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THE CONCEPT OF A WALKABLE CITY AS AN ALTERNATIVE FORM OF URBAN MOBILITY

Summary. The article is dedicated to the concept of the walkable city as an alternative form of urban mobility. In the work, the authors present basic principles connected with the notion of walkability in the context of sustainable development and sustainable transport. The authors also discuss pro-pedestrian solutions implemented in the Polish cities of Łódź, Rybnik, Szczecin, Gdynia, Wrocław and Katowice, including examples of good practice regarding walkability and the “Walk Score” indicator. The article also introduces typical problems related to pedestrians’ movement around the city. The advantages of implementing the walkability concept and the factors related to making cities more “pedestrian-friendly” are mentioned as well.

Overall, the aim of this work is to introduced the concept of walkability as an alternative form of smart mobility in the context of urban logistics.

Keywords: walkable city; pedestrians; mobility solutions; sustainable transport; sustainable development; Walk Score indicator.

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1. INTRODUCTION

The constant development of technology and the desire to move more quickly have led to the creation of many vehicular traffic privileges in cities. The focus has mainly been on aspects related to greater road capacity, the design of high-speed routes in the city or the provision of good car communication. This kind of trend is referred as fostering an “automobile-oriented” attitude [1]. Automobile-oriented cities impose many restrictions on pedestrians. Too many cars in cities, many of which are parked on pavements or other pedestrian spaces, traffic jams, copious fumes and other pollution are just some of the problems faced by urban transport [2]. When attempting to solve these problems, residents and urban planners have been compelled to reflect on whom the city is for.

It has been acknowledged that transport should be good not just for drivers, but also other people and their public health, as well as for the environment and the economy. As such, it is connected with sustainable transport policies. Sustainable transport also assumes a reduction in the scale and effects of urban space dominance by individual car transport [3]. One idea to realize the goals of sustainable transport has been to focus on pro-citizen demands to create urban-friendly cities.

The idea of cities being good for pedestrians has led to the spread of the phenomenon known as “walkable cities” [4]. Its basic principle is to create public urban spaces that are available for pedestrians and friendly for walkers.

The aim of this work is to present the idea of walkability and its solutions as used in Polish cities as an alternative form of smart mobility in the context of urban logistics. The article presents examples of good practices connected with walkability in the case of Łódź, Rybnik, Szczecin, Gdynia, Wrocław and Katowice.

2. WALKABILITY CONCEPT

The walkability concept has become popular due to the poor quality of urban spaces dedicated to pedestrians (footpaths, pavements etc.). City authorities have often forgotten that the streets offer a huge potential, which should not be limited to cars and parking spaces; rather, they should be available to all pedestrians, even if they are using urban transport [5, 6, 7]. The pedestrian and cycling models of individual mobility should be accessible to all urban residents [8, 9]. Moreover, walkability is connected with quality of life (being healthy) issues, while offering environmental and economic benefits [5, 10, 11]. To claim that a city is “walkable”, it is necessary to meet four basic conditions: security, functionality, attractiveness and convenience [4].

Implementing the concept of walkability into cities has fostered a new culture of mobility, which brings with it many benefits, such as [12, 13, 14, 15, 16, 17]:

- Improving the level of safety on the streets
- Decreasing the environmental footprint and reducing air pollution, traffic, noise or vibrations
- Improving the attractiveness of public spaces, which can be help to support local businesses and local tourism, as well as encourage investment
- Decreasing spending on construction of and repairs to the road infrastructure
- Improving the health of residents and prolonging their life
- Balancing the transport system load
- Reducing the scale of difference in the usage of means of transport

To be able to encourage a new mobility culture, however, it is necessary to fulfil the following five steps [6, 9]:

1. Change in mentality and the need to produce immediate changes in the model of urban life
2. Political will
3. The emergence of a leader who will encourage change
4. A sense of mission among public sector employees
5. Cooperation between local governments and residents in order to identify the latter's needs.

When implementing walkability in cities, three scales are involved: the planning scale, the street scale and the detail scale. Each of them are complementary [9].

