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# Activating Public Space: How to Promote Physical Activity in Urban Environment

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**Abstract.** Physical activity is an essential component of a healthy lifestyle. The quality and equipment of urban public space plays an important role in promoting physical activity among people (residents, tourists). In order for recreation and sports activities to be undertaken willingly, in a safe and comprehensive manner, certain spatial conditions and requirements must be met. The distinctive feature of contemporary large cities is the disappearance of local, neighbourly relations, and the consequent loneliness, alienation, and atomization of the residents. Thus, the design of public spaces should be an expression of the values of social inclusion and integration. A properly designed urban space would encourage people to leave their homes and integrate, also by undertaking different forms of physical activities. This, in turn, can lead to raising the quality of the space, especially in the context of its “familiarization” and “domestication”. The aim of the research was to identify the architectural and urban features of the public spaces of contemporary cities that can contribute to the promotion of physical activity. The paper presents the research results and the case studies of such spatial solutions and examples of good practices, which invite residents to undertake different forms of physical activities in public spaces. The issue of the integrating, inclusionary, and social function of physical recreation and sport is discussed as well, and so are the possibilities of translating these values into physical characteristics of an urban space. The main conclusions are that taking into account the diverse needs of different social groups, participation in the design and construction process, aesthetic and interesting design, vicinity of the residence, open access for all age groups and the disabled would be the most important spatial determinants of a properly designed, physically activating public space. Strategies of planning the sports and recreation infrastructure should also make sure of their multifunctionality and variability in time to adjust it to the changing needs of the residents.

## 1. Introduction

Sport and physical recreation are an important social phenomenon. Physically active residents are very visible in urban public spaces, because contemporary forms of physical activities are becoming more and more detached from typical sport facilities. In light of scientific research, participation in a physical activity alone is not sufficient from the point of view of human health needs. What is more important, a significantly increased mortality and incidence of lifestyle diseases caused by lack of physical activity can be observed [1]. Physical activity is a necessary component of a healthy lifestyle and it should be undertaken by a much larger share of the population. That is why the aim of the research was to identify the architectural and urban features of the public spaces of contemporary cities that can contribute to the promotion of physical activity among their residents.



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The quality of public space – its architecture, equipment, design, as well as its level of accessibility and openness to the different needs of the residents – has a direct impact on the number of its users and on the quality of life in the city. Therefore, its features can have an effect on the residents' activation.

The results of the research conducted in Poland indicate that from the point of view of the needs of the urban population, the most important are the efforts towards the participation in sport for all, not in professional sport [2]. As the main reason for undertaking physical activity, about two-thirds of the respondents from whole Poland indicated pleasure and fun, health benefits, improvement of physical and mental condition, and the possibility of meeting new people. Also, 65% of the respondents declared that they are not interested in competing. It shows that modern sport for all should put fun and pleasure above rivalry. Busy and overworked residents of big cities need physical and mental relaxation instead of the stress of competition.

The distinctive feature of contemporary big cities is the disappearance of local, neighbourly relations, and the consequent loneliness, alienation, and atomization of the residents. This applies especially to people who came to the cities in search of work and haven't yet established closer relations with other members of the local community. A possibility to participate in sport in close proximity to the place of residence may be a response to this lack. Encouraging people to leave their homes and integrate in the public space seems important. This, in turn, can lead to raising the quality of the space, especially in the context of its "familiarization" and "domestication". Therefore, this study also discusses the social and spatial relationship between modern forms of physical activity and public space. Public space is subject to the processes of design, creation, construction, and revitalization. In order for physical activity to be undertaken there willingly, in a safe and comprehensive manner, certain spatial and social conditions must be met to make it a friendly and activating place for its users.

It has to be stated that this study applies only to the participation in sport for all and in voluntary recreation in public spaces and open recreation areas, not in professional sport. Professional sports infrastructure and facilities are not the subject of this study. Each time we speak about sport in this study, this concept should be understood primarily as a sport for all, physical recreation, any form of physical activity undertaken in leisure time and for pleasure by different groups of city residents. The definition of the concept of sport for all [3] draws attention to the integrating and socially inclusive role of physical activity, the pleasure it should give, and its public character. Therefore, the design of public space can, and even should, efficiently support and disseminate the idea of sport for all.

