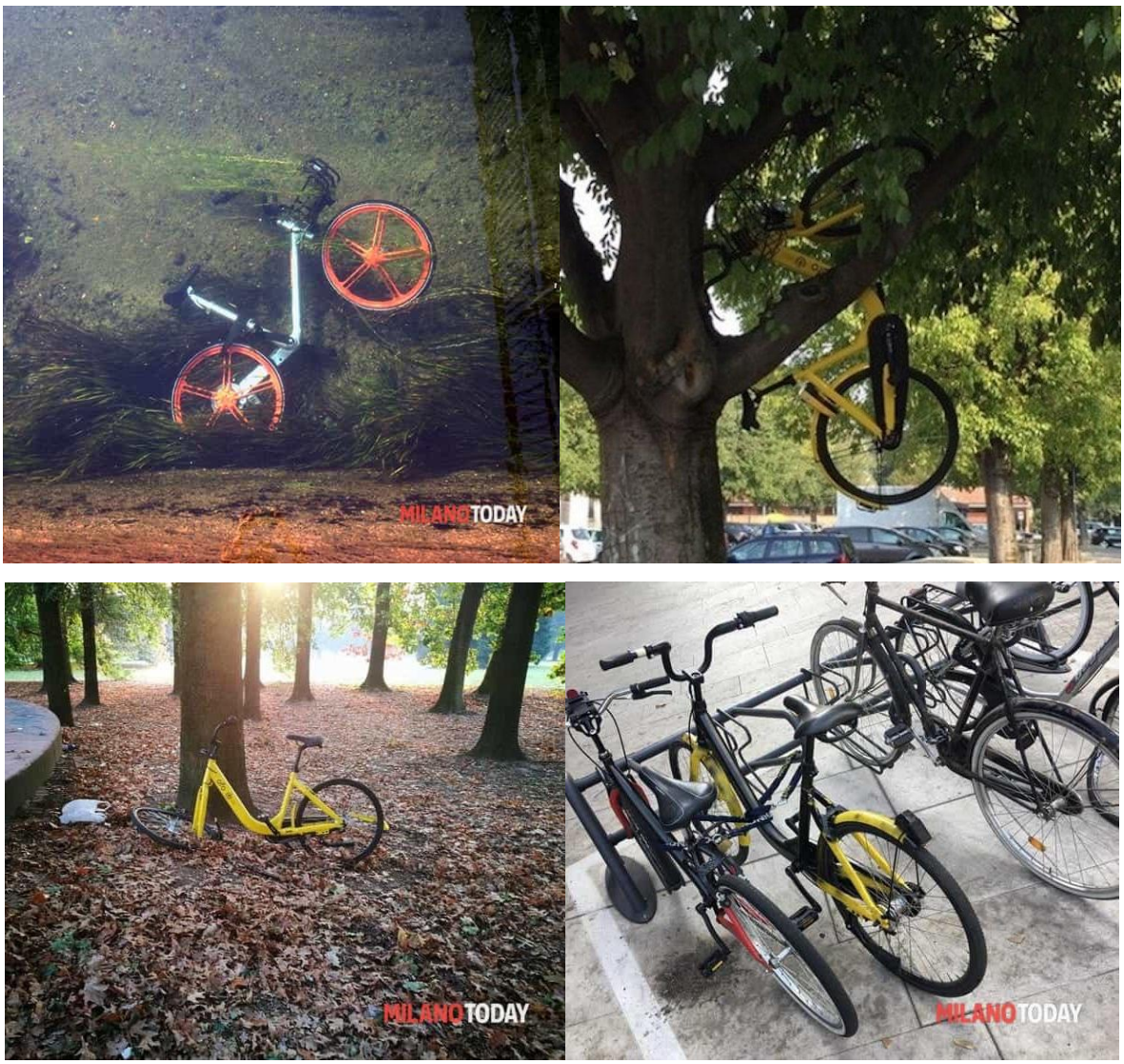


Figure 39 Free-floating bicycles vandalised. Source: MilanoToday and 'Il Milanese Imbruttito'

Bike-sharing schemes and nightlife

The two maps illustrating Mobike use shown in the section *Expansion of the service area* are showing usage peaks in the Navigli area, where the city's water canals meet. This is not due to the area being similar to Amsterdam and its world-famous canals, but because it's a popular nightlife district in the city. Accessibility to the area is problematic: on one hand, the area is closed to motor traffic at night; on the other, Milan's night-time public transport features a short number of lines with a frequency of one bus every thirty minutes, with the metro lines closing shortly after 1 AM, early for Italian nightlife. Free-floating schemes make it easy for users to reach the area, leave the bicycles around without the need to find a rack or a pole to lock it, and travel back home at the end of the night. In the warm part of the year (April-October) BikeMi is operational until 2 AM from Sunday to Thursday and in 24h service during Friday and Saturday nights. BikeMi 24h service is often available even during special events, like the design event *Fuorisalone*. It's important to mention that riding a bicycle while under the effect of alcohol is illegal in Italy, as the same laws apply to both motor vehicle drivers and bicycle riders, though the enforcement by the different police corps operating in Milan leaves a lot to be desired (e.g. testing for alcohol is only done to car drivers). The lack of cycling infrastructure is especially dangerous at night, where most of the traffic lights are turned off and crossing large roads becomes a problem. Fortunately, as of writing, searching for press articles about road crashes at night, in Milan, featuring bicycles brings up zero results. This practice does indicate, that to understand how these bicycles are being used one needs not only look at commuters, how as we have seen when discussing the regime level have not taken up the new schemes. Therefore, the success of these free-floating services might hinge on appropriating all the occasional short-distance trips, that would have anyway been undertaken without the use of a private car (e.g. walking, public transport or taxi/Uber).

Ciclo Ignoranza races

We already presented Ciclo Ignoranza in the the actors analysis, an informal group organizing races on Mobikes, usually in the city parks at night. The events include drinking beer, wearing extravagant costumes and even a crowd cheering on the finish line. The videos of the events can be found on the *Ciclo Ignoranza* Facebook page. As explained in the interview we had with the organizers, the goal is to demonstrate in an entertaining way that if something as unfit for the purpose as Mobike bicycles can be used to race, then everybody can leave their car home and

use a bicycle in their daily routine. Moreover, Mobike, even if not officially supporting the events, offered free minutes as prizes for the races.

Figure 40 Ciclo Ignoranza race starting line in Parco Lambro. Source: Ciclo Ignoranza Facebook page

While it remains to be seen if these events turn into a cyclical feature, since there have not been any races organised in 2018 as of writing, this movement can be seen as a 'from below' way to appropriate new technologies. The introduction of the Mobike fleet has enabled new forms of connecting cycling enthusiasts in Milan, that would not have emerged without the existence of the scheme. Although these events cannot be classified as practices, because of their non-ritualised nature, they do point to an untapped source of civic energy that can help transform Milan into a more bicycle-friendly city.

MLP Summary

After our analysis based on the MLP, it's worth to run a summary of the most important findings from our research. While we have previously presented the findings following the cultural dimensions of the MLP, i.e. from networks through discourses to practices, here we summarise the findings following the 'vertical' dimension, i.e. by going through the different levels: landscape, regime and niche.

Landscape

At the landscape level, while Milan is still clearly a car dominated city, we can find the push that the largest European cities are facing towards sustainability and the sharing economy, with the objective of reduce pollution and improve the quality of life at the same time. Milan is no exception to this push, with bike sharing being a part of a wider policy to reduce the motorization rate, that proved to be effective in the past decades, with a falling trend of said rate. This is being held back from the general Italian discourses about car ownership and use (every young man has the goal to get the driving license once he turns 18 years old, as stated by Sevino) and cycling being mainly a sport for a few though men fighting on the slopes of the Alps during the Giro d'Italia, rather than a viable mode of transport. In general, both cycling and bike-sharing are still far from entering and establishing themselves at the landscape level, even if the number of shared bicycles has more than tripled in the city since the introduction of ofo and Mobike services. The physical infrastructure remains a major challenge for the city to boost its bicycle modal share to levels remotely comparable to those of bicycle-friendly cities, although the car-centric discourses are slowly being eroded.

Regime

When investigating the regime, we found that widespread concern and attention was put on the regulation of the free-floating schemes, when it comes to their impact of the Milanese urban space. Actors stated their concerns on how the bicycles can be parked anywhere, without any regulation or mean to control and enforce proper parking practices, i.e. where bicycles aren't obstacles for pedestrians, or prevent vandalism. The Municipality's idea is to designate 'mobility areas' where parking shared vehicles is encouraged, maybe even with discounts on the service fees or other sort of non-monetary prizes. Another theme portrayed at this level is the

environmental impact that users' behaviour can trigger by using bike-sharing, which is pursued by all the operators in Milan, as a marketing tool to attract customers. The assumption of the operator is that the users switch from average-aged and average-polluting cars to BSSs, while in fact they might shift from going by foot or using public transport.

Niche

Niche level shown a variety of themes. We have seen how vandalism has different levels between docked and free-floating bicycles, with BikeMi reporting vandalism levels among the lowest in Europe. Moreover, we have seen how Ciclo Ignoranza organizes night races in the city parks to prove that if Mobikes can be used to race, then they can be used by anyone in their daily routine. Another theme is the one about the use of data generated by the users, with the BSSs operators promoting themselves as the 21st century saviours of our cities and of the environment but at the same time collecting private data, raising concerns about users' privacy. Clear Channel is transparent about being an advertising company, less transparency comes from Chinese companies ofo and Mobike, affiliated to Alibaba and Tencent, notorious mega-corporations with ties to the Chinese government.

Comparative case study

Since the invasion of free-floating BSS is a global phenomenon, with many European cities also having to cope with these new actors, we decided to shortly investigate four cases that illustrate different cycling cultures and contexts. The experiences from these cities will help us formulate our recommendations for how to incorporate the free-floating BSS into the toolbox of urban planners and mobility managers. We have selected Amsterdam, where cycling is present on the landscape level, Paris, which boasts one of the biggest docked BSSs, Munich, a city of comparable size to Milan, and Beijing, a city where free-floating BSSs have become part of the landscape level.

Amsterdam

We have included Amsterdam in our case studies as, next to Copenhagen, it epitomises a city built around bicycles, where the cycling culture has dominated the landscape level, with the automotive culture playing a smaller role, although hardly close to marginal, as nearly 70% of

the space is allocated to cars (O'Sullivan, 2017). With over 700 km of cycle paths and nearly 60% of those above 12 y/o using a bicycle daily it would seem like the perfect place to start a free-floating BSS. This is especially so, since Amsterdam does not possess its own municipal BSS, although those who wish to commute the last mile from a train station can use OV-Fiets, a countrywide cycle hire service. There are ca. 15 stations in Amsterdam itself, where people can rent these bikes, usually located at important transport hubs and destination points. In general, this system has been experiencing rapid growth in recent years, with the number of subscribers countrywide growing from 200,000 to 500,000, and the system being expanded by some 6,000 bicycles up to 14,500 (Rottier, 2018).

Naturally, the success of the bicycle culture comes at a price in Amsterdam, a city of narrow streets and extremely limited free space supply. This price is notorious problems with bicycle parking, with thousands of abandoned bicycles swarming the streets. This has led the city officials to not only take measures to provide additional parking facilities, but also to make sure that the abandoned bicycles are cleared off the streets.

In such a context five different bike-sharing companies have decided to start their operations in Amsterdam flooding the streets with some 5,500 bicycles, only to be banned from the streets soon afterwards. In response to this decision an official from one of the banned companies stated that they "sensed that there was no immediate plan" and that "[h]alf a year later and there is still no policy, but the municipality has its hand on the brakes." (O'Sullivan, 2017). As expressed by Amsterdam's alderman Pieter Litjens, the city does not want "this kind of bicycles to take up public space" (Van Roy, 2017). According to Roelofs, Amsterdam's smart mobility officer, the companies made a number of mistakes when trying to establish their operations in Amsterdam, such as failing to understand the bicycle culture in the city, with high level of ownership, providing low-quality bikes, and lastly not coordinating parking or volume with the officials (Ahmed, 2018). The city's ban might not prove quite as effective, as the execution of the ban is left to the city's districts. Notwithstanding, Amsterdam officials admit, that in a city overcrowded with bicycles, BSSs might actually help relieve many problems with parking, and indicate Hello Bike's dockless station at Zuidas as an example to follow.

What Amsterdam's case shows is a clash between aggressive BSSs and a city with a highly-developed cycling culture, where cycling is established as a practice at a landscape level, and where there is little need to provide people with further opportunities to use a bicycle. It is worth underlining, that Amsterdam's officials do not need to add numbers to the bike-sharing system to prove that they are a bicycle-friendly city, which is often the case in cities, where cycling remains a niche practice and which try to boost bike-ridership at any cost, especially if they do not need to invest a single dime in a particular measure.

Figure 41 Example of a Hello Bike's dockless station in Amsterdam. Source: https://twitter.com/zuidasamsterdam/status/794580752721657858

Paris

The city of Paris was selected based on its extensive docked BSS, the Velib Metropole (until December 2017 called simply Velilb), which has been seen as the role model for cities all over the world. Trace of this image as the final point of evolution of a BSS can also be seen in Milan's Sustainable Urban Mobility Plan, which assumes that Milan should reach the same service density as Paris, measured as the number inhabitants per one shared bicycle (one bicycle per 97 inhabitants according to data from 2013). The system is currently undergoing a major revamp, with a new operator taking charge of providing the service, however, the transition has been anything but smooth (O'Sullivan, 2018). The new operator Smovengo, who replaced JCDecaux, has promised to offer a more connected service, using up-to-date technologies, as well as more electrified one, with 30% of the fleet being batter assisted. Despite the fact that the system was supposed to be up and running by the beginning of 2018, Smovengo recently had to recall 3,000 dysfunctional bikes, which was a major blow to the system ("Paris's e-bikes recalled in yet another crisis for Velib", 2018). What already became part of the Parisian landscape, the grey Velib bicycles, have since the transition been nearly absent from the streets. This chaos has created the perfect conditions for the free-floating operators to enter the market.

In the absence of a well-functioning Velib system, four different operators entered between October 2017 and January 2018, including Gobee Bike (2,000 bicycles), oBike (500), ofo (1,000)

and Mobike (4,000). While most of the companies cooperate with the local authorities, who have initially threatened to charge them for commercial use of public space, but who probably welcome these companies with open arms, having in mind the problems plaguing the Velib Metropole service, it is worth noting that Gobee Bike has already in March 2018 decided to cease its operations in Paris because of excessive vandalism. As of now, other actors, such as ofo and Mobike actually plan to expand their services, and have not suffered from excessive vandalism, at least not from one exceeding the levels accepted in their business model (Lelievre, 2018).

The Paris case shows that these free-floating companies have an extremely adaptable and flexible business model, with the ability to deploy thousands of bicycles within a short period of time. The mounting problems with the new operator of the docked BSS have been a fertile ground for these newcomers to flourish, however the jury is still out if they will actually manage to displace Velib Metropole as the go-to bike-sharing system in Paris once it is fully operational. Until then, the free-floating companies can only hope that Parisians will grow tired of the Velib Metropole's neverending issues and use their services rather than cars or public transport.

Munich

Munich, Germany, was chosen due to its similarities with Milan in terms of population, even if it is larger and thus, less dense. Cycling in Munich saw an increase in the modal share recently, though new data is expected to be released this year (Landeshauptstadt München, n.d.). The Municipality launched a city-marketing project named *'Radlhauptstadt München'*, literally 'bicycle capital', stating the ambitious goal to become Germany's leading city when it comes to bicycle mobility. The project contains marketing and communication campaigns as well as safety-improving campaigns. Events include bicycle tours in the city, flea markets to buy/sell bicycles and related products, bicycle repair workshops, hands-on on electric bicycles and much more. Deutsch Bahn launched its own station-based BSS in 2011 and currently counts around 1,200 bicycles, which turned into a free-floating scheme only in the central part of the city, keeping the station-based structure in the outskirts. Then, in 2017 Singapore-based oBike launched its free-floating scheme, bringin 7,000 bicycles in the city.

Suddeutsche Zeitung's Philipp Crone (2018) reports popular uproar against the scheme and the bicycles scattered through the city, which turned into light (bicycles turned upside-down) and heavy (bicycles with cut brake cables, thrown on trees and into the Isar river) vandalism acts. As

a consequence, during the winter many bikes became unusable, leading oBike to dismantle the bicycles and start again with a smaller, easier to maintain, pool of bicycles. Munich's picture of bicycles in the river or up on the trees recall immediately the scenes seen in Milan, but systemically-turning the bicycles upside-down without causing damage implies a different form of vandalism.

Beijing

Last but not least, the capital of China was included as it might seem a success story from far away for free-floating schemes but, looking at it closer, things are a little more complicated. Beijing, as the whole country, was dominated by cycling in its modal split until the economy boomed and people could afford motor vehicles. According to Grabowski (2013), during the period 1980-2010, the motorization rate outpaced the population increasing by growing almost 22 times faster. Cycling was obviously impacted from this change at the landscape level, seeing its modal split cut in half from 2005 to 2010 alone. As an answer to this shift, the city developed a metro system counting more than 600 km of lines and a public station-based BSS, with more than 1,000 docking stations and more than 10,000 bicycles.

