

Organizing for Digital Economy: societies, communities and individuals

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Car Sharing and Relocation Strategies: a Case Study Comparison in the Italian Market

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Abstract. The sharing economy represents an economic model based on the sharing of goods and services. In particular, this paper examines car sharing model, an attractive alternative to a self-owned car which has found large interest in the recent literature in different research fields. This study aims to investigate innovative and effective relocation strategies based on the analysis of data on users' consumptions, for the constantly growing car sharing system. For this purpose, after a literature review, the paper presents a case study focused on the car repositioning algorithm developed by one of the market leader in this sector: car2go. More in detail, the paper evaluates differences and similarities in the strategic management of this model within the Italian context, through a comparison among the cities of Rome and Milan. Empirical results and practical implications for users will be provided, by highlighting opportunities and threats concerning the different settings.

Keywords: Sharing Economy, Car Sharing, Relocation Strategy, User Experience, Innovation.

1 Introduction

Sharing economy was defined as “The peer-to-peer based activity of obtaining, giving, or sharing the access to goods and services, coordinated through community-based online services” (Hamari et al., 2015). It is a well known phenomenon that has spread over the years thanks mainly to technological innovation [1].

A specific sharing economy model that has been studied for several years is the car sharing.

The Transportation Sustainability Research Center (Tsrc) describes car sharing as a service that “allows people to rent cars on a short-term (hourly or daily), as-needed basis, paying only for the time they use the car and the mileage they drive. The operators of the carsharing program provide vehicle maintenance, repair, and

insurance”. Customers use this type of transport due to the several benefits associated to it. For Tsrc its benefits are ¹:

- a decrease in vehicle ownership and use;
- an increase in the use of alternative modes of displacement such as cycling or walking;
- cost reduction;
- environmental benefits;
- reduced demand for car park.

In Italy, “Osservatorio Nazionale Sharing Mobility” in the first National Report on Sharing Mobility of 2016 identified about 700.000 users of the car sharing service in 29 cities, and 5.764 vehicles used for the service. Of these 5.764 vehicles, 34% are present in the city of Milan with 370.000 users; in Rome there is the 27% of vehicles with 220.000 users; Turin has 16% of vehicles and Florence 11% (see the chart below).

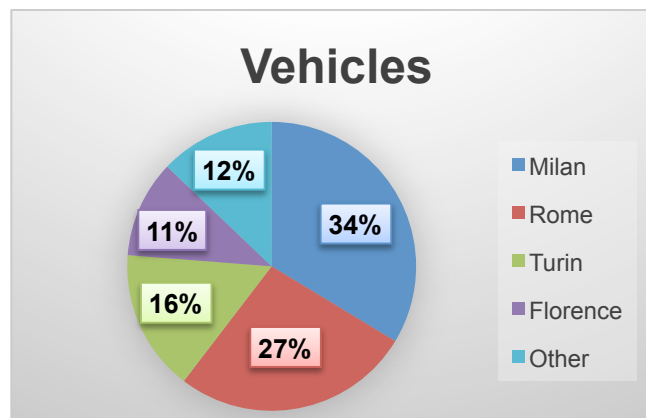


Fig. 1. Distribution of cars in cities (Source: Elaboration from data of Osservatorio Nazionale Sharing Mobility) [2]

The service has increased since 2013, when the “free floating” car sharing has been introduced in Italy. In this type of car sharing, the user locates the car through an app e there are no stations in which to deposit the car. The data collected by the Observatory have shown an increase since 2013 of the number of vehicles. Indeed, in 2013 there were more than 1.000 registered vehicles, and in 2015 more than 5.000. Concerning the number of registered users in 2013 were less than 100.000 and in 2015 were 700.000. Also rentals have risen; in fact, in 2014 they were 3.000.000 while in 2015 more than 6.000.000 were registered.

¹ Transportation Sustainability Research Center, <http://tsrc.berkeley.edu>

In Italy the four largest cities that offer free floating car sharing service are Milan, Rome, Turin and Florence and manage 89% of the fleet of vehicles. The 91% of users are subscribed to the free floating car sharing service and 9% to station based car sharing in which the car is leased and reported to a station [2].

