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The impact of the car restrictions implemented in the city centre on the public space quality

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Abstract

Implementation of the car traffic and parking restrictions is one of the most controversial aspects of the urban transport policy. Such initiatives frequently meet with the opposition of the local groups of users. These changes affect not only the users of private cars, but also shopkeepers and restaurant owners, who are afraid to lose income. On the other hand, these solutions, typically introduced in the city centre, improve the flow of the public transport vehicles, enhancing its competitiveness, and increase the public space attractiveness. Nevertheless, the public awareness of the positive effects of the restrictions is low and it is important to show that their introduction brings benefits for the inhabitants and visitors and does not cause negative changes in the income of the owners of facilities. The paper presents the results of the research carried out to evaluate the impact of car restrictions implemented in several locations in the Cracow city centre. The survey was conducted among customers and owners of the facilities located in the areas of the implemented changes. The results show that a very small percentage of customers had problems with accessing those facilities and they are mostly related to traffic congestion. Satisfaction with the quality of public space is declared by approx. 80% of customers. The vast majority of owners did not want to restore the previous situation and their income remained at a similar level.

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1. Introduction

Restrictive, forced instruments often backed by legislation, the so-called "push measures" are intended to discourage commuters from using cars (Marshall and Banister, 2000; Loukopoulos, 2007; Sierpinski, 2016). They relate to the introduction of restrictions on the traffic or parking of vehicles, such as e.g. prohibition to enter by car to certain city areas or to selected street sections, prohibition to park or limiting the number of parking spaces (Garling and Loukopoulos, 2007). They are also associated with the use of financial resources (Khademia and Timmermansa, 2011; Migliorea et al., 2014), e.g. in the form of fees for entering a separated city area, fees for the use of certain elements of the transport network or car parking fees. The implementation of such instruments is usually accompanied by other actions related to the improvement of the travelling conditions for means of transport alternative to cars, appropriate development of areas covered by actions and increasing their attractiveness, especially for pedestrians. Nevertheless, the introduction of traffic and parking restrictions is one of the most sensitive and controversial aspects of the implementation of transport policy in the cities (Garling and Loukopoulos, 2007). These types of initiatives are usually not supported by the society. The protesters are not only car users, but also the owners of commercial, service and restaurant facilities located in the areas of those entry restrictions, who fear a decline in the income in their business activities. The objections of entrepreneurs are based on an incorrect and negative perception of both, space users who will be affected by the change and the future effects of planned actions (Hall and Has-Klau, 1985). Entrepreneurs believe that motorized customers are wealthier than public transport users and pedestrians, and have more purchasing power than the two former groups (Soni and Soni, 2016). However, the research does not support such thesis. What's more, households that do not have a car, save more money because they spend less on commuting to work by car (Soni and Soni, 2016). Restaurant owners are also convinced that a facility that is better accessible, and especially if the restaurant has a parking lot right in front of it, attracts customers, including those living in more remote areas of the city. Meanwhile, studies indicate that customers do not find it important whether there is a parking lot in close proximity to the facility and are willing to walk a longer distance on foot than the distance perceived by entrepreneurs (Hall and Has-Klau, 1985; Soni and Soni, 2016).