Zhang et al., explain the system and its immediate successors: launched in 2007, before the Olympic Games, was an experimentation led by Beijing Municipal Public Security Bureau and the Beijing Environment Protection Bureau, with the aim to fight bicycle theft. Then, 10 private companies launched their own schemes, resulting in failures and soon closing down operations, due to unsuccessful business models, mainly being advertising-oriented with 'very low' public subsidy (Zhang et al., 2015).

Later, free-floating schemes launched in the city, with 15 different schemes providing 2,4 million bicycles (Beijing bans new bikes as sharing schemes cause chaos, 2017). As the title of the BBS article cited, the situation became tragic for the urban space and the city decided to ban new bicycles and announced the will to regulate parking in public spaces. As reported by Haas (2017), Bluegogo, the third-largest BSSs, went bankrupt losing to the competition of other schemes, massively dumping bicycles on the streets of Chinese city outnumbering the actual demand. In his article, Haas includes a picture by Chen Zixiang picturing a brightly-coloured hill of abandoned shared bicycles dumped by trucks. McLaughling (2018) reports of more cities banning permits for free-floating schemes and of another scheme, Xiao Ming, going bankrupt.

Uncertainty is a keyword when describing Chinese BSSs, as regulations tightens and the business models reveal their fragilities.

Case study findings

This quick overview serves to provide context for Milan's experiences, and as we can see many challenges are common to all cities. The themes that stand out particularly are reducing public space quality, vandalism and difficult relationships with city officials. The Parisian case indicates that even a large, traditional bike-sharing schemes, such as Velib Metropole should not be taken for granted as the revamp issues continue to amass. Amsterdam's approach shows a way for cities with strong municipal authorities that are not afraid of enforcing their vision, should public interest be threatened, but also, through Hello Bike's stations, provides a solution to some of the more pressing challenges with free-floating bicycles. oBike's disappearance from Munich exemplifies difficulties that such operators encounter, even in highly developed countries, that at first sight should have high civic culture. Lastly, Beijing's case shows the limits to the expansion of such schemes, providing a clear lesson that if left unregulated and simply to the market forces, such schemes cause great nuisance to the public sphere, even if they benefit many users.

	Amsterdam	Paris	Munich	Beijing	Milan
Population	851,573	2,206,488	1,464,301	21,707,000	1,363,180
Surface area	220 km^2	105 km^2	310 km^2	16,411 km^2	181 km^2
Population density	5,135/km^2	21,000/km^2	4,973/km^2	1,300/km^2	7,531/km^2
Length of cycle paths	767 km	700 km	1,200 km	n.a.	215 km
Length of metro system	42.5 km	220 km	103 km	608.2 km	96.8 km
Bike modal share	58% (above 12 y/o)	3%	17% (n.d.)	16% (2010)	6% (2013)

	Amsterdam	Paris	Munich	Beijing	Milan
Bike-sharing systems in existence	No local system (only the national OV-Fiets)	Velib (est. 2007) Metropole (est. 2018)	Call a Bike (est. 2011) oBike (est. 2017)	15 different BSSs	BikeMi (est. 2008) Mobike (est. 2017) ofo (est. 2017)
Number of docking stations (if present)	16 OV-Fiets stations (300 countrywide)	1,400 (planned)	n.a.	n.a.	280
Number of shared bicycles	14,500 countrywide	Velib Metropole - 20,000 (planned) oBike - 1,800 Ofo - 1,000 Mobike - 4,000	Call a Bike - 1,200 oBike - 7,000	2,4 million bicycles	BikeMi - 4,650 Mobike – (up to) 8,000 ofo - (up to) 4,000
Bike-sharing per 1000 inhabitants	n.a.	12.14	5.60	110.56	12.21
Fee for 30 minutes ride, for single use (in EUR)	€3.85 per 24 hours (only one flat rate available)	Velib Metropole - €0/1 (depending on subscription) ofo - €0.50 (20 minutes) oBike - €0.50 Mobike - €0.50	Call a Bike - € 1.00 oBike - € 1.00	Between €0.07 and €0.13	BikeMi - €0 (with subscription) Mobike - €0.50 ofo - €0.50

Table 4 Comparison of cities with different bike-sharing schemes

CHAPTER IV

CONCLUSION, RECOMMENDATIONS AND FUTURE RESEARCH

Introduction

In the following chapter, we first present general conclusions from the analysis, based on the MLP analysis and the case studies. We then envisage a number of recommendations about the design of a successful bike-sharing scheme, based on five key features. As a final note, we indicate the potential for future research that could help better understand and design such schemes.

Conclusion

Going back to the research question from Chapter I (How are the new free-floating schemes reshaping Milan's cycling practices?), we belie we found an answer, if only partial, through the use of Multi-Level Perspective analytical approach. The new free-floating schemes became a reality because of friction between the Municipality of Milan and the public, dock-based, scheme operator Clear Channel. It brought a new transportation option to people who couldn't get a shared bicycle before, whether because of geographic distribution of the docking stations or their access to the specific payment method Clear Channel is enforcing. While the operators label their schemes as the key to sustainability and a mean of transport that saves CO_2 emissions, other actors are less confident and believe that shared bicycles are making people shift a segment of their commute from public transport or walking, not from polluting cars. Some city-dwellers reacted guided by anger to the number of bicycles being deployed in the city, parked wherever it pleased someone, and at times causing nuisance to pedestrians, in a city where sidewalks and green areas are already full with parked cars. Overall, the impact of these schemes on Milan's cycling practices seems to be limited and lies mostly in their visibility while standing on the streets rather than in actual numbers of people using them for their commute.

The idea of free- floating or dockless bicycles is not new, and as Edoardo Croci pointed out they considered such a scheme already when establishing BIkeMi. What has changed during this period is the mobile technologies, that now enabled the operators to gain access into something as personal and intimate as a smartphone, and hence created conditions for a new way of monetising people's both offline and online behaviour. For this reason, this recent wave of rapid development of free-floating BSSs around the world needs to be seen in a wider context, one with giant transnational corporations, looking for ways to transform human activity into financial profit. There are many signs indicating that these schemes are part of a new bubble, as evidenced

the short-livedness of many of the schemes. The strongest companies, with the most financial resources to withstand fierce competition, driving the profit margins down, an unprecedented scale of vandalism, and operational challenges, come out as winners for now. But the jury is still out, if the business model based solely on users' fees will prove viable in the long-term, or if the companies finally find ways to transform their data-mining capacities into a profitable business, without scaring the users off, because of the related privacy concerns.

Just like the actors we have interviewed, we believe that bike-sharing has a role to play in cities, especially those with poorly developed cycling culture and infrastructure. Even if its impact on the growing number of cyclists cannot be proven, these schemes have shown the politicians and decision-makers that cycling can be a viable form of transportation. Since bike-sharing is still a relatively new phenomenon it is too early to judge if it is merely a tool for transitioning towards a city, where most dwellers have their own bicycles, or if it is there to stay, even in cities such as Amsterdam. As we have seen, even in the Netherlands OV-Fiets is becoming increasingly popular, which might suggest that such schemes have a role to play, particularly to facilitate multi-modal trips for people commuting from neighbouring municipalities, even in cities with already well-developed cycling cultures.

Lastly, while the private bicycle has been since its inception seen as an emancipative tool, one that enhanced mobility of the masses, particularly women, and one that brought clear benefits for the environment and the quality of urban life, the free-floating bike-sharing industry has managed to entangle it in new discourses, not necessarily for the better. The chaos introduced into public spaces, the bicycle graveyards, and private data concerns are a testimony of a rather gloomy and dystopian reality that has been brought upon by these schemes.

Recommendations

Based on our findings there is a number of themes that need to be addressed to take full-advantage of the free-floating BSSs and integrate them into a mobility platform such as MaaS. To this end, we shall present what we believe could be the ideal bike-sharing system, incorporating the experiences and findings gathered through this research. Since the phenomenon of dockless BSSs has received great attention, many actors have already ventured into setting out a code of conduct for these companies. These recommendations will constitute a foundation that we will critically build upon our own set of best practices. In the following sections will shall try to indicate ways in which the municipalities could work with these operators

to achieve common goals. Naturally, as we have seen earlier any cooperation between a public authority and a private company pursuing profit requires a balancing of public and private interests in a way that minimises the risks of a potential agency conflict.

Any successful mode of transportation that is to replace the private automobile must score high on comfort, convenience and reliability. As we have seen, while BikeMi scores high on comfort and reliability, and slightly less so on convenience, the new free-floating services score high on convenience, but have major issues with comfort, especially Mobike's smaller bicycles, and reliability, as it can prove difficult and time-consuming to find a working bicycle, as many of the bicycles are out of service. Therefore, it is clear that these aspects need to be improved in all three services before they can be treated as a viable part of the public transport. Additionally, 'softer' parameters such as social inclusiveness, or low system sign-up barriers, and private data protection need to be addressed for the systems to truly thrive. As we have shown, BikeMi's registration requirements are intentionally selective towards the affluent, typically male, users, whereas both ofo and Mobike can be seen as vehicles for collecting and mining sensitive location-based data. Accordingly, we believe that any successful BSS has to score high on the following five parameters:

1. *Comfort* – comfortable bicycle, suitable for people of differing posture, easy to handle, operate and return.
2. *Convenience* – bicycles should be easily accessible at major transport hubs, easy registration, convenient rental process that is based on mobile technologies, e.g. QR code scanning.
3. *Reliability* – users should be able to find the bicycles with ease, and broken bicycles should be taken off the streets and off the apps as soon as possible. This feature also translates into maintaining order in the public space and avoiding nuisance to non-users.
4. *Social-inclusion* – registration requirements should be lowered, particularly in terms of payment methods, and the service area should be expanded to include the more peripheral areas of cities.
5. *Privacy protection* – while tracking technologies are the basis of any modern BSS, they need to be managed responsibly and at least in the EU according to the coming General Data Protection Regulation, which stipulates how such sensitive data should be handled.

Naturally, there can be a trade-off between some of the parameters, e.g. a more social-inclusive service might lead to more vandalism, rebalancing and maintenance issues, while the convenience of GPS tracking might pose a threat to data privacy.

As has been highlighted elsewhere, the introduction of new competitors to Milan's bike-sharing market has made many of the deficiencies of BikeMi much more apparent than they otherwise would have been. This is particularly the case with taking advantage of the benefits of app-mediation, as well as tracking technologies. Therefore, we believe that the ideal BSS should incorporate the features from both the docked and the dockless systems to form a new hybrid system. In what follows, we present concrete measures that we believe can ensure that a BSS scores high on all of the abovementioned five parameters.

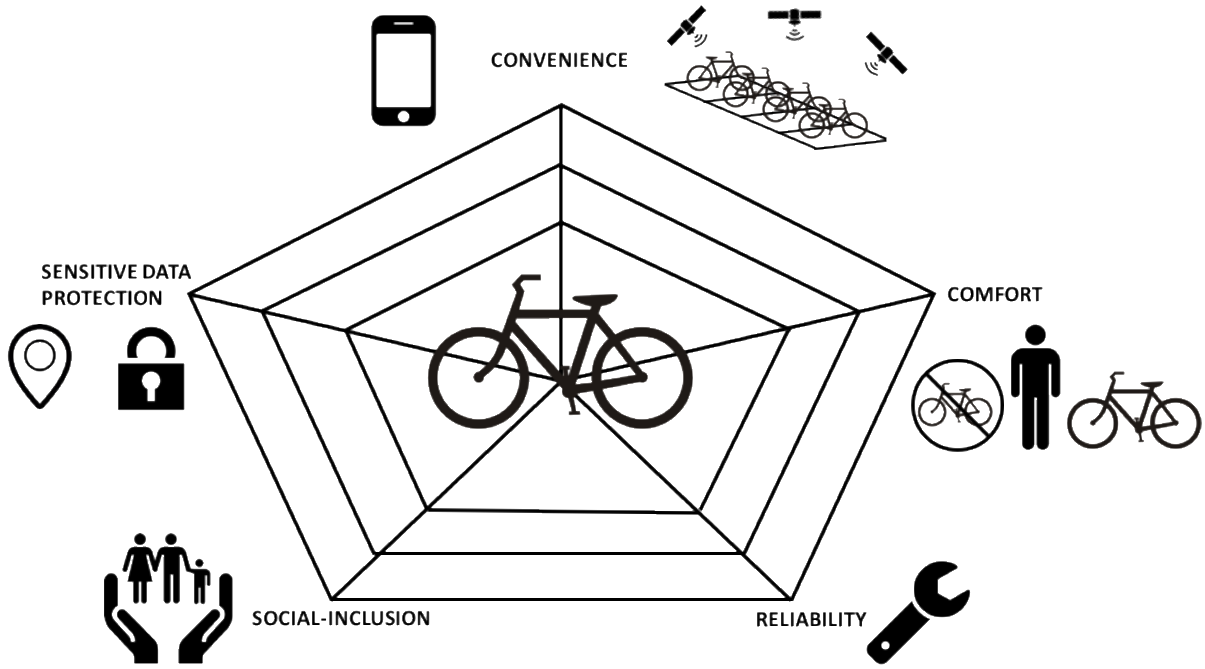


Figure 42 A spiderweb diagram presenting the five main parameters of a successful bike-sharing system. Source: own.

Convenience – Use smart locks to create geo-fenced virtual docking stations at local transport hubs

The convenience of the system should be ensured first by making the bicycles easily accessible at major transport hubs. It is worth noting that Milan is already thinking of creating mobility areas, where different shared-services would be available. While tracking technologies enable finding one's way to a free-floating bicycle that was left outside of an urban focal point, it is still instrumental that these bicycles are found in places with greatest exposure to potential users. A

major part of building up a sustainable practice is shaping a habit, and in this case users should be able to find a bicycle while being on 'autopilot', i.e. without resorting to navigation techniques that require even the smallest mental effort. Anyone who has ever tried walking and navigating through a city with a mobile phone showing how to get around can attest that this is not as straightforward as it might seem. Therefore, for convenience's sake it is fundamental that people are able to build this habit easily, without the need to look for a bicycle in different places each time they want to use one. To this end, we believe that creating geo-fenced virtual docking stations, which nevertheless are clearly marked in the urban space is the most promising solution to this challenge (compare "Free Floating, Hybrid or Docking?", 2017). The free-floating nature of the scheme could be preserved with users being able to leave the bike wherever they wish, although, this would come at a higher per use cost. Additionally, to encourage parking within the designated areas, the users could be offered preferential fees should they pick up a bicycle left outside of such areas and return it to another designated area upon trip completion.

At least until smartphone remains the most popular mobile technology used to interact with the built environment, the bike-sharing service should be accessible through an app, unlike BikeMi today. Such an app should enable finding a bicycle on a map, as well as unlocking through QR-code scanning or other mobile technologies e.g. Bluetooth, NFC or RFID. What is more, convenience can be further expanded for the users through integrating the bike-sharing service into a Mobility as a Service platform, where users pay a monthly subscription, which covers access to different services such as public transport, bike-sharing, car-sharing or taxis. Thanks to such service pooling, the users do not need to require to each and every service provider, instead being able to sign-up for all services in one place. Here Milan is also already thinking of combining all such services into one platform, although it remains to be seen when it is actually in place, and if all operators will agree to join it.

Comfort – Adjust to local conditions

As we have shown the free-floating bicycles often leave a lot to be desired in terms of comfort, with Mobike bicycles being uncomfortable to the point of unusability. This clearly stems from a lack of appreciation for cultural differences in different markets these companies try to operate in. While the municipality of Milan has set up a requirement that these bicycles should be suitable for a person of 1.5 m of height, this has proven insufficient with numerous cyclists complaining that these bicycles are simply too small. While this has enabled more women to take up these

bicycles, it is important to account for the fact that in cities such as Milan, i.e. with generally poor cycling conditions, it is predominantly the more risk-taking men who cycle. Additionally, the omnipresence of the 'pave' as the road surface in Milan requires that bicycles have better suspension, and non-pneumatic tyres are a misfit in this situation. Therefore, BSS operators should also account for the kind of cycling infrastructure available in the city, although this might be complicated for the Chinese giants who rely on economies of scale in their operations.

But increasing comfort could also be achieved through abandoning the docking stations, which particularly in Milan pose problems as the somewhat heavy bicycle has to be lifted off the ground and two bolts need to be put into two holes in the bicycle rack, which is not an easy and comfortable task. This is why, smart locks have many advantages from a users' perspective, since the bicycles is returned by simply closing the smart lock mounted on the bicycles, which instantaneously communicates that the trip has been ended.

Reliability – Ensure durable design and maintenance

This feature is intricately connected with convenience, however, it places focus on the certainty that the user will encounter a well-maintained bicycle whenever he or she plans to rent one out. Naturally, because of the 'smart' lock, there is more to this than making sure that the chain, brakes and gears all work. Unfortunately, the experiences with the free-floating service indicate that the operators are understaffed when it comes to rebalancing and maintenance tasks, which is understandable in a market with virtually zero profit margins as of now, but which makes it a poor addition to the public transport. While Mobike has designed a bicycle with maintenance in mind, since there are no gears or chains that could break, it has unfortunately led to a design that is not functional. Nevertheless, the bicycles and the smart locks themselves need to be robust to withstand any attempt at destruction or vandalism. There is also a need for a well-functioning reporting system that allows users to quickly report any broken bicycles.

