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The Analysis of Carsharing Market in Polish Cities

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Abstract:

Purpose: *The aim of this paper is to show the development of car sharing in Polish cities. The main focus was put on the demand on this sort of services and the range of cars offered as a part of these services.*
Design/Methodology/Approach: *The research study covers changes in the car sharing market in Poland. The author concentrates on core criteria, such as rental prices, vehicle types, location, and the system of renting and returning vehicles. The study employs a comparative analysis.*
Findings: *When analyzing car sharing services in Poland, one should keep in mind the fact that it is a new profile of activity, still under development. Therefore, companies are not willing to share information which may be unfavorable and could generate negative opinions about the service.*
Practical Implications: *One of the key concerns of the urban transport system in Poland is increasing access to automobiles. Car sharing as an element of the sharing economy lowers car ownership rates, which contributes to a reduction of car traffic and noise volumes, an increase in parking spots availability, and cleaner air.*
Originality/Value: *Subject literature rarely mentions car sharing in Poland; it is scarce and usually consists in journal and news articles, typically online.*

Keywords: *Car-sharing, sharing economy, sustainable urban development, urban transport, Poland.*

JEL Codes: *R41, Q01, O18, N70.*

Paper type. *Research article.*

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1. Introduction

The long-term policy of sustainable development of transport has been a challenge to local businesses in terms of increasing environmental standards. This is due to progressing urbanization and suburbanization associated with intense energy consumption, congested transport networks, water and air pollution, waste, and a decrease in the quality of life (Sompolska-Rzechuła and Kurdyś-Kujawska, 2020). Urban development poses a challenge to city transport for it boosts the demand for smooth, rapid, safe, and environmentally friendly means of transportation. Therefore, is it necessary to develop forms of transport other than one' s own car (Starowicz, 2011).

A tool to improve the quality of urban transport and life may be carsharing. Carsharing has recently evolved from a relatively little-known concept to a broadly discussed solution to urban mobility issues. What is more, carsharing is associated with the development of communities less dependent on possessing. Nowadays, carsharing continues to be of limited use, mainly in urban areas, but it is bound to expand in the years to come. Potential of car sharing is of specific amounts, given by Global Market Insights, and has a chance to turn back the amounts of money from the investments on the level of up to 34.8% per year (Wadhwani and Saha, 2020). In 2006, there were 0.35 million vehicles in the sharing system globally. In 2015, the number surged to 7 million and it is said to reach 35 million of vehicles worldwide in 2025 (Hjorteset and Bocker, 2020).

The size of car sharing market exceeded $2.5 billion in 2019 and still is going to increase over 24% in 2020-2026. Implementing strict rules by the governments from around the world according to the gas emission drives implementation of the solutions in terms of mobility within the cities, what additionally drives the car sharing market and increase of its value (Wadhwani and Saha, 2020).

The biggest increase of car sharing has been reported in Europe. Citizens of European cities have realised quite quickly that crowded city centres are not the best space to own and use their own cars. Thus, they started using newly created solutions that were systems of car sharing, which work alike to bike sharing companies. According to the data from February 2016, the most people using the car sharing system were from Germany (1 million users) and it made up to 1/3 of all European users of all car sharing systems these days. To compare, in North America car sharing was used by 1.5 million of people, and in Asian and Pacific region countries it was used by 2.3 million of people (South Korea had 1.8 million of car sharing users) (Rzędowska, 2017).

Carsharing is a "pay-as-you-go" type of concept, which is an additional incentive to use vehicles less frequently and, instead, avail of some more environmentally friendly modes of transport. Carsharing helps reduce energy consumption, noise pollution, and local emissions (Carrese *et al.*, 2020).

2. The Essence of Car Sharing

The spread of carsharing services as a novel and more sustainable means of transport is changing private mobility from the right of ownership to the right of use. The idea of car sharing, however, is not new and goes back to the 1940s. It was first mentioned in the programme called *Selbstfahrergenossenschaft* created by a housing cooperative in Zurich in 1948 (Rotaris *et al.,* 2018). In the early 70s, first carsharing systems started to appear, amongst them the French ProcoTip. In 1969, in Amsterdam works began on the implementation of a Witkar system. The project by a Dutch inventor and politician Luud Schimmelpennink has been one of the first technological projects of carsharing in the world (Wood, 2020). The 80s and the first half of the 90s saw some continued slow growth of carsharing services, mainly in the form of small non-profit systems in the United Kingdom, Switzerland, and Germany, and some larger scale initiatives in Sweden, Holland, Canada, and the United States. Since the year 2000, new systems have been successfully developing all around the world.

