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SHARED MOBILITY AS AN ALTERNATIVE TO PRIVATE TRANSPORT IN CITIES

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Purpose: The aim of this paper is to analyze the shared mobility trend in Poland and assess its impact on the propensity to own a private car.
Design/methodology/approach: The research methodology integrated three primary methods: literature review, data analysis and inductive approach. The literature review served to identify impact of car-sharing on travel choice and car ownership. After establishing the theoretical context, an analysis of quantitative datasets on shared mobility vehicles and private passenger cars was conducted. The data comparison formed the basis for drawing conclusions and identifying the factors that contributed to the significant increase in the number of private cars.
Findings: The data analysis showed that despite the significant growth of shared transport systems in Poland, the number of private cars has risen considerably.
Research limitations/implications: The primary limitation in studying the quantitative changes in the development of shared mobility is a lack of official data on shared mobility vehicles and users. Future research should primarily include larger groups of respondents from different cities, as qualitative research to date has been very limited. The research should cover both regular users of shared transport and non-users to identify the factors that prevent them from changing their transport behavior. Further research also could focus on the differences between generations.
Originality/value: The article compared the results of studies on the impact of the development of car-sharing systems on private car ownership, conducted in various locations around the world, with the situation in the Polish market. The reasons for the contrasting trend in Poland were identified, where the increase in the number of shared vehicles coincided with a notable rise in the number of private cars. Research gaps in the study of attitudes towards car ownership were identified. Several actions were suggested to encourage the transition from private car ownership to car-sharing, offering valuable guidance for urban transportation authorities.
Keywords: shared mobility, car-sharing, micromobility, private cars.
Category of the paper: research paper, viewpoint.

1. Introduction

The management of passenger transport in urban areas poses many challenges to those responsible for organizing transport services for residents. While the importance of public transport, cycling, and walking for sustainable mobility policies is widely accepted, the role of shared mobility services is more debatable.

The main challenge for cities is the inefficiency of transport systems due to the number of vehicles in traffic exceeding the infrastructure's capacity, resulting in congestion. An unfavorable trend has been observed in the structure of passenger transport: the share of travel by private cars has increased, while interest in public transport has declined. New opportunities to reverse this trend have emerged with technological progress and new social trends. Significant changes in information technology and the rise of social networks have contributed to the rapid development of the sharing economy, and transport is one of the areas most susceptible to its implementation. The concept of sharing unused tangible and intangible resources is emerging as a new paradigm that allows access to goods and services without ownership.

The literature demonstrates many benefits of shared mobility for both users and society. However, looking at the level of motorization in Polish society, one may wonder whether wider access to shared modes of transport could induce people to use private cars less or even to give them up. The study of the impact of new mobility services in the urban environment should take into account changes in the functioning of all modes of urban transport, as these services have a significant impact on each other.

Over the past few decades, shared mobility has grown in importance worldwide, as well as the need to integrate it into urban transport systems and make it more efficient from a social, economic, and environmental perspective. Research interests naturally gravitate towards newer and more innovative modes of transport. Most research has treated shared mobility as an isolated system, neglecting the complexity of its interaction with other modes of transport. As a result, estimating its impact on the overall transport system has been difficult, leading to a tendency to overestimate the influence of this type of service.

This paper aims to examine the trends in shared mobility in Poland and assess its impact on the propensity to own a private car.

2. The idea and types of shared mobility

Shared mobility involves sharing vehicles or making shared journeys instead of owning the means of transport. It uses telecommunication technologies to connect users with service providers. Shaheen and Chan (Shaheen, Chan, 2016) define shared mobility as the sharing of a motor vehicle, bicycle, or other means of transport to enable travelers to gain short-term access to transport on demand. This form of mobility includes renting bicycles, scooters, car-sharing, carpooling or renting vehicles via mobile apps.

However, it is difficult to draw the boundaries of shared mobility, as the term encompasses a wide range of services, including traditional car rentals, while others emphasize the importance of intermediation using contemporary information and communication technologies in their definitions (Le Vine, Polak, 2015). "The bone of contention" among researchers is also the demarcation of which types of shared mobility should be considered part of the sharing economy, particularly regarding the classification of on-demand transportation services (e.g. Uber).