Social inclusion – Lower system sign-up barriers

Bike-sharing worldwide has proven to be predominantly adopted by well-off, highly-educated, white male, and therefore there is a need to make the future systems more equitable in terms of gender, age and income. While the gender gap might be at least to some extent attributable to the hostile cycling environment in Milan, it could also be explained through by generally lower labour market participation by women (although steadily growing, still the ratio of female to male

labour force participation is only at 67.8% as of 2017, see "Gender Data Portal - Italy", 2018), who as a result have more difficult access to financial services, including credit cards. Therefore, while creating accountability through association of the user with his credit card is the most straightforward and low-risk option, there is clearly a need to look beyond this model. Both ofo and Mobike have more equitable access in terms of payment methods than BikeMi, as they accept pre-paid credit cards, which are much more common and accessible for people without stable employment. More varied payment methods and alternative accountability measures built into the MaaS platform could vastly enhance the accessibility of the service.

Bridging the age gap might prove to be more difficult, and here more traditional public transport cards, using the FRID technology could prove more beneficial for alleviating the digital divide. This could be part of the MaaS platform, although overcoming the technology aversion might still prove to be a barrier.

Lastly, while access to the credit card is a proxy of the level of income and employment stability, there are other factors that have excluded lower-income population from using the services, particularly the locations of the docking stations. As in many other cities, Milan's docked BSS is concentrated in the central areas, and the free-floating services have not expanded the service areas quite as significantly, presumably because the operators prefer central locations where there is higher user turnover, including tourists. To alleviate this, virtual geo-fenced stations should be created in the peripheral areas and the operators should be obliged to ensure a certain minimum threshold of bicycle allocation to these areas.

Privacy protection – Share data responsibly

Thanks to the free-floating bicycles the world bike-sharing has taken a major, if mostly quantitative, step towards smart mobility. The systems gather enormous amounts of 'capta', particularly those pertaining to the trips undertaken by its users. For any public authority such wealth of information can be useful when evaluating the existing infrastructure and planning future infrastructural projects. This is why, municipalities need to guarantee that all trip-related data is made available for its purposes to better understand the flows around the city. As has been pointed out earlier, there are some caveats to be taken into consideration, since a lot of the 'capta' might turn out to be nothing more than white noise. Such requirements should be clearly stated in the tender, as it has been the case with Milan, and operators should provide raw data, without any attempts at manipulation to paint a rosier picture of their operations. However,

handling such sensitive data requires great care and city official must be aware of all the implications it has on personal privacy. While the raw data that the companies hand to the municipalities is anonymised and therefore difficult to use against any particular person, these companies gather information about other aspects of users' interaction with the service than just the trip route. As we have highlighted, the apps require access to many smartphone features that are not necessarily related to the services main purpose, with the location data being collected also when the person is not using the bicycle, and the app is not in use either. The new GDPR entering into force by the end of May 2018 should ensure that these companies make it patently clear which sort of information about the user they gather, how do they use it, and with whom do they share it. Although the officials at ofo and Mobike are wary not to mention data collection when presenting their companies, they need to be treated as vehicles for collecting very sensitive data that could be commercialised without the user knowing the exact extent of data mining. Until now the free-floating companies have claimed that they do not base their business model on data extraction, however, until now they have also been able to use enormous cash injections from technology giants, whose business is exactly that. This does require city officials to be aware of these hazards and not treat them lightly, as the convenience of gathering precise location data about bike-sharing users might come at the cost of users' privacy. This issue is particularly important in countries outside of the EU, where GDPR does not apply, and therefore companies have greater elbow-room to take advantage of the collected information in ways obscure to the general public. The stated goals of the free-floating companies to replace all private bicycles coupled with Chinese government's plans to introduce social-credit score, which will penalise behaviours as seemingly innocent as jaywalking, it is easy to imagine a future, where free-floating bicycles are simply part of a state surveillance system, whose role is to make citizens conform with an ideal of a citizen created by the government bureaucrats.

Future research

Bike-sharing schemes are in a transition phase, where older, consolidated, often public-owned, station-based schemes are challenged by newer private-owned free-floating schemes, especially in the western world. In the Far East, where the new schemes firstly found mass implementation, things are rapidly mutating as well, with operators facing financial problems and cities starting to tackle the regulatory dimension in order to reduce the negative impacts on the urban space and

liveability of multi-million cities, as we have seen in the case of Beijing. On newspaper headlines, free-floating schemes are often reported to be *'the future of bike sharing'*, but after having studied it through the Multi-Level Perspective approach, we are not sure about it. This interesting uncertainty about the future is what we think should lead the future research, here we present a brief list of topic that will be interesting to study, in our opinion.

Hybrid schemes

Station-based could open up a little in terms of location thanks to new technologies, while free-floating could be limited to park in specific areas to defend the quality of urban space, converging towards a hybrid model made by virtual docking stations. How similar will they become? Will cities defend the public schemes or leave the market to private companies?

User appropriation and vandalism

With the images of free-floating bicycles becoming less of a novelty over time, will vandalism continue? Will we see new uses for the bicycles? Will users be more mindful in their choice about where to park?

Business model – user fees, advertising and data mining

With the new privacy concerns rising recently, especially in the European Union, with the creation of the GDPR, collection of private data and its use will be hopefully limited. What kind of business model will then become more financially strong? Will the advertising-based model continue to be sustainable, given the transition of the advertising markets towards the digital space and media technology?

Cycling culture

BSSs have been trying, since their first appearances, to present cycling as cool, healthy and positive for the environment. At the same time, we have seen an increase in the bicycle modal share in the past years in European cities. What part did bike-sharing operators' discourses had in this shift? Where they the starters or did they just follow a pre-existing trend? Will it continue in the future?

Other sharing schemes

Bicycles aren't the only vehicles targeted by sharing schemes: cars, minicars, mopeds, motor scooters and even kick scooters are all available from sharing schemes somewhere in the world. MLP was used to address the bicycle schemes in Milan, but it could be used also for other schemes, as it allows to analyse different levels (landscape, regime, niche) of the different dimensions (networks, discourses, practices) that shape contemporary mobilities. Even though there are evident differences between different vehicles, some topics stay across the board and the globe. As an example, shared electric scooters in San Francisco are causing problems to other road users, as they can be found parked in bad locations for pedestrians or rode on sidewalks, causing vandalism acts in response and legal action from the city attorney (Farivar, 2018).

Figure 43 Shared electric kick scooters in San Francisco, USA. Source: ArsTechica

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References

AMAT (2017, December). *Shared Mobility in Milan: current situation and future developments.* Retrieved from: https://www.amat-mi.it/downloads/608/

Beijing bans new bikes as sharing schemes cause chaos. (2017, September 8). *BBC News.* Retrieved from: http://www.bbc.com/news/business-41197341

Bendinelli S. (2017, October 2). I nuovi bike sharing a Milano faranno fallire BikeMi? the Submarine. Retrieved from: http://thesubmarine.it/2017/10/02/total-war-bike-sharing/

Beroud, B., & Anaya, E. (2012). Chapter 11 Private Interventions in a Public Service: An Analysis of Public Bicycle Schemes. In Cycling and sustainability (pp. 269-301). Emerald Group Publishing Limited.

Bettoni, S. (2018a, April). Milano, arrivano i vigilantes delle bici in condivisione: «Troppi vandalismi». *Corriere della Sera.* Retrieved from: https://milano.corriere.it/notizie/cronaca/18_aprile_13/milano-arrivano-vigilantes-bici-condivisione-troppi-vandalismi-1f250f24-3f0a-11e8-876a-83c5b28c227f.shtml

Bettoni, S. (2018b). Milano, Brera e i Navigli: la movida che pedala, le notti del bike sharing. Retrieved from https://milano.corriere.it/notizie/cronaca/18_aprile_01/milano-brera-navigli-movida-che-pedala-notti-bike-sharing-3fe49f5a-3577-11e8-b2e5-b255d4399dd5.shtml

Bhaskar, R. (2013). A realist theory of science. Routledge.

Bicycling in Milan. *Ciclobby.it*. Retrieved 16 April 2018, from http://www.ciclobby.it/cms/bicycling-in-milan

Bike sharing, la società cinese Gobee: «Via dall'Italia, qui troppi vandali» (2018, February 18). Corriere della Sera. Retrieved from: http://www.corriere.it/tecnologia/18_febbraio_14/bike-sharing-gobee-via-dall-italia-qui-troppi-vandali-bc55c210-117a-11e8-9c04-ff19f6223df1.shtml

BikeMi, record nel 2016: oltre 8 milioni di prelievi e 55mila abbonati annuali. (2017). *Trasportinfo*. Retrieved 12 April 2018, from https://www.trasportinfo.com/2017/01/18/bikemi-record-nel-2016-bike-sharing/

BikeMi: superati 15mln di prelievi, sempre più utenti ed ecco i nuovi furgoni. (2016). Retrieved from https://www.trasportinfo.com/2016/11/10/bikemi-bike-sharing-milano-prelievi-utenti-furgoni-metano/

Boullier, D., & Crépel, M. (2014). Vélib and data: a new way of inhabiting the city. urbe. Revista Brasileira de Gestão Urbana, 6(1), 47-56.

Canon Rubiano, L. (2018). *Zero docks: what we learnt about dockless bike-sharing during #TTDC2018*. *Transport for Development*. Retrieved 10 April 2018, from https://blogs.worldbank.org/transport/zero-docks-what-we-learnt-about-dockless-bike-sharing-during-ttdc2018

Cardoza, A. (2010). 'Making Italians'? Cycling and national identity in Italy: 1900–1950. *Journal of Modern Italian Studies*, *15*(3), 354-377.

City of Copenhagen (2014). Copenhagen City of cyclists, The bicycle account 2014. Retrieved from: http://www.cycling-embassy.dk/wp-content/uploads/2015/05/Copenhagens-Biycle-Account-2014.pdf

Clear Channel festeggia San Valentino con BikeMi. (2018). Retrieved from http://www.brand-news.it/comunicazione/out-of-home/clear-channel-festeggia-san-valentino-bikemi/

Cohen, B., & Kietzmann, J. (2014). Ride on! Mobility business models for the sharing economy. Organization & Environment, 27(3), 279-296.

Comune di Milano (2017). Muoversi a Milano - Piste Ciclabili. Data available at: http://www.muoversi.milano.it/web/portale-mobilita/percorsi-ciclabili

Comune di Milano (2017, June). *Piano Urbano della Mobilità Sostenibile - Documento di Piano.* Pp. 306-307. Retrieved from: http://download.comune.milano.it/13_07_2017/DdP%20Documento%20di%20Piano%20emendato%20(1499955646081).pdf

Corbin, A. (2015). *Equitable bike sharing is about much more than credit cards*. *PeopleForBikes*. Retrieved 13 April 2018, from https://peopleforbikes.org/blog/equitable-bike-sharing-is-about-much-more-than-credit-cards/

Crone, P. (2018, March 26). Obike zieht Großteil der Leihräder aus München ab. *Süddeutsche Zeitung*. Retrieved from: http://www.sueddeutsche.de/muenchen/fahrradverleiher-obike-zieht-grossteil-der-leihraeder-aus-muenchen-ab-1.3922021

Duarte, F. (2016). Disassembling Bike-Sharing Systems: Surveillance, Advertising, and the Social Inequalities of a Global Technological Assemblage. *Journal of Urban Technology*, *23*(2), 103-115.

EUROCITIES. (2017). European Mobility Week Thematic Guidelines. Retrieved from: http://www.mobilityweek.eu/fileadmin/user_upload/materials/participation_resources/2017/2017_EMW_Thematic_Guidelines.pdf

European Committee of the Regions. (2017). Opinion of the European Committee of the Regions - An EU Roadmap for Cycling. Retrieved from Official Journal of the European Union: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52016IR1813&from=EN

European Cyclists' Federation. (2017). European Cycling Strategy. Retrieved from: https://ecf.com/sites/ecf.com/files/EUCS_full_doc_small_file.pdf

Eurostat (2017). 2015 GDP per capita in 276 EU regions. Retrieved from: http://ec.europa.eu/eurostat/documents/2995521/7962764/1-30032017-AP-EN.pdf/4e9c09e5-c743-41a5-afc8-eb4aa89913f6

Farivar, C. (2018, April 4). San Francisco to scooter startups: Your customers are terrible. *ArsTechnica*. Retrieved from: https://arstechnica.com/tech-policy/2018/04/san-francisco-dubs-new-electric-scooter-startups-a-public-nuisance/

Fishman, E. (2016). Bikeshare: A review of recent literature. Transport Reviews, 36(1), 92-113.

Free Floating, Hybrid or Docking?. (2017). Retrieved from https://x.bike/post/free-floating-hybrid-or-docking

Galli, E. (2009). Il Bike sharing come chiave di lettura della ciclabilità milanese. *Ciclobby Notizie*, (2-2009).

Gardiner, S. (2017). *How your personal information funds share bike schemes*. *The Sydney Morning Herald*. Retrieved 7 April 2018, from https://www.smh.com.au/business/consumer-affairs/how-your-personal-information-funds-share-bike-schemes-20171110-gzj05d.html

Gatersleben, B., & Uzzell, D. (2007). Affective appraisals of the daily commute: Comparing perceptions of drivers, cyclists, walkers, and users of public transport. *Environment and behavior*, *39*(3), 416-431.

Geels, F. W. (2011). The multi-level perspective on sustainability transitions: Responses to seven criticisms. *Environmental innovation and societal transitions*, *1*(1), 24-40.

Geels, F. W., & Verhees, B. (2011). Cultural legitimacy and framing struggles in innovation journeys: a cultural-performative perspective and a case study of Dutch nuclear energy (1945–1986). *Technological Forecasting and Social Change*, *78*(6), 910-930.

Gender Data Portal - Italy. (2018). Retrieved from: http://datatopics.worldbank.org/gender/country/italy

Gössling, S. (2017). The Psychology of the Car: Automobile Admiration, Attachment, and Addiction. Amsterdam, Netherlands: Elsevier.

Grabowski, T. (2013). Transport Demand Management in Beijing. Retrieved from: http://www.tpprofessional.org/download.cfm/docid/D9050EB7-F2F1-47BF-A95862EE9F0791F7

Greenfield, A. (2017). *Radical technologies: The design of everyday life*. Verso Books.

Haas, B. (2017, November 25). Chinese bike share graveyard a monument to industry's 'arrogance'. *The Guardian.* Retrieved from: https://www.theguardian.com/uk-news/2017/nov/25/chinas-bike-share-graveyard-a-monument-to-industrys-arrogance

Han, S. (2017). *Do the economics of bike-sharing schemes stack up?* | *CityMetric*. *Citymetric.com*. Retrieved 7 April 2018, from https://www.citymetric.com/transport/do-economics-bike-sharing-schemes-stack-3352

Horton, D., & Parkin, J. (2012). Chapter 12 Conclusion: Towards a Revolution in Cycling. In *Cycling and sustainability* (pp. 303-325). Emerald Group Publishing Limited.

iamsterdam.com (n.d.). Amsterdam Cycling History. Data available at: https://www.iamsterdam.com/en/plan-your-trip/getting-around/cycling/amsterdam-cycling-history

Il BikeMi di Milano fa 674 giri intorno alla terra. (2016). *wisesociety.it*. Retrieved 12 April 2018, from http://wisesociety.it/ambiente-e-scienza/bikemi-milano-bike-sharing-co2/

Jensen, O. B. (2013). *Staging mobilities*. Routledge (non-layout version).

Kaufmann, V., Bergman, M. M., & Joye, D. (2004). Motility: mobility as capital. *International journal of urban and regional research*, *28*(4), 745-756.

Kent, J. L. (2015). Still feeling the car–The role of comfort in sustaining private car use. *Mobilities*, *10*(5), 726-747.

Ketelaar, P. E., & van Balen, M. (2018). The smartphone as your follower: The role of smartphone literacy in the relation between privacy concerns, attitude and behaviour towards phone-embedded tracking. *Computers in Human Behavior*, *78*, 174-182.

Kneuts, I. (2018). *Free floating bike-sharing 'banned' before it arrives*. *newmobility.news*. Retrieved 13 April 2018, from https://newmobility.news/2017/10/23/free-floating-bike-sharing-banned-arrives/

Landeshauptstadt München (n.d.). Radlhauptstadt Munich. Retrieved from: https://radlhauptstadt.muenchen.de/

Larmer, B. (2017). *China's Revealing Spin on the 'Sharing Economy'*. *Mobile.nytimes.com*. Retrieved 7 April 2018, from https://mobile.nytimes.com/2017/11/20/magazine/chinas-revealing-spin-on-the-sharing-economy.html

Lelievre, A. (2018). Vélo-partage : le chinois Mobike mise sur l'abonnement à Paris. Retrieved from https://www.lesechos.fr/industrie-services/tourisme-transport/0301441217542-velo-partage-le-chinois-mobike-mise-sur-labonnement-a-paris-2161481.php

Lyons, G., & Chatterjee, K. (2008). A human perspective on the daily commute: costs, benefits and trade-offs. *Transport Reviews*, *28*(2), 181-198.