At the same time, both the sector of services and retail and city residents have low awareness on the positive effects of the implementation of restrictive instruments that allow to give the space back to other traffic users, especially those walking on foot. The implementation of such solutions will improve travel conditions and increase the transport availability of these areas with means that are alternatives to cars. Reducing the number of vehicles on the street sections, which will be the result of the implementation of the restrictions, streamlines the traffic of public transport vehicles, positively affects the punctuality and the regularity of service, contributing to an increase of competitiveness of this means of transport. In addition, car parking restrictions, which will cause that accessing a car park will take longer on foot, and thus, make it comparable in time to a distance walked to a public transport stop, increase the probability of choosing public transport when travelling (Knoflacher, 2006). These solutions contribute to creating streets and public spaces that are friendly to pedestrians and cyclists. Studies also show that by creating the right conditions for travels made by walking, more people not only walk, but remain in the urban spaces (Gehl, 2013; Montgomery, 2015). The pedestrianization of streets and squares, resulting from the application of car restrictions increases the number of journeys on foot, which in turn, stimulate other activities and are an opportunity to interact and communicate with other people (Montgomery, 2015). Freeing city spaces from cars causes that these spaces can be used in a new way (e.g. organization of cultural events, festivals, street art events), and increases their pace, as they become more vital (Gehl, 2013). Limiting traffic causes less accidents involving pedestrians and cyclists, including children and the elderly people (Soni and Soni, 2016). Other social benefits of pedestrianization relate to increasing the sense of personal safety as a result of minimizing the risk of an accident. This means that pedestrians, including children, the elderly and people with disabilities, can, without fearing for their lives, stroll and walk, enjoying a car-free environment (Gehl, 2011). Benefits can also be considered in the context of health effects - reduced level of contamination that is harmful to human health, as well as increased physical activity, which is the

result of improving conditions for journeys made via active means of mobility (Giles-Corti et al., 2009). No motorized vehicles, and thus reduced level of pollution, noise and vibration also contribute to the protection of cultural heritage. The improvement of safety, reducing noise and emissions of harmful pollutants and positive shopping experiences have a positive impact on the increase the number of people who visit high streets (Soni and Soni, 2016). According to Leinberger and Alfonso (2012) and Litman (2011), pedestrian-friendly areas have intrinsic economic value that result from stimulating social exchange and economic transactions. In turn, the results of the research show that the transformation of streets into pedestrian areas that are accessible only by public transport and only for supply vehicles increase the turnover of the owners of facilities that are located in that area (TEST, 1989; Roberts, 1990; Newby, 1992; Hass-Klau, 1993; Sandahl and Lindh 1995; UITP, 2011). Studies also show that the volume of turnover and the number of customers are proportional to the number of pedestrians in the area (Hall and Hass-Klau, 1985). Another positive effect of pedestrianization is an increase in the property value (Sandahl and Lindh, 1995; Diao and Ferreira, 2010; Gilderbloom et al., 2015).

The problem of high public ignorance about the positive effects of such projects is particularly evident in Poland. Despite many examples of the positive effects of the implementation of restrictive measures flowing from abroad, there is a need to obtain evidence of their effectiveness in the Polish conditions that are specific in terms of economic, cultural, sociological aspects. From the point of view of public consultations that are more and more often conducted in Poland, it is extremely important to show that the introduction of restrictions brings benefits not only for the visitors of these areas, but also does not cause negative changes in the income of the owners of facilities that are located in those areas. This article presents the results of the first Polish studies assessing the results of the implementation of restrictions on traffic and parking of cars, introduced over the last decade in several locations in the city centre of Cracow. The surveys that allow to conclude on the impact of the restrictions have been conducted among visitors and owners of facilities located in those areas. To support the thesis that the implementation of such instruments generally does not cause negative changes in the volume of income of the owners of facilities, data obtained from the Tax Office in Cracow was used.

2. Description of the analysed areas

For the purposes of the analysis, three locations were selected from among many situated in the city centre of Cracow, which in the last decade have been converted into areas for the exclusive use of pedestrians and cyclists. Two of them are the city squares: Szczepanski Square and Small Market Square that currently perform a cultural and recreational role. Both until 2008 served as inner city car parks (in Figure 1 Szczepanski Square is marked with number 1, and the Small Market Square is marked with number 2). The third location is the Grodzka Street, one of the oldest streets in Cracow, of great historical and cultural importance, where traffic restrictions were implemented gradually, since the first July 2013 was covered by a complete ban on car traffic (in Figure 1 Grodzka Street is marked with number 3).

