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PREFERENCES AND BEHAVIOUR OF DRIVERS PARKING CARS IN CITY CENTRE AT THE EXAMPLE OF GDYNIA ŚRÓDMIEŚCIE DISTRICT

Abstract

The article aims at presenting research results concerning preferences and behaviour of people parking their private cars. The research was conducted to learn the behaviour of drivers parking their cars and determine their willingness to change the behaviour under selected factors.

The source of primary data used in this article includes own research conducted under individual interview method. The secondary source of data includes academic literature (monographs, academic articles), conference presentations and Internet sources.

The article presents the concept and scope of travel behaviour and preferences of drivers parking their cars in the city centre, the concept and scope of parking policy, and characteristics of drivers parking cars in the city centre.

Keywords: parking policy, drivers' preferences and behaviour, travel behaviour, city travels, car, sharing economy, marketing research

Introduction

Drivers who enter the city centre are characterized by particular travel behaviour. Learning their behaviour and preferences makes it possible to develop parking policy properly from the perspective of transport policy. Cities are facing road traffic congestion, which is particularly severe in the city centres. The problem also refers to providing sufficient number of parking spaces; however it must be assumed that from the perspective of sustainable development policy it means, on the one hand, efforts to discourage drivers to enter the city centre by cars and leave them at parking spaces, on the other, to promote alternative means and modes of travel.

The aim of this article is to present the behaviour of drivers parking in the city centre at the example of Gdynia Śródmieście district as well as their preferences and willingness to use sharing economy solutions in transport and to become aware of remedies counteracting shortage of parking places. The primary data used in this article was obtained by analysing 720 drivers parking their cars in Gdynia Śródmieście under method of random selection at 33 points (parking lots and places) during workday at two time periods (in the morning and afternoon peak hours). The analysis was conducted based on individual interview questionnaire containing 20 questions (open and closed). The research was performed in November 2007.

Due to its limitation, the research did not cover the entirety of drivers' behaviour related to city travel, and thereby the modes such as *park and ride* – change system outside the city centre were not examined and no detailed analysis on alternative modes of travel in the city was performed.

1. Preferences and Behaviour of Drivers Parking Private Cars

The preferences and behaviour of drivers belong to overall travel behaviour, namely the behaviour aiming at fulfilling the transport needs as per the preferences and completing the decision-making process in this respect (Hebel, 2015). Such perception of the concept of travel behaviour makes it possible to analyse the behaviour as such but also how the behaviour should be influenced taking account of the assumed objectives, and also (including preferences) to adjust parking policy to users' expectations.

The selection of means of transport depends on numerous factors which can be divided into time-related factors, spatial factors, availability, weather and other factors (e.g. psychological ones) (Wyszomirska-Góra, 2013). The studies prove that the main advantages of traveling by car perceived by car users include (Sierpiński, 2012):

- comfort of travel,
- short time of travel,
- choosing the route,
- car capacity,
- independence from weather conditions,
- possibility to take passengers,
- usefulness in emergency,
- safety from strangers.

However, the use of such means of transport in city travels involves some disadvantages. They include adverse impact on natural environment (especially at heavy traffic), necessity to concentrate on driving, and impact on congestion.

The number of households with private cars in Gdynia has been rising on a regular basis and at present they constitute ca. $\frac{3}{4}$ of the total number of households (Hebel, Wyszomirski, 2014). Moreover, the conducted studies prove that the share of private car used in city travels has been rising steadily (*Preferencje i zachowania komunikacyjne mieszkańców*, 2016) and amounts to more than 50%. The main reasons for choosing private cars include comfort and shorter time of travel. At the same

time, the respondents indicate that the most important factors decreasing their willingness to use private cars in city travels include finding a parking place and paying parking fees. Private car has become the dominant means of transport in city travels (Hebel, Wołek, Wyszomirski, 2017).

2. City Transport Policy on Parking Private Cars

The parking policy should be included in the city transport policy, and the latter should ensure smooth operation of urban transport. Thus, the parking policy should take account of the objectives of city transport policy including not only economic viability but also objectives resulting from the spatial, social and environmental development (Grzelec, Wyszomirski 2017). The main instruments of parking policy include adapting infrastructure (parking spaces, access to them and their facilities e.g. markings and parking meters), actions aiming at changing the behaviour and in particular discouraging drivers to travel by car to the city centre and encouraging people to use public transport, other means of transport such as bicycle and use solutions in line with the idea of sustainable development.