Magnani, A. (2017). *La guerra del bike-sharing: così le bici cinesi low cost «invadono» il mercato italiano*. *Il Sole 24 ORE*. Retrieved 16 April 2018, from http://www.ilsole24ore.com/art/impresa-e-territori/2017-11-27/la-guerra-bike-sharing-cosi-bici-cinesi-low-cost-invadono-mercato-italiano-075023.shtml

Manzi, G., & Saibene, G. (2017). Are they telling the truth? Revealing hidden traits of satisfaction with a public bike-sharing service. *International Journal of Sustainable Transportation*, 253-270.

McLaughling, B. (2018, March 27). This week in China tech: Huawei's blockchain move, bike sharing goes bust, and more. *Forbes*. Retrieved from: https://www.forbes.com/sites/baymclaughlin/2018/03/27/this-week-in-china-tech-huaweis-blockchain-move-bike-sharing-goes-bust-and-more/#5f03a4936baf

Metrobike. (2018). Bike-sharing World Map. Retrieved from: www.bikesharingmap.com.

Mingoia, M. (2017). *BikeMi critica le due ruote a flusso libero in arrivo dalla Cina*. *Il Giorno*. Retrieved 16 April 2018, from https://www.ilgiorno.it/milano/cronaca/bike-sharing-1.3229612

Mobike. (2018). How Cycling Changes Cities. Insights on how bikesharing supports urban development

Onoszko, M. (2017). *Share bikes' real value is in the data they collect, says BlackRock*. *Financial Review*. Retrieved 7 April 2018, from http://www.afr.com/leadership/innovation/share-bikes-real-value-is-in-the-data-they-collect-says-blackrock-20171030-gzbf2w

O'Sullivan, F. (2017). Amsterdam's Fight Against Rogue Bike Shares - CityLab. Retrieved from https://www.citylab.com/transportation/2017/08/amsterdam-fights-back-against-rogue-bike-share/535791/

O'Sullivan, F. (2018). The Great Parisian Bikeshare Meltdown. Retrieved from https://www.citylab.com/transportation/2018/05/the-paris-bikeshare-is-now-free-but-thats-because-its-broken/559913/

Paris's e-bikes recalled in yet another crisis for Velib. (2018). Retrieved from https://www.thelocal.fr/20180504/all-of-pariss-e-bikes-recalled-in-yet-another-crisis-for-velib

Présidence du Conseil de l'Union européenne / Luxembourg 2015. (2015, 10 7). Transport Declaration of Luxembourg on Cycling as a climate friendly Transport Mode - Informal meeting of EU ministers for Transport. Retrieved from: http://www.eu2015lu.eu/en/actualites/communiques/2015/10/07-info-transports-declaration-velo/07-Info-Transport-Declaration-of-Luxembourg-on-Cycling-as-a-climate-friendly-Transport-Mode---2015-10-06.pdf

Questionario sulla soddisfazione del cliente BikeMi 2016. (2017). Retrieved from https://www.bikemi.com/media/246719/questionario-soddisfazione-bikemi-estratto-analisi.pdf

Ricci, M. (2015). Bike sharing: A review of evidence on impacts and processes of implementation and operation. *Research in Transportation Business & Management*, *15*, 28-38.

Rip, A., & Kemp, R. (1998). Technological change. *Human choice and climate change*, *2*, 327-399.

Rottier, J. (2018). Aantal ritten OV-fiets met een derde gestegen - VERKEERSNET. Retrieved from https://www.verkeersnet.nl/fiets/25345/aantal-ritten-ov-fiets-derde-gestegen/

Schmitt, A. (2018). *Is the Dockless Bike-Share Revolution a Mirage?*. *Streetsblog USA*. Retrieved 8 April 2018, from https://usa.streetsblog.org/2018/02/07/is-the-dockless-bike-share-revolution-a-mirage/

Sheller, M. (2004). Automotive emotions: Feeling the car. *Theory, culture & society*, *21*(4-5), 221-242.

Sheller, M. (2012). The Emergence of New Cultures of Mobility: Stability, Openings and Prospects. Na.

Shove, E., & Pantzar, M. (2005). Consumers, producers and practices: Understanding the invention and reinvention of Nordic walking. *Journal of consumer culture*, *5*(1), 43-64.

Smith, A. (2011). Greenwashing. In N. Cohen & P. Robbins (Eds.), *The SAGE References Series on Green Society: Toward a Sustainable Future: Green business: An A-to-Z guide* (pp. 305-307). Thousand Oaks, CA: SAGE Publications Ltd. doi: 10.4135/9781412973793.n85

Stella A. (2011, March 4). Spazio alle bici sui marciapiedi «Un patto sociale anti traffico». Corriere della Sera. Retrieved from: http://milano.corriere.it/milano/notizie/cronaca/11_marzo_4/spazio-bici-marciapiedi-martesana-190151548588.shtml

Superati 55mila abbonati al BikeMi nel 2016. (2017). Retrieved from http://viveremilano.info/curiosita/citta-metropolitana/superati-55mila-abbonati-al-bikemi-nel-2016.html

TomTom International BV (2016). TomTom Traffic Index. Data available at: https://www.tomtom.com/en_gb/trafficindex/

Wired Italia (2018, April 20). A #smartlandcremona c'è @MobikeIT con Alessandro Felici: "Oggi il business del bike sharing si basa sull'utilizzo delle biciclette e i dati raccolti non vengono usati. Non sappiamo se il geo-marketing basato sui dati diventerà un elemento di profitto e business, ma è possibile". Retrieved from https://twitter.com/wireditalia/status/987340589766242304

van der Zee, R. (2016, April 26). Story of cities #30: how this Amsterdam inventor gave bike-sharing to the world. Retrieved from https://www.theguardian.com/cities/2016/apr/26/story-cities-amsterdam-bike-share-scheme

Van Roy, J. (2017). Amsterdam to ban free-floating bicycle-sharing. Retrieved from https://newmobility.news/2017/08/03/amsterdam-ban-free-floating-bicycle-sharing/

Venkatesh, S. A. (2013). The Reflexive Turn: The Rise of First-Person Ethnography. The Sociological Quarterly, 54(1), 3-8.

Verrecchia, S. (2017). Centralità della bicicletta e biciclette condivise. *Ciclobby Notizie,* (3-2017).

VIIAS (2015). VIIAS Executive Summary. Retrieved from: http://www.salute.gov.it/imgs/C_17_pubblicazioni_2368_allegato.pdf

Zhang, L., Zhang, J., Duan, Z. Y., & Bryde, D. (2015). Sustainable bike-sharing systems: characteristics and commonalities across cases in urban China. *Journal of Cleaner Production*, *97*, 124-133.

APPENDIX

Here we present some of our raw data, in particular the interview transcripts, notes from meetings where we could not record, and first person ethnography account of our experiences with the three bike-sharing schemes. Other raw data, such as observations data (Observations.xlsx) and visual ethnography materials are available on the attached CD.

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INTERVIEW TRANSCRIPTS AND NOTES FROM MEETINGS

Agenzia Mobilità Ambiente Territorio (AMAT) - transcript of an interview with Adriano Loporcaro and Valentino Sevino

Q: What exactly is the role of AMAT in the Bike sharing world of Milan?

A: AMAT doesn't have official rule. AMAT is the advisor for the municipality of Milan, for the mobility and policy, and for the car-sharing and bike-sharing as well. We worked to define the tender for the car-sharing, scooter-sharing and bike-sharing. And our role in the bike-sharing system is the monitoring, we collect data, now from both Ofo and Mobike. We work to define a meeting in order to explain the new survey of customer satisfaction, because they are obliged to do a survey each year. Our role in the bike-sharing is the monitoring, like with car-sharing.
We have another tender for the peripheral areas, metropolitan areas, because the municipality would like to enlarge the service on the metropolitan areas. A new tender was published in order to find a company to deploy the bike-sharing system, but I don't know if we have an answer to the tender, because it is difficult to have the service outside of the city. But it is not so easy to create this service.

Q: What are the objectives in terms of changing the modal split?

A: As I told before, we started in 2008, and from 2008 the BSS, and bikes in particular, the BSS really became a modal transport in Milan. Because before 2008 it was leisure to go by bike. Since then it became really modal transport. (explainging Presentation from Bruxelles, by Roberta) We have a peak during the peak hour in the morning, midday and evening. In relation to this peak, you have the answer to your question, because it is used to go to work. We have a combination with other modal transport, multimodal travel. Normally it is used for the last mile, from the train, metro or tram station to the office. I think that we don't have a lot of trips running exclusively by bike-sharing.

Q: Do you have any data on the modal shift? What were these people doing prior to using bike-sharing? Using PT and walking or private cars.

A: No, no we don't think we have people shifting from private cars to BSS. We have people shifting from PT to bike. That is not a bad situation, because … We think that in order to attain the goal to shift from the private car to other modality, is to have a big, very large panorama of possibility to use different modal transport systems. I think that, if we only have BSS of car-sharing, we don't achieve the goal to shift from private car. In this moment the city of Milan, has an important possibility to reduce the motorisation rate. We have 50 per 100 inhabitants, very high compared to other European cities. And the most important measure is the sharing mobility, but not concentrated in one or two sharing systems, but a panorama. In our SUMP we have this goal to create a modality to aggregate all the sharing service we have in Milan in relation to the MaaS policy. We are working with the ATM in order to create our platform, MaaS platform. We believe that with MaaS we have the possibility to reduce the car use in Milan.

Q: What were the objectives when implementing the three different BSSs? Rank from highest to lowest priority.

A: The objective was Milan has a bike-sharing, BikeMi since 2008. In 2015 city of Milan introduced pedelecs, with an interesting system because the bikes don't recharge on the station, but each bike has a battery, with an autonomy of 70 km. And when the battery arrives at 20% of the recharging capacity, the logistic system takes out the bike and the battery is recharged. This system is a bit expensive in logistic terms, but it is easy to install the stations, because we don't have to have the charging at the station. It is not so expensive, because anyway they go to each station every to reallocate the bikes. So when the relocate the bikes, they change the battery. The system is expensive in terms of the battery, because in the economic plan they calculated to change two batteries each year. Each battery costs EUR 500. During the last winter, 2017, city of Milan was blackmailed by BikeMi, to renovate the batteries. They asked for the money to change the batteries, and the municipality of Milan didn't have the money. They blackmailed to stop the whole bike-sharing. In order to avoid blackmail by the company, the municipality accelerated with the free-floating, and in order to have another service on the territory. This is the really key story behind the fast deployment of the free-floating. Another aspect was, we had different pressure from bike-sharing operators, and to avoid that they arrive in our city autonomously, we decided to accelerate this operation. But our technical goal was to test the different service in the city.
We have 280 stations (BikeMi), we have an important area without BSS in the city. In order to grow the service in the city, we would like to test free-floating.

Q: Based on what elements will you decide do hold a new tender to continue the free-floating schemes after these first 3 years?

A: The experimentation is to test the orderliness of the urban space. Before we did the tender we studied the situation in China. Our goal was to avoid this situation. Our goal was to define the rule to have a good situation in our territory. In this moment the tender was established in order to deploy 12,000 bike for three years, to study the situation, the phenomenon, but it is possible that before the three year period ends the municipality of Milan will ask to deploy more bikes.
We don't have a contract with the company, we have an agreement that is not a contract, they answered to the tender, and if their reply is compliant with the tender the municipality gives authorisation to deploy a service. It is an authorisation, you have the possibility to deploy bikes according to the rules. If you don't respect the rules, I take the authorisation and you go out of Milan.
In our tender we wrote that they are obliged to deploy the service for 36 months. The company pays 30 euro per each bike per each year. So if they pay, they stay. If they decide to leave Milan, we have the deposit for 50 euro each bike, and if the go out before the time, we take these money.

Q: Have you studied the impact of these new systems on the old dock one? How do you think they will interact?

A: BikeMI reduced operations by 20% since the launch of Ofo and Mobike.

Q: Do you have data about modal shift regarding the Bike sharing users? Are there differences between BikeMi and free-floating?

A: No, we don't think we have people shifting from private car to bike, we think it's mainly people shifting from public transport. But it's not bad. We think that in order to obtain the modal shift, it is needed to have a very wide panorama of possible transport system to use. If we have only bike sharing or only car sharing, we can't achieve the modal shift. It's about the combination of different possibilities. In this moment the city of Milan has an important possibility to reduce the motorization rate, which is among the highest in the large european cities. The main tool is to have shared mobility systems. But not one or two. We need to aggregate all the sharing services, it's our idea of the mobility as a service system that we are developing together with ATM.

Q: Has the city tried campaigns or policies aimed at people commuting from other cities around Milan to promote the Bike-Sharing Schemes? Sometimes the Bike Sharing Schemes are perceived as a tool for milanese citizens and less for commuters from outside.

A: With the new tender for Bike Sharing Schemes we wanted to bring the service to the metropolitan area outside of the city, so the goal is to give people living outside the city the possibility to use the BSS to enter in the city. But not with a communication acampaing, bbecause we think it's better to first offer the service. And the BikeMi operator probably has difficulties in going outside the city, because it's an investment with not huge results. We already seen this with the car-sharing service, it was experimented by an operator to few municipalities outside the city but they closed the service after 3 months.

Q: What challenges are specific to Milan in enacting a modal shift? You already give many travel choices, from bike sharing to car sharing, and public transport has a positive customer satisfaction.

A: When we started with the car sharing project, we weren't confident to obtain the results we now have in this moment. Because for personal behavior you use your car, you have a car, a beautiful car, you drive it. Maybe it's changing with the new generation. When I was 18 years old my first ambition was to get a driving license, the young generation in this moment maybe get the driving license at 25 years. So we didn't expect these results. In our SUMP we are convinced that in order to shift, we have to give a plurality of measures. It's not only one. The congestion charge is another important one. No we are working to create a low emission zone, much larger than the congestion charge, its purpose is to ban the most pollutant vehicles. Euro 5 diesels will be banned when it launches, Euro 6 by 2025. Maybe you will buy an electric car or otherwise you will shift to other modes: public transport, bike and car sharing.

Q: Sustainable Urban Mobility Plan: why are free-floating services not included in the Documento di Piano?

A: In July we have a step of procedure to approve the SUMP and an observation that asked us to include in our SUMP an amendment, in order to insert the free floating bike sharing. So we translate this observation, that our goal is to grow BSS, but not only in the traditional system.

Q: Free floating operators are collecting data about users and trips: how do they use it?

A: Not a lot of data, now working on collecting data. Mobike September-December 900,000 trips. 200,000 active users (together Ofo and Mobike). 1,800,000 trips for both schemes September-December (partly including a period when Ofo was free - mid September). Map with data regarding the most roads used. Important in relation to the bike lanes planning. We compare our planning for the bike lanes for compliance with area planification.

Q: You mentioned that you use this data to plan where to set new cycle lanes, is that actually matching the data we see here on this map (map of the use of Mobike, based on the shortest route from start to end points)?

A: We use the data for different aspects. To monitor the system, in particular the service level. We use the data in relation to planning, in order to plan the transpot and in order to measure the phenomenon in our city.

Q: Dedicated parking areas: was an operator own decision or did the public side enforce it? What is its objective? How were the areas chosen?

A: Alike with car-sharing, the municipality of Milan decided to define rules regarding the service. The other aspect in relation to the management of the service is totally controlled by the operating company. So, I don't know, how Ofo works with their App, but I imagine they chose the areas to take the bikes directly. Despite of Milan decided to define different areas to give and take bikes in order to have more orderly landscape. Areas where you have to possibility to take or leave the bike. The goal is to create different area in each street. So its a hybrid situation between a docking system and a dockless system. But it is a suggestion to leave these bikes in the area. Otherwise you have the possibility to leave the bikes in other areas, as long as it is complying to the law.

Q: Now a difficult question for you to answer. Let's be honest: the free-floating bikes are not the top of the line regarding comfort, especially on medium and long trips: don't you think this could have a negative effect on how cycling is perceived by new users?

A: It not the free floating that's not confortable, it's the bike. It's a thing. But in the tender we define the different characteristics of the bikes, these are compliant and now we have them. But we have information that Mobike would like to arrive with pedelecs and with different sizes than the ones actually used in Milan. They are now studying bikes for the european market.

Q: What is (in a few words) the Mobility as a service platform? How will it interact with Bike Sharing Schemes?

A: It's a platform to provide those measures we were talking before. We are bringing together car and bike sharing, public transport and other options to provide those people shifting from private car a very interesting alternative.

Q: So the mobility as a service it's a platform that brings some instrumental value to different transport modes alternatives to the car. But what sort of actions do you take in order to change the sentimental value that people attach to these transport modes? Or do you think that not much can be done and it's a thing that normally happens over time?

A: The cultural behavior is a very long process to change. For exmaple in the field of sharing mobility, the City of Milano started in 2002. For 10 years the people ignored the car sharing system. Since 2012-2013 the situation and the policies changed very fast in Milan and those people coming back in Milan after ten years recognized that the city was totally changed. There were different steps in the mobility policy. We started in early 2000s with parking price policies, then with Ecopass, then to Area C, changing from a pollution charge to a congestion charge after a city referendum. With Ecopass the people had the possibility change the car to be able to enter again the area and that is what happened, the private fleet of the city was modernized after the introduction of the pollution charge, to the point where we had the same traffic level than before the implementation of Ecopass. So the administration decided to switch to a congestion charge.