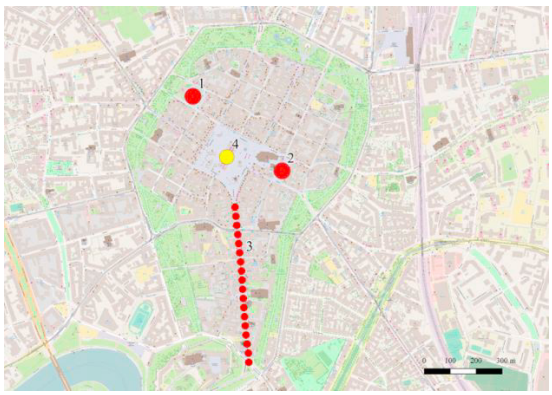

Fig. 1. The areas of analysis (1 - Szczepanski Square 2 - Small Market Square, 3 - Grodzka Sreet, 4 – Main Market Square in Cracow). Source: own study based on www.openstreetmap.org.

Each of the areas is located directly in the historical city centre, near the Main Market Square, which is the most strongly identified public space in Cracow (in Figure 1 Main Market Square is marked with number 4). Of note, even in the seventies of the XX century, one could drive a car on the Main Market Square. In 1979, the Main Market Square was closed to motorized traffic and to this day it has been a meeting place, a place for summer festivals, concerts and fairs, inaccessible for cars.

Small Market Square and Szczepanski Square are locations from which, in the context of urban policy of the communist state in the mid-twentieth century, the previous fair functions were removed and free space was arranged for municipal parking lots (Farid and Vogt, 2008). In 2008 both Szczepanski Square and Small Market Square were covered by the program "Integrated Access Control Strategy in Cracow" in the framework of the EU CiViTAS CARAVEL project. The main objective of the program was increasing the areas with limited access for cars in the city centre. Over the next few years, car parks on both city squares were liquidated and their space was included into zone B, one of the restricted traffic zones in the Cracow Downtown (there are 3 zones of restricted traffic and parking for vehicles: Zone A - with access for pedestrians and cyclists, zone B - accessible only for residents of the properties located in the area and zone C - with parking fees for parking vehicles[1]). Within a few years after the liquidation of the parking areas on both Small Market Square and Szczepanski Square, these areas have been modernized and as a consequence of those works, public space of these squares gained new infrastructure elements: benches, flowerbeds, fountains that make the space more attractive to tourists and city residents. Currently, in both locations numerous municipal cultural events are organized: concerts, fairs, festivals, expositions and exhibitions.

Grodzka Streets is one of the oldest streets in Cracow and is part of the so-called "Royal Tract" that leads from the Main Market Square to the Wawel Castle. Its attractiveness in terms of culture, tourism and retail makes that the street is visited by large numbers of tourists and locals. Therefore, traffic restrictions in the street have been gradually introduced over the years. Until 2013, entering Grodzka Street was only possible for the residents of the street and authorized vehicles. As a result of the implemented changes Grodzka Street was classified as Zone A - with access only for pedestrians, cyclists and horse-cabs.

3. Results of the research into the change of income and the attitudes of the owners

After about 10 years since the car traffic restrictions were introduced on two mentioned city squares and about 5 years since the transformation of Grodzka Street into a pedestrian - bicycle tract, a survey was conducted among the owners of the facilities located on this street. The study was conducted on weekdays in the afternoon in the second half of June 2016. The aim of the survey conducted among the owners of the facilities (restaurants, stores, retail facilities) was to obtain information about the number of new restaurants or shops after the implementation of changes, possible changes in the income and their views on the applied traffic restrictions. During the survey interviews were conducted with owners of:

- 47 facilities operating in Grodzka Street. 94% of the owners of the facilities had been conducting their business activities prior to the introduction of car traffic restrictions.
- 10 facilities operating around Small Market Square. 30% of the owners of facilities had been conducting business activities before the parking lot was eliminated, while the remaining 70% began operating after changes.
- 18 facilities operating around Szczepanski Square. 56% of the owners of facilities had been conducting business activities before the parking lot was eliminated, while the remaining 44% began operating after changes.