Unlike station based car sharing, the free floating car sharing defines a geographical perimeter (geofence) in a radius from the city center, in which users with smartphone can find and rent a car without going to a station (Herrmann et al., 2014) [3].

This paper compares the free floating car sharing service between two major cities: Rome and Milan. In particular, the comparison is based on the relocation strategies of one of the leader in the car sharing sector: car2go.

Therefore, the purpose of this work is to investigate the functioning of the relocation strategy of car2go through the algorithm within the two cities and identify the differences and similarities between the two contexts.

The paper is structured as follows: next section presents a literature review on sharing economy and car sharing phenomena as well as the description of some relocation strategies used for car sharing. Section 3 presents the case study car2go and the comparison between the strategies in the two cities. Finally, section 4 shows the results of the comparison. The last section contains the conclusions and recommendations for future research.

2 Literature review

2.1 The Sharing Economy

Existing literature provides some definitions of this phenomenon. Belk (2007) defined the sharing economy as “the act and process of distributing what is ours to others for their use and/or act and process of receiving or taking something from others for our use” [4].

It is considered “an emerging economic and technological phenomenon” developed thanks to information and communication technologies, to diffusion of collaborative web communities and of the social commerce (Hamari et al., 2015). In their paper “The sharing economy: why people participate in collaborative consumption” the authors describe “sharing economy as a technological phenomenon”. Indeed the development of technology has allowed the sharing of “physical and non-physical goods and services” thanks to information system connect on internet [1].

Thus Information and communication technology enables the exchange and match of information on the online platform and the consumers participate for convenience and economic benefits (Jae-Hun Joo, 2017) [5].

Hamari et al. (2015) described four aspects of the sharing economy. The first aspect is *collaboration online* which refers to sharing on peer-to-peer platforms where users mutually exchange information. The second aspect is *social commerce*, which is based on the peer-to-peer interaction of users who use social networks and are motivated by economic and personal reasons. Then the authors describe another

aspect, *sharing online*, which refers to evolution of sharing activity through the social networking sites (SNS) where users can share goods, services and information. The last aspect is defined as “*consumer ideology*”, because there is an ideology underlying the sharing economy, for example green consumption and sustainability [1].

Consumers decide to share goods for various reasons. The sharing economy is a good alternative especially for economic benefits after the economic crisis (Bardhi and Eckhardt, 2012) [6], but also for reasons related to sustainability, personal enjoyment, reputation and personal attitude [1].

Kathan et al. (2016) state that sharing economy will grow again because it generates new consumption experiences, convenience, allows people to interact and creates benefits for the environmental sustainability [7].

In literature, sharing economy is often defined as collaborative consumption and the two terms “tend to be used interchangeably” (Martin et al., 2015) [8].

Moreover, Belk (2014) defines collaborative consumption as “people coordinating the acquisition and distribution of a resource for a fee or other compensation” [9].

Schor (2014) describes four categories of sharing economy activities:

1. recirculation of goods;
2. platforms that facilitate the use of durable assets;
3. service exchange;
4. sharing of productive asset or space to allow production

In the first category the author indicates as examples eBay and Craigslist, born in the 1995. In the second category, Zipcar was the innovator, but the author indicates in transportation sector also Uber, Relay Rides, Zimride. Furthermore Couchsurfing and Airbnb have been cited in lodging sector. As part of the third category there are for example TaskRabbit and Zaarly. In the last category there are educational platforms such as Peer-to-Peer University or Skillshare.com but also marketplaces and co-working spaces [10].

2.2 Car Sharing and Relocations Strategies

Bardhi and Eckhardt (2012) have defined car sharing as a service in which a group of individuals pay for “access a fleet of cars” with other paying individuals. The authors have studied the concept of access in car sharing service. They defined access-based consume as “transactions that may be market mediated in which no transfer of ownership takes place” [6].