Q: Do you know of Ciclo Ignoranza? They are an "underground" group promoting races in parks with Mobikes. What do you think?

A: (laughs) I didn't know. Really? Maybe the next year we will have a Giro d'Italia or a Tour de France with bike sharing! But in any case we are working to create a manual on how to use the bike sharing system together with some university students in the communication field. Their idea is to create a place to explain how to use correctly these systems.

Q: Do you personally use these schemes? If so, what is your opinion? If not, why?

A: Normally like with the car sharing I don't use a specific company's service, I use the closest to me. If there is a close BikeMi station I go there, otherwise I choose the closest one.

Q: Whenever there is a news release about Bike Sharing Schemes, journalists like to mention that it saves CO2. It's promoted in the media as a tool to reduce pollution and gas emissions, while in your perspective it's more about reducing choices.

A: When BikeMi gives us the data, they state the amount CO2 saved. But the number depends on which mode did they user shift from. Is important in my opinion if we reduce the number of cars in our city and the number of trips done with private vehicles. So from this point of view is important to communicate the emissions avoided by the different mode. In Milan we don't have data about modal shift, but our idea is that Bike Sharing takes people from public transport.

Q: Do you have any concerns about the financial viability of the new schemes?

A: If we do some basic calculations, I think that these free floating Bike Sharing Schemes are more profitable than car sharing services, if you include the cost of cars, the cost of fuel, insurance, etc.

Q: When you commute you want a reliable service because you want to find the service available when you have to commute and with BikeMi you have that, you just go at the station and are almost sure to find a bicycle and it will work. With Ofo and Mobike even if they have a map, you maybe arrive and find that the bike is broken or inaccessible inside a private property. So there might be some reliability problems with the free-floatin schemes.

A: In relation to car and bike sharing, we started with a dock-based system, we then deployed free floating, and are now convinced that the perfect way is an hybrid system. We have a project to develop "mobility areas" in Milan where you can find all of the shared mobility systems. There are advantages for the companies (they get logistic savings) and for the users (they get a discount if they live the vehicles inside the mobility area, and they know they will find some solution inside the area). We would like to test this hybrid scheme.

Clear Channel - answers sent the BikeMi operator.

Answers are presented both in Italian and translated into English

Objectives

Q: How do you define the objectives of the scheme? After more than 9 years in operation, to what extent do you think the scheme has reached these objectives? If and how have these objectives changed over time?

A: L'obiettivo di BikeMi è offrire alla cittadinanza un servizio di bike sharing capillare e complementare agli altri servizi di trasporto presenti in città. Alla soglia del decimo compleanno di BikeMi riteniamo di aver raggiunto l'obiettivo, Il progetto però non è terminato ed è in continua evoluzione e crescita. Al momento abbiamo circa 280 stazioni e abbiamo in cantiere oltre 40 nuove stazioni. L'obiettivo dichiarato dal Comune di Milano è il raggiungimento di 500 stazioni attive.

BikeMi's objective is to offer to citizens a diffused bike sharing service which complements the other transport services in the city. At BikeMi's 10th birthday, we think we reached the goal, but the project is not over, it is in continous growth and evolution. At the moment we have around 280 stations, with more than 40 planned. The official goal of the municipality is to reach 500 active stations.

Environmental effects

Q: On your website, you state that BikeMi is an "easy, practical and ecological system that helps to improve the quality of the environment and your physical well-being"? In what ways does BikeMi provide these benefits?
BikeMi also provides users with information on the amount of saved CO2 emissions. Why do you think this information is relevant for the users? How precise is this information?

A: BikeMi è un sistema rapido e semplice da utilizzare. Il prelievo e la restituzione si effettuando in pochissimi secondi, tutto è monitorabile tramite l'app per smartphone.
E' oramai risaputo e scientificamente provato che l'attività fisica quotidiana ha benefici sia dal punto di vista fisico che psicologico, la biciletta inoltre permette spostamenti rapidi evitando lo stress del traffico e della ricerca del parcheggio. A questo va ovviamente aggiunto che la bicicletta non produce gas di scarico e non inquina.

BikeMi is fast and easy to use. Bike withdrawal and docking takes few seconds and everything can be monitored with the smartphone app. It's known and scientifically proven that daily physical activity provides benefit on both physical and psychologica well-being, moreover the bicycle enables fast travels avoiding traffic and the search for a parking space. Obviously, to all of this, we should add that the bicycle doesn't produce exhaust fumes a doesn't pollute.

Riteniamo corretto informare i nostri abbonati su come il proprio comportamento influisce positivamente sull'ambiente circostante, conoscere la quantità di co2 risparmiata è una informazione che può indurre ad un circolo virtuoso. Perpetrare e diffondere la cultura della bicicletta e sono parte della nostra mission.

We think it's correct to make our subscribers aware that their own behavior influences the environment in a positive way: to know the CO2 quantity saved is an information that could lead to a virtuous circle. Perpetuating and spreading the cycling culture is part of our mission.

Il calcolo della co2 risparmiata è basato sul Defra's carbon conversion factor che calcola il consumo di un'auto media.
Considerate che ad oggi, con una media di circa 2 km per ogni utilizzo e gli oltre 20milioni di prelievi effettuati, i milanesi hanno pedalato per più di 40milioni di Km. Questo significa che hanno percorso il giro della Terra più di 1.000 volte, facendo risparmiare oltre 8milioni di Kg di CO2.

The saved CO2 calculation is based on Defra's carbon conversion factor that accounts for the carbon production of an average car. You should consider that nowadays, with an average of 2 km per trip and more than 20 millions trips done, milaneses cycled for more than 40 million kilometers. It means they have done more than 1000 round trips around the Earth, saving more than 8 million kg of CO2.

User behaviour
Q: How would you describe your average user (age, gender, income etc.)? How did this change over time? How does people's behaviour differ from that seen in other countries where you operate (e.g. trip length, average user)?
What problems did you experience in the beginning of your operations? What are the main problems now? E.g. we found full docking stations with many undocked bikes in the same area. BikeMi doesn't officially let users lock their bikes, if the station is full but it seems it's tolerated. What's your opinion on this?
How much vandalism do you experience? Can you compare it with the level of vandalism experienced by Ofo and Mobike?

A: Vi inviamo i dati demografici completi. I dati di utilizzo sono in media con quelli registrati negli altri paesi.
Il problema principale, che è aumentato con l'aumentare del numero di utilizzi, è la regolazione e la gestione delle stazioni. La gran parte dei prelievi avviene nelle fasce orarie corrispondenti con l'ingresso e l'uscita dei luoghi di lavoro, quindi con i momenti di maggior traffico automobilistico.
I nostri furgoni impiegano quindi più tempo per gli spostamenti e può accadere di trovare una stazione senza stalli liberi per la restituzione. In tal caso il cliente è tenuto a recarsi alla stazione con stalli liberi più vicina, per raggiungerla riceve automaticamente 15 minuti di utilizzo gratuito.
Stiamo affrontando il problema effettuando delle migliorie ai nostri software, aumentando il numero di stalli presenti in centro città e valutando le nuove possibilità offerte dalle nuove piattaforme tecnologiche. Nelle ore di punta, inoltre, abbiamo avviato un servizio extra di operatori e furgoni per servire le stazioni più congestionate.
L'obiettivo del nostro Customer Care è informare gli abbonati sulle corrette modalità di gestione e contrastare i comportamenti che arrecano danni al sistema e agli altri abbonati. Di conseguenza tolleriamo il comportamento fuori dal regolamento solo quando non è ripetuto.
La nostra percentuale di vandalismo è oggi intorno al 5%, contro il 20-30% registrato ad esempio a Parigi e Barcellona. Non conosciamo i dati di Ofo e Mobike ma non abbiamo registrato episodi di vandalismo simili a quelli visti nei primi giorni di servizio dei sistemi free floating, soprattutto in

termini di quantità, a parte qualche raro caso occorso dopo molti anni di servizio in particolare quando ci siamo allargati verso le periferie.

We send you the complete demographic data. Use data are close to ones in oother countries. The main problem, that increased with the increse of trips, is the management of stations. Most of the trips happen during rush hours, the same for cars an bikes. So our vans take more time to travel and users might find empty stations. They have to get to the closest one and they get 15 minutes of service for free. We're taking care of the problem with some software updates, increasing the docks in the city center and thinking about the possibilities coming form the new technologic platforms. During peak hours, moreover, we started putting more vans and workers to serve the most congested stations.
The objective of our Customer Care is telling the subcribers about the correct ways to use the system and to contrast damaging behaviors. As a consequence, we tolerate 'out of the regulations' behavior only when it's not repeated. Our vandalism level nowadays is around 5%, lower than the 20-30% coming from Paris and Barcelona, for example. We don't know the data from Ofo and Mobike but we didn't record acts of vandalism similar to those at the beginning of the free-floating services, specifically in terms of quantity, a part from some rare acts happened only after many years in service, in particular when we expanded towards the outskirts.

Practice change

Q: What are your expectations regarding changing the way people move around the city?
Research indicates that bike sharing schemes are generally speaking not effective at changing the modal split away from private car. Why do you think this is the case?
What were the most surprising issues they came across when implementing and operating the bike sharing schemes?
Have you heard of Ciclo Ignoranza, an informal group organizing night races with Mobikes, that Mobike unofficially supported by providing free minutes as awards. Have you ever tried or thought of "out of the line" events for promoting your scheme?

A: I dati ci dicono le persone stanno progressivamente abbandonando l'idea di proprietà del mezzo di trasporto. Mezzi pubblici e sistemi di sharing mobility offrono un ventaglio di soluzioni. Il singolo può quindi organizzare i propri spostamenti in modo flessibile in base alla situazione contingente, ad esempio preferendo la biciclette nelle giornate serene e altri mezzi nelle giornate di pioggia.
Nella città di Milano il numero di spostamenti con il servizio di trasporto pubblico è in crescita, crediamo che ciò sia anche favorito dalla presenza di bike, scooter e car sharing che permettono di completare e migliorare l'esperienza quotidiana.
Un problema importante che abbiamo affrontato all'avvio del servizio è la diffusione del concetto di "sharing". In Italia 10 anni fa tale tema non era ancora poi così diffuso e conosciuto. Abbiamo quindi investito tempo e risorse in informazione e "formazione" dei nostri abbonati. Ora non è più così, anche grazie al nostro servizo che è stato uno dei principali precursori della sharing mobility in Italia.
Conosciamo CicloIgnoranza, per il momento BikeMi non è interessata a questo tipo di attività.

BikeMi è un servizio di trasporto pubblico, è quindi da sempre connessa con le associazioni che si occupano di ciclabilità e ambiente in modo qualificato e che collaborano con le istituzioni cittadine (es. Fiab, Ciclopride, Legambiente, ecc.).

Data tells us that people are more and more let go of the idea of property for a mean of transport. Public transport and sharing mobility systems offer a plurality of solutions. The individual can organize its trips in a flexible way, based of the actual situation. For example, by preferring cycling on sunny days or other means on rainy days.
In the city of Milan, the number of trips by public transport is increasing. We believe that part of it is thanks to the presence of bike, scooter and car sharing that make it possible to complete and improve daily experience.
And important problem that we faced at the beginning of the service is the spread of the notion of "sharing". In Italy, 10 years ago, such notion wasn't yet spread and known. So we invested time and resources in informing and 'forming' our subscribers. Now it's no more like that, even because of our service, one for the main forerunners of the sharing mobility in Italy.
We know about Ciclo Ignoranza, but for noe BikeMi is not interested in this kind of activities.
BikeMi is a public transport service, so it has always been connected with associations interested in cycle-mobility and environment in a qualified way and that cooperate with local institutions (eg Fiab, Ciclopride, Legambiente, ecc).

Barriers

Q: What were the biggest barriers in implementing the scheme?
Have you considered using price incentives to promote self-rebalancing?
What do you perceive as main the barriers to bigger modal shift towards cycling?
What challenges are specific to Milan and Italy?
Have you encountered any agency problems when cooperating with the municipality? Has the relationship changed over time, and if so how?

A: La regolazione delle stazioni è l'attività che assorbe la maggior parte delle nostre energie. Stiamo valutando l'attivazione di regole premianti per coloro che utilizzano il servizio in modo corretto e di incentivi sulle tratte vantaggiose per il sistema.
Il tutto dovrebbe essere gestito tramite l'app che fornirebbe opzioni diverse a seconda della situazione contingente del sistema.
Secondo i nostri abbonati il problema principale è la sicurezza, percorsi ciclabili protetti e ben segnalati sono di sicuro il miglior incentivo all'utilizzo della bicicletta.
Non abbiamo avuto particolari problemi di relazione con il Comune di Milano e con ATM.

Managing the stations it's where we put most of our efforts. We are evaluating to reward those people who use the system in a correct way and incentives on trips beneficial to the system. All of it would be managed through the app, it would give different options given the actual situation of the system.
In our subscribers' opinion, the main problem is safety, well-visible cycle path are for sure the best incentive for the use of bicycles.
We didn't have any particular problem in our relationships with the Municipality of Milan or ATM.

Ofo and Mobike

Q: How do you perceive the new entrants on the market? Do you think of them more in terms of competition or cooperation? How have these companies affected your operations?

A: Con i nuovi sistemi di bike sharing cinesi non siamo entrati in competizione.
Si tratta di servizi sostanzialmente diversi dal nostro e che si presentano più come un noleggio che un sistema di sharing. BikeMi è invece un vero e proprio servizio pubblico, abbiamo livelli di efficienza da raggiungere quotidianamente.
Assicuriamo la disponibilità delle biciclette nelle stazioni presenti in città nello stesso modo in cui tram, bus e metropolitane assicurano le corse in determinati orari.
BikeMi si affianca quindi agli altri sistemai di trasporto pubblico, completando l'offerta.

We are not in competition with the new chinese bike sharing systems. They are very different system than ours and they are presented more like a rental than a sharing system. Instead, BikeMi is a real public service, we have levels of efficiency to reach everyday. We make sure of the availability of bicycles at the stations in the same way tram, buses and metros deliver service at specific times of the day. So, BikeMi complements the other public transport services.

Future
Q: Do you believe BSS will remain a permanent part of the urban landscape? If so, for how long? What developments do they foresee in the next years?

A: Il trasporto collettivo, pubblico o privato, non potrà soddisfare tutte le necessità di spostamento. I veicoli per il trasporto di singoli individui o piccoli gruppi sarà sempre presente. In tale ambito i sistemi di sharing mobility, bike sharing compreso, costituiranno uno dei pilastri della mobilità del futuro e saranno sempre più presenti e capillari nelle città di medie e grandi dimensioni.
Il futuro di questi sistemi è legato principalmente all'evoluzione tecnologica. Intelligenza artificiale, guida autonoma, miniaturizzazione dell'hardware, sono solo alcuni settori che porteranno grandi innovazioni e al cambiamento delle nostre abitudini.

Collective transport, public or private, will not cover the whole demand for transport. Vehicles for the transport of individuals or small groups will always exist. In said perspective, sharing mobility systems, bike sharing included, will be a pillar of futures' mobility and will be even more present and diffused in medium and large cities. The future of these systems is tied mainly to technological evolution. Artificial intelligente, autonomous driving, hardware miniaturization, are only a few of the fields that will bring great innovations and change our habits.

Edoardo Croci, professor at Bocconi University in Milan, former mobility advisor for the Municipality of Milan - transcript of an interview

A: Information about the users is not easily available, about the behaviour yes, because you have the data of the use of the system, but about the motivations and values there is not much. We tried to find the data about modal shift before and it was not available, because this would be very interesting to see how it is in competition with public transport and how it is substituting private car use. The problem with available statistics is that you ask people only about the main means of transport but now people use two or three means of transport, so this behaviour is not captured by the official statistics. E.g. every 10 years there is an extensive survey by the region and municipality, with 100,000 interviews (Origine/ Destinazione), but they only capture the main transport mode.

Q: How did the idea of a Bike Sharing Scheme came into the discussion inside the Public Administration?

A: Well, when under mayor Moratti, who started her mandate in 2006, at the time I was appointed counselor for mobility and environment. There was a big attention towards the sustainability and the international relationships, in fact Milan hosted the Expo in 2015. That was a big lever for the change of the city. We drafted an integrated plan for sustainable mobility with about 30 actions, a notorious one is the road pricing system, introduced in 2008. Looking at experiences of other cities in Europe, we looked the bike sharing systems, which was introduced in December 2008, one year after road pricing. We decided it was part of a package to give the users alternatives to private cars. The idea with the road pricing was to disincentivise the use of private cars. But also to give alternatives, with public transportation. There was a huge increase in public transportation use, with new metropolitan lines with a longer time horizon, but also with more innovative actions like bike sharing. This was really a part of a package, looking at all mobility in Milan.

Q: Did you look at other cities/systems to use as a reference?