The subject of the physical activation of urban residents is present in numerous publications and strategies of urban development, it is also addressed by such international institutions as the World Health Organization (WHO), the Association for International Sport for All (TAFISA), or the International Sport and Culture Association (ISCA). The increasing awareness of the importance of physical activity for human health, the fight against air and environment pollution, as well as more and more frequent and obvious no-car zones in city centres promote the idea of active cities [4]. Economic studies show that inactive residents generate high costs for cities. Financial outlays on friendly, physically activating public space and infrastructure tend to be several times lower than the cost of treating diseases caused by lack of physical activity [5, 6].

## **2. Activating public spaces: Classification and characteristics**

To indicate the physically activating architectural features of public spaces, the most actual trends in sport and recreation among urban residents have to be identified. The research results show that in Poland the most popular activities are swimming and biking, team sports, and group exercises [7]. Except bikers, in public spaces we can most frequently encounter joggers, inline skaters, skateboarders, Nordic walkers, as well as BMX and kick scooter riders. Street sports are increasingly popular, undertaken both in non-dedicated public spaces and specially prepared zones, such as skate parks or street ball fields. Many people exercise in a park, individually or collectively. The number of activation programmes and initiatives is constantly increasing, aiming at promoting a physically active lifestyle among city residents.

The choice of a particular activity form may depend on different factors, the most important of which are: age, physical abilities, gender, sex, family status (e.g. being a parent of a baby), as well as place of residence and its proximity to sports and recreation facilities. Although these factors may not be relevant to certain people or groups, they impact the way of using public spaces and sports facilities. Teenagers, for example, may do it in a completely different way and at a different time of day than families with children or elderly people.

To identify the relationship between the forms of activities favoured by city residents and the features of public spaces in which they are undertaken, a double classification has been made. The first approach divides activity spaces into formal and informal ones, while the second one categorizes the different needs of their users according to their age and physical abilities.

### *2.1. Formal and informal activity spaces*

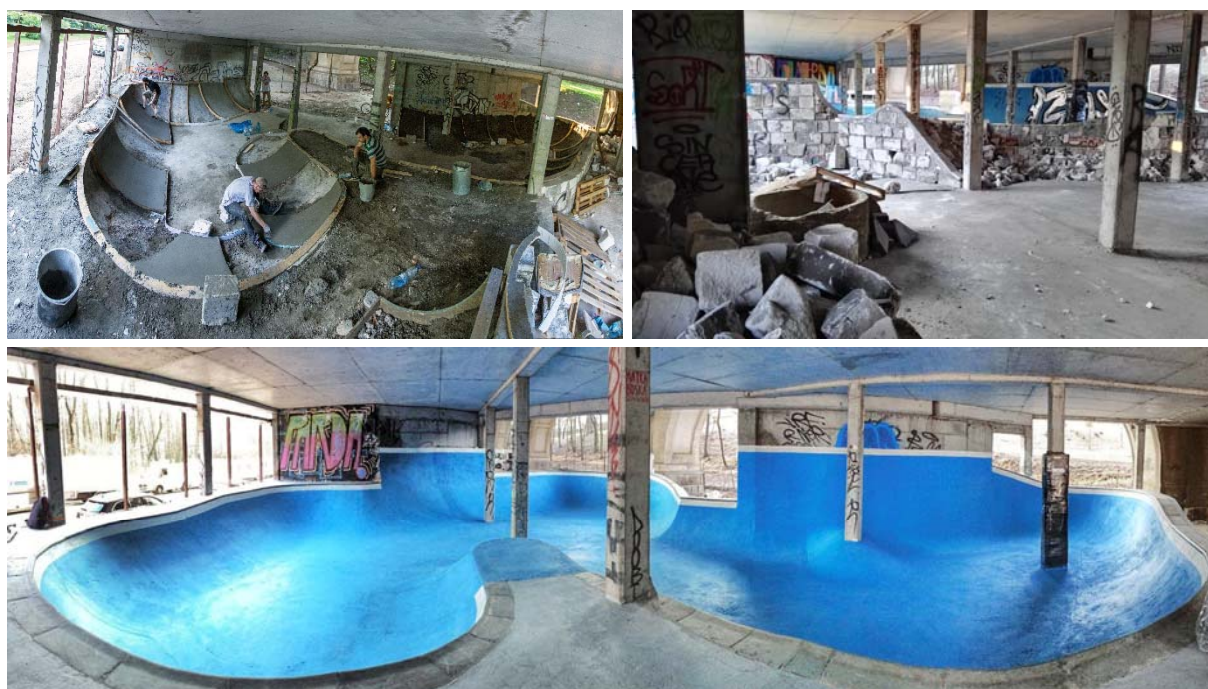
*2.1.1. Formal spaces.* Formal spaces include areas and facilities designed and constructed for sports or recreation, in principle dedicated for physical activity. As this study does not take into account professional sports facilities, the group of formal activity spaces includes the following areas and infrastructure: public sports fields and playgrounds, outdoor workout and fitness stations, bicycle paths, skate parks, pump tracks, parks, as well as pedestrian and tourist routes. Their users indicated positive and negative aspects of their functioning and spatial features [7]. Their most desirable attributes are: proximity to the place of residence, accompanying greenery, spatial connections to bicycle paths and other recreation areas, and multi-functionality – formal activity spaces should also perform a social function, serving as a meeting place for local communities and peer groups, with not only sports equipment, but also different kinds of benches, seats, and shelters from sun and rain. What may discourage people from using these spaces is the exposure to spectators, which is the most common problem raised by the elderly and women, and the resulting lack of privacy or intimacy during exercises.