Given growing demand in the carsharing sector, companies directly involved in the motor market (Car2Go – Daimler, DriveNow – BWM, Quicar – VW) and traditional car rentals started to offer their services in the field. Zipcar, founded in 2000 in the USA, provides services in France, Spain, Belgium, the UK, and the USA. The German Car2Go operates in many German, Italian, American, Austrian, Canadian, Dutch, Spanish and even Chinese cities. Owing to a flexible scheme of car rental by the minute, in 2016 Car2Go recorded 2 million users.

Since the idea has been implemented in various parts of the globe, its operations vary in certain aspects. The system may be organized and managed by a private company, public entity or users organized in the form of a company or a cooperative. In terms of organizational structures and the models of operation, we can distinguish several concepts of carsharing (Ferrero *et al.,* 2018).

At present, carsharing is a broad issue based on a variety of business concepts, such as the free-floating, stationary, or peer-to-peer sharing schemes. Some service providers (Stadtmobil in Germany) offer both the free-floating and the stationary options (Heilig *et al.,* 2018). The schemes have become excellent platforms for establishing B2B and B2C relations. What is more, O2O (online to online) platforms consolidate carsharing offers, ensuring that they are up to date. This increases convenience and provides an opportunity to compare between different offers. Even though the schemes are not similar, they meet many conditions satisfied by private passenger cars only. High availability, great extent, flexible and transparent pricing policies, and availability of various classes of cars, has made carsharing an attractive alternative to car ownership (Zhou *et al.,* 2020)

The free-floating carsharing scheme is one of the latest approaches to the idea of sharing a car. Although still under development, it has already become attractive

and popular. It offers customers unrestricted travel opportunities with an option to leave a car at any location within the system. Moreover, as one can travel direct, free-floating is alluring not only as an alternative to private cars and taxis, but also to other means and forms of transport, such as public transport (Kortum *et al.*, 2016).

Compared to the stationary carsharing scheme, free-floating is a more expensive model. Rates for using a car are typically based on car use time (minutes), which makes free-floating a relatively costly relocating option, especially during the rush hours. Furthermore, highly urbanized areas have a limited number of parking spaces, which is why most companies keep small and medium-sized vehicles. Another important matter is a cooperation between service providers and local authorities aimed at reaching agreements as to, for example, parking flexibility. How significant an issue this is can be illustrated by a 2014 event when, after 18 months, Car2Go ceased operations in London because it had failed to obtain permits to park across all London districts (Lagadic *et al.,* 2019). Many carsharing service providers operating on the free-floating basis are companies established by motor giants which consider this sort of investment to be of strategic importance. Carsharing may become a virtual advertising channel for their products and a source of information about customers.

The stationary carsharing scheme is a much older concept. While free-floating emphasises flexible travelling, the stationary scheme offers trips between certain points within a given network. It is a model which may compete with traditional car rentals. The lack of relative flexibility may be compensated by fleet diversity in terms of brands and models, which satisfies various customer needs. The stationary model is, at the same time, used much more frequently in towns, small and medium-sized cities and across less urbanized areas. Moreover, in comparison with free-floating, here cars are used for longer journeys over pre-planned routes. This results in a lower number of potential customers (Tournier, 2017). Here, we need to underline that stationary carsharing providers are typically regional and local enterprises (except for Flinkster which belongs to Deutsche Bahn) (Giesel and Nobis, 2016). Next, the stationary model of carsharing is not immensely popular among motor giants – the only exception being Volkswagen that has taken over 60% of Greenwheels shares (Malinowski, 2017).

Another alternative to the existing carsharing schemes is to offer the service based on a peer-to-peer (P2P) communication model (known also as a person-to-person carsharing). The P2P model presents cars which are owned by private individuals operating within a given community. Entities operating in the sector deliver a transaction platform, insurance coverage, and necessary telematic equipment. Considering the decentralized and varied fleet, customers have a greater diversity of brands and models. Charges are based on a daily tariff and constitute a good alternative to the stationary model and traditional car rentals (Shaheen and Cohen, 2013).