A: Then in order to introduce the bike sharing systems, we looked at the experiences of other cities in Europe. What we need exactly, we promoted a research funded by a bank foundation, which finances studies. The municipality together with the foundation promoted this investigation, carried out by Politecnico of Milan, which was a comparative study of bike sharing systems in other cities in Europe. Please consider that at that time I was a counselor at the municipality but I had a university background, so we start with a study and assessment. Basically, they just studied cases, nothing particularly difficult. They assessed the different systems, both the fixed stations and floating systems. As you know Berlin had a free floating system at the time. but at the time we decided that for Milan it was more interesting with the fixed system. So we looked mostly at France and Spain and first of all the pioneering experience of Lyon, you know that Paris came after Lyon. So I went to Lyon and spoke to the people who implemented the system in Lyon. We copied and adapted the system to Milan. And in fact, after the study we transfer the study to the municipality and AMAT, the internal consultant. And the municipality with support from AMAT defined the model for Milan based on Lyon. The design of the bike was improved, also the system with the innovative chainless transmission system. Eventually, this kind of

characteristics were incorporated in the technical annex of the call for tender. The technical annex was very important, because normally the municipality just make the call, and then it's the producer or the operator defining the characteristics. But in this case the municipality of Milan new exactly what it wanted, both for the bicycle and the station. The characteristics were set for the system in the annex.

Q: How was ClearChannel chosen as the scheme operator?
Then there was the decision not to have the call issued directly by the municipality of Milan, but to use the public transportation operator, ATM, which is 100% owned by the municipality. It was basically my decision. We wanted to change the role of the public transport operator. The operator was concentrated just on running transportation. And we thought that to support the change towards sustainable mobility it was necessary to give more attributions to the public transport operator. Different decisions could be made, but it was decided that ATM would be responsible for road pricing, car-sharing and bike-sharing. ATM at the beginning was not very happy, they thought that was not their main business, that their business was public transportation. But after a couple of years they were enthusiastic about this change. They were reluctant, but then they understood that this was an opportunity for them, to interpret the mobility as a holistic system and they understood the synergies among all these incentives and services. So ATM issued the tender, with the technical annex. At the beginning there were three operators, but none really applied. So at the end, it is allowed by the Italian law about concessions, there was a direct negotiation with two operators, Decaux, the same as in France, and Clear Channel, with whom the contract was eventually signed.

Q: Why create a monopoly? This monopoly had impacts on the relations of power between the municipality and the operator, threatening to shut down the whole system because the municipality had troubles funding new batteries for e-bikes.

A: My opinion was that our business model we adopted was clever, because we didn't provide any money for the operator. We provided 5 million euro for the startup of the system, which came from the national government. This contribution was transferred to the municipality, which then transferred it to ATM. The contribution was basically paying for the basic infrastructure for a specific number of stations. The system was designed to go up to 5,000 bicycles, almost. It was designed in 3 steps. We started with a 100 stations and 1,300 bicycles. We opened the system with this number in the city center to maintain the density. It was important to have a critical mass of stations working before opening, because otherwise it would have been a sure failure. And then the idea was that infrastructure was paid by the money from the minister of transportation. The system, except for a system for annual subscriptions, which was marginal, was paid by external advertising in the city. Next to the stations were billboards, posters put by the operator. It is interesting that both Clear Channel and Decaux are advertising business, not mobility business. These are big advertising operators, it is a way for them to acquire more advertising space in the city centers. Of course there were tough negotiations about how much space to give them in the city center, which is not easy to calculate how much this space is worth. It really is a negotiation game with asymmetric information on both sides. But in this way the idea was that the municipality didn't pay any money, that the system was repaid by advertising and marginally by subscriptions. What happened after I left the administration, was that ATM instead of using the money for infrastructure for the different phases, once it got the money it went into the balance sheet of the year. So basically they spent about 1.5 million for phase one. But basically the money

disappeared. Let's say that ATM considered that money as a gift from the municipality and really didn't use it for the next implementation. But that is a marginal problem because ATM is owned by the municipality. The problem was that Clear Channel said that there was an economic crisis, so the value of advertising decreased, so they were not able to implement the 2nd and 3rd phase at the conditions which were defined in the beginning, and so they required that the municipality pay for the extension of the system. I would have never allowed this situation, because the contract was very clear and they assumed this contractual risk. But basically the next administration decided to pay some money to the operator, I think it was a mistake. Because the whole system started with the idea that no money comes from the municipality. When you give the money to the operator it changes the situation, it becomes a subsidised system, and the operator thinks he can get the public money from the municipality. It really changes the roles. I understand that the advertising space decreased, but you can find other solutions than giving them money. But the decision was to give them money for the extension of the system and the introduction of the electric bikes. It was a political decision. In the original plan there were no electric bikes, but it was for EXPO with the idea that people from the city center could arrive at the EXPO site with electric bikes. To be honest I don't think anyone ever used the bikes this way. The electric bikes are interesting integration, because they extend the range of the system, even if Milan is flat. There were some stations to connect Milan to the EXPO, but then after that the area covered by the bike-sharing doesn't really need electric bikes. But this was covered with extra money. I think that the administration wasn't able to calculate the fair price and the operator took advantage of the situation. And last year, the municipality decided to reduce the contribution to Clear Channel. I think there is still a contribution, but I think it is smaller.

Q: What were the initial objectives of BikeMi? Was reducing emissions, congestion one of them? If so, why was this assumed? If not, why?

A: The main objective was to promote sustainable mobility and to provide alternatives to the use of private cars and discourage the use of the car, through road pricing. The idea was to provide alternatives. There was a huge skepticism, with attacks from journalists that it would never work in Milan, it was winter and so on. But at the end it was a huge success. And now that the free floating operators arrived, Milan is really one of the cities in the world with more density of bicycles compared to the population. And also we tried to promote the car-sharing in Milan, but here the big change happened later. I put the car-sharing under ATM, but the diffusion of smartphones changed the game. My idea was to put the cars on the streets, not in the garages. It wasn't as easy as now with the smartphones, you still had to call the service. The next administration also introduced competition, while my idea was to concentrate all these services under one operator, to achieve economies of scale.

Q: Do you remember if BikeMi had problems related to vandalism as the newer free-floating systems are facing now?

A: In the case of ClearChannel vandalism was very very limited. Out of curiosity, the apparent reason that pushed Decaux out of the tender for the system was the data about vandalism coming from their newly deployed bike sharing system in Paris, and the economic offer of the city of Milan was not enough to compensate the repair costs to the bikes. In the case of Milan it was very very limited, surprisingly limited, the operator said it was one of the best city in the world in terms of low vandalism. I think the system where you have to provide the number of your credit

card is a very valid one to disincentivise vandalism. So there is a huge difference between docking and free-floating systems in terms of vandalism.

Q: Looking back from now, would you have done something differently?

A: I think that bike sharing was well structured and studied, the most difficult phase for me was the internal negotiation inside the municipality with the departement of advertisement. They were thinking we in the mobility area were entering their area and they were also partially "captured" by the advertisement companies who didn't want more competition. The reason the bike sharing system started one year after the pollution charge was the internal negotiation inside the municipality and the pressure of the advertisement operators. Then there was a huge technical problem because when you dig a hole anywhere in the city, the old rules said that you had to communicate it to about 50 operators of electric cables, phone companies, pipes owners, and get all of their single permissions stating that they don't have anything in there. We didn't have a map of the underground of Milan. Then we changed a little bit these rules. These three elements were the main obstacles. Going back I would have liked to have different rules inside the municipality to govern all of this. But of course they were not something depending from me alone. Also for the cameras of the pollution charge, there are sometimes rules that slow down important innovations. But regarding the approach I think we got the right approach on how to do the bike sharing in Milan.

Q: Sometimes Milan is criticized for promoting its Bike Sharing Schemes and not building cycling infrastructure, what do you think about it?

A: I completely disagree on that. The logic of the attackers was that you should delay the deployment of BSS until there is a complete infrastructure and lanes for bicycles. You have to wait 20 years! [laughs] I think it was a completely crazy idea. On the contrary what happened is that we introduced a BSS in a city that is not bike friendly. I think it was a big impulse in promoting the use of bikes also to people not using the BSS. Of course the BSS users have a lot od advantages, as they steal your private bike in Milan, using a BSS you're not risking that. Also, this was an incentive both to build new lanes and in fact when we introduced the system there were like 70 km of protected lanes in Milan, they became 150 by the end of the Mayor's mandate and now the new administrations they doubled again. So I mean… Huge increase in protected bike lanes because bicycles became cool, and in Milan bicycles became cool mainly because of the bike sharing system. So it was a key element to foster many elements for all the cycle users. To the attackers logic was exactly the opposite of what happened. At the same time, for the whole package, in Milan in the last 10 years we reduced the ownership rate of cars by 1% each year. It was close to 65-67% and now is around 55-57%. Not only because of bike sharing but because of the whole package. While in the rest of Italy the opposite happened. And latsly we have not to think only about protected lanes, we have to think about a city where it's easy to travel by foot, bikes, public transport, all the sustainable modes. The idea is to really change the way that people move in the city and if you look at the figures the process is happening.

Q: Is there an element of greenwashing in focusing on BSS in building a cycling culture? For example, when the press says that BSS is saving us thousands kg amount of CO2.

A: When we tought about the introduction of bike sharing we didn't really think about cliamte mitigation. We also drafted a plan in those years for climate mitigation, but bike sharing was not relevant for it. Of course there is a contribution, I think the contribution is more coming from cleaner vehicles and the modal shift. But using these apps is a game, they give you some idea that you're saving CO2, it's positiv, it's a good message, but if you look at the contribution for mitigation from only bike sharing, it's not so big. At the big picture, it's something different.

Q: Relating to the BikeMi, how do you see the competition of the new schemes? Not only for the blackmailing episode but also as a tool to cover areas far away from BikeMi stations, and the related cannibalism between different systems.

A: It is clear that from the planning point of view, the regulating point of view and the economic efficiency of the system it would be better to have one operator if correctly regulated. The competition makes the regulation easier as the prices are brought down and the quality enhanced by the market, the regulator doesn't have to know all these data about the cost, the coverage, the quality of the service in order to "make" the price. So competition is easier but somehow worse from the efficiency point of view. In my view, there was the alternative to contiunue with only one well regulated operator and expand the system to the outskirts, it was certainly possible but it would have been heavier for the municipality. Going for the competition was another choice. I'm not saying that one is better than the other, there are different opportunities, different problems. The idea of going to a free floating system was probably taken without having a clear study. When we started with the docking system we had in mind what we wanted and how we wanted to achieve it, I think with the new operator they simply said "let's open the market, there are the chinese, let's see".

Q: They said that they studied because they wanted to avoid the chaotic solutions for urban space found in Chinese cities. Maybe they didn't study competition effects.

A: But actually there is chaos. When we decided for the docking stations, we also studied the free-floating systems and the idea was at the time that free-floating had some negative aspects. The first one is that you're not guaranteed to cover the right areas when there are peaks in demand. Of course with a fixed station you have a continuous service of redistribution to allow for the local demand at the right time of the day. With free floating, if some of the bikes go to a peripheric area of the city, they stay there for two weeks. The other problem is the disorder and the chaos in the city. I think it's a big problem for a city like Milan with small streets and a high concentration of activities in the city center. It would have been better to introduce the system with set parking racks and to force the users to park in these racks. And then of course we have problems of vandalism and so on. I'm not saying that it was a wrong idea to put in competition the system but for sure it had to be studied better, now some problems are really evident.

Q: Today, after 10 years from the launch of BikeMi it's still impossible to register without a proper credit card. Do you think that this is representative of the difficulty in changing the system? And what about limit the access to the service to citizens without credit cards?

A: First of all, is clear there is an evolution in payment systems and is clear that you have to follow the evolutions. In a few years we will be paying everything with smartphones and forget credit cards, maybe. Still I think that the identification of the user through the payment system is

essential, you have to know who is using the money and you have to be able to take the money out of his pocket if he steals the bike, let's say. I think it's essential. But of course there is a digital divide problem. Not everybody, especially in Italy, have credit cards. Of course Milan is better than other areas like in the south of Italy but still there is some sort of digital divide, if you don't have a credit card or some innovative form of payment you can't use the bike. But there is no solution, I think the problem is not to introduce older systems of payment but to diffuse newer systems to all the people in Italy.

Q: Because the new ones let you register with debit cards and prepaid cards, so they are maybe consuming a different market, of people who don't have credit cards. But in a way they are also more expensive, so people who can't afford credit cards are forced to a more expensive system.

A: There is a social divide. You're absolutely right. But you also have a lot of vandalism. You have a social divide because the city center is more serviced than outer areas. We studied it. It's very clear there is a divide by age, older people don't use the system, but it's not a reason not to go on with the system. You have to keep into account that while tram and busses are socially equal, these new mobility systems are wonderful but in some ways they limit the use of certain kind of users. It's not something you can't deny, it's a bet.

Q: Have you tried the new bike sharing systems?

A: I have to, I never tried, I have to admit that the I use the traditional bike sharing system a lot and I'm happy. Sometimes I think I should try them as an expert and test it. But in terms of the use I do I don't have any problem with the old system, probably because I live in the city center and I work here relatively close to the center, I have a station next to here, I have a station next to home, but I understand that there are people who are not covered by the old system and for them it is something really useful. But I will test it, just for the sake of it.

Giancarlo Manzi, Associate Professor at the University of Milan at the Department of Economics, Management, and Quantitative Methods- notes from a meeting

At a workshop last October, the new municipality's assessor (advisor) said, he was hoping that everything goes well with the new BSSs. Clear Channel is not happy about the introduction of the new systems. They are reluctant to share new data, after the introduction of the other schemes. Manzi indicates that they have a sensitive business model, not robust, or able to cope with much external influence.

Manzi mentions that they are planning to launch a 3rd survey about the satisfaction of BikeMi users. Next year they plan to implement a general survey, not only of users. He indicates that the success of BikeMi is because of a good business model, providing a good service for the citizens and for the city. He points out that women are, of course, not satisfied because of the weight. He points out that average length of the trip is around 1,5km. Among the major challenges for BikeMi he quotes that the bike is not good enough, reallocation of the bike is expensive, and there are problems with docking stations. He admits that the app is not as technologically advanced as that of competition, and that the logistics are a bit of a mess.

When it comes to users, Manzi indicates that the average user is not keen on having a private bike. The average user is usually a male, 45y/o. Many young people commented about allowing prepaid services in the future.

Manzi indicated that there is a lot of use around train stations and that the service is useful for short trips. He also added that, in his view, the service might be perpetuating a perception of bicycle as a short trip only mode. He highlights that this might be a difficult first experience for those not accustomed to cycling. There is less use next to underground, buses and trams are not as important.

Manzi indicates that BikeMi is much more of a public good. He comments that the main problem for Milan in promoting cycling is that there is no culture for biking.

Lastly, he remarks that the BikeMi service was working until few months ago, but that there is now too much competitive pressure, which might be a problem for BikeMi, the only successful BSS in Italy.

Ciclo Ignoranza - notes from a meeting with members of the group

Ciclo Ignoranza is an informal group, formed around a social media profile under the same name, which began organising Mobike races in autumn 2018. The name denotes not only ignorance defined as the lack of knowledge about a specific topic, in this case cycling, but among young people it aquired the definition of being out of line, crazy wrong, exaggerated and being proud of these 'qualities'. The founders themselves, both male in their twenties, met at the first event of this kind and are cycling enthusiasts, strongly believing in the benefits of cycling for personal health and urban space quality.

The races with Mobike bicycles began as a prank or a joke, with the founders of these races comparing them to racing with golf carts, or something else looking ridiculously. When asked why not Ofo, the main reason was that the Mobikes were less comfortable and didn't have gears, ensuring a more level playing field for all. The idea to set up the first race came from another group of cycling enthusiasts who were already doing races both with fixies and with small bikes, with wheels smaller than 20", parallel to the Red Hook Crit race in Milan, the local grand prix of an international fixie bike championship organised by video game producer Rockstar Games (famous for Grand Theft Auto serie). This gave the founders an idea to take advantage of the free floating bikes, so that everyone who could afford to rent a Mobike could participate. However, as we learned, the races were also meant to have both a promotional and educational value. The founders were hoping that through such one-off, fun experiences with this bike-sharing scheme people will get used to riding bikes and maybe continue into their everyday lives.

Mobike contacted them - scared at first, then entered cooperation. Mobike offered awards (free minutes), however it did not decide to officially sponsor them. Despite this colaboration the next race had very few participants, as people probably didn't believe that the prizes were real. Besides, it was November, and so the weather was anything but inviting.

On one hand concerns about data privacy - no control over what they are doing with it. On the other hand a very relaxed and open attitude towards giving data to these companies.

Culture in Milan, and Italy in general, mentioned as one of the main obstacles. Lack of education at school, kids don't know how to fix a flat tire or maintain the bike. Maybe physical education should be extended to include everyday maintenance of bikes. When parents buy their kids bikes, usually cheap ones, they are interested in buying the whole cycling equipment, lycra and helmet, even though these are not necessary to bike in the city.

Competitive cycling seen as a way to promote cycling among the broader society, need for a major figure to lead by example (couple of Italian celebrities mentioned, only male).