*2.1.2. Informal spaces.* In the cities, physical activity is also undertaken in spaces not specifically dedicated to it. Two categories of informal spaces can be distinguished. (1) Physical activities such as skateboarding, BMX riding, or parkour are undertaken in such public spaces as squares, streets, and parks, and make use of their architectural elements and parts of the buildings, e.g. balustrades, stairs, walls, ramps, benches, street lamps, or pillars. Although these activities are not always accepted, they are increasingly common and frequent. (2) The second category includes spaces which have been adapted for sport in an informal and bottom-up way, for example as a DIY (Do It Yourself) project. The main feature of this kind of infrastructure is its grassroots character and location in the previously degraded areas. Its users return the space to the city, developing and adapting it to their needs. Examples of such facilities include DIY skate parks or BMX tracks under bridges or highways. Apart from skateboarding and BMX riding, DIY facilities are most commonly used for practicing inline skating, kick scooter riding, climbing, parkour, streetball, hip-hop, break dance, etc. Importantly, these spaces are given new significance by their users, who identify themselves with it and introduce new elements specific to their group, such as street art (graffiti), music, lights, seats, etc. By that, this space is being domesticated and a placemaking process can be observed. By taking them under their care, the users make these places their own. Such values are more difficult to find in formal spaces.

In spite of the popularity of such activities, more and more often protective architectural elements such as overlays, spikes, or other “skate stoppers” are being introduced, preventing skateboarding or parkouring in public spaces and on buildings (similar protection tends to be used against homeless people), which can be interpreted as a sign of marginalization and social exclusion of certain groups, showing that in many cases public space is not open and accessible for everyone [8].



An example of a DIY facility is the “Szaber Bowl” skate park in Warsaw, under the Poniatowski Bridge (Figure 1). Inside the bare structure of a never-finished shopping centre, a multi-storey illegal skate park is functioning with the connivance of the municipal government. The skate park users created their own rules and ensure order and security. They are aware that any transgression on their part can result in their expulsion from the site. What makes this place particularly appreciated is the bridge that serves as a roof, which allows it to be used at any time of the year.



**Figure 1.** The DIY “Szaber Bowl” skate park in Warsaw under the Poniatowski Bridge. Above: under construction. Below: already built and painted (Photo: M. Duch)

## 2.2. Division of spaces according to the age and physical abilities of their user

First, it has to be stressed that the most actual trend in sports facilities design is to ensure their integrating and inclusive character, with no age or physical ability segregation. It has to be kept in mind, however, that particular age and ability groups have their specific requirements concerning the design of public sports and recreation spaces, resulting mostly from their motor skills and height. They are characterized below.

