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SPACE AND ITS USE FOR PEDESTRIAN TRAFFIC IN CENTER AREAS OF SELECTED POLISH CITIES

Abstract

The quality of urban space in terms of walkability can be assessed taking many parameters into account, such as the presence of sidewalks, their density and continuity, appropriate technical parameters as well as the presence of greenery, squares, parks, which create the environment for pedestrian traffic. The lack of travel barriers, the possibility to shorten the route, travel safety and security, the presence of street furniture, shops and services are also significant. This article concerns some of the above described factors and presents selected research results on the use of space in city centers of several Polish cities – Kraków, Gdańsk, Szczecin, Warsaw, Gdynia, Wrocław and Poznań as well as the results of an analysis on the friendliness of this space for pedestrian traffic. The first phase of this study was to determine the share of public space within the analyzed city center areas, and then define areas used as roads, infrastructure for pedestrians and cyclists, squares, green areas, parks and public courtyards. The balance of the used space was created for each researched area, and the space dedicated to pedestrian traffic was additionally analyzed in terms of the presence of obstacles as well as sidewalk location. The analysis results prove that that greatest amount of the public space is located in the city center of Poznań, and the smallest in Kraków. Warsaw is characterized by the greatest and Szczecin by the smallest percentage of the pedestrian infrastructure. Szczecin dominates in terms of the share of roads in the downtown area, Wrocław in terms of squares and Gdańsk – public courtyards.

Keywords: pedestrian traffic, walkability, public space quality

Introduction

Foot travel is the most natural and basic form of mobility, and at the same time – the most eco-friendly, cheapest, and one of the healthiest ways to move. Not only is it an independent form of transport, but it can also be one of the segments of a journey made by the public transport or by car (walking to a stop, a parking area, etc.). Traveling on foot stimulates other activities and is an opportunity to interact with people (Gehl, 2014). Improving the conditions of pedestrian travel promotes sustainability not only in the environmental but also social sense, allowing children, elderly or less affluent people or those who do not have a car to reach their destination and have everyday activity on foot (Soni, Soni, 2016; Gilderbloom *et al.*, 2015). The research also shows that by creating appropriate conditions for travelling with the force of one's own legs only, more people not only walk but also remain in urban areas (Gehl, 2014). Moreover, it leads to new ways of using space, increases the pace of their lives, they become more vital. The fact that pedestrians are filling the space which is made available to them is evident on the examples of Copenhagen or New York, where a steady increase in pedestrian activity has been noted with emerging new areas and facilities dedicated to pedestrians (Montgomery, 2013). How to create pedestrian friendly urban spaces then?

To paraphrase Jan Gehl's statement "First we shape our cities, then they shape us" (Gehl, 2014) it can be said that one should start with the issue of spatial planning because the way in which we shape spatial structures will determine the way we move in them. Thus, planning techniques that are conducive to pedestrian travel are e.g. balancing the job offer with the number of occupationally active people or increasing the degree of multifunctionality of the area, which leads to reduced travel needs over longer distances – sources and targets are located in close proximity and therefore are available on foot (Cervero, Duncan, 2003; Ewing, Cervero, 2010). In the context of the infrastructure, the important issue is the presence of sidewalks, their density and continuity and appropriate technical parameters (appropriate width, comfortable pavement) (Southworth, 2005; Olszewski, 2007; Lee, Talen, 2014), as well as adaptation to the needs of the disabled, elderly and children (Moayedi *et al.*, 2013). The traveler must be able to safely cross the street (however, rather in the form of an on-ground than underground crossing or a footbridge), and the traffic safety can be further improved by introducing, for example, structures for limiting the speed of vehicles (Jacobs, 1992; Galanis, Eliou, 2011). The presence of signs, markings and traffic signals for pedestrians and motorists is also not without importance, which, in addition to the safety aspects, facilitates the pedestrian orientation (Moayedi *et al.*, 2013). The quality of the pedestrian space is influenced by the provision of street lighting adapted to their needs, the absence of obstacles such as parked cars and the possibility of shortening the route (e.g. lack of barriers in the form of fenced housing estates) (Gehl, 2013). In addition, the space is made more attractive by the presence of greenery and trees (which also provide shade), street furniture (increasing the comfort of travel), shopping and service outlets, and street art (Gehl, 2014).