When analysing the responses relating to the number of owners who conducted their business activities before the introduction of car traffic restrictions and those who have opened there their businesses after the implementation of traffic organization, it can be concluded that the transformation of the car parks on Small Market Square and

[1] Parking fees in zone C are far too low: PLN 3.00 (EUR 0.70) for the first PLN;3.50 (EUR 0.82) for the second; PLN 4.10 (EUR 0.96) for the third and PLN 3.00 (EUR 0.70) per the fourth and another hour of parking. Currently it is not possible to increase these fees, as it would be inconsistent with the law on public roads in force in Poland.

Szczepanski Square into city squares has attracted new entrepreneurs, who decided to invest in these locations. In addition, the observations show that a greater number of facilities in the close vicinity of other attractions (festivals, concerts, street art) also resulted in an increase in the number of visitors to these areas and the fact that the visitors decided to stay there for longer.

The owners of the facilities that operated before the introduction of restrictive solutions were asked whether after the implementation of traffic restrictions, they noticed any changes in the income from their business activities. The results of the research for all areas are shown in Table 1 in total. The largest part of the owners of the facilities localized in the areas of the analysis has not recorded any changes of income or, interestingly, they haven't noticed any relationship between the implementation of change and their income. 19% of owners of the facilities declared a decline in the revenue (they were mainly retail facilities), and in the case of 7% of the owners, their incomes increased as a result of the introduction of measures that gave the space back to non-motorized traffic participants. Of note, 11% of the owners was not willing to disclose information about changes in their income. This is due to the fact that in Poland people are generally very reluctant to talk about money they earn.

Table 1. Changes in the size of income of owners of the facilities located in the area of the analysis.

Income increased (%)	Income decreased (%)	Income remained unchanged (%)	No correlation (%)	No response (%)
7	19	37	26	11

In order to verify these results, an attempt to analyse the amount of value added tax paid to the Cracow Tax Office by the owners of facilities located in the area of analysis was made. Due to a long period of 8 years that elapsed since the introduction of traffic changes in Small Market Square and Szczepanski Square, data on the amount of tax payable to the Tax Office before and after the changes were possible to obtain only for the facilities located at Grodzka Street. Fig. 2 shows the dynamics of changes in the value-added tax paid up to the Tax Office by the owners of facilities located at Grodzka Street for the first quarter of 2013. As mentioned earlier, car traffic and parking restrictions at Grodzka Street were introduced on 1 July 2013. The quarter, at the beginning of which these changes were made, is marked in Fig. 2 with a red line.

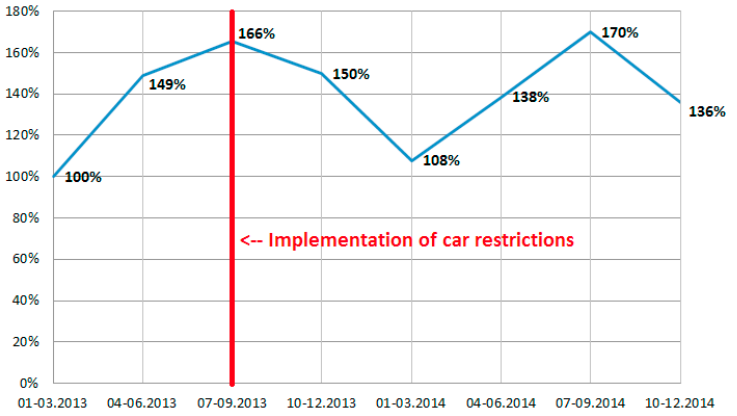

Fig. 2. The dynamics of changes in the value-added tax paid up to the Tax Office by the owners of facilities located at Grodzka Street for the first quarter of 2013. Source: Tax Office in Cracow.