**2.2.1. Children and families.** The meeting places for families and children should constitute the spatial heart of a local community, where all its members can spend their time. This is a zone of games, movement, and different activities which shape the imagination. It should be a space where children challenge their physical and mental capabilities, creating different forms of free play. Through games and their social, physical, and creative character, children also learn about the community they belong to. What is especially important is that in their first years children are accompanied by adults. Playground design should therefore ensure that adults have the possibility of accessing their children, but also of teaching them and providing good tips. It should also stimulate them to undertake physical activity themselves. The worst, but the most common situation is when children are playing, and adults are sitting on the surrounding benches. For children, there is no greater incentive than their parents example.

Another trend in the design of multifunctional, family playgrounds is to use natural materials like stones, wood, water, and plants, to teach the importance of having contact with the natural environment. The research show that the users of untypical, wild, natural, disordered, “mysterious”, and “dangerous” playgrounds are two times more physically active than the users of traditional playgrounds [9].

Multifunctional, physically activating public spaces are conducive to strengthening the ties between generations, to integrating families and community members, and to transferring good practice from parents to children regarding how to be physically active. Children who from an early age participate in physical activity with their parents are much more likely to lead an active lifestyle in the future than those who didn't have positive behaviour patterns at home.

Examples of friendly, integrating, and activating public spaces can be found in Sydney (Figure 2). Their significant feature is that they allow the users to enter into the landscape, and even be its integral part. The design of playgrounds and activity spaces is treated as the art of landscaping, which takes into account all natural values: terrain morphology, local building materials and plant species, and local history. Such places have no clear boundaries and they seamlessly fit into the environment. They contribute to the strengthening of spatial order. Equipped with small architecture elements, seats, water facilities, play and sports areas, as well as places to relax and to be active, these spaces are friendly both to very young and adult users, also in terms of undertaking physical exercises.



**Figure 2.** Sydney, Pyrmont. Physically activating public spaces for young and older

**2.2.2. Teenagers and youth.** This age group is characterised by a rejection of the children's world and negation of the adults' world, which finds its expression in undertaking alternative street activities: skateboarding, inline skating, scooter and BMX riding, streetball, parkour, etc. Teenagers search for places to undertake their activities and find them even in the areas of urban space not designated for sport. In fact, they are the largest group of users of the already discussed informal and DIY sport infrastructure. They play their own music, bring sports equipment and lighting which allows them to use the space even in the night. They use movable elements to arrange the place in different ways. They like to decorate the walls, benches, pavements, and ramps with graffiti and resent being told how their space should look like.

It is very important to take into account these specific needs in the planning and design process of formal spaces as well, by allowing young people to arrange them according to their expectations. Their participation in the design and construction process should be the best way to assure them that they are welcome there as hosts, not as guests, and give them a real sense of having an impact on the places important to them. It also contributes to building and strengthening their identification with the place, encouraging them to treat a community area as their own territory.

**2.2.3. Adults.** The most common public facilities for adults are sports fields, parks, outdoor gyms, workout stations, as well as paths for biking, walking, jogging, or Nordic walking. As the most often indicated barrier preventing adults from undertaking physical activities is the lack of time [2, 7], they should be located in the vicinity of the place of residence. Other inconveniences, already described when discussing formal spaces, include: lack of shelters, lighting, and greenery, and too much exposure to other users. Women in particular report the need for intimacy in exercise areas [7]. What most adults need, however, is motivation, company for joint exercises, a local leader, and organized activities close



to home – which are issues of a more organizational nature, not connected with the spatial aspects of physical activity. An example of well-organized activities in public spaces can again be found in Australia, where the so-called “mothers’ groups” – local groups of women from the same community or neighbourhood, mothers of babies and toddlers – meet for joint exercises (Figure 3). Activities are held in public parks, information can be found on the internet. Trees and the surrounding silence create favourable conditions for sleeping and playing children, while their mothers exercise together and take turns looking after them.