The parking policy includes elements such as (Hebel, 2015):

- identification of needs related to parking in the city,
- number and structure of parking places,
- providing access to parking places for people particularly predestined to use them (e.g. the disabled),
- system of parking fees (paid parking zone size and structure, amount of fees and parking fee payment system, exemption from fees),

Within the sustainable transport policy the aim is not to eliminate private cars completely, as means of transport in the city centre, but ensure their rational use to benefit from their advantage over other means of transport and limit their negative impact on the environment. Therefore, it is rational to encourage private car users to use such solutions as carpooling (sharing the car journey by several people at the same time by offering seats in the car and sharing the travel costs), carsharing (shared paid use of private car by several drivers, usually anonymous to each other – most frequently the car is rented from car rental company), use of bicycle or scooter.

The city parking policy in Poland is based on adopted solutions resulting from national⁵ and local laws⁶ as well as strategic planning included mainly in the transport plans for the city (*Plan Zrównoważonej Mobilności Miejskiej dla Gdyni*, 2016). The main instruments in the city parking policy focus on two activities (Parkitny, 2016):

- reducing car traffic in the city centres,
- establishing transfer systems outside the city centres.

⁵ Act on Road Traffic of 20 June 1997 Dz.U. 1997 No. 98 item 602 as amended; Act on Public Roads of 21 March 1985 consolidated text of 9 November 2017 Dz.U. 2017 item 2222.

⁶ Resolution No. XXI/443/12 of the City Council of Gdynia of 27 June 2012 (as amended, i.e. Resolution tj. no. XXXIV/953/17 of the City Council of Gdynia of 30 August 2017), with item 2222 of 1 December 2017.

Such approach should increase the attractiveness of walking, travelling by public transport or cycling relative to travelling by car, as the dominant means of city transport (See also Frieberg, 2013).

Paid parking zones are established to discourage drivers from parking their cars (thereby traveling by car) to the city centre. If, despite the parking fees the driver decides to travel by car and pay the parking fee, the charging system should increase the parking turnover (it is crucial to arrange the parking fee system so that the charges increase every subsequent unit of time the car is parked), and thereby increase the number of parking spaces for other users.

3. Characteristics of Surveyed Drivers

Among the surveyed drivers women constituted 40% and men 60%. The age structure and social and professional status is presented in figure 1.

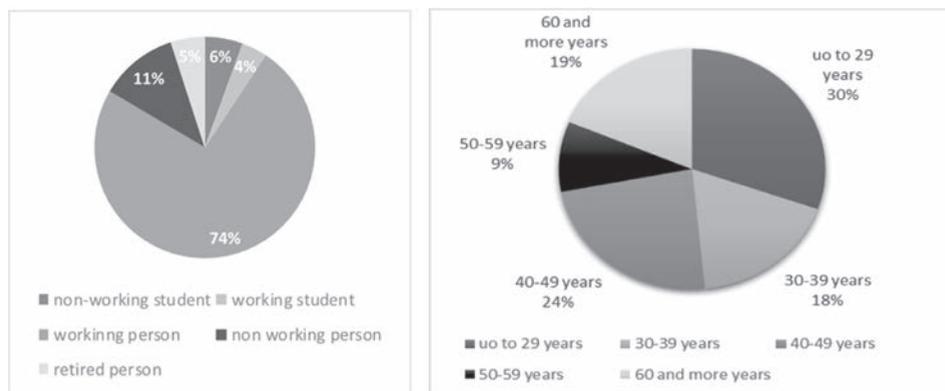


Figure 1 Age and social and professional status of respondents

Source: (own elaboration)

Among the survey participants nearly 1% of respondents do not have a car in their household (they use cars of other people/entities), 379 have one car per household (53% of respondents), 33% of respondents have two cars per household, 13% of respondents have 3 and more cars per household. Three hundred and forty three (343) respondents came from outside Gdynia and 378 from Gdynia (the sample did not include the inhabitants of Gdynia Śródmieście district).