The concept of carsharing, present in several countries for many years now, is quite new to Poland. The idea to set up public systems of urban short-term car rental emerged in 2015. Local authorities of Warsaw and Wrocław, experienced in public bike rentals, analysed the possibilities of introducing urban carsharing. It appeared that the law at that time was unfavourable to the new service. As far as the capital of Lower Silesia is concerned, it was more complicated as it pertained to electric cars. But what was challenging for self-governments, turned out relatively easy for a private entity. In the early October 2016, in Cracow, a traditional car rental called Express introduced a new brand on the market – Traficar, which offered the first regular carsharing services in Poland. Initially, Traficar offered 100 Opel Corsa vehicles across Cracow. The service was available at a fee in the absence of cooperation with municipal authorities. After 6 months of market presence, the company decided to double the fleet by supplementing it with Renault Clio. Next, in December 2017 it began to introduce another set of 100 vehicles. At present, Traficar operates across Cracow, Warsaw, Poznań, Wrocław and Tricity. All these cities feature the free-floating service model.

Another private entity offering carsharing services is 4Mobility. Founded in 2015, in September 2016 it offered its first car sharing services to business, and in December 2016 also to individuals. Ever since it was established, 4Mobility has been operating based on two models' stationary car sharing and free-floating, providing PREMIUM services (BMW and Mini cars). Only in the summer of 2017, upon entering a partnership with Hyundai Motor Polska, the fleet expanded to include further 200 vehicles and STANDARD category services were introduced (Kwestarz, 2017).

In 2017, 4Mobility and Audi developed a strategic cooperation which effected in the commencement of carsharing services in Poznań in March 2018 and another fleet increase by a minimum of 30 vehicles. In this case, 4Mobility placed the accent on higher comfort vehicles, presenting Poznań dwellers with Audi A3 Sportback, Audi A3 Limousine and Audi Q3 (gloswielkopolski.pl, 2020). In Poznań, just like in Warsaw, 4Mobility offers both stationary and free-floating car sharing services. Here, it needs to be emphasised that the free parking zone is limited and, in both cases, does not cover the whole city (4mobility.pl, 2020).

Another important entity on the market is PANEK. The company operating only in the Rent a Car until 2017, implemented carsharing services first in Warsaw and the neighbouring towns. At present, the company is expanding also in Cracow, Tricity, Wrocław and Lublin. Vehicles provided by PANEK are assigned to 6 groups. In addition to popular traditional engine, hybrid or electric cars, the service provider offers unique vehicles from the past. The company rents a Polonez, Fiat 126p, Fiat 125p, Syrena, Trabant, Pontiac Trans Am and a Corvette Stingray C3 (panekcs.pl, 2020).

In the early November 2017, the first Urban Electric Car Rental Vozilla was set up in Wrocław. The fleet consisted of 190 Nissan Leaf electric cars and 10 light commercial vehicles Nissan eNV200. The travelling range could be as much as 250 km, which is more than enough for anyone to move freely across the city. To increase travel comfort, Wrocław's authorities demarcated special parking spots in the city centre and allowed bus-lane to use at most congested streets. It should be emphasised that Vozilla services are extremely popular. In the first month of operation, electric cars were used more than 20 thousand times (wroclaw.pl, 2020).

3. Methodology

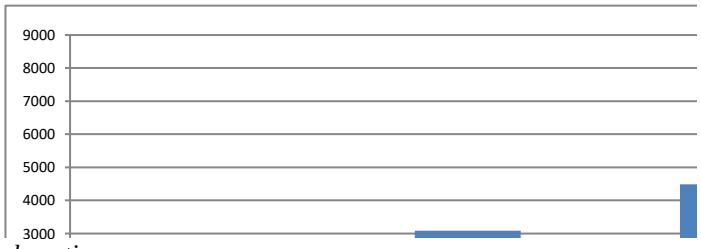
Individual transport is a vital element of the city transport system. However, its environmental impact requires changes in the entire system of transportation. The objective of this paper is to present an idea of carsharing based on the economy of sharing in Poland. The subject of the research is the carsharing market in Polish cities and its development prospects. The research problem, the solving of which will allow the researcher to attain the study goal, is to find an answer to the following question *"What are the prospects for carsharing development in Polish cities?"* The sources of research data are reports on carsharing in Poland and transport indices in the largest Polish cities. In addition, some data originate from scientific magazines and online sources.