This article deals with some of the above described factors that shape pedestrian-friendly spaces. The research results presented in the article concern areas located in the city centers of seven Polish cities – members of the CiViNET POLSKA network¹ – Kraków, Gdańsk, Szczecin, Warsaw, Gdynia, Wrocław and Poznań.

1. Short description of analyzed areas

The research on the space in selected cities of the CiViNET POLSKA network was carried out from 15th September to 13th October 2015.

The researched area in Kraków is located inside the second ring road of the city and its boundary runs along Trzech Wieszców Avenue and Powiśle, Podzamcze, Świętego Idziego Streets. On the eastern side, the space is limited by the railway track. The space is about 2.9 km² in area. In Warsaw an area of approx. 2.8 km² was studied including, inter alia, Downtown, Old Town and the Saxon Garden. The border runs along, Generała Andersa Street, Marszałkowska Street, Jerozolimskie Avenues, then parallel to Nowy Świat Street and Krakowskie Przedmieście Street (also along the western boundary of the Beyer Park, Dynasy Street, the western boundary of the Kazimierzowski Park), up to Solidarności Avenue, eastward along the alley and then on Wybrzeże Gdańskie, R. Sanguszki and Konwiktorska Streets. The analyzed section in Poznań is slightly smaller in area, approx. 2.3 km². Its borders are: Niepodległości Avenue, Królowej Jadwigi Street, the Warta River, Ewarysta Estkowskiego Street, Małe Garbary Street, Wolnica Street and Solna Street.

In Gdynia the studied space, approx. 2.0 km² in area, covering the Downtown and the place called Kamienna Góra (the Stone Mountain) is limited by railway tracks on the west. The other borders run along Piłsudskiego Avenue, the Baltic Sea, and Jana z Kolna Street, T. Wendy Street and św. Piotra Street on the north side. The researched space in Wrocław, approx. 1.4 km² in area, is limited by the Odra River and the City Moat. It is located entirely in the Old Town.

The smallest analyzed space was in the city center of Gdańsk and Szczecin – approx. 1.2 km². In Gdańsk, the area includes the Old Town, the Main City, Zamczysko (the Castle), and its border runs along Podwale Przedmiejskie Street, Okopowa Street, Wały Jagiellońskie Street, Podwale Grodzkie Street, parallel to Wałowa Street and north of Stępkarska Street and then along the Motława River. In Szczecin the analyzed area includes the Old Town, with borders formed by the Odra River, 3-go Maja Street, Niepodległości Avenue, Żołnierza Polskiego Square and Trasa Zamkowa im. Piotra Zaremby Road.

¹ CiViNET POLSKA, which is a network of cities that have been carrying out CiViTAS projects in the past and are ready to share experiences as well as cities and other entities that would like to benefit from this experience. It is a platform for information exchange and a tool for promoting innovative sustainable mobility.



Figure 1. Analyzed area in Gdańsk
Source: Own study based on (OpenStreetMap, 2017)

2. Share of public space in analyzed areas

The urban space may have different functions, such as residential, service, etc. In the presented research, the emphasis was put on analyzing the space serving travel functions or forming the environment for pedestrian traffic, e.g. parks, squares, etc. The first stage of the study was to determine the share of public space in each of the analyzed areas. For this purpose, using an orthophotomap, maps available at www.google.pl/maps and the QGIS software were used; the surfaces occupied by roadways, the pedestrian and cyclist infrastructure, squares, urban green areas, parking lots and public courtyards were counted and added. The results of this operation are shown in figure 2.