The scope of the planning scale includes studies of a city's conditions and directions, local spatial development plans and major investments (e.g., hospitals, schools, stadiums). The street scale is related to pedestrian traffic, any road works, alterations and construction of streets etc. The detail scale includes the requirements to be taken into account when offering tenders or contracts for alterations to and construction of streets, squares, interchanges etc. [9]. Specific items included in each scale are presented in Table 1.

Table 1. Types of scale and actions [7, 12]

Type of scale	Actions
Planning scale	<ul style="list-style-type: none"> • City planning with the highest priority for pedestrians • Planning a compact city structure • Standardized green areas • Preventing the formation of large areas that are inaccessible by pedestrians • Consistency and continuity of hiking trails • Clear spatial structure • Creating squares only for pedestrians • High level of attractiveness in pedestrian areas • Paths for disabled persons • Avoiding blind footpaths • Creating public transport nodes
Street scale	<ul style="list-style-type: none"> • Places for business and culture activities • Wide pedestrian paths • Increasing the number of pedestrian crossings at favourable locations • Avoiding designated pedestrian crossings in areas with slow traffic • Streets without car traffic • Removal of parking places on pavements • Reducing the amount of bus bays • Increasing pedestrian safety • Reducing the amount of traffic lights

	<ul style="list-style-type: none"> • Reducing the amount of crash barriers • Maintaining traffic flow during events
Detail scale	<ul style="list-style-type: none"> • Good quality of pavements surfaces • Proper placement of technical installations and small architectural elements • Reducing the number of posts and road signs • Increasing the number of trees, bushes and flowers • High standards of maintenance of footpaths

There are many techniques to make a city more walkable and communities more hospitable to walkers. The main criteria of a walkable city are presented in Fig. 1.



Fig. 1. Criteria of a walkable city (source: author's own collaboration based on [4, 10, 20])

Measuring the effectiveness of streets for pedestrians is connected with an indicator known as the "Walk Score". The operation of this system, based primarily on Google and OpenStreetMap data, involves producing a score in relation to the distance and availability of shops, as well as the level of safety, convenience, functionality and attractiveness [16]. The Walk Score is a number between 0 to 100 points and a mean [18]:

- 0-24 points - car-dependent (almost all errands require a car)
- 25-49 points - car-dependent (most errands require a car)
- 50-69 points - somewhat walkable (some errands can be accomplished on foot)
- 70-89 points - very walkable (most errands can be accomplished on foot)
- 90-100 points – "walker's paradise" (daily errands do not require a car)

The Walk Score for Krasińskiego 8 Street, the location of the Silesian University of Technology's Faculty of Transport, receives 93 points, which means it is a walker's paradise.

3. WALKABILITY SOLUTIONS: EXAMPLES FROM POLISH CITIES

Pro-pedestrian solutions involving the concept of walkability are becoming more and more popular around the world. Currently, in Polish cities, we can observe an increasing number of pro-pedestrian solutions informed by good practice from abroad. One of the good practices dedicated to the well-being of pedestrians is the "woonerf" concept.

A street where pedestrians and cyclists have priority is a woonerf. On this kind of street, special emphasis is placed on calming traffic, increasing the level of safety and ensuring aesthetic qualities. In the beginning, woonerf combined functions of the boulevard, a street with parking and a meeting place. To achieve this, the traditional division of space between the road and pavements was abandoned. This restricted transit traffic but did not exclude the possibility of introducing public transport [20, 22].

One of the first woonerf streets in Poland was created in Lodz in 2014 at 6 Sierpnia Street, which was positively received by the residents and resulted in the significant growth of pedestrian traffic. In 2015, a section of Traugutta Street was converted into woonerf, while, in April 2016, another street of this type was opened at Piramowicza Street [19, 20].

Another solution, which has been dedicated to women (but, in practice, it is used by all pedestrians), has been to create a high-heel pavements known as “szpilkostrada” in areas that are mostly covered with cobblestones, which are difficult for walking on. These kinds of solution are popular in old town city markets. The concept of szpilkostrada also facilitates greater mobility for wheelchair users. The examples of szpilkostrada in Polish cities can be found in Wrocław or Rybnik [21]. This type of pavement, as found in Rybnik, is presented in Fig. 2.