The research process was conducted in two major stages. The first stage was a search query and an analysis of available data on carsharing. The second stage comprised an analysis of the present condition of carsharing in Poland and a presentation of carsharing prospects in Poland.

4. Car Sharing Services Development in Poland

Recently, Poland has witnessed a true revolution of shared urban transport. At the end of 2017, there were 8 carsharing entities offering 898 vehicles. In 2018, there were 3082 vehicles available on the market. Then, in 2019, the number of businesses reached 12 with a total number of passenger vehicles 4482 (Instytut Keralla Research, 2019).

Figure 1. *The number of passenger cars offered as part of carsharing in Poland*



Source: *Own elaboration.*

The largest quantity of vehicles is provided by Express, which under the business name Traficar provided 1640 cars in 2019. The company's fleet constituted 36.6% of all passenger vehicles used in the carsharing mode in Poland.

The second biggest fleet provider is Panek CS. The company offered a total of 1112 vehicles, which was 24.8% of the market in 2019. The fleet has increased since 2018 by as many as 85.3% (in 2018 the company had 600 vehicles to share) (Instytut Keralla Research, 2019).

Table 1. *Characteristics of car sharing providers*

Item	Company Name (brand)	Number of vehicles	Main business activity
1	Express (Traficar)	1640	Rent a Car
2	PANEK S.A. (Panek CarSharing)	1112	Rent a Car
3	Innogy Polska (Innogy GO!)	500	Distribution of electric energy
4	MiiMove (MiiMove)	400	Carsharing
5	PGE Nowa Energia (4mobility)	300	Distribution of electric energy
6	EasyShare (EasyShare)	200	Carsharing
7	Enigma Systemy Ochrony Informacji (Vozilla)	190	IT
8	C2G (Click2Go)	102	Rent a Car
9	TAURON Polska Energia (eCar od Taurona)	20	Distribution of electric energy
10	GreenGoo (GreenGoo)	11	Rent a Car
11	PGE Nowa Energia (PGEmobility)	5	Distribution of electric energy
	Total	4482	

Source: *Instytut Keralla Research, 2019.*

Passenger cars offered as part of carsharing services are now present across 8 provinces (*voivodships*). Most vehicles are available in Warsaw and Tricity (Gdańsk, Gdynia, Sopot agglomeration). It is worth pointing out that two offerors, Express and Panek, allow customers to rent vehicles in one city and return them in another.

Table 2. *Geographic availability of the car sharing service*

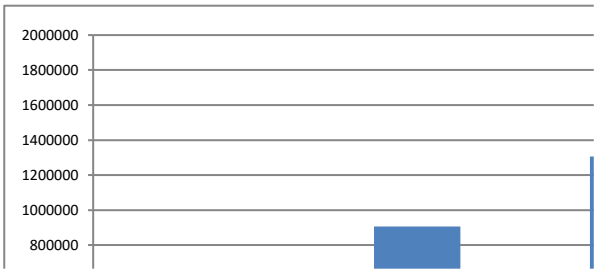
City	Service Providers	Number of Vehicles
Warsaw	• 4Mobility • Traficar • PANEK • Innogy GO!	1660
Tricity	• Traficar • MiiMove	1000
Cracow	• Traficar • PANEK	550

Wrocław	• Vozilla • Traficar	390
Katowice	• Traficar • GreenGoo • eCar od Taurona	390
Poznań	• 4Mobility • Easyshare • Click2Go • Traficar	345
Lublin	• Panek	100
Łódź	• Easyshare	50
Siedlce	• PGEmobility	5

Source: *Instytut Keralla Research, 2019.*

Increasing number of cars available in terms of car sharing results primarily from increasing demand for those services. The biggest service provider Traficar owned in 2018 over 200 thousand of users. The demand for car sharing in 2019 was reported by over 630 thousand of people. According to the forecasts the demand for this type of services is going to increase year by year. In 2025 it is going to be three times bigger than in 2019.