Transport is an area in which the sharing economy is thriving, both in B2C and C2C relationships, sometimes also with the support of local authorities. The most popular model is B2C, which involves the interaction between consumers looking for services or vehicles and the companies that own or manage these assets. In the C2C model, individuals interact to trade or exchange services through smartphone apps or online platforms. The company that operates such a platform is not directly involved in the transaction (European Parliament, Directorate General for Internal Policies, 2016).

Sharing in transport can take many forms. Shaheen and Chan (2016) proposed a classification of shared mobility based on whether a vehicle or a ride is shared:

1) Vehicle sharing:
   - car-sharing – short-term access to a car,
   - micromobility – short-term access to bicycles, electric scooters and motor scooters.
2) Journey sharing:
   - ridesharing: connecting passengers with drivers to travel together,
   - on-demand ride services: private car owners offer rides for hire,
   - microtransit.

The choice of the form of shared journey depends on whether the journeys are long-distance or short-distance and on their frequency. Demand for long-distance intercity journeys is usually occasional. People undertaking long-distance travel often seek fellow travelers heading in the same direction. Travelers looking for a car are motivated by economic considerations (lower cost of travel compared to rail and bus), greater convenience of travel and the opportunity to spend time in pleasant company. The rating system on platforms such as BlaBlaCar allows them

to choose someone of a similar age, with similar interests, and who has good feedback from other users.

Short-distance journeys are usually shared within cities or suburban areas. This type of transport can involve a group of people travelling together regularly, usually to work or school, using the car of one of the travelers (carpooling). Another possibility is to rent a car for a specific period (car-sharing). For the occasional need for short-distance transport, a private car with a driver can be ordered via an app, which can be seen as an alternative to taxis (e.g. Uber, Bolt, FreeNow). It is a form of transport classified as on-demand services. The role of micromobility, such as scooters and bicycles, is limited to covering relatively short distances, effectively serving as a means of first- and last-mile transport, specifically for pick-up and drop-off to public transport points.

Systems based on short-term rental of private vehicles are relatively flexible in terms of rental duration and travel distance. In the case of P2P transactions, the external assistance of the company controlling the entire rental process consists of the organization giving users information support, technical support, mediating the transaction, and providing a platform where the transaction can take place (Cohen, Shaheen, 2013).

3. Exploring the relationship between the development of shared mobility and individual motorization: a literature review

Individual motorized transport is the dominant mode of transport in most cities, and its share of urban transport has increased steadily. The development of various forms of shared mobility has raised hopes of convincing part of the population to abandon the use of private cars for urban trips. Car-sharing has grown rapidly in recent years. It is estimated that there were 55 million users worldwide in 2023, compared to only 36 million in 2017 (Statista, 2025).

The advantages of car-sharing systems benefit not only users and service providers but also the city and its residents. In the literature, the main arguments for the development of car-sharing systems include: fewer car journeys, a reduction in traffic intensity and congestion (Martin, Shaheen, 2011b; Shewmake, 2012), a decrease in the number of private vehicles (Martin, Shaheen, Lidicker, 2010), lower energy consumption (Minett, Pearce, 2011), lower emissions of CO_2 into the atmosphere (Martin, Shaheen, 2011a), decreased parking demand (Millard-Ball, Murray, Ter Schure, 2006), lower travel costs for users due to reduced fixed costs compared to car ownership (Litman, 2015), increased travel comfort (Machado et al., 2018), enhanced mobility and alternative transport options (Bondorová, Archer, 2017), and the ability to complement public transport in areas not well served, particularly in peripheral parts of the city (Shaheen, Chan, 2016; Bondorová, Archer, 2017).

In the context of striving for sustainable urban transport, it is particularly important to reduce the number of trips made by private cars. In countries with a long history of shared mobility, where its development effects have been observable, studies have examined the impact of these transport modes on the travel behavior of the population, particularly car-sharing as the closest substitute for private cars. Although the development of car-sharing could be expected to reduce the rate of motorization, this outcome is not entirely clear, as users of these new services include not only former private car owners and users but also individuals who previously used public transport. The availability of a convenient, easy-to-use, and cost-effective service may encourage users of other modes of transport to choose shared transport (Bucsky, Juhász, 2022).