Weikl and Bogenberger (2012) argue that the car sharing idea was used for the first time in USA as a tactic during the Second World War. In 1948 car sharing service was organized in Zurich by SEFAGE. During the energy crisis of the 1970s the car sharing was organized by car clubs [11]. So in 1971 in Montpellier was founded a car sharing system that is called Procotip, and in 1973 was formed Witkar in Amsterdam [12].

The first true form of organized car sharing was born in Switzerland in 1987 by citizens motivated by environmental problems which they formed two cooperatives: ShareCom and ATG (Auto Teilet Genossenschaft). In 1997 they merged and formed a

new organization: “Mobility, Car Sharing Switzerland” (Truffer, 2003). After Switzerland, car sharing organizations were also established in other countries, especially in Austria, Germany and Netherlands, and later in many other countries around the world [13].

Nowadays the rapid growth of mobile technology and internet allow to simplify the sharing process and are emerging new forms of car sharing [11].

Compared to the past in which the main motivation was related to environmental benefits [13], a recent study has shown that consumers today use car sharing especially for convenience and time savings (Jae-Hun Joo, 2017) [5].

A study by Cohen and Kietzmann (2014) describes three car sharing business models: *Business-to-Consumer (B2C)* car sharing in which the company distributes cars at key points in the city; *NonProfit / Cooperative* car sharing, in which the organization is a non-profit cooperative; *P2P* Car sharing that the authors defined unique model because doesn't need any additional vendors and suppliers and is more sustainable than the B2C model [14].

Furthermore based on relocation strategies of vehicles there are two types of B2C car sharing. Car sharing service can be:

- *round - trip*, when the car is reported to the rental point
- *one - way* type, in which the car can be left at a different point than the rental location (Di Doi and Danielis, 2015).

Moreover *one - way* car sharing type is divided into two other types: *car sharing station - based* in which the company establishes the place to return the car, and *car sharing free - floating* where the car can be parked in one of the car parks in a given area. The authors described four car sharing models. In a first model, the cars available are owned by specialized companies; in a second model there are no-profit organizations that rent their own cars (for example Carshare Selbstfahrer Genossenschaft born in Zurich in 1948). Another CS model involves local public transport operators providing cars near the railway stations or buses and peer-to-peer car sharing model in which private individuals share their private car. Also there is a type of car sharing in which there are municipal companies that offer the service that in Italy are coordinated by “*Iniziativa Car Sharing (ICS)*” funded by the Ministry of the Environment [15]. ICS that consists of a legal agreement among cities to support and establish car sharing services, was born in October 2000 and his role was decisive for the development and diffusion of car sharing in Italy [16].

In literature there is a great amount of research on relocation strategies of car sharing system. Weickl and Bogenberger (2012) conducted a research on relocations strategies in free-floating car sharing comparing two strategies: user- based and operator-based. The user-based strategy is based on bonus and incentives for users, instead in operator-based strategy the system operators relocate cars. The authors described an algorithm that connect the two strategies [11].

In another research Clemente et al. (2013) describe relocation strategy user -based in which the ICT tools installed on board of the car suggest to the user where and when return the car [17].

Herrmann et al. (2014) have conducted a survey on car2go user in Hamburg to identify the appropriate relocation strategies of free floating car sharing [3].

3 Case study

3.1 Methodology Research

The aim of this research is to investigate relocation strategies through the case study of car2go, one of the leading companies in the car sharing sector. In particular, the investigation has been carried out by comparing the cities of Rome and Milan, identifying similarities and differences between the two contexts.

To achieve this goal it was conducted a research based on a face-to-face in depth interview and triangulated the evidences obtained with data retrieved through different sources (i.e. car2go itself; market reports, websites, etc.). For the interview we contacted Mr. Horacio Reartes, car2go location manager in Rome. A case study design was used because it allows to explain “how” and “why” questions of a phenomenon of interest [18].

The main topics of the interview are listed below:

- 1) Free-floating relocation strategy
- 2) Competitors
- 3) Differences in demand
- 4) User’s feedback and satisfaction
- 5) Short and medium-term goals
- 6) Swot analysis

In the following paragraph, after a brief introduction of the company, the results of the interview are presented point by point according to the previous list.