Figure 2. *Forecast of the number of vehicles used withing the car sharing system*



Source: *Own elaboration.*

Vision of increasing demand makes the companies to increase and diversify their vehicle fleet. However, this would be an extremely hard task without the government's and municipal authorities' help. It is assumed that this would balance on the verge of profitability. In 2017, before the rise of car sharing market, the Panek which was focusing more on "rent-a-car" company has increased its income by one fifth, and their profits by almost 50%. When car sharing became more popular, Panek's income, instead of significant increase, increased only by 1.2% to 62.1 million PLN, what results from the report of the National Court Registry. Income has decreased from 3.6 million PLN to 383 thousand PLN. This company is still profitable, but only thanks to its traditional "rent-a-car" system, not to car sharing which significantly worsened its statistics and brought losses in 2018.

Operation costs have visibly increased. Financial costs increased within a year from 0.7 million PLN to 3.3 million PLN (Frączyk, 2019).

As car sharing in Poland develops, operators expand their portfolios to offer additional services. An excellent example would be Traficar and its continuously growing number of co-operating parties. The strategic Traficar partners in Poland are Renault Polska and PKN Orlen. Orlen supplies fuel and infrastructure to prepare the cars. Thanks to the cooperation, vehicles can be left at dedicated locations at selected Orlen gas stations, which amplifies service availability (newsauto.pl, 2020). In September 2017, Traficar implemented a pilot programme with Ikea. As part of this collaboration, customers buying large items in Ikea in Cracow could rent Traficar LGVs to move purchased goods (ikea.com, 2020). As of 17 January 2018, Renault Kangoo Van can be rented in a form of carsharing at Poznań's Castorama (smartcityblog.pl, 2020). It is the first shop of the Castorama network to offer its customers an opportunity to rent a car by the minute.

In 2019, there were already 3 companies offering carsharing of light commercial vehicles. Since 2018, LGVs by the minute have been offered by ModusGroup. Under the brand CityBee, it offers 150 vehicles, which is 56.6% of all vehicles offered as part of carsharing. A total of 265 vehicles are available as BIGcarsharing, which constitutes an increase by 341.7% compared to the year 2018 (in 2018 there were only 60 such vehicles). Light commercial vehicles are present across 11 provinces, including cities where passenger carsharing is not available, i.e., Szczecin, Bydgoszcz and Białystok.

Fees collected by operators are typically of two types: distance-based (km) and time-based (min). The above two criteria preconditioning the charges relate, above all, to the basic car sharing service on a relatively small distance. Depending on the vehicle segment and the way it is delivered, charges range from PLN 0.50 to 0.95 per 1 minute and between PLN 0.80 and 0.99 per 1 kilometre, or the fee covers the time of use only and ranges between PLN 1.1 and 2.0. What is more, some service providers can also charge by the hour, day or long-distance.

For carsharing in Poland to grow, it must meet the postulates of one's own car. What is more, it must be competitive with Taxi corporations or Uber. In the cities with carsharing presence, an average taxi rate per 1 km is between PLN 1.20 and 2.40, plus the starting rate of PLN 5 to 8. In the event of public transport, in addition to the fare we must take into consideration the time, circumstances and e.g., the frequency or the number of people we intend to take with us (Table 3).

Table 3. *Comparison of the cost of the Main Railway Station - Airport trip*

City	Route	Distance	Average journey time	Average cost Carsharing[1]	Average cost Uber	Average cost Taxi
Warsaw	Warsaw Central Station – Chopin Airport	7.9 km	Ca. 15 min	17.8 zł	17 zł	22.5

Warsaw	Warsaw Central Station – Modlin Airport	41 km	Ca. 40 min	65.29 zł	60 zł	113 zł
Cracow	Kraków Główny – Kraków-Balice Airport	16.7 km	Ca. 25 min	32.86 zł	34.5 zł	45.5 zł
Wrocław	Wrocław Główny - Wrocław-Strachowice Airport	11.1 km	Ca. 20 min	24.27 zł	24 zł	25 zł
Katowice	Katowice Główne – Katowice-Pyrzowice Airport	34.1 km	Ca. 35 min	55.55 zł	68 zł	130 zł
Poznań	Poznań Główny – Poznań-Ławica Airport	8 km	Ca. 15 min	17.90 zł	17 zł	18 zł
Gdańsk	Gdańsk Główny – Gdańsk Airport	14.3 km	Ca. 20 min	27.12 zł	34.5 zł	39 zł

Source: *Own study compiled on the basis of Google Maps.*

When we compare the above tabulation with taxi rates, Uber rates, or even public transport fares, car sharing may seem a particularly good alternative, especially in the case of travelling in groups.