Shared transport, including carsharing, is significantly more developed in Western European countries and the United States than in Central and Eastern Europe. This is partly due to the fact that these services were introduced much earlier in those regions (Kuźma, Połom, Żukowska, 2022). Researchers have conducted numerous studies, mainly surveys on the potential impact of car-sharing on travel choice and car ownership. They calculated the substitution rate for car-sharing users, i.e. what percentage of them would be willing to give up car ownership. The results of these studies were varied. The rate of car-sharing users willing to give up their cars ranged from 3.5% in London, 5% in several North American cities, 6% in Basel, to 36% in London, and 43% in Philadelphia (Bucsky, Juhász, 2022, p. 2210). The discrepancy in the results of the London survey is puzzling, as surveys conducted in the city four years apart have produced entirely different outcomes. Surveys with relatively small samples are difficult to consider fully reliable, as the sample may not accurately reflect the population, and the surveys may be subject to various biases. Additionally, the results of the survey obtained during the initial stage of development of shared mobility systems may differ from those gathered during the maturity phase.

A survey conducted in Switzerland included both car-sharing users and those who did not use it (Becker, Ciari, Axhauseeten, 2018). The survey was initiated with the launch of car-sharing, and a second round was conducted one year later. The results showed that car-sharing users had a significantly lower car ownership rate (0.27 compared to 0.84 for non-users). This indicator changed only slightly one year later (to 0.24 and 0.83 respectively). A comparison of ex ante and ex post results revealed a 6% decrease in car ownership among car-sharing respondents, indicating that it had little impact on car ownership across the city.

More accurate results are provided by empirical studies determining the substitution rate. Such a study was conducted by Kolleck (2021) in 35 cities in Germany. He considered not only the number of registered vehicles but also new car registrations and end-of-life registrations between 2012 and 2017. The substitution rate was calculated for vehicles rather than users and was between 0.9 and 1.9. This means that each shared car replaced one or two cars, a much smaller effect than what other studies have suggested.

Jain, Rose and Johnson (2022), based on a study in Melbourne, Australia, found that many car-sharing users reduced their car ownership, with most of these changes occurring in the year before joining the scheme. A third of car-sharing users had sold their car or given up buying a car. However, the relationship between car ownership and car-sharing use is not clear. The reduction in car ownership may have been due to the frequent use of car-sharing, or it may have been due to changes in personal circumstances or general attitudes towards mobility.

Bucsky and Juhász (2022) compared changes in motoring rates in regions with and without car-sharing systems, as well as changes over time before and after the introduction of these services. Their analysis of data from across the EU revealed that previous questionnaire-based studies had greatly overestimated the impact of car-sharing on car ownership. In fact, car-sharing has a marginal effect on changes in car ownership, with more developed car-sharing systems in certain regions being associated with smaller declines in car ownership rates. Such a result does not seem to support theoretical considerations. However, the conclusion has been drawn that the more affluent urban areas of Europe, which have introduced car-sharing systems, are closer to reaching saturation in private car ownership.

4. Impact of the development of shared mobility on the number of passenger cars in Poland

Shared mobility began to develop in Poland relatively late compared to western European countries and the United States. However, since Poland acceded to the European Union, the level of motorization in Polish society has increased rapidly, and in the largest cities, the share of passenger car travel now exceeds 40% (Wolański, 2023).

The first car-sharing system was launched in 2015 in Wroclaw (GoGet), followed by Krakow (Traficar) and Warsaw (4Mobility) in 2016. The following year, Panek CarSharing, Easyshare and Vozilla appeared on the market. Other local systems were launched but failed to sustain themselves in the market. There are currently three companies that together dominate the market: Traficar, Panek CarSharing and 4Mobility. Table 1 provides data on shared transport modes.

Table 1.
Vehicles of shared transport in 2022

City	Car-sharing	Electric scooters	Motor scooters	Bicycles	Car-sharing vehicles per 1000 inhabitants**	All shared vehicles per 1000 inhabitants
Warsaw	1394	14472	49	3835	0,75	10,62
Tri-City	1001	8080	86	4000*	1,31	12,57
Kraków	647	6778	0	154	0,81	9,43
Wroclaw	335	3302	0	1714	0,50	7,94
Poznan	311	4009	104	1397	0,57	10,75

Cont. table 1.

Łódź	285	1578	0	1334	0,43	4,86
Szczecin	233	1866	56	666	0,60	7,2
Katowice	142	1347	0	563	0,51	7,32
Lublin	50	713	0	511	0,15	3,85
Rzeszów	30	699	50	20	0,15	4,05

Note. * in Tri-city the Mevo city bike sharing system was launched in 2023; ** own calculations based on the number of inhabitants in 2022.