3.2 car2go

Car2go is a Daimler group company and its headquarters are located in Stuttgart, Germany. It was the first car sharing company adopting the free floating relocation model. The idea of the free fleet was created by Daimler's Business Innovation Division in 2007 and in 2008 a first phase of the project was developed in Germany, but the pilot project is dated March 2009. In 2013 it was implemented also in Italy and precisely in the cities of Milan, Rome, Florence and Turin. The company is currently present in 30 cities, 15 of them in Europe, 14 in North America and 1 in Asia [2].

Free-floating relocation strategy car2go. Free floating relocation is part of car2go “*service essence*” because, also for security reasons, cars cannot stay stationary for more than 48 hours in the same area. From the relocation as a rule, a more targeted relocation results in greater car accumulation in areas with greater demand exist. This was initially done manually, and subsequently an algorithm to automate this process was developed in Germany.

For the relocation of cars, the company conducts an analysis of the demand. The figures below represent examples of two zones (A and B) where relocation occurs.

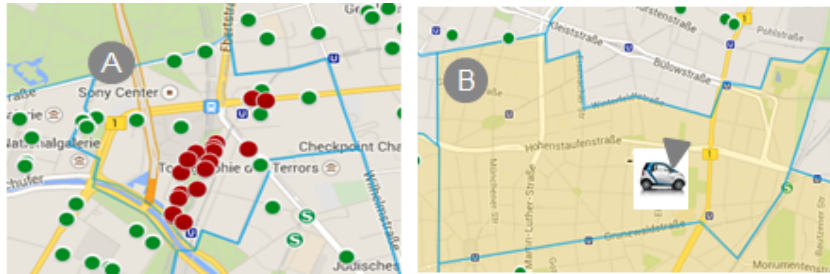


Fig. 2. Relocation from A to B (Source: car2go)

More in detail, cars will be relocated from zone A to zone B if the following conditions are met:

- The demand for cars in zone A is less than the current supply. Instead in B the predicted demand is higher than the current supply.
- For the next time the estimate revenue is lower in A and higher in the B area.
- It is preferable to transfer cars that are concentrated in an agglomeration.

Areas where users can rent and leave cars are called Home Areas (HA). Within this areas users can see the presence of green and red sub-areas. Red ones usually represent the periphery where cars are often hired for a one-way trip.

The company uses a specific application that allows to divide the operating area into polygons. A representation of the zones is defined in the following figure (Figure 3 on the next page).

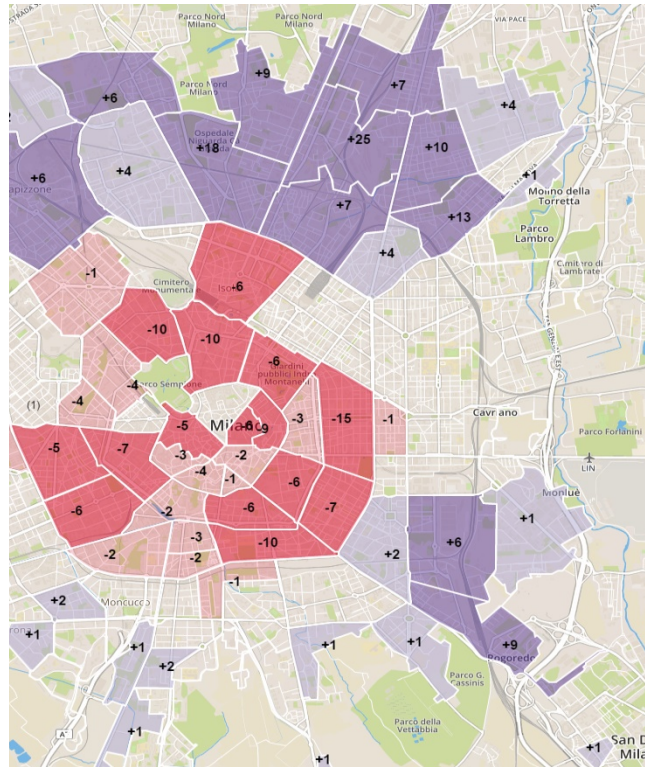


Fig 3. Relocation Zones (Source: car2go)

As it is possible to see from Figure 3, the different zones of the city are marked with a “+” sign or a “-” sign. Areas with + sign are zones where there is an oversupply.

The relocation team intervenes to move the cars from a zone with the + sign to zones with the – sign. In particular, the number next to the sign indicates the amount of cars in excess. Thus, for instance, “+4” indicates 4 cars in the area that can be relocated in one or more areas marked by the minus sign.

Competitors. For car2go the main competitors for both cities are people who use their own cars. The other competitors are:

- *Enjoy*: is the car sharing service by Eni S.p.A. Group. It also uses a free floating relocation strategy and provides Fiat 500 as fleet cars.
- *Share'ngo*: it is a potential competitor even though it has a different strategy based exclusively on electric cars. In Italy the company has a fleet of 1500 ZD model vehicles and is present in Milan, Rome and Florence ².

² Share'ngo, <http://site.sharengo.it>

- *Drive Now*: in Italy operates only in Milan. It is a company founded by the joint venture between BMW group and the rental company Sixt³. The cars available for the service are BMW and Mini⁴.

Differences in demand. In this paragraph the present study highlights some differences in the demand of car2go services concerning the two cities under investigation.

About the target users that use car2go, it resulted that the majority of them are men. In fact, the total is composed by 65% of men and 35% of women.

Moreover, in Rome the average age of car2go service users is over 34 years.

Instead, Milan is more in line with the European average, recording an average age around 28 years.

About the space dedicated to the cars, it is 100 km² in Milan and 92 km² in Rome.

The figure below shows the trend of total rentals per week during the year (2016) in the city of Rome.

The blue color represents the number of rentals without relocations; in red the rentals generated by relocations.

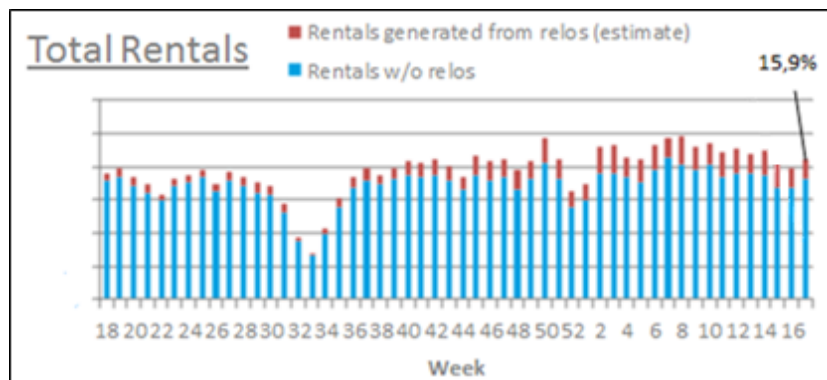


Fig. 4. Rentals per week in Rome (Source: car2go)

In figure 4, the abscissa axis shows the weeks of the year (2016). The percentage of 15.9% indicates the average of additional rentals per week during the year generated by relocation, compared to the number of rentals obtained without relocation.

In addition, the figure below (figure 5) represents the trend of total rentals per week during the year (2016) in Milan.

³ Isole24ore, <http://www.ilssole24ore.com>

⁴ Drive now, <https://www.drive-now.com>

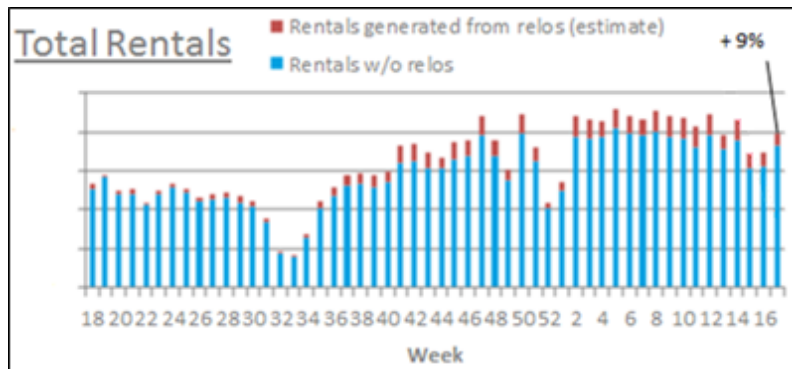


Fig 5. Rentals per week in Milan (source: car2go)