5. Conclusions

Even though carsharing reached Poland quite late, it is under strong development. The numbers of service providers, customers and vehicles are growing. The year 2019 rounded up with nearly 4 thousand cars to share. Carsharing reflects a motor market evolution. It is said that not only vehicles (electrical and autonomous, constantly Online) but also the way they are exploited is bound to change. Less and less people will be buying cars. Instead, they will begin renting them whenever needed. The more competition, the better for the customer – companies competing for their portfolios will cut rates and make offers more appealing. Another factor in favour of carsharing may be increasing cost of own car maintenance (higher insurance and parking fees in city centres).

Moreover, carsharing is also a step into a smart mobility. A single vehicle operating within the carsharing scheme can replace four to ten individual cars (Urbanowicz, 2015). Clearly, the expansion of carsharing has modified the way the Western European city transport system looks like. The growing popularity of this form of car use can decrease automobile density and car traffic, lower the parking pressure, free the urban space, and lead to cleaner air. Over the years to come, carsharing operators may be expected to enter medium-sized cities, such as in the case of Siedlce. Municipal authorities, urban activists and users who do not own a car or own one too few are all interested in carsharing development. Cities are willing to support environmental development of transport and, therefore, provide parking space to electric, hybrid and carsharing scheme cars. New and environmentally friendly vehicles will contribute to a drop in air pollution. However, will cars by the minute on Polish roads reduce traffic jams or do just the opposite? What if those who have commuted to work by public transport or bicycle start using carsharing services, instead?

References:

4Mobility wchodzi do Poznania. Będzie można wypożyczyć luksusowe modele audi.Available at: http://www.gloswielkopolski.pl/motofakty/aktualnosci/a/4mobility-wchodzi-do-poznania-bedzie-mozna-wypozyczyc-luksusowe-modele-audi-zdjecia,12933897/.

Balac, M., Becker, H., Ciari, F., Axhausen, K.W. 2019. Modeling competing free-floating carsharing operators – A case study for Zurich, Switzerland. Transportation Research Part C, 98, 101-117.

Carrese, S., D'Andreagiovanni, F., Giacchetti, T., Nardin, A., Zamberlan, L. 2020. An optimization model for renting public parking slots to carsharing services. Transportation Research Procedia, 45, 499-506.

Dostawczy Traficar dostępny także w Poznaniu. Available at: https://www.smartcityblog.pl/dostawczy-traficar-dostepny-takze-w-poznaniu/.

Edelstain, S. Daimler's Car2Go carsharing service sings up 78000 China users in 2 months.

Ferrero, F., Perboli, G., Rosano, M., Vesco, A. 2018. Car-sharing services: An annotated review. Sustainable Cities and Society, 37, 501-518.

Frączyk, J. 2019. Carsharing to niełatwy biznes. Panek ujawnił dane. Available at: https://www.money.pl/gospodarka/carsharing-to-nielatwy-biznes-panek-ujawnil-dane-6407801265022593a.html.

Giesel, F., Nobis, C. 2016. The impact of carsharing on car ownership in german cities. Transportation Research Procedia, 19, 215-224.

Heilig, M., Mallig, N., Schroder, O., Kagerbauer, M., Vortisch, P. 2018. Implementation of free-floating and station-based carsharing in an agent-based travel demand model. Travel Behaviour and Society, 12, 151-158.

Hjorteset, M.A., Bocker, L. 2020. Car sharing in Norwegian urban areas: Examining interest, intention, and the decision to enroll. Transportation Research Part D: Transport and Environment, 84, 1-15.

http://4mobility.pl/

http://www.newsauto.pl/traficar-renault-clio-systemie-na-ulicach-warszawy/

https://panekcs.pl/flota

https://www.greencarreports.com/news/1104399_daimlers-car2go-carsharing-service-signs-up-78000-china-users-in-2-months

https://www.ikea.com/ms/pl_PL/service-offer/traficar/

https://www.spidersweb.pl/2016/10/traficar-carsharing-krakow.html

https://www.spidersweb.pl/2017/10/traficar-poznan-wroclaw.html

https://www.traficar.pl/

Instytut Keralla Research. 2019. Rynek car sharing w Polsce 2019 (pojazdy osobowe i dostawcze).

