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DAWID ABRAMOWICZ[a], REMIGIUSZ TRITT[b], GRZEGORZ BORKOWSKI[c]

Qualitative and Quantitative Assessment of Recreational Development: The Case of Szachty Park in Poznań, Poland

Abstract. Given the growing demand for active leisure, and consequently, the increasing emphasis placed on recreation, the proper management of recreational facilities and development is becoming particularly important. The authors propose a three-stage assessment of recreational infrastructure, which takes into account both qualitative and quantitative aspects. The proposed approach can be a useful tool for determining directions of development of recreational facilities in areas with varied characteristics, and can also help create a decision-making framework regarding changes in recreational development in a given area. By analysing strengths and weaknