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ANALYSIS OF THE COSTS OF SELECTED CAR-SHARING SERVICES – A CASE STUDY ON SIX CONTINENTS

Abstract

Different types of transport solutions that are to influence the sustainability of urban logistics are increasingly used around the world. The same applies to the opportunities offered by the implementation of shared mobility services. According to this idea, car-sharing systems are currently present on six continents of the world and it is anticipated that by 2025 there will be over 36 million users worldwide sharing car-sharing services. In line with this trend, it is worth paying attention to aspects that will encourage the public to use car-sharing services. Because the price is one of the main factors for the society during making a decision about using car-sharing services, the author decided to analyze the costs of car-sharing mobility. In the text basic assumptions about car-sharing services and their development were presented. Then, the article showed the analysis of the cost of using services on six continents in the line of temporary and parking fees. In addition, the work also refers to the impact of the type of vehicle fleet on the price level. The aim of the work was to assess the occurrence of differences between the services offered and the relation between costs and the assumptions of sustainable transport development.

Keywords: car-sharing, new mobility, shared mobility, car-sharing costs

JEL: R49

Introduction

The current transport situation in cities and metropolises in the case of sustainable development needs to be improved to achieve more environmental and economic “friendly” conditions for the society (Pawłowska, 2013). One of the solution to achieve the sustainable urban logistics is implementing the new-mobility concept

(Okraszewska, Nosal, Sierpiński, 2014]. That issue includes many different solutions for better and flowing transportation. One of them is implementation of shared mobility systems in cities. In line with this trend, shared mobility systems are becoming increasingly popular in cities around the world. Despite their growing accessibility, the public often has many concerns about using systems (Meelen, Franken, Hobrink, 2019). They include, for example, the type of service, the location of the operator parking spaces or zones to which the vehicle should be returned, the vehicle fleet, but above all the cost of using the service (among others: Ko, Ki, Lee, 2017; Perboli et al., 2018; Turoń, 2018). Due to the fact that the price plays a very important role for the user who wants to use the car-sharing system (Kortum et al., 2016), as well as that car-sharing serves tourism and supports the attractiveness of regions (Sioui, Morency, Trépanier, 2013) – the author has analyzed the costs of selected car-sharing systems on six continents.

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1. Car-sharing systems development – statistics

The car-sharing concept is the one of many possibilities of sharing economy idea. Its assumptions lies in the ability to rent a car usually for a short period of time. The first car-sharing system in the world was launched in 1948 (Doherty, Sparrow, Sinha, 1987), but over the years its greatest development began after 2008, when the economic crisis occurred (Bardhi, Eckhardt, 2012). Currently, car-sharing systems are developing around the world very much. The main reason why car-sharing systems started to be more and more attractive is connected with IT technologies evolution. The Internet solutions, expansion of mobile applications, social media services and online platforms allow to develop car-sharing systems on 6 continents of the world. The trend connected with the a rapid increase in the start of using shared mobility services is called the uberization of the economy (Pichère, 2016). It describes how people are moving towards the economy based on services rather than a so-called production economy (Pichère, 2016).

About 7 million people used a car sharing service at least once in 2015 (Statista Portal, 2019). At the end of 2017 there were 23.8 million system users in the world (Berg Insight, 2018). The car-sharing market was worth \$5,571.2 million in 2018 and is expected to advance at a CAGR of 11.0% to 2025 (Graphical Research Portal, 2018; Car-sharing Bundesverband Report, 2019). For comparison, in Germany, in 2016 were 1.2 million active users within the car sharing industry (Deloitte, 2017). There were 150 car-sharing providers and 16,000 cars active within the industry, making it the largest market in Europe (Deloitte, 2017). In turn, in 2018, services were offered in 677 cities (Fleet Europe, 2017; Car-sharing report, 2018). Statistics from

January 2019 conducted by the German association Car-sharing Bundesverband indicate that the systems are available in 740 locations (Car-sharing Bundesverband Report, 2019). Currently, it is anticipated that by 2025 there will be over 36 million users worldwide sharing car-sharing services (Statista Portal, 2019). The car-sharing development until 2025 was presented in Figure 1.