When analysing the information presented in Fig. 2 it can be noticed that the amount of value added tax paid to the Tax Office before and after the implementation of restrictions are at a similar level and, therefore, the income of the owners remained generally unchanged. A significant increase of taxes in both 2013 and 2014, observed since the beginning of the second quarter to the end of the fourth quarter, with a peak in summer months (July - September),

is due to the dynamics of tourist traffic in Cracow and a higher activity of people in the city centre in the warmer months. What is very important – it can be noticed that in summer 2014 (after implementation of car restrictions) the amount of value added tax was higher by 4 percentage points than in summer 2013. It means that for the period of the highest activity of people in the city centre the income of the owners has been increased.

Another question in the survey was whether entrepreneurs would like to restore the situation from before the restrictive changes and the answer was "no" in case of 66% of owners of facilities located on Grodzka Street, 86% of the owners of the facilities located on Small Market Square and 72% of the owners of facilities located on Szczepanski Square. This very high percentage of votes against restoring privileges for cars clearly indicates that the decision to introduce traffic restrictions proved to be right, and the benefits of these changes are also noticed by the owners. Those owners of facilities whose income dropped want to restore the changes. This group of entrepreneurs justified their aversion to the changes with the problems of the customers, suppliers and employees parking their cars. In the opinion of the owners, if the traffic restrictions had not been introduced, the facilities would be visited by a greater number of customers, including the elderly, who now, in their opinion, have limited access to them.

4. Results of the research of the consumers' travel behaviours and the level of space quality satisfaction

A survey conducted among the customers of the facilities was to answer a question of whether the users of the analysed spaces notice problems connected with the access, or is it just a matter of misperception of the owners of the facilities. This survey also allowed to obtain information about the means of transport chosen by the customers, about the frequency of visits to facilities and the level of satisfaction with the quality of the space. The study, just like in the case of the owners of the facilities, was conducted on weekdays in the afternoon in the second half of June 2016. Questions were directed to 900 randomly selected people who were using the services of various types of facilities located in different areas (information from 300 persons was collected from each area). The biggest group of respondents were young people aged 18 to 25 years old (50.3% of respondents) and from 26 to 40 years old (31.2% of respondents). Persons in the age groups 41 to 50 and from 51 to 65 years old accounted for a total of 16.9% of the respondents. The smallest group were the elderly (over 65 years old) and they constituted 1.6% of the respondents. A large share of young people is not surprising, if we consider the fact that Cracow is a university city, with numerous universities located in it.

The analysis of the answers of the responses to the question relating to the means of transport that they chose to access the area of the analysis showed that the highest percentage of respondents chose to walk or to travel by public transport (Figure 3). Bicycle trips accounted for 4% to 9.3%, which considering Cracow conditions is a pretty good result (according to the Comprehensive Traffic Studies conducted in 2013 the share of bicycle trips in the downtown area is 1.9%). A little over 10% of visitors to premises located on Grodzka Street and a negligible percentage of customers from Szczepanski Square and Small Market Square came by car. Among other means of transport, the respondents most often indicated that they used taxi, occasionally minibus and a scooter.

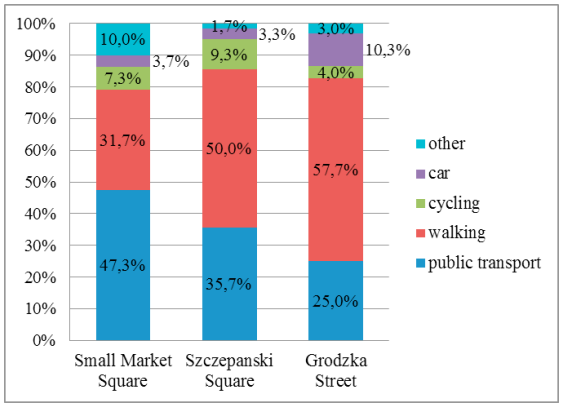

Fig. 3. Means of transport in getting to the analysed area.