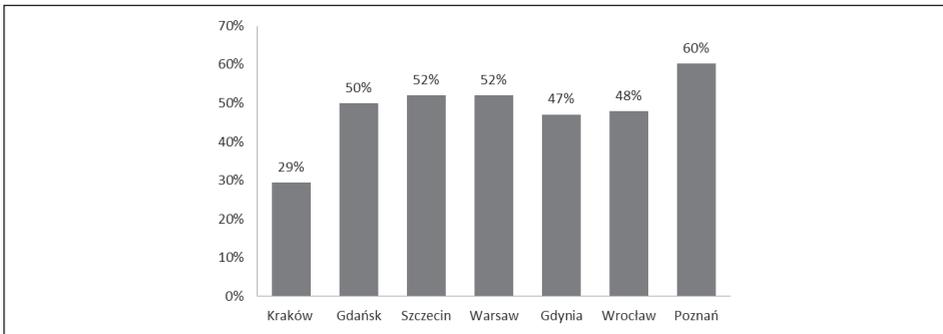


Figure 2. Share of public space in analyzed areas
Source: (own study)

Analyzing figure 2 it can be seen that the largest percentage of public space is located in the city center of Poznań – as much as 60% of the total area of this space serves travelling functions or is developed as squares, green areas. On the other hand, the smallest percentage, accounting for only one third of the analyzed area, is located in the center of Kraków. This is probably due to the Kraków Old Town buildings, which are densely packed and with a great number of enclosed church areas. The share of public space in the analyzed urban centers of the other cities is similar, at the level of 47% to 52%.

3. Use of public space in analyzed areas

Due to the local conditions, the size of public space may vary, nevertheless, the most important thing is the way in which it is used. Balances of the used space were prepared for each of the analyzed urban areas and the result of this analysis is presented in figure 3.

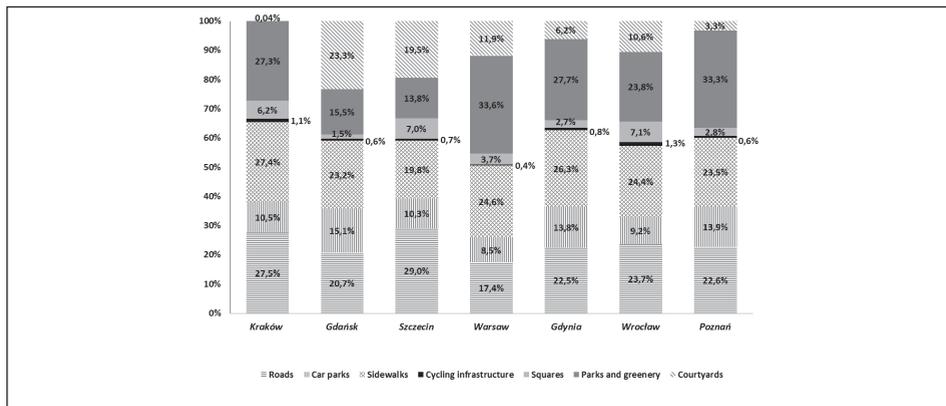


Figure 3. Functional division of public space in analyzed areas
Source: (own study)

When analyzing the functional division of space an unfavorable regularity can be noticed – roadways and car parks collectively occupy an average of over one third of the public areas in the urban centers of the analyzed cities (35% on average). The largest amount of space provided mainly to cars is to be found in Szczecin – one third of the public space is occupied by roads and another 10% – by car parks. Not much less, 38% of the public space in total is dominated by motorized traffic in Kraków. The smallest percentage of this type of space (26%) is characteristic for Warsaw.

About 11 percentage points on average less than in the case of the space for motorized traffic in the analyzed areas is occupied by pedestrian traffic areas (24.2%). The largest share of sidewalks is in Kraków and Gdynia, while the smallest in Szczecin. Almost in every case the smallest share of the public space

is the infrastructure for cyclists (0.4–1.1%), and such a small percentage, in addition to the years of neglect in the developing the cycling infrastructure, also results from the fact that cyclists can ride in the general traffic in central areas.

As regards the presence of spaces that can play role of the environment for pedestrian traffic, i.e. squares, parks and greenery, the leading city is Warsaw where nearly 34% of the space in the downtown are green areas, and approx. 4% are squares.

In addition, a large percentage of green areas are to be found in the centre of Poznań, Gdynia and Kraków, surely thanks to the Kraków Planty Park. The smallest share of squares, parks and green areas in the analyzed areas was noted in Gdańsk and Szczecin. On the other hand, the highest percentage of squares is in Wrocław, Szczecin and Kraków.