The most frequent reason for travelling is work (27% of respondents), followed by shopping (15%), health-related services (14%) and business meetings (11%). Other reasons for travelling (less than 10% of answers from the respondents) include education, tourism and recreation and administrative errands. The area of Śródmieście is diversified as for various activities. The wide range of reasons and objectives of travel by survey location in Śródmieście district are provided by studies within Civitas Dyn@mo project (Jamroz et al., 2015).

The respondents have also been analysed as for their use of public transport. Around 8% of respondents use public transport on a daily basis, 25% less than once a week, and 45% of respondents did not travel by public transport even once in the analysed year. Studies on preferences and travel behaviour of the inhabitants of Gdynia indicate that the share of collective transport in city travels amounts to 40%, whereas transport by private cars totals 58% (*Preferencje i zachowania komunikacyjne mieszkańców Gdyni*, 2016).

4. Drivers' Behaviour as regards Travels to City Centre

From the perspective of availability of parking places, the duration of parking is crucial. Shorter stay duration ensures higher turnover of vehicles and availability of parking places. The stay duration of parked cars is presented in Figure 2.

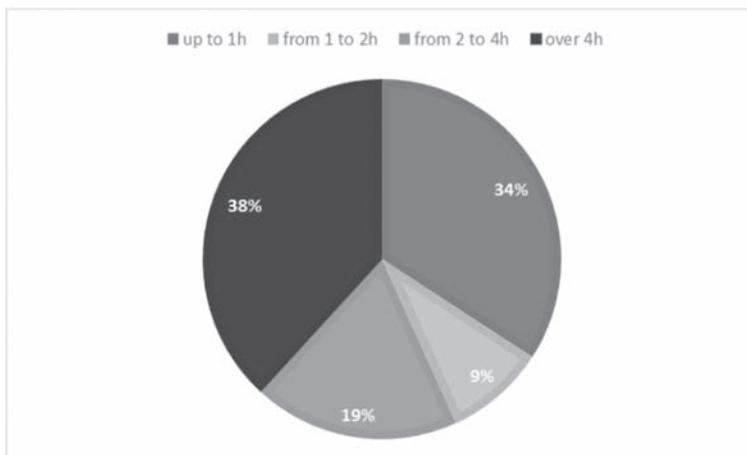


Figure 2. Stay duration of cars parked at the parking lot
Source: (own elaboration)

Cars are, first of all, parked in places where no parking fee is charged (despite the fact that Śródmieście district is included, to a large extent, in the paid parking zone). It amounted to 76% of cases. Fourteen per cent (14%) of drivers paid for parking and 10% of drivers exercised their right to free parking in places included in the paid parking zone. It must be indicated that if the aim of introducing paid parking zones involves reducing the number of cars entering the city centre and shortening the duration of parking occupancy, the aim has not been achieved in the light of conducted research.

The scale of parking frequency translates, to a large extent, into reasons for traveling to the city centre. Over one fourth of the respondents park their cars in the aforementioned district on a daily basis or on all work days. Similar scale refers to parking cars two to three times a week. Twenty eight per cent (28%) of drivers park their cars less than once a week, and 8% of the respondents have

parked their car for the first time in this location in the calendar year. We can observe clear correlation between the professional and educational needs and interim travels for other reasons.

One of the objectives of transport policy is to encourage people to share travels and avoid one person travels, which should reduce the number of cars on roads and occupied parking places. The research results on the number of persons in the car at entering and leaving a particular parking place are presented in Table 1.

Table 1 Number of passengers accompanying the driver at entry and exit

Number of passengers	Entry		Exit	
No passenger	426	59%	No passenger	426
1	171	24%	1	171
2	87	12%	2	87
3 and more	36	5%	3 and more	36

Source: (own elaboration)

The majority of drivers during entry – 59% and exit – 57% to and from the parking place travelled with no passenger. Moreover, only a small change was observed between the number of people entering and leaving the parking space in one car. It indicates low level of shared travels by private car.

The study verified reasons for choosing private cars as means of transport to the city centre. Drivers were analysed as for comfort, lack of alternative connections, time of travel by public transport and lack of direct connections by public transport. The results are presented in figure 3.