Fig. 2. Szpilkostrada in Rybnik (source: authors' own work).

An additional pro-pedestrian solution is to ensure the adequate control of traffic lights on pedestrian crossings. The idea is to give priority to pedestrians, rather than traffic, by using all-green traffic lights at the pedestrian crossings. This idea was implemented for the first time in Poland in Lodz. The principle of the operation is that, when there no cars and trams on the road, all four of the pedestrian crossings show a green light. This only changes when a vehicle approaches the lights. This idea was also introduced in Gdynia, at two places in the downtown area. Signage indicated “all-green” full pedestrian priority can be found at the junction of Żeromskiego and Derdowski Streets [22].

The Vienna station represents another solution, which is a type of tram stop in which the lane between the rails and the pavement is elevated to the pavement level. This improves passenger comfort and makes boarding and getting off the tram easier. The safety level is also improved by forcing cars to slow down [22].

Interchanges are an unavoidable element of travelling on public transport, as they reduce travel comfort and increase travel time. Frequent stops are separated from each other, which forces passengers to experience extra distances. Thus, a bus-tram stop is convenient for passengers, as it not only improves travel comfort and shortens travel time, but also significantly improves passenger safety [22].

Another type of good practice created with idea of walkability in mind is a bridge dedicated especially to pedestrians, trams and cyclists. This kind of solution is intended to increase the safety of unprotected road users, i.e., pedestrians and cyclists, by eliminating the possibility of accidents with motor vehicles [22, 23]. The most popular bridge for pedestrians in Poland is called the Jagiełło Bridge, which is located in Bydgoszcz. The Jagiełło Bridge, which was built in 2012, is an example of a cable-stayed bridge. It was also the first suspended tramway bridge to be constructed in Poland [23].

There are also other solutions that are used in Polish cities, such as:

- Restricted speed zones (e.g., Zone 30 in Katowice)
- Anti-bay bus stations (e.g., the anti-bay on Marszałkowska Street in Warsaw)
- Pedestrian crossings with a narrowed road surface
- Narrowed intersections at crossroads
- Transverse pavements

All of the pro-pedestrian practices mentioned above have been assessed by the Walk Score indicator system. Their values range from 68 to 100, which means that using these solutions confirms that pedestrians are prioritized and the respective city is more walkable. The indicator values for every solution are shown in Table 2.

Table 2. The Walk Score indicator value for Polish pro-pedestrian solutions
(Source: authors' own work.)

Walkability solutions	City	Score
Pro-walkability bridge	Bydgoszcz	93
Szpilkostrada	Rybnik Plac Wolności	97
	Wrocław Rynek	99
Woonerf	Łódź 6. Sierpnia	90
	Łódź Traugutta	93
	Łódź Piramowicza	68
Traffic lights with pedestrian priority	Gdynia Żeromskiego	97
	Gdynia Derdowskiego	97
Vienna stations	Wrocław Hubska	87
	Łódź Piotrowska	87
	Poznań Gwarna	100
	Kraków Podwale	99

4. SUMMARY

In summary, the concept of a walkable city represents one of the possibilities for introducing sustainable mobility. As the concept of walkability offers many advantages, particularly economic ones, it should not be difficult trying to persuade local governments to make such changes in urban logistics.

The analysis based on examples from Polish cities shows that pro-pedestrian solutions affect the outcome of the Walk Score indicator calculations, which determines whether or not a city is pro-walkable.

The case study of Polish cities has shown that solutions are available that are dedicated to pedestrians, such as: woonerf, szpilkostrada, Vienna stations, bus-tram stop stations, all-green traffic lights or bridges for pedestrians, trams and cyclists. However, the analysed examples only involve standalone practices in cities. To fully embrace walkability, it is necessary to become acquainted with the demands of society and make favourable changes to urban spaces based on the findings.

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