**Figure 3.** Sydney, Centennial Park. Mothers’ exercise group

**2.2.4. Seniors (70+).** Physical activity for people advanced in years has great impact on their physical, mental, and intellectual condition, and the ability to conduct an independent life for as long as possible [10]. Among the most recommended activities we can list balance exercises that prevent falls, coordination exercises that help to perform all kinds of domestic and other activities, as well as muscle strengthening exercises that make it possible for the elderly to overcome terrain difficulties and stairs and to perform heavy housework. Group activities allow to make new and maintain old friendships and give a sense of being a part of the community, which is especially important for single persons or those living far from their families. Facilities for the elderly should therefore be designed so as to enable their users to stay in contact – see each other and chat. Integration is a very important issue in this age group.

Apart from strictly physical exercises, recreation and relaxation is of great significance: the possibility of walking, jogging, cycling in green areas, observing people, taking part in community life. That is why safe, green links between the pace of residence and other urban areas, such as the community centre, recreational and sports areas, or cultural centre, are necessary. Design for the elderly should realize all principles of the universal design of public spaces, making them accessible, friendly, and safe for both young and old ones, for people on wheelchairs, the blind or deaf, and others physically disabled [11].

### **3. Some organizational and social aspects of creating physically activating spaces**

Meeting the users’ needs and an interesting design of public spaces is not sufficient to physically activate the urban population. Examples from Great Britain show the significance of social programmes and actions for activating the residents. The English governmental organization Sport England has implemented the “Use Our School” programme, which is considered as a tool to open school sports fields and sports facilities to the local communities. Including them into the public system of sports facilities is much cheaper than building the new ones. They can become a part of the public space and a place for community members to integrate.

Warsaw is also facing the problem of closed school facilities. An inventory of more than a hundred public and school sports fields conducted in years 2015–2016 by the grassroots initiative “Our Sports Field” (“Nasze Boisko”) showed that the residents’ problem is not the lack of sport infrastructure, but its availability (in the case of school facilities), poor technical and aesthetic condition (in the case of public facilities, especially in the degraded areas of historical districts or the late-modernism estates built in large panel technology), or lack of neighbourly relations [12], which results in lack of joint activities, such as playing together on a nearby sports field. That is why “Our Sports Field” concentrates on organising weekly games for neighbours on public fields and searching for local leaders to promote the idea of neighbourhood sports within communities.

Another interesting initiative is the British programme “ParkLives”, currently under implementation in ten cities. Its aim is to organize sports and recreational activities in public parks, free of charge. The list of events, places, times, and target groups (if necessary) is continuously updated on the website of the programme. It strives to promote physical activity in public space, activating and integrating the residents. Some of the park activities are open to anyone, sometimes certain restrictions need to be set to make them completely safe (in technically difficult or very dynamic sports mixing adults with children could be dangerous for children) or to provide enough comfort to the participants (e.g. for women). The research shows that women have many barriers to overcome, especially those related to appearance, which make it difficult for them to decide to participate in sports [13].

Public spaces also tend to be an arena of mass sport events (street runs, marathons, sports shows, community sports classes, etc.). Public sports events contribute to improving physical culture and building the image of an active city by promoting physical activity among urban residents.

In the years 2012–2016, about 60% of Sport England’s investments in the development of a physically active society, about 60% have been made sports participation (out of which 2% in combating inactivity) and only 24% in procuring facilities. The investment plan for the years 2017–2021 proposes investing 13% in combating inactivity and only 16% in procuring facilities [14]. Such a distribution of expenditure shows that investments in infrastructure are only a part of the process of activating urban residents.

The above-mentioned examples show that the issue of encouraging people to undertake physical activity is complex and if the goal is to be reached, all of the discussed aspects – design (spatial), social, organizational, and economic ones – should be considered.

#### 4. Results and discussion: Design guidelines

The above analyses of the needs of different social groups, their determinants, expectations, and barriers to physical activity in public spaces indicate the importance of understanding the diversity of these needs. Some of the desirable characteristics of public spaces have been indicated by all the groups. Admittedly, not all these needs can be met in every public space – however, the goal is primarily to address the needs related rather to the dedicated sports areas or specific groups – such as the subculture of skaters, who need their own space of special character.

This coexistence of universal and specific needs is natural. It is not possible for each public space to meet all the requirements of all the groups, but it is possible to ensure that the architectural character and links of the discussed facilities to other urban spaces (also those performing different functions) serve as many users as possible, also in terms of physical activity.