Infrastructure not seen as the main problem, at least not in terms of separated cycle tracks. They expressed a view that the municipality is doing to little to improve cycling conditions, especially on the streets with trams, where cyclists have to negotiate a narrow, cobblestone strip between the curb and the tracks.

Additionally, the effort required to cycle by bike wasn't perceived as main barrier, e.g. having a change of clothes when arriving sweaty at a workplace. One of our interviewees mentioned repeatedly that people are lazy, pointing at difficulties in changing habits.

FIRST PERSON ETHNOGRAPHY

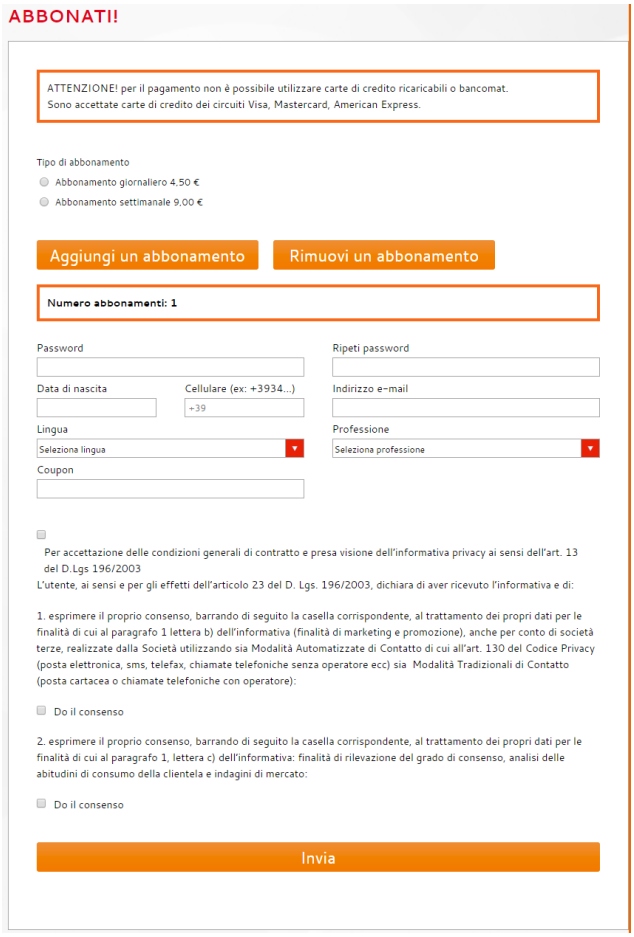
Here we present our own experiences with the registration and use of the three schemes.

BikeMi

Giovanni

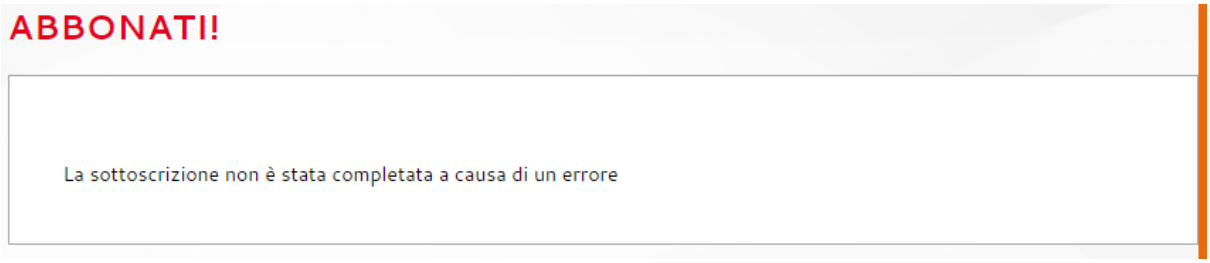
I'm going through the website registration for BikeMi. We chose the weekly subscription since it's the one that best fits our own needs. The graphic of the website looks a bit outdated, but there is a big red button saying "Abbonati!" (Subscribe!).

The form itself looks simple and clean, the standard privacy disclosures take a lot of space as for any public service in Italy. They ask for a password, in facts it's a pin of 4 numbers.



Then there is the payment section, from a separate website.

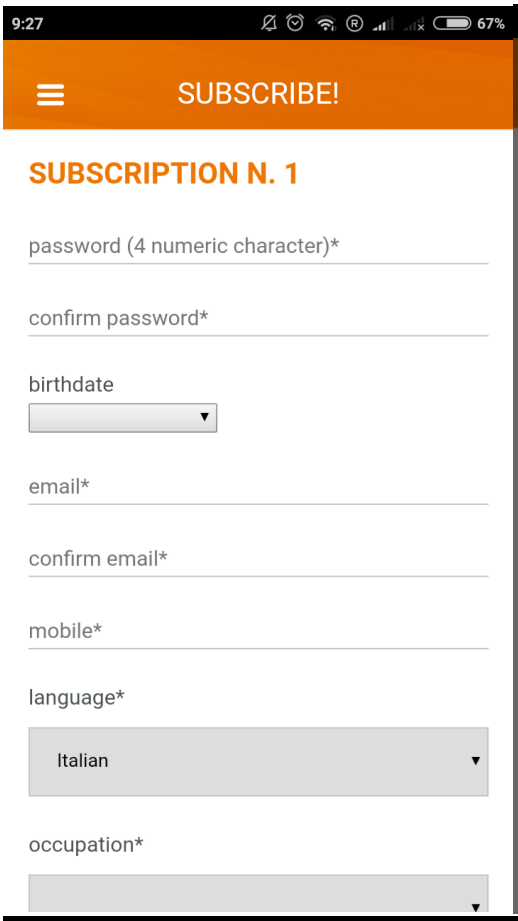
Unfortunately, it didn't work, the error message doesn't state the reason.



Not even at the second try. I'm going with the app. The app looks neat, even though every time I scroll the page in the subscription form, the on-screen keyboard pops up and I have to close it down. The payment page is the same from the website. Again, the subscription doesn't work. After looking on the website I found out the reason: I'm using a prepaid credit card, unfortunately I don't have one.

We are now in Arco della Pace, Krzysztof decides to give me his BikeMe to test since I couldn't register and he takes a Mobike. BikeMe is very heavy on the front, so it handles in a strange way compared to a normal city bike, but the baricenter is low so it feels very stable. I cycle kind of slow to let Krzysztof keep up, BikeMe and its gears works good, maybe having an harder gear to sprint downhill would be better but Milan is very flat and cycle paths are narrow and designed for very low speeds. The size of the bike is just right, the riding position is comfortable even if the saddle is a bit "slippery". I arrive in Darsena fine, not tired, hands hurts a little after cycling 2 km on cobblestones. Docking the bike is easy.

Krzysztof:
Registration
There is a warning on top of the screen informing that only credit cards are accepted. It is easy to miss it. Regular registration form, no fireworks. Not the best designed interface I've ever seen (e.g. for birthdate you start with the date of registration and need to press "+" or "-" to select your own date of birth). Why do they ask about occupation? It's an obligatory field, maybe it's because the scheme itself is very much about advertising, so they want to collect any relevant information. Confusing "acceptances". I only checked the first box, wasn't sure, what the others meant. But the registration went through, so it means it was enough. The payment itself is a standard form for inserting credit card details. It is again asking for my e-mail address.
In general, the app itself is not really an app, it is only their website put into a smartphone format. No additional functions are added. Although the map seems to be able to locate the user in the area, there is no GPS, so for someone not from Milan this is rather a meaningless feature. The app takes 10.39MB of the storage space, which is relatively little compared to Ofo and Mobike.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SUBSCRIBE!
SUBSCRIPTION N. 1
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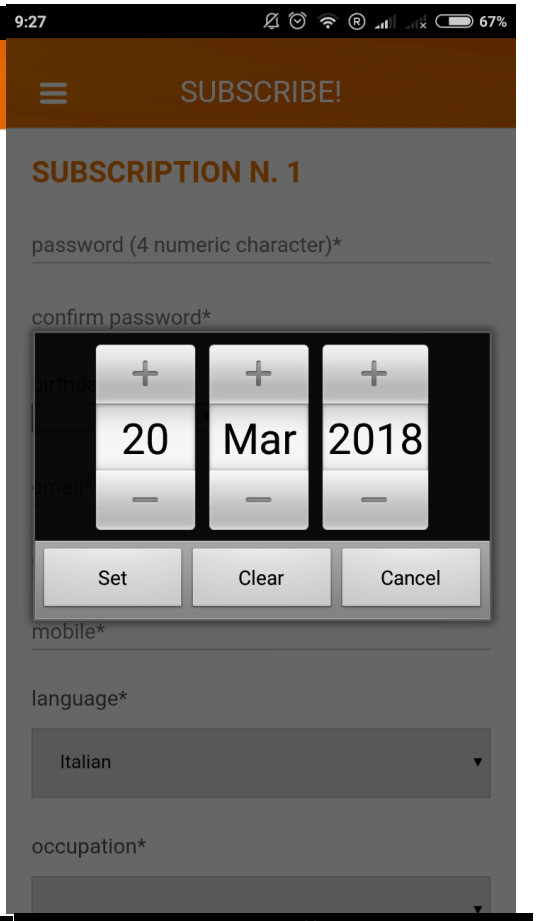
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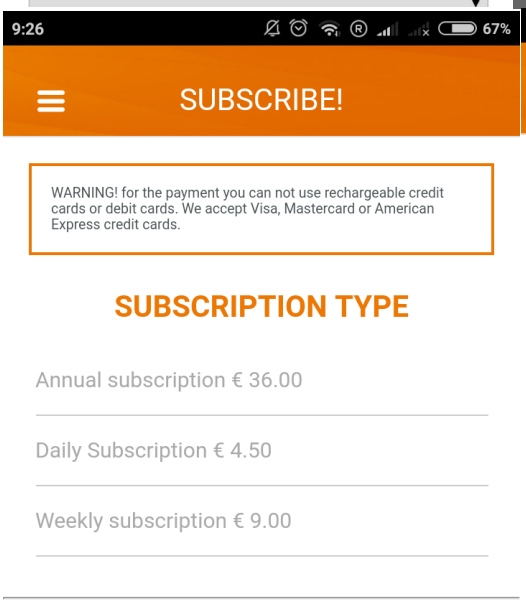
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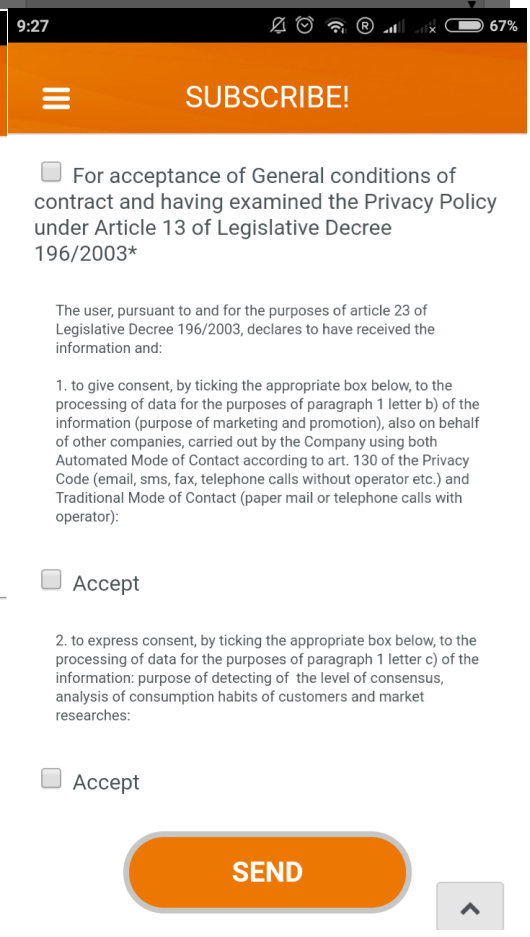
SUBSCRIBE!
WARNING! for the payment you can not use rechargeable credit cards or debit cards. We accept Visa, Mastercard or American Express credit cards.
SUBSCRIPTION TYPE
Annual subscription € 36.00
Daily Subscription € 4.50
Weekly subscription € 9.00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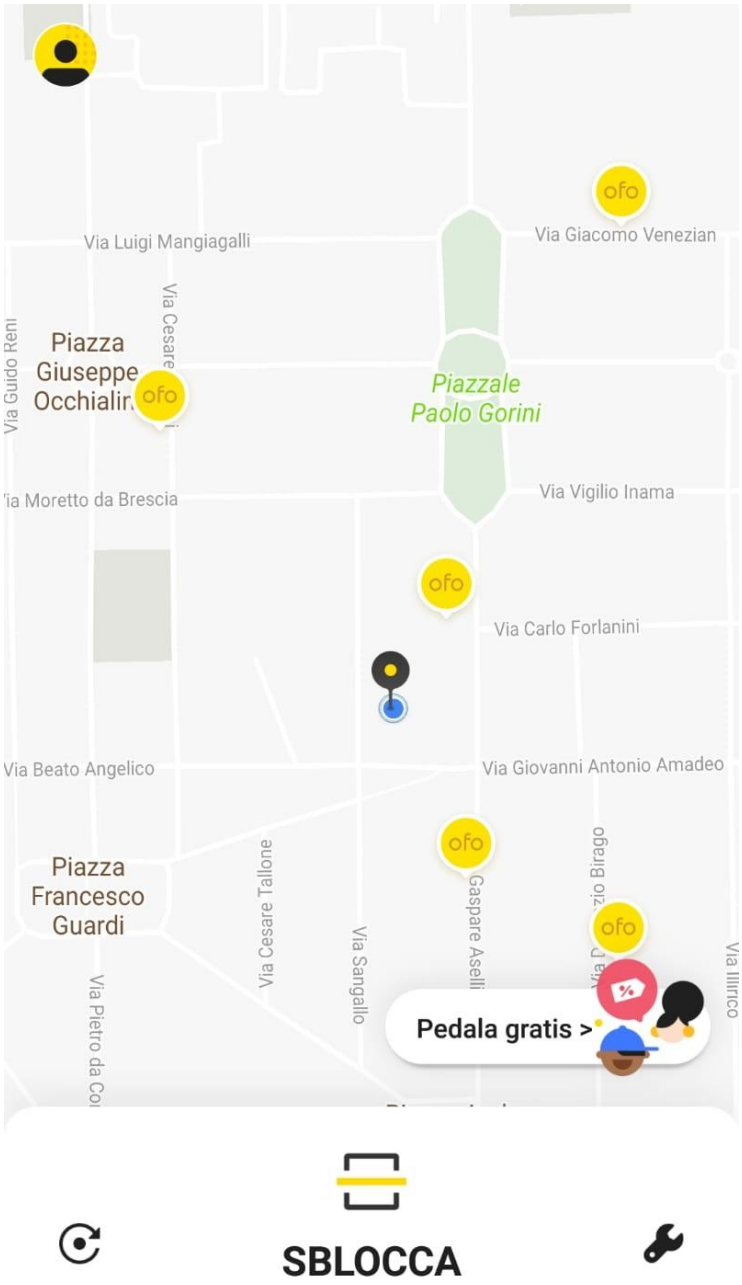
SUBSCRIBE!
For acceptance of General conditions of contract and having examined the Privacy Policy under Article 13 of Legislative Decree 196/2003*
The user, pursuant to and for the purposes of article 23 of Legislative Decree 196/2003, declares to have received the information and:
1. to give consent, by ticking the appropriate box below, to the processing of data for the purposes of paragraph 1 letter b) of the information (purpose of marketing and promotion), also on behalf of other companies, carried out by the Company using both Automated Mode of Contact according to art. 130 of the Privacy Code (email, sms, fax, telephone calls without operator etc.) and Traditional Mode of Contact (paper mail or telephone calls with operator):
Accept
2. to express consent, by ticking the appropriate box below, to the processing of data for the purposes of paragraph 1 letter c) of the information: purpose of detecting of the level of consensus, analysis of consumption habits of customers and market researches:
Accept
SEND

Use
The rent process is not as advanced as Ofo and Mobike and requires to type in the user name and password on a screen of a terminal. After validation, and choosing a classic or a pedelec bike, the screen tell you the number of the rack to pick up the bike. The locking system is not the most comfortable one I've encountered and requires to lift the front of the bike from the rack to release it from the dock. The bikes themselves are fairly comfortable, with adjustable seats, three gears and disk brakes. The only issues I've encountered regarded the front basket, which made a terrible amount of rattling noise on the cobblestoned roads of Milan, and with breaks which were not very well maintained and made awful squeaking sounds. The main problem with the service's usability lies within ending of the trip and locking the bike, as the user never knows if there will be a space available to return the bike at the destination. Unfortunately, the app is completely useless in this regard, it only indicates where the nearest stations are, which for a tourist in Milan is a worthless information, because the app doesn't even use GPS on its map, so there is no way of telling where one is. Additionally, there is no way of attaching the bike to one of the bikes already locked to the docking station (e.g. a feature that can be found in Nextbike fleet in Warsaw). This forces one to wait until someone else picks up the bike at the station, while the ride time is continuously ticking, or alternatively to look for a different station in the vicinity. This makes for a frustrating experience in an altogether reliable service.

ofo

Giovanni:
Registration
The registration process is made as easy as possible. No need to read through confusing data privacy settings (not necessarily comforting). The app requires access to a lot of smartphone functions, including location, bluetooth, camera, and interestingly contacts. Installing only requires to type in the phone number and e-mail address. Once registered you need to fill in the card details - important difference compared to BikeMi is that it doesn't have to be a credit card - this makes the app much more accessible. After inserting the card details, you need to top up the account with whatever amount you feel like using (ca. from EUR 1 to EUR 10). The interface is way better designed than BikeMi, and it is an actual app.
One annoying feature is a small icon that acts as a call to action for you to invite 3 more friends to get three free rides. It also opens up every time you open the app.
Use
So now I'm going to use Ofo. I already registered a couple of months ago, I remember that my first impression was it being very easy and fast to register through the app. Now there are a few bikes close to my home.