Kortum, K., Schonduwe, R., Stolte, B., Bock, B. 2016. Free-Floating Carsharing: City-Specific Growth Rates and Success Factors. Transportation Research Procedia, 19, 328-340.

Kwestarz, P. 2017. Trwa pierwsza publiczna oferta akcji 4mobility. Czy warto kupić akcje spółki. Available at: https://strefainwestorow.pl/artykuly/debiut-ipo/20170922/4mobility-oferta-publiczna-akcji.

Lagadic, M., Verloes, A., Louvet, N. 2019. Can carsharing services be profitable? A critical review of established and developing business models. Transport Policy, 77, 68-78.

Le Vine, S., Zolfaghari, A., Polak, J. 2014. Carsharing: Evolution, Challenges and Opportunities. Centre for Transport Studies.

Malinowski, B.F. 2017. Miej auto bez auta. O co chodzi w miejskim carsharingu? Available at: https://wethecrowd.pl/miejski-carsharing/.

Monitor Deloitte. Car sharing in Europe. 2017. Business Models, National Variations and Upcoming Disruptions. Available at: https://www2.deloitte.com/content/dam/Deloitte/de/Documents/consumer-industrial-products/CIP-Automotive-Car-Sharing-in-Europe.pdf.

Parysek, J. 2016. Dla kogo miasto? Dla ludzi czy dla samochodów. Studia Miejskie, 23, 9-27.

Rotaris, L., Danielis, R. 2018. The role for carsharing in medium to small-sized town and in less-densely populated rural areas. Transportation Research Part A, 115, 49-62.

Rzędowska, A. 2017. Rzędowska: Carsharing czyli ekonomia współdzielenia w praktyce (ANALIZA). Available at: https://biznesalert.pl/carsharing-czyli-ekonomia-wspoldzielenia-w-praktyce-analiza/.

Shaheen, S., Cohen, A. 2013. Carsharing and Personal Vehicle Services: Worldwide Market Developments and Emerging Trends. International Journal of Sustainable Transportation, 7(1), 5-34.

Sompolska-Rzechuła, A., Kurdyś-Kujawska, A. 2020. Quality of Life of Rural and Urban Population in Poland_ Evaluation and Comparison. European Research Studies Journal, XXIII(3), 645-656.

Starowicz, W. 2011. Zarządzanie mobilnością wyzwaniem polskich miast. Transport miejski i regionalny, 1, 42-47.

Tournier, B. 2017. Free-Floating vs. Stationary vs. P2P: Car-sharing technology providers open the door to new options. Available at: https://www.sierrawireless.com/iot-blog/iot_blog/2017/11/free_floating_vs_stationary_vs_p2p_carsharing_technology_providers_open_the_door_to_new_options/.

Urbanowicz, W. 2015. Carsharing w Warszawie od 2016 r. Available at: http://www.transport-publiczny.pl/wiadomosci/carsharing-w-warszawie-od-2016-r-48376.html.

Vany od VOZILLI już dostępne. Available at: https://www.wroclaw.pl/zobacz-jak-dziala-vozilla-miejska-wypozyczalnia-aut-elektrycznych-wroclaw-wideo.

Wadhwani, P., Saha, P. 2020. Car Sharing Market Size by Model (P2P, Station-Based, Free-Floating), By Business Model (Round Trip, One Way), By Application (Business, Private), Industry Analysis Report, Regional Outlook, Application Potential, Price Trend, Competitive Market Share & Forecast, 2020-2026. Available at: https://www.gminsights.com/industry-analysis/carsharing-market

Wood, A. 2020. Tracing the absence of bike-share in Johannesburg: A case of policy mobilities and non-adoption. Journal of Transport Geography, 83, 1-7.

Zhou, F., Zheng, Z., Whitehead, J., Perrons, R.K., Washington, S., Page, L. 2020. Examining the impact of car-sharing on private vehicle ownership. Transportation Research Part A, 138, 322-341.