When analyzing the quality of urban space in the context of pedestrian traffic, it should be remembered that a very important factor is the possibility of shortening the route of passage, which is influenced e.g. by the lack of fenced housing estates and the presence of public courtyards. In light of the conducted research the leader in this respect is Gdańsk, in which the share of courtyards of this type reaches over 23%. A relatively high percentage – 19.5% is to be found also in Szczecin. In Warsaw and Wrocław these shares are 12% and 11%, respectively, in Gdynia – just over 6% and in Poznań – just over 3%. Interestingly enough, there are no public courtyards in Kraków, which means that it is impossible to shorten the route and it is possible to travel along the streets only.

4. Quality of sidewalks

The next step of the research was to assess the quality of sidewalks in the context of inconveniences for the user (lack of sufficient width of sidewalks) and location of sidewalks (located in or outside a park). The results of the analysis on the location of sidewalks are shown in figure 4.

Analyzing figure 4 it can be observed that sidewalks in the analyzed areas are located mainly outside parks (in Szczecin almost exclusively outside them). The share of pedestrian infrastructure located in parks is the largest in Warsaw and Poznań amounting to 23% and 20%, respectively. And in the context of inconveniences for the user in the absence of sufficient width of sidewalks, surface-based analyzes have shown that in general, the percentage of pedestrian areas with such inconveniences in the surveyed urban areas is small in the range from 1% to 5%. The largest share of sidewalks with inconveniences for pedestrians was found in Kraków and in Gdańsk.

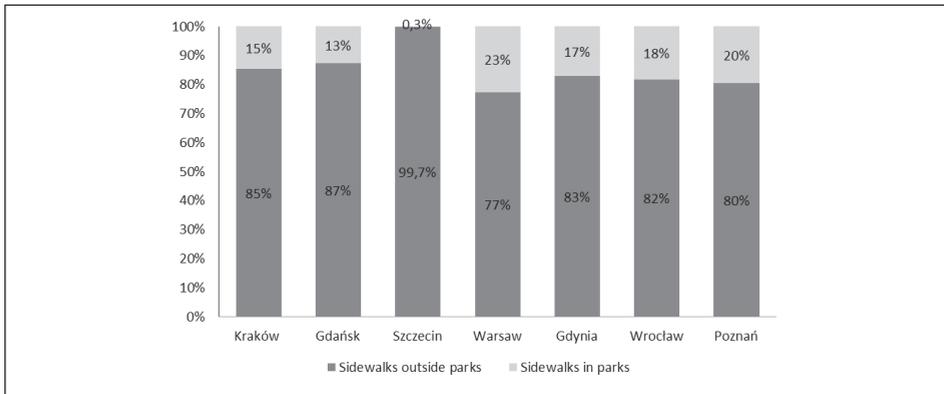


Figure 4. Quality of sidewalks

Source: (own study)

Conclusions

As the above described research results have shown, the share of public space in the city centers of the studied cities is about 50%, and its value depends on the local conditions, including the type of development. The functional division of space has revealed an unfavorable regularity – roadways and car parks collectively occupy on average over 35%, while pedestrian traffic areas account for 24% on average. The amount of space dedicated to motorized traffic is to be found in Szczecin and the largest share of sidewalks is in Kraków and Gdynia. Sidewalks are located mainly outside parks, although the leader in terms of space surrounding the pedestrian area (squares, city green areas) is Warsaw. The greatest possibility to shorten the route is in Gdańsk, while in Kraków such a possibility is almost unavailable to the pedestrian.

It should be noted that an inventory of street furniture (benches, trash baskets, fountains, monuments), public toilets and trees was made during the research. However, the data of the inventory is still analyzed, although in the light of the first results, the following conclusions can be drawn:

- the largest number of benches and trash baskets is to be found in the city centre in Wrocław;
- the largest number of trees, monuments and public toilets are in the city centre in Kraków;
- the area analyzed in Warsaw is characterized by the largest number of fountains.

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