I get to the first bike, I scan the QR code and nothing happens. The app gives me a PIN code to enter manually with the buttons on the lock. The bikes doesn't unlock but the app starts counting the trip and asking for money. I stop it immediately. It asks for 50 cents, but the automatic payment fails. I try another bike next to it: it doesn't unlock but I somehow achieve to stop the trip before it starts, so I keep my money. I report the first bike through the app. We move on towards the BikeMi station for Krzysztof, hoping to find another Ofo in that area. Unfortunately, there aren't.

Krzysztof:
Use
Unfortunately, when I tried to unlock one of the bikes it didn't work. Nevertheless, the app informed me that the cost of the trip was EUR 0,5. This was very frustrating and I decided to use

BikeMi instead. It also lead me to uninstall the app. The reliability of the service leaves a lot to be desired.

Mobike

Giovanni:
Registration and use
I decide to install and register to Mobike on the fly. The process is easy, in 1 minute I'm ready to go. The only problem: Ofo charges you individual trips on the credit card, Mobike requires to topup the account. The minimum topup is 5€. I find the bike close to me, I unlock it at the first try in a few seconds, I raise the saddle and I'm ready to go. First minute impression: even with the raised saddle it's too low, the handle bar is too close, if I turn it, it hit my knee. Krzysztof takes his BikeMi and we head towards the city center.

We arrive in San Babila. Impressions after the first use: it's terrible, simple as that. Too small, the gear ratio is wrong, the bike is very hard on rough surfaces. Riding makes you feel like a hamster on its wheel, trying to pedal as fast as possible and not moving at all. It's perfect for burning calories, you sweat a lot. I arrived exhausted after a 2,5 km trip. The app says the amount of calories burned, but I think it's at least the double of what is stated, given the energy I put in compared to a normal bike. I arrived at destination tired and with short breath, and I am used to cycle every day to work and back home for around the same distance one-way. Ending the trip is very easy, just leave the bike somewhere and push down the lock.

I take Mobike once again to get back home, it's a 6 km trip. I arrive completely exhausted, my ass and my arms hurts from the hardness of the bike on uneven surfaces, my muscles are itchy by the work. I promise to myself that I'm never going to use Mobike again after I finish the 5€ credit I put in my wallet. The unlock and payment system works beatifully, it's correct to mention it. But the bikes are terrible, it would be better to ride the bikes of a 9 years old kid. The only good thing about the bikes are the brakes. They work very good compared to both BikeMi and my own bike I use everyday. Might be because I never ride this slow, who knows, but they felt good.

Krzysztof:
Use
These are the worst bikes I've ever ridden on. Very difficult to pedal, small wheels require unproportionately large amount of energy, leaving you tired even after a short ride. The seat is adjustable, but only suitable for people lower than 170. For anyone higher than that the bike is a torture, especially for the knees. The position on the bike is extremely uncomfortable and the solid wheels leave one with no amortisation whatsoever, which taking into account the quality of roads in Milan (cobblestones, patchy asphalt), leaves one shaken and stirred at the end of the ride. Terrible bikes, absolutely unusable. At the end of the trip I could understand all those who decided to dump the bike into a canal or throw onto a tree, because the service is an utter waste of money. Better bikes needed desperately.

APP REVIEWS FROM GOOGLE PLAY STORE

Here we present a selection of bike-sharing app reviews from Google Play Store. We selected two reviews matching each of the ratings available on the platform (from one star up to five stars).

	BikeMi	BikeMi (ENG)	Ofo	Ofo (ENG)	Mobike	Mobike (ENG)
5 stars	Tutto ok! Una volta arrivata e abilitata la tessera bike mi, sono diventate operative tutte le funzioni.	Everything OK! Once the BikeMi card arrived and it was activated, all the funtionalities became active.	Che dire...utilizzo le bici a Varese e Milano..raramente ho trovato bici con problemi...mi sto trovando davvero bene..forse più che spendere 50 centesimi a viaggio,valuterei un abbonamento annuale.App semplice da utilizzare...c'è un unico neo..come faccio a segnalare le bici parcheggiate nei cortili,se non posso arrivare a leggere il numero della bici?	What should I say... I use the bikes in Varese and Milano... I rarely found bikes with some problems... I'm really satisfied.. maybe more than spending 50 cents for a trip I would like a yearly subscription. The app is easy to use... there is only one problem... how can I report bikes in courtyards if I can't get to read the number of the bike?	Ottimo servizio, 0.50 centesimi non sono niente in confronto al casino che si può avere usando una macchina...per non parlare dei benefici fisici dell'utilizzo della bici al posto di una vita sedentaria. Sicuramente Sicuramente è una bici pesante ma preferisco faticare invece di usare la macchina!	Great service, 0.50 cents is nothing compared to hastle of having to use a car... not to mention the physical benefits of using a bike with a sedentary lifestyle. It is a heavy bike without a doubt, but I prefer to get tired instead of using a car!
5 stars	App molto buona e con una bella grafica	Very good app and with nice user interface	Avendo il cambio consente di pedalare più agevolmente nel traffico senza farsi travolgere !	Having the gears lets you ride more swiftly through traffic without getting rammed!	Va tutto bene ma fa male il cu.o dopo un Po	Everything is fine but a** hurts after a while

	BikeMi	BikeMi (ENG)	Ofo	Ofo (ENG)	Mobike	Mobike (ENG)
4 stars	È utile? Sì. Può essere migliorata? Sì. Ad esempio? Segnalare le piste ciclabili, visualizzare il percorso da seguire tipo navigatore, migliorare lo storico e il profilo personale aggiungendo dati generali su num di utilizzi, km totali percorsi, co2 risparmiata e calorie bruciate.	Is it useful? Yes. Can it be improved? Yes. For example? Show the cycle paths, add a navigator-style functionality, improve the rent history and the personal profile, adding general statistics on the number of bikes used, km rode, saved COS2 and burned calories	Non metto 5 stelle perchè molte volte la geolocalizzazione non è precisa o non aggiorna l'assenza/presenza della bici in tempi brevi. Per l'inciviltà degli animali che rompono o rubano pezzi di bici, posso consigliare un sistema di allarmi in stile mobike. Non credo si risolva il problema completamente ma è un inizio.	I don't give 5 stars because geolocalisation is often not precise or it doesn't update the availability of bikes in short times. Regarding the incivility of the animals that break or steal parts from the bikes, I suggest an alarm system like the one from Mobike. I don't think it could solve the problem completely but it's a start.	50 centesimi è un po' troppo, aggiungo un euro e prendo la metro...	50 cents is a bit too much, I add 1 euro and take the metro
4 stars	Ottimo servizio! Sarebbe bello poter sbloccare le bici direttamente dall'app. E che nella mappa delle stazioni di docking venisse mostrata la posizione GPS corrente	Great service! It would be nice to unlock the bikes directly from the app. And that in the docking stations' map it would show the current GPS location	Molto comodo e spesso trovo una bici vicino al. Lavoro senza fatica. Buona la bici con tre rapporti a disposizione	Very useful and I often find a bike close to my workplace without any hassle. The bike with three gears is nice to have.	Leggo molte critiche soprattutto sulla pesantezza della bici. Evidentemente molte persone non hanno ben capito lo scopo del servizio: spostamenti brevi in città su mezzi che devono essere necessariamente molto robusti perché utilizzati da moltissime persone molte delle quali non troppo delicate con gli oggetti degli altri. Se uno vuol fare delle passeggiate ne affitti una adatta allo scopo o se la compri.	I read a lot of criticism especially concerning the weight of the bike. Evidently, many people have not understood the purpose of the service: short journeys in the city on vehicles that must be very robust because they are used by many people, many of whom are not too delicate with others' objects. If one wants take a longer trip he rents one that is suitable for the purpose or if he buys it.

	BikeMi	BikeMi (ENG)	Ofo	Ofo (ENG)	Mobike	Mobike (ENG)
3 stars	Va assolutamente messa la possibilità di segnalare un malfunzionamento della bicicletta, dal momento che molto spesso hanno dei problemi. In tal modo il cliente sarebbe ovviamente contento di avere un servizio ben funzionante e l'ATM investirebbe sì nella spesa per l'aumenatata manutenzione, ma ne avrebbe un indubbio ritorno nell'immagine del proprio servizio.	Since the bikes often got problems, it's absolutely important to add the possibility to report a malfunctioning bike. That way the user would of course be happy to have a good working service and ATM would surely spend more in maintenance but would also have a better public image, without any doubt.	poche bici..troppe bici rotte (colpa della gente incivile)... a volte faccio fatica a trovarle col gps.. applicazione assolutamente da migliorare troppi crashh	few bikes.. too many broken (due to incivility)... sometimes it's hard to find them with gps.. app absolutely to be improved too many crashes	Ottimo servizio. Da rivedere la tipologia di biciclette: troppo piccole e faticose da utilizzare	Great service. To review the type of bikes: too small and tiring to use
3 stars	App utile, certamente migliorabile (storico, gps, ricerca stazione più vicina, segnalazione guasti, colorazione stazioni in base agli stalli disponibili, ...).	Useful app, certainly could be improved (history, gps, finding the closest station, malfunctions reporting, coloring after the number of docking spaces available, ...)	Servizio di localizzazione difettoso, le icone spariscono dalla mappa anche se ci si sposta di 1 mm, non dice bici più prossima e non si può prenotare la bici come la concorrenza, alcune bici presentano dei difetti, segnalato già varie volte, di notte lo sblocco anche con il flash dello smartphone diventa complicato, peccato perche il servizio per me che sono alto 1.85 è perfetto, bici più fluide, pedalata leggera con rapporti giusti. Vedete di modificare solo queste piccole cose.	Localisation service is defective, icons disappear from the map even if you move by 1 mm, doesn't give you the closest bike and you can't book a bike like with the competion, some bikes are defective, I already reported it many times, at night unlocking with the smartphone's flash is hard, it's a pity because the service it's perfect for me, being 1.85 m tall, bikes are more fluid, light pedalling with the right gear ratios. Just fix these little things.	L'app funziona abbastanza bene, ma continua ad accedere alla posizione anche se non è in uso, consumando batteria. Sono stato costretto a negare all'app l'accesso al GPS, e ogni volta che la devo usare devo abilitarlo per poi disabilitarlo nuovamente. Per favore risolvete il problema.	The app works well enough, but continues to access the location even if it is not in use, consuming battery. I was forced to deny the app access to the GPS, and every time I have to use it I have to enable it and then disable it again. Please solve the problem.

	BikeMi	BikeMi (ENG)	Ofo	Ofo (ENG)	Mobike	Mobike (ENG)
2 stars	Cosa ci vuole a mettere il GPS?!?!? Un buon servizio nei fatti accompagnato da una app così così. Incredibile che all'alba del 2017 non abbiano ancora implementato il GPS e che per cercare la stazione più vicina...	What does it take to add GPS?!?!?!? A good service paired by an average app. It's incredible that in 2017 they have yet to implement GPS to search for the closest station.	Dopo aver utilizzato mobike ho deciso di provare anche quest'app, ma per ora continuo a trovare bici dentro proprietà private o di gente che se le porta a casa, così è inutilizzabile. Sicuramente non è colpa vostra ma della loro maleducazione ma spetta a voi far rispettare le regole..	After having used Mobike I decided to try this app as well, but for now I keep finding bikes in private property or that people get them in their homes, it's unusable this way. For sure it's not your fault, it's their incivility, but it's you who have to enforce the rules.	Si fa meno fatica a piedi. Se migliorate le bici l'idea è ottima	It is less tiring to walk. If you improve the bikes the idea is excellent
2 stars	Stupido non inserire la possibilità di dare feedback anche perché le manutenzione delle bici è penosa e sarebbe facilissimo segnalare quando qualcosa non va (sellino, freni, ruote, motorino delle e-bike .....). Se va avanti così meglio passare a servizi simili forniti da altri soggetti.	It's stupid to don't give the possibility to give feedbacks, also because the bikes maintanance is poor and it would be very easy to report when something is not working (saddle, brakes, wheels, e-bike motor .....). If it goes on like this it's better to migrate to similar services by other operators.	50 cent allo scatto sono un furto. Il servizio diventa inutilizzabile: riducete le tariffe o almeno fate uno scatto di tariffa ogni 5-10 min e non ogni 30. Le bici sono peggiori rispetto al bikemi ma decisamente migliori a quelle di mobike	50 cents fee is a robbery. The service becomes unusable: lower the fees or at least charge every 5-10 minutes, not every 30. Bikes are worse than bikemi but better than those from mobike-	Idea utile, purtoppo le bici sono parecchio "dure" nella pedalata, ruote piccole, piene e pesanti...ho provato lo stesso percorso cn la mia mountainbike e con questa e ci ho messo il triplo del tempo....costo anche un po troppo elevato	Useful idea, unfortunately the bikes are quite "hard" in the pedaling, small wheels, airless and heavy ... I tried the same route with my mountainbike and with this and I put the triple time .... also cost a bit too high

	BikeMi	BikeMi (ENG)	Ofo	Ofo (ENG)	Mobike	Mobike (ENG)
1 star	Applicazione che non da la posizione di dove si è, biciclette spesso mal funzionanti, cambio, sella e freno, bisognerebbe mettere nella applicazione la segnalazione guasti, visto che ogni bici ha un numero. Mi è capitato di andare in 3 colonnine dove le bici erano disponibili ma non era possibile prelevarle. Il servizio costa poco ma è pessimo, le bici sono troppo pesanti, nelle altre città o basta andare a san donato le bici sono normali e leggere inoltre l'abbonamento è meno costoso.	The app doesn't give someone's location, the bikes are often malfunctioning, gears, saddle and brake, the malfunctioning reporting should be added to the app, given that every bike has its own number. It happened that I went to 3 columns where bikes where available but it was impossible to take them. The service is cheap but is terrible, bikes are too heavy, in other cities or even in San Donato bikes are normal and lightweight and the subscription is cheaper.	Due chilometri a piedi, due bici inesistenti sui punti segnalati. Co seguenze:, appuntamento saltato e treno perso. Prima unica e ultima esperienza con questo servizio.	Two kilometers on foot, two non-existent bikes on the marked points. Consequence: missed appointment and lost train. First unique and last experience with this service.	Molto belle esteticamente, però girarci per Milano è a dir poco impossibile. Sono bici tanto pesanti, di fatica molto per andare lenti. Forse chi le ha create non ha mai pedalato in vita sua. P.S. Vado in bici da corsa, mi faccio pure le montagne ed in città mi passano avanti anche le vecchine, queste sono più dure da usare, ed è un vero peccato.	Very beautiful aesthetically, but to ride around Milan is nothing short of impossible. These bikes are so heavy, a lot of effort is required only to go slow. Perhaps those who created them have never cycled in thier lives. P.S. I ride a road bike, I also do the mountains and in town I was overtaken even by old women, these are harder to use, and it's a real shame.
1 star	ELIMINATE LE BICI DI NUOVO TIPO, SONO QUASI INUTILIZZABILI, PESANTI E CON SELLA TROPPO LARGA. app migliorata, funzione timer utile ma nascosta. Aggiungo una stella ma senza GPS rimangono al massimo 2. Poter prelevare a bicicletta tramite app sarebbe il massimo, ma comunque ci sono altre cose che vanno sviluppate prima.	ELIMINATE THE NEW TYPE OF BIKES, THEY ARE ALMOST UNUSABLE, HEAVY AND THE SADDLE IS TOO BIG. app improved, timer functionality is useful but hidden. I add one star but without GPS they are at most 2. Being able to take a bike with the app would be the best, but anyway there are other things with higher priority.	L'app è improponibile! Il sistema di localizzazione molto impreciso. Spesso è impossibile contattare il server e l'APP si blocca. Bici sempre guaste, inoltre difficili da reperire. Ho acquistato un pass mensile, ma molto spesso non riesco ad utilizzarlo in quanto è impossibile trovare la bicicletta. Un vero disastro. Sono dispiaciuto di aver acquistato il pass mensile!!!!	The app is impractical! The localization system is very inaccurate. It is often impossible to contact the server and the APP stops responding. Bikes always broken, also difficult to find. I bought a monthly pass, but very often I cannot use it because it is impossible to find the bike. A true disaster. I'm sorry I bought the monthly pass !!!!	Oggi pomeriggio ho provato a sbloccare qualcosa come 30 biciclette e non ha proprio funzionato. Risultato 5km di corsa per raggiungere mia figlia all'uscita di scuola.	This afternoon I tried to unlock something like 30 bikes and did not really work. Result is a 5km walk to reach my daughter at school exit.