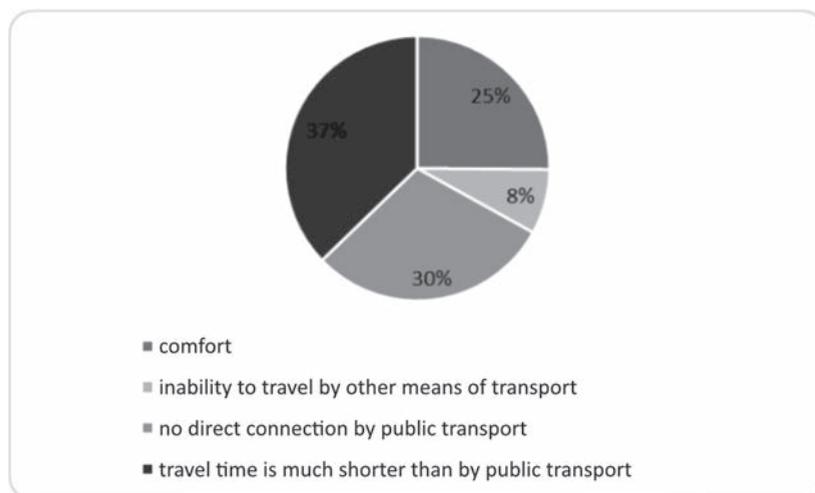


Figure 3. Main reasons for using cars to travel to city centres

Source: (own elaboration)

Relatively small proportion of those who parked their cars could not use other means of transport than their private cars. The majority of answers included

comfort and lack of direct connection by public transport, which can also be recognized as using private cars as alternative to inconvenient, from the perspective of respondents, travels by public transport with changes. We need to add that direct connections constitute the highest travel demand of the inhabitants of Gdynia as for urban transport, indicated in regular surveys (*Preferencje i zachowania komunikacyjne mieszkańców Gdyni*, 2016).

Making parking spaces available for drivers is conditional upon numerous factors. They include, e.g. land development plan, city parking policy, number of parked cars, etc. Determinants for choosing parking space indicated by the respondents are presented in Figure 4.



Figure 4. Main determinant for choosing parking space
 Source: (own elaboration)

Choosing a particular parking space for their cars, drivers focused first of all on location. The cost of parking (parking fee) was less important as well as the number of vacant parking places. By comparing these results with the research results regarding whether parking fee is collected at a particular parking space we can conclude that drivers choose places they do not need to pay for, and at the same time places which help them reach their destination as conveniently as possible.

It is in the interest of drivers to support the increase in the number of available (vacant) parking spaces. In the survey, drivers were asked about their willingness to accept particular changes in the traffic organization in Śródmieście district and increase in parking fee charges in exchange for increase in the number of parking places. The results are presented in Table 2.

While drivers are generally willing to accept changes in traffic organization such as speed slowdown and more one-way roads, they definitely do not accept increase in parking costs.

Table 2 Willingness to accept particular changes in traffic organization and costs of parking in exchange for increase in the number of parking places

Variable	Yes	No	Don't know
increase in the number of one-way roads	328	253	139
speed slowdown to 30 km/h	271	369	80
increase in parking costs by 50%	174	479	67
increase in parking costs by 100%	49	618	53
increase in parking costs by 200%	33	639	48

Source: (own elaboration)

5. Factors Discouraging Drivers from Parking

From the perspective of city transport policy it is well grounded to limit the number of cars entering the city centre and encourage drivers to park their cars in the centre as short as possible. The survey analysed opinions of drivers on factors which could limit their willingness to park in the city centre. The results are presented in Figure 5.



Figure 5. Factors limiting entry to and parking in the city centre

Source: (own elaboration)

The factor which will be least discouraging for drivers entering and parking their cars in the city centre is the extension of paid parking zone area. By interpreting research results we can assume that drivers look for places where they do not need to pay for parking. Therefore, extending the paid parking zone area will force them to look for other free parking places, although less convenient in terms of location. The comparable and most influencing the drivers are extension of travel time (i.e. further limitations in the distance of travel resulting from congestion), increase in parking fee costs (which correlates with the results on measuring factors which could help increase the number of free parking places). Drivers do not accept limiting the number of parking places, either (See also Parkitny, 2013).

The above mentioned result refers also to research results on changes in the behaviour of drivers parking their cars due to increased road congestion. The behaviour is presented in Figure 6.