Source: Stowarzyszenie Mobilne Miasto (2023).

Traficar has the widest range and is available in 28 Polish cities. It offers services mainly in the largest cities such as Kraków, Katowice conurbation, Wroclaw, Poznan, Warsaw, Łódź, Tricity, Szczecin, Lublin, Rzeszów, as well as in a dozen or so smaller cities located near large conurbations. Panek CarSharing operates in 8 cities, while 4Mobility in 7. The number of users registered in car-sharing applications is increasing year on year. However, the number of shared cars per 1000 inhabitants remains relatively small and does not sufficiently meet the needs of the population.

To answer the research question of whether the development of shared mobility has influenced vehicle ownership in Poland, changes in the number of registered cars and the motorization index were analyzed in the largest cities, where shared mobility systems are developed (Table 2).

Table 2.
Number of registered passenger cars between 2016 and 2022

City	2016		2022		Increase in the number of vehicles 2016-2022	Increase in the number of vehicles 2016-2022 (%)
	Number of vehicles	Number of vehicles per 1000 inhabitants	Number of vehicles	Number of vehicles per 1000 inhabitants		
Warsaw	1 194 068	680,8	1 460 479	815,4	324 247	27
Tri-City	432 405	570,4	526 064	690,8	93 659	22
Kraków	448 004	585,4	561 986	699,6	113 982	25
Wrocław	403 063	632,1	506 821	751,9	103 758	26
Poznan	356 788	660,3	431 181	796,5	74 393	21
Łódź	365 931	525,4	434 956	660,5	69 025	19
Szczecin	205 779	508,2	247 261	631,5	41 482	20
Katowice	199 139	668,0	233 939	834,9	34 800	17
Lublin	172 128	505,6	214 298	647,0	42 170	24
Rzeszów	96 672	515,8	125 195	634,9	28 523	30

Source: GUS, Bank Danych Lokalnych (2025).

An analysis of the data in Tables 1 and 2 shows that, despite the significant development of shared transport systems in Poland, private car ownership has not been abandoned. In fact, the number of private cars has increased significantly. Between 2016 and 2022, the percentage increase in the number of private cars ranged from 17% in Katowice to 30% in Rzeszów. At the same time, it is worth noting that in 2022 Katowice had the highest level of car saturation, with 834.9 vehicles per 1000 inhabitants, while in Rzeszów the rate was only 634.9 – one of the lowest in the country. Therefore, the example of Poland does not confirm the results of studies carried out in other countries.

The reasons for the identified phenomenon can be attributed to various factors, including the insufficient availability of shared transport and the influence of factors that drive the desire or necessity to own a private car. Shared transport in Poland is still in an early stage of development and there are too few vehicles, particularly car-sharing cars. This limits the availability of these services and creates uncertainty about the availability of a car when needed. Especially during peak demand times, there may be a shortage of available vehicles, which limits the flexibility of using the service. The car-sharing fleet in Poland has not developed at the pace or in as many locations as market demand would suggest, primarily due to the difficulties faced by car-sharing companies in acquiring enough new vehicles.

Brychcy and Przybyłowski (2018) surveyed Traficar users in Tricity, which showed that more frequent use of car-sharing could be encouraged by the lower price of the service, greater availability of vehicles and a larger spatial zone of service. The cost of renting a car is another factor limiting car-sharing use. This cost can be higher than when using one's own vehicle, due to charges for car use time and mileage. Car-sharing users also highlight the formalities involved in renting a car, as well as concerns about insurance and potential additional costs arising from damage to the vehicle.

Various factors of an economic, social or cultural nature influence the continuous growth of the number of private cars in Poland, despite the development of shared mobility. Over the years, Poland has been catching up in terms of cars per capita compared to highly developed countries, and it is now one of the EU countries with the highest ratio. Higher incomes and a broad availability of credit enable an increasing number of consumers to purchase cars, while those with lower incomes are opting for more affordable used vehicles. The increase in the number of cars in households is also linked to urbanization changes and the development of suburbs, as this increases the need for daily travel related to work and living needs. Owning one or more cars in a family becomes a necessity when adequate public transport services are not provided.