For 95% of all respondents accessing the analysed area was not an issue. In the case of Grodzka Street, 6.0% of respondents declared a problem with accessing, in case of the respondents from Small Market Square and Szczepanski Square, it was in 4.3% of cases. The respondents connected the reasons of the problematic commuting mainly to the necessity of making a long trip, congestion of the streets, lack of parking spaces for cars and poorly developed cycling infrastructure. For 20.4% of all respondents the analysed area was the main (only) destination. This was an answer from 23.3% of the respondents in Small Market Square, 34.4% at Szczepanski Square and 4% on Grodzka Street. The majority of the users of selected areas visited the place where they were interviewed rather occasionally (62.1% of respondents), or less than once a week (21.3% of respondents). 8.1% of respondents use the services of the facility once a week, 5.9% - several times a week, and 2.6% - daily or almost daily.

The last question asked in the survey related to assessing the public space chosen for the analysis, that was given back to pedestrians and cyclists. A vast majority of respondents declared that they enjoyed spending time in the above-mentioned places (Table 2). The main reasons for satisfaction with the space given by the respondents was a human-friendly designed space, the absence of cars, structural landscaping, such as benches and fountains. According to the respondents, a major role in the perception and enjoyment of public space have also aesthetic values, interesting architecture and distinctive atmosphere of the historic city. The aforementioned aspects, however, are of a subjective nature. A small group of people who expressed their dissatisfaction with the designed space, the most commonly given reason for dissatisfaction was a small amount of greenery and places to sit.

Table 2. Satisfaction level with public space

The area of analysis	Small Market Square	Szczepanski Square	Grodzka Street
The share of satisfied users	81.3%	81.3%	86.7%
The reasons for satisfaction:			
friendly space, with no cars, with elements of structural landscaping	56.6%	77.4%	53.1%
atmosphere/charm of the place	18.4%	1.2%	12.7%
architecture of the space	11.9%	0.0%	20.0%
silence, tranquillity	4.9%	15.2%	0.0%
other	8.2%	6.2%	14.2%
The share of not satisfied users	18.7%	18.7%	13.3%
The reasons for dissatisfaction:			
lack of greenery, a small number of places to seats	44.6%	82.1%	17.5%
aesthetic values	19.6%	1.8%	0.0%
not renovated buildings, unattractive infrastructure	16.1%	1.8%	0.0%
busy (many people)	8.9%	7.1%	50.0%
no parking/restrictions in car traffic	3.6%	0.0%	32.5%
other	7.1%	7.1%	0.0%

5. Conclusions

This article presents the results of the first Polish studies assessing the results of the implementation of restrictions on traffic and parking of cars, introduced over the last decade in several locations in the city centre of Cracow. The information obtained and own observations show that the transformation of car parks into city squares attracted new entrepreneurs who wanted to invest in these areas, and a greater number of facilities and the presence of other attractions resulted in an increase in the number of visitors to these areas, who stayed there longer. Based on the results of research on the changes in the size of income of the owners of the facilities, it can be concluded that the application of restrictions generally did not cause significant changes in the size of income or the changes in income are not identified with the restrictions. And even if the implementation of the restrictions did not produce a significant increase in the income of the owners, it generally did not cause negative impact on the revenue and this is

what the owners are always most concerned about. In the case of facilities located at Grodzka Street this conclusion is confirmed by the data obtained from the Tax Office in Cracow. What is more, in this case a few-percentage point increase in the income can be observed for the period of the highest people activity in the city centre.

What is extremely important is that a very high percentage of owners - 75% for all locations in total, would not want to restore the previous state. A very high degree of satisfaction with the quality of analysed areas (on average 83%) is also observed among the customers of the facilities located in these areas. They are primarily satisfied with the absence of cars in these areas, while enjoying the presence of structural landscaping and historic buildings, as well as a unique atmosphere of the place. Moreover, only a negligible share of respondents see problems in accessing these facilities. Currently, respondents get to these facilities mainly on foot or by public transport, visiting facilities less frequently than once a week, or occasionally, when carrying out other activities in this area of the city.

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