The assumption that one of the functions of a public space is to physically activate its users suggests that its design should be based on tolerance rather than exclusion of unwanted behaviours. Instead of introducing numerous prohibitive signs (against skateboarding, parkour, ball games, etc.), it is better to seek a compromise concerning terms of use of the space specified by all the stakeholders in the course of workshop meetings and their participation in the design process. The compromise solutions already in existence (e.g. in Warsaw) confirm that if all the parties acknowledge their respective needs, they will understand and respect each other. Such an approach increases the users’ safety and contributes to the inclusive role of public space, ensuring that there is no need for special preventive elements excluding



certain forms of activities, such as spikes or other stoppers, which are both aesthetically and socially disruptive.

Working together on increasing the quality of public space can deepen relationships between neighbours, strengthen people's identification with their place of residence (both in spatial and social sense), and provide an opportunity to create an important community space through the joint action. It is also important to implement activating programmes that will increase the participation of all age groups in different forms of physical activity. Regulations should take into account the presence and acceptance of different types of wheeled devices in public spaces – bicycles, inline skates, baby strollers, wheelchairs, skateboards, kick scooters, etc., including their electric versions (e.g. for the disabled). In public spaces that perform an activating and integrating function, their users should be treated as equal.

The most important and universal architectural features, which should be taken into account during designing and furnishing public spaces, include: aesthetic and interesting use of colours (e.g. not aimed at children, not too vivid); meeting the needs of different users, without differentiating between children and adult stylistics; natural building materials; physical activity facilities that either accommodate all users, irrespective of age and height, or include elements targeted at different age groups; benches for rest and observation; greenery. Moreover, an individual approach to the design process should be taken and due respect given to the existing urban and architectural context; also, it has to be taken into account that certain elements of public spaces will be used in many, also informal, ways.

Other desirable features of physically activating public spaces include: (1) their proximity to the place of residence (of key importance to the elderly, children, and families with young children, but also for busy adults who do not want to spend extra time commuting); (2) linking them into a cohesive system that enables to actively commute between different city areas (housing estates, schools, public transport nodes, sports and recreation areas); (3) bicycle stands and parking spaces for a variety of wheeled devices, especially near schools, in activity areas, and at public transport stops, to facilitate active and safe travels; (4) multifunctionality and diversity of architecture and facilities to encourage the widest range of users of all ages and fitness levels to undertake physical activity, also in a manner not necessarily foreseen by the designers (various signs of street sports – parkour, skateboarding, BMX riding); (5) adapting them to the context and the surrounding landscape by preparing an individual design, introducing a lot of greenery, and providing both easily accessible and more enclosed areas; (6) the possibility of using them all year round, day and night, in all weather conditions thanks to roofing, lighting, and other architectural elements protecting from wind, sun, rain, or snow. Significantly, most public spaces are designed as to be used only in spring and summer – and yet some of the park alleys can be turned into winter skating rinks, and some of the pedestrian routes, unsprinkled with salt and sand, can be used by cross-country skiers or sled pullers.

## 5. Conclusions

The main, eponymous question put forth in this article was: how to promote physical activity in urban environment? The results of the presented studies and examples show that the most important spatial determinants of properly designed and physically activating public spaces are as follows: taking into account the diverse needs of different social groups, ensuring their participation in the design and construction process, aesthetic and interesting design, proximity to the place of residence, as well as accessibility to all age groups and the disabled. What is also important, the strategies of planning sports and recreation infrastructure should assume their multifunctionality and variability in time to make it adjustable to the changing needs of the users.

The above conclusions, however, raise another question – namely, whether design alone is sufficient to fill public spaces and recreational areas with active people. The case studies show that complex problems, barriers, and needs related to the concept of sport for all should be acknowledged. Cooperation between residents, designers, developers, local authorities, school principals, and other stakeholders, e.g. NGOs, is necessary to achieve a properly functioning system of public spaces, sports and recreation areas, as well as pedestrian and bike routes. There is a danger that without local leaders, interesting and integrating programmes, strong communities, residents' awareness of their needs, wise parents, active

kids, and open schools, public spaces and sports fields could be, if not empty, used occasionally or not used by all the interested parties. Even a properly designed space, therefore, is not everything. Sport is present in the cities thanks to active people, not sports facilities. Places of importance for the residents are being created by taking action, not only by preparing design plans. That being said, it has to be remembered that through its aesthetic and functional solutions, design can and should play a great role in motivating and encouraging people to undertake physical activities in public spaces.