In Poland, there is a specific attitude toward car ownership, as it not only serves as a means of transport but also symbolizes independence, prestige, and comfort, further motivating the public to purchase a car. People value independence and flexibility, which is reflected in the ability to use a car whenever necessary, the freedom to plan the route and the flexibility to determine the exact time of travel. For many, the car has ceased to be a luxury item and has become a basic household necessity. Owning a car facilitates to carry out everyday tasks, such as shopping or taking children to school.

It is also worth emphasizing that the rise in the number of passenger cars in Poland is driven not only by households but also by the business sector. According to data from the Polski Związek Przemysłu Motoryzacyjnego (Polski Związek Przemysłu Motoryzacyjnego, 2025), enterprises registered around 68% of new passenger cars. Passenger cars are an indispensable working tool in many industries, both for customer service and for the daily operation of the company.

5. Conclusions

Promoting shared mobility solutions has become a standard component of urban transport development strategies, serving as a solution within the concept of sustainability. Unfortunately, there is a lack of official data on shared mobility vehicles, making it nearly impossible to monitor changes and assess whether expected effects are occurring. An attempt to obtain data on the number of vehicles and users in each city from the main car-sharing operators was unsuccessful. Only one of the three main companies operating in the Polish market provided data. This is one of the primary limitations in studying the quantitative changes in the development of shared mobility.

The discrepancy between the results of studies conducted in other countries and trends in car ownership in Poland is, among other factors, due to the fact that when shared mobility systems were introduced, Western European countries already had higher rates of private car saturation than Poland. The second important reason is the attitude of Poles towards cars. The mentality towards car ownership is multidimensional, resulting from historical, cultural, and socio-economic conditions. The scarcity of cars during communist times meant that the private car was perceived as a coveted symbol of prestige and a marker of social success. Combined with low-quality public transport and underdeveloped shared transport, this attitude has become deeply entrenched.

It can be predicted that, in the coming years, the increase in the number of passenger cars in Poland will no longer be significant due to the already high motorization rates compared to other developed European countries. Another reason is that younger generations do not attach as much importance to owning a car on their own. So, they may not buy a car if they have the option of using a vehicle when needed. Some studies have found that there is a higher incidence of car-sharing users who do not own a car and do not buy, rather than those who decide to sell their vehicle. People who own cars only rent car-sharing vehicles on rare occasions.

To date, research on shared mobility in Poland has been quite limited, typically focusing on small samples of local car-sharing and micromobility users. They are mainly qualitative studies aimed at determining the preferences of users of these systems, the level of satisfaction with the use of services, expectations regarding improved infrastructure and integration with public transport, as well as factors that have encouraged respondents to use this form of transport. Directions for further research should primarily include larger groups of respondents from different cities. Furthermore, the research should cover both the group of users who regularly use shared transport and those who do not, in order to find out the factors that prevent them from changing their transport behavior. Perhaps there are differences in attitudes towards urban travel between generations of users. In view of the observed phenomenon of a continuous increase in the number of private cars, it would be worthwhile to carry out an in-depth study of the factors causing Poles' reluctance to give up owning a private car and what might persuade them to use other forms of transport.

There is a substitution between modes of transport, meaning that transport needs can be met in various ways. The choice of a particular mode of transport is influenced by how well it meets the user's cost and quality requirements. Therefore, it is necessary to take initiatives to increase the attractiveness of using shared modes of transport. The guiding idea behind such solutions is to better integrate the different modes of shared mobility, as well as with public transport. Infrastructural integration requires the setting up of dedicated locations where different vehicles and shared mobility services are made available. Such places, called mobility hubs or centres, should be established at public transport interchanges, office buildings, or shopping malls, i.e. places where large numbers of people travel. Finally, it is important to integrate access to information on the availability of different services, as well as the ability to book vehicles and pay fares, into a single mobile application. This type of integration can be described as digital integration. An example of such an advanced digital tool is the integrated platforms linking public and shared modes of transport, known as Mobility-as-a-Service (MaaS), which are operating in an increasing number of cities around the world. MaaS systems not only allow users to find the best travel alternatives based on their needs, but also enable payment for travel across different modes of transport as if it were a single service

It is conceivable that implementing solutions that improve the convenience, accessibility, reliability and affordability of shared mobility could encourage more people to use these services. Additionally, congestion commonly found in cities could serve as an unlikely ally, and an organizational solution to promote the shift from private cars to car-sharing could involve allowing shared vehicles to use bus lanes, as is the case with taxis.

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