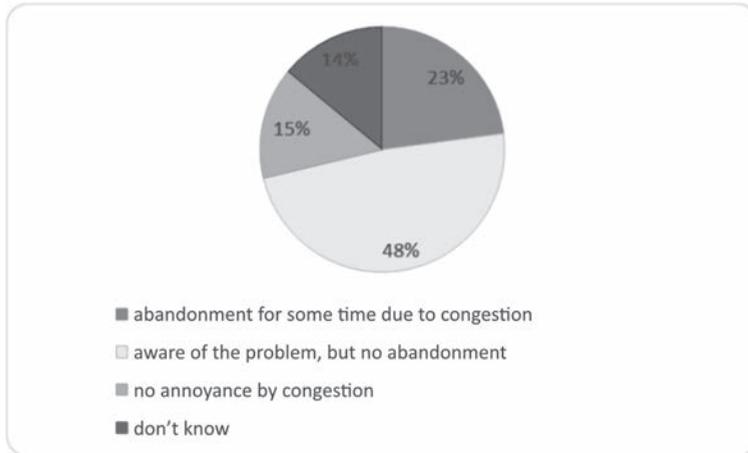


Figure 6. Impact of road congestion on drivers abandoning traveling by private car
Source: (own elaboration)

Due to the increase in road congestion, $\frac{1}{4}$ of drivers would be willing to abandon traveling by private car. However, the majority of drivers believe that the issue is unimportant to them – they either fail to notice its annoyance, or do not change their behaviour despite large congestion, believing that the alternative modes of transport fail to satisfy their needs and preferences like travels by private cars.

6. Sharing Economy as Element Limiting the Number of Parked Vehicles

In sharing economy we can distinguish various models for satisfying the transport needs (Rudawska, 2016; Sztokfisz, 2017). The first involves using means of transport alternately with others (*peer-to-peer sharing*) through sharing them. Such solutions include e.g. Traficar, Blinkee, city scooter (which can be used in Tricity) and the designed „Metropolitan Bicycle”. Such model fits well into the assumptions of sustainable city transport policy and consequently into parking policy. The second model involves collective use of goods – in case of transport, *carpooling*, e.g. BlaBlaCar. Another model refers to rendering transport services, i.e. Uber or iTaxi, which are perceived first of all as taxi service and not as element of sharing economy. The solutions are possible thanks to high level of IT-based services, payment transactions and IT use throughout the society.

In the analysed area it is possible to use commercial solutions in carsharing, collective use of scooters and it is planned to introduce city bicycle system. Willingness

to use such solutions, and consequently rational use of parking places is presented in Table 3.

Table 3. Willingness to abandon travels by car if carsharing, city bicycle or scooter are possible

Willingness to abandon travels by private car	Carsharing		City bicycle		City scooter	
abandonment	31	4%	32	abandonment	31	4%
temporary abandonment	159	22%	160	temporary abandonment	159	22%
no abandonment	530	74%	528	no abandonment	530	74%

Source: (own elaboration)

The majority of drivers are not willing to abandon travels by their cars in a situation when instruments of sharing economy are promoted to satisfy the transport needs in the city. Only small proportion (3–4%) would be willing to completely abandon travels by private cars to the city centre. Some of the respondents accept temporary abandonment of travels by private cars.

Conclusions

The use of private cars as means of transport to and from the city centre results from conformist approach of car users (comfort and unwillingness to change transportation), and to a smaller extent from impossibility to travel by public transport.

One of the parking policy objectives is to limit entry to city centre for vehicles. The objective can be achieved by paid parking zones. However, the conducted research proves that the majority of drivers look for free parking places, which makes the parking policy ineffective. On the one hand, drivers indicate that lack of parking places and obligation to pay for parking limits their willingness to travel by car to the city centre, on the other, they find free places to park their car, especially places outside the paid parking zone.

It follows from the above that introducing limits and tools discouraging drivers from using private cars as means of transport to and from the city centre is ineffective to a larger extent, and we need to provide drivers and passengers with alternative solutions to fulfil their transport needs and travel preferences.

Moreover, the majority of drivers fail to notice grounds for permanent or temporary change in their travel behaviour in the city promoted by the idea of sharing economy with the use of carsharing, carpooling or city bicycles and scooters.

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