As per the previous figure, in fig.5 the abscissa axis indicates the weeks of the year (2016). The value of 9% indicates the average percentage of additional rentals per week during the year generated by relocation compared to rentals without relocation.

The figures below (i.e. Fig. 6 and 7), however, describe the relationship between revenues and costs generated by the relocation in the two cities in 2016.

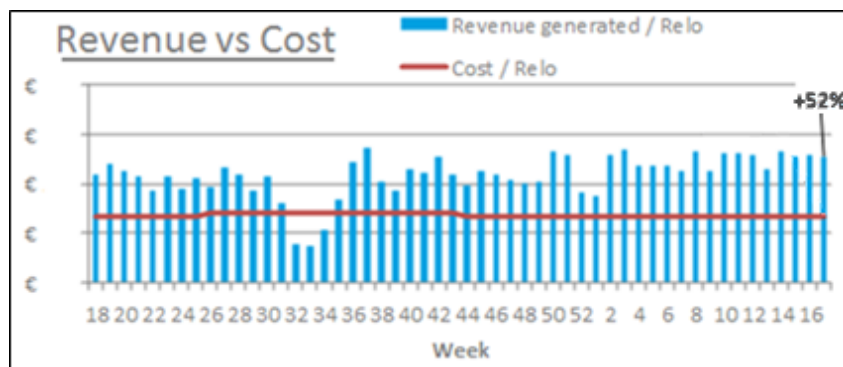


Fig. 6. Revenue vs costs in Rome (Source: car2go)

As we can see in figure 6, in Rome, in the year 2016, average revenues were higher than average relocation costs with a value of +52%.

Furthermore, below is reported the comparison between revenues and costs in Milan (see Fig. 7).

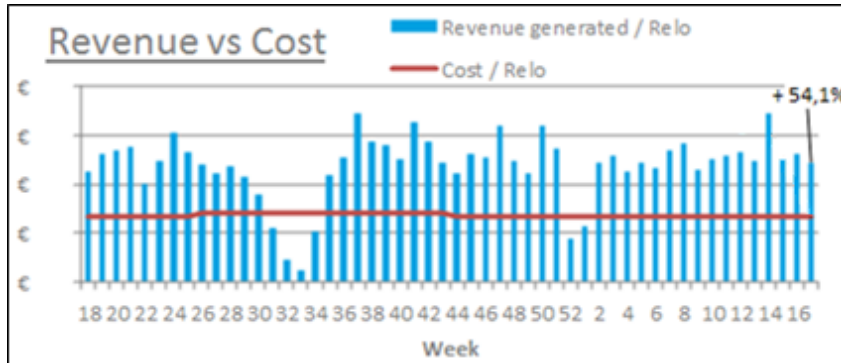


Fig. 7. Revenue vs costs in Milan (Source: car2go)

As per Rome, in Milan during the year 2016 the revenues generated by relocation are higher than its costs: in this period, indeed, average revenues per week is 54,1% higher than costs of relocation.

User’s feedback and satisfaction. For the relocation of the fleet, the feedback is given through the application. Instead, to collect feedbacks on users’ satisfaction various actions are implemented. In Germany, the largest office is in marketing area.

There is also a very important social management with a social media manager who handles users responses but also clusters the typology of questions and the typology of users. From this analysis car2go creates proposals for users. Another important task of this office is to monitor the conversion rate between registered users and actual users, to adjust relocation strategies and promotions in order to increase the number of customers using the service. This analysis focuses mainly on two types of consumers: users who registers to the service but never used the car; and people who only used the service once. Particularly with regard to this latter type of users, the company needs to contact them in order to deeply understand possible issues occurred and develop strategies to improve in the service.

For ad-hoc promotions, there is an *ad hoc* mobile application notification, that represents the most direct means of communication the company has at the moment.

The company also uses innovative techniques for demand prediction. Currently, the company is improving the forecast of demand that is based on: historical demand, weather conditions, events and holidays.

Short and medium term goals. It is also crucial to have an overview on the main goals of car2go in the short-medium term.

In Rome, for instance, the goals are: the inclusion of smart ForFour (a city car with four seats manufactured by Daimler group) in car2go fleet; the project of creating a dedicated parking area at Leonardo Da Vinci’s airport (which has just been activated); and the future introduction of the electric car sharing service.

In Milan the targets also concern the increase in the number of smart Forfour and the introduction of higher segment car, such as Mercedes-Benz A and B-Class.

Swot Analysis. This paragraph describes some common features representing the company in different markets where it operates. In particular this information are summarized in the SWOT analysis in the matrix below.

The SWOT analysis framework, firstly developed in 1960's, is a useful instrument commonly used in the Management field to describe the strengths and weaknesses of internal organization and the threats and opportunities of the external environment [19].

<p style="text-align: center;">Strenghts</p> <ul style="list-style-type: none"> • A large Daimler group behind that provides high level of know-how, technology and capital. • Location Management: lean structure with managers spread on the territories where the company operates 	<p style="text-align: center;">Weaknesses</p> <ul style="list-style-type: none"> • Complete digitization of the service and impossibility of reaching some users' targets
<p style="text-align: center;">Opportunities</p> <ul style="list-style-type: none"> • Creating car parking dedicated to car sharing • Creating "islands of mobility", i.e. spaces where you can rent cars or bikes 	<p style="text-align: center;">Threats</p> <ul style="list-style-type: none"> • Security for available cars (e.g. theft, etc.): mainly in Rome

Fig 8. Swot Analysis car2go (Source: our elaboration)

4. Conclusions and Future Research

In the last ten years car sharing service has evolved at an increasingly fast rate, with more and more companies adopting different business models.

In this work we proposed an overview of the car sharing settings and analyzed the dynamics of car2go service based on the free floating relocation strategy, with particular reference to Rome and Milan.

This paper offers both some practical and theoretical contributions. Indeed, in addition to a general overview of service strategies and free floating strategy, our

analysis has highlighted some important differences and similarities of this model by taking into account the aforementioned two Italian cities.

About the similarities, a point in common for the two cities concerns the criteria used for car relocation, based on demand forecasts, which allows the company to move cars from an oversupply area to another area of the city where demand exceeds availability. At the same time, our analysis showed that, taking the year 2016 as a reference period, revenues generated by relocation strategies in the two cities taken into account have largely overcome their relevant costs.

Another common point is represented by the biggest competitor: the citizen who uses his car as a means of transport. In terms of companies who compete in this market, for both the cities analyzed Enjoy is the main one, also based on the free floating model. In addition, for both Rome and Milan users are predominantly male.

Moreover, the swot analysis provided in the previous page indicates some features that characterize the company in both of the cities taken into account.

Furthermore, there are similarities in the short and medium term goals, as the renewal of the fleet by introducing further segments of cars (i.e. larger and more classy four-seats vehicles), through which it would be possible to reach different targets of users.

This research has also identified some differences between the two realities. Indeed, one of the main differences concerns the areas covered by the service, which in Milan is larger than in Rome. Milan also recorded an higher number of rentals per week in comparison to Rome and is recognized as a reference model for this service at European level.

Finally, another difference is the average age of users: evidences report that in Milan users are younger, in line with the European average.

Despite these insights, the present research also faces some limitations, especially because it is based on a single case study for the investigation and understanding of the main phenomenon. Therefore, the analysis of a larger number of case studies would be needed for a more detailed comparison as well as for the generalization of quantitative/qualitative patterns that describe the investigated model.

Acknowledgments

We would like to thank Mr. Horacio Reartes, location manager at car2go for the city of Rome, for his fundamental contribution, and car2go team which provided us with some important information.

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