Every effort should be made to integrate all groups, irrespective of their social and economic situation, age, gender, cultural background, and physical abilities, and find a place for them in urban public spaces. Sport and recreation, thanks to the values they bring, can be a very effective tool for social inclusion and integration. The design of physically activating public spaces should also constitute an expression of these values.

## References

- [1] P. Edwards, A.D. Tsouros, "A Healthy City Is an Active City: A Physical Activity Planning Guide", World Health Organization, 2008.
- [2] "Uczestnictwo Polaków w sporcie i rekreacji ruchowej w 2012 r." ["Participation of Poles in sport and recreation in 2012"], Główny Urząd Statystyczny, Departament Badań Społecznych i Warunków Życia, 2012.
- [3] A. Gołdys, I. Derlatka, O. Ślifirska, K. Tadeusiak-Jeznach, "Sport dla wszystkich. Zdrowie dla każdego. Poradnik dla animatorów sportu" ["Sport for all. Health for all. A guide for sports animators"], Ludowe Zespoły Sportowe, Warszawa 2012.
- [4] "Designed to Move: Active Cities. A Guide for City Leaders", designedtomove.org, NIKE Inc., 2015, access: 15.02.2017.
- [5] "Koszty ekonomiczne braku aktywności fizycznej w Europie" ["Economic costs of physical inactivity in Europe"], Raport ISCA / Cebr, June 2015.
- [6] A. Davis, "Value for Money: An Economic Assessment of Investment in Walking and Cycling", NHS Bristol, 2010.
- [7] S. Nowak, R. Wierzbicki, "Diagnoza społeczna zapotrzebowania na infrastrukturę sportowo-rekreacyjną. Raport z badania jakościowego i omnibusowego" ["Social diagnosis of the demand for sports and recreation infrastructure. Quality and omnibus survey report"], GfK Polonia, Warszawa 2016.
- [8] U. Abłażewicz-Górnicka, "Marginalizacja i wykluczenie społeczne w przestrzeni miejskiej" ["Marginalization and social exclusion in urban space"], *Pogranicze. Studia społeczne*, vol. XXII, pp. 231–242, 2013.
- [9] G. Beltzig, "Księga placów zabaw" ["Book of playgrounds"], Wrocław 2001.
- [10] "Growing Older – Staying Well: Ageing and Physical Activity in Everyday Life", World Health Organization, Ageing and Health Programme, Geneva 1998.
- [11] "Universal Design Handbook", eds. W.F.E. Preiser, K.H. Smith, Second Edition, The MacGraw-Hill Companies, 2011.
- [12] M. Kostrzewska, "Neighbourhood Sport as a Tool of Urban Regeneration: A Warsaw Case Study", *3<sup>rd</sup> International Multidisciplinary Conference on Social Sciences and Arts SGEM 2016, Conference Proceedings, Book 4, Vol. II, Architecture and Design*, pp. 433–440, 2016.
- [13] M. Kostrzewska, "Sport dla wszystkich w przestrzeni miasta. Przegląd rozwiązań przestrzennych i programów aktywizujących w wybranych krajach" ["Sport for all in the city space. Overview of spatial solutions and activation programmes in selected countries"], czerwiec 2016, <http://www.msport.gov.pl/badania-i-analazy/infrastruktura>, access: 03.02.2016.
- [14] "Sport England: Towards an Active Nation. Strategy 2016–2021", Sport England, London, 16 May 2016, [www.sportengland.org/activenation](http://www.sportengland.org/activenation), access: 19.01.2017.
- [15] M. Wysocki, "Projektowanie otoczenia dla osób niewidomych. Pozawzrokowa percepcja przestrzeni" ["Designing the environment for the blind. Non-visual perception of space"], Gdańsk 2010.