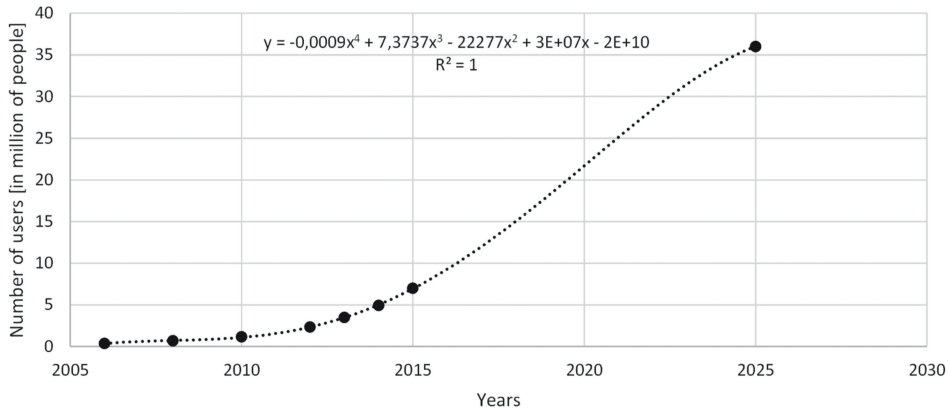


Figure 1. Car-sharing worldwide development statistics until 2025
Source: (Mindur et. al 2018)

Currently, the development of the segment of shared mobility of cars has a very large impact on the increase in public interest in micro-mobility services (bicycles, scooters, segway) (among others: Bieliński, Ważna, 2019; Czech, Turoń, Urbańczyk, 2018, p. 208; Łebkowski, 2019).

2. Car-sharing cost – methodology and analysis

Due to the global need to develop car-sharing systems and the differences in price variants offered by system operators in the world, it is worth making a price comparison of the provided services. To analyze the car-sharing price market effectively, the author proposed their own methodology, which is based on 5 steps. These include:

- determination of parameters that will be compared in the analysis;
- reviewing existing car-sharing systems on the global market;
- selection of the sample of car-sharing companies from 6 continents;
- performing the analysis in accordance with the proposed methodology – comparing and elements of statistical analysis;
- preparation of results and discussion.

First of all, the parameters that will be compared when analyzing the costs of selected car-sharing systems have been defined. They proposed 4 parameters that will be taken into account and are presented in Table 1.

Table 1. Parameters to compare costs in car-sharing systems

No.	Parameter	Description	Unit
1.	Fleet drive	Electric or classic cars drive	–
2.	Fee per time	Fee per minute driven by vehicle from car-sharing service	€/min
3.	Fee per distance	Fee per kilometer driven by vehicle from car-sharing service	€/km
4.	Fee per parking	Stop over fee	€/min

Source: (own elaboration based on: Becker et al. 2017; Efthymiou et al. 2013; Kortum et al. 2016; Schaefers 2013)

Then, analysis of car-sharing systems leading on 6 different continents was carried out. The analyzed enterprises were selected on the basis of shared mobility market reports in the world and car-sharing outlook analyzes (PS Market Research, 2019; Graphical Research Portal, 2018; Car-sharing Bundesverband Report, 2019; Deloitte, 2017; Shaheen, Cohen, Jaffee, 2018). A total of 18 companies were selected for analysis, resulting in 3 organizations from each continent. And then, according to the parameters included in Table 1, the statement presented in Table 2 was made.

Table 2. Parameters to compare costs in car-sharing systems

No.	Continent	Country	Company	Fleet drive	Fee per time (€/min)	Fee per distance (€/km)	Fee per parking (€/min)
1.	Europe	Germany	Drive Now	Classic and electric	0.25	–	0.25
2.	Europe	France	Moov'in.	Electric	0.39	–	0.19
3.	Europe	Denmark	Green Mobility	Electric	0.54	–	0.26
4.	Asia	China	EvCard	Electric	0.07	–	0.07
5.	Asia	Malaysia	SoCar	Classic	0.03	–	0.03
6.	Asia	Kazakhstan	Doscar Club	Classic	0.07	–	0.01
7.	South America	Brazil	Urbano	Electric	0.30	–	0.15
8.	South America	Argentina	Mykeego	Classic	0.15	–	0.15
9.	South America	Chile	Awto	Classic	0.24	–	0.12
10.	North America	USA	Car2Go	Electric	0.37	–	0.37
11.	North America	Canada	Communauto	Classic	0.27	–	0.27
12.	North America	Mexico	Carrot	Classic	0.07	–	0.07
13.	Australia and Oceania	Australia	Maven	Classic	0.08	–	0.08
14.	Australia and Oceania	New Zealand	Mevo	Electric	0.35	–	0.35

No.	Continent	Country	Company	Fleet drive	Fee per time (€/min)	Fee per distance (€/km)	Fee per parking (€/min)
15.	Australia and Oceania	New Zealand	Yoogo Share	Electric	0.27	–	0.27
16.	Africa	South Africa	Locomute	Classic	0.11	–	0.11
17.	Africa	Morocco	Carmine	Classic	0.05	–	0.05
18.	Africa	Rwanda	Move	Classic	0.05	–	0.05

Source: (own elaboration based on: Car-sharing operators: Drive Now, Moov'in, Green Mobility, EvCard, SoCar, Doscar Club, Urbano, Mykeego, Awto, Car2Go, Communauto, Carrot, Maven, Mevo, Yoogo Share, Locomute, Carmine, Move webpages presented in references)

On the basis of the list contained in Table 2, the analysis of the costs of car trips from car-sharing systems per minute was made on the example of 18 systems from 6 continents, as shown in Figure 1.

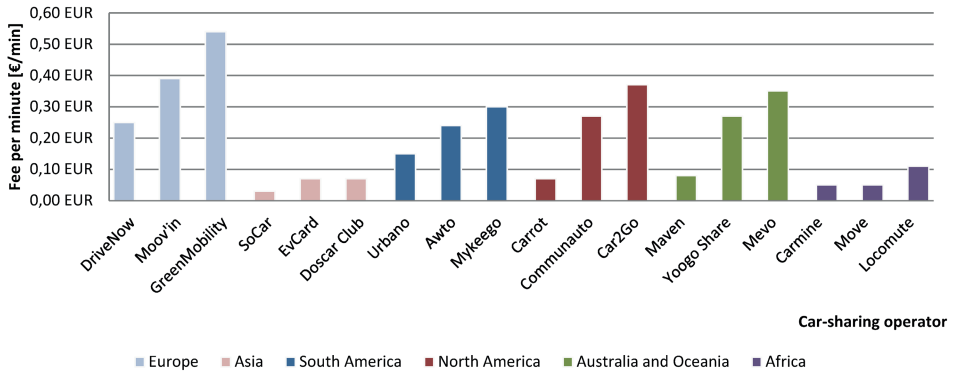


Figure 1. Selected car-sharing system fees per minute comparison
Source: (own elaboration)

Then, the author made the analysis of the fee of car-sharing stop over function. The results are presented in the Figure 2.

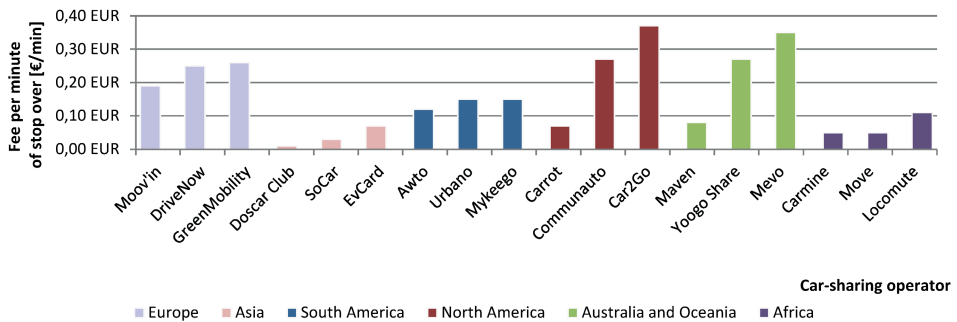


Figure 2. Selected car-sharing system fees per minute of stop over comparison
Source: (own elaboration)

The next step was the analysis with the statistical parameters with: the minimum and maximum car-sharing fees in all six continents, arithmetical average, and the first quartile, second (median) and third quartile and also the standard deviation and the coefficient of variation. The results are presented in the Table 3.

Table 3. Selected statistical parameters of analyzed car-sharing services fees per minute

No.	Continent	Average value of fees	First quartile	Second quartile (median)	Third quartile	Minimum	Maximum	Standard deviation
1.	Europe	€0.39	€0.32	€0.39	€0.47	€0.25	€0.54	0.15
2.	Asia	€0.06	€0.05	€0.07	€0.07	€0.07	€0.07	0.02
3.	South America	€0.23	€0.15	€0.20	€0.24	€0.27	€0.30	0.08
4.	North America	€0.24	€0.17	€0.27	€0.32	€0.07	€0.37	0.15
5.	Australia and Oceania	€0.23	€0.18	€0.27	€0.31	€0.08	€0.35	0.14
6.	Africa	€0.07	€0.05	€0.05	€0.08	€0.05	€0.11	0.03

Source: (own elaboration)

3. Results and Discussion

Basing on these results, it can be stated that the car-sharing services are the most expensive in Europe. The conducted analysis showed that the biggest difference in the cost of car-sharing services is even EUR 0.51, which is a very significant difference between the costs of provided services.

From the point of view of a fee for a stop-over service, systems operating in Asia and Africa were found to be the cheapest. The biggest difference is EUR 0.36. The price difference may depend on lower, in the case of Asia and Africa, costs of fuel or energy as well as lower costs of human work, i.e. servicing.

In addition, the analysis shows that systems consisting of electric vehicles are globally more expensive than systems with a classic fleet, what can be explained by the high cost of buying or leasing the electric vehicle.

What is more, the analysis shows that operators changed their standards of fees from the hybrid fees consisting with the fee per distance and the temporary fee to fees incurred per minute. This kind of behavior is changing the earlier approach to the costs of car-sharing services (Turoń, Sierpiński, 2019). Therefore, it was not necessary to carry out the case study involving the determination of a specific number of kilometers to travel in several systems.

It is also worth noticing that some global systems, i.e. Car2Go in the USA, offer the possibility to reduce the cost of stopover parking after purchasing a package of services.

Furthermore, in the case of systems operating in Australia, it was noticed that there are mainly systems based on subscription and package fees. In addition, while reviewing the market, it was noted that peer-to-peer systems predominate in Australia and New Zealand.

Conclusions

In conclusion, the analysis of car-sharing systems, carried out on the example of six continents, showed that the most expensive services for users are provided in Europe. In turn, the cheapest services are offered in systems in Asia and in Africa. In addition, the analysis showed that systems equipped with a fleet of electric vehicles are more expensive for users than systems with a classic fleet.

Global analyzes indicate that the price factor of car-sharing services is one of the main features affecting the use of systems (Kortum et al., 2016). Therefore, the results of the analysis are not satisfactory from the point of view of implementing the European policy of sustainable development of transport and urban logistics. Therefore, it is worth considering special recommendations for operators and local governments cooperating with them to develop solutions that will be optimal for the society and encourage them to use the service willingly.

Further research by the author will be conducted towards the implementation of more extensive price analyzes of car-sharing services, taking into account a larger number of operators and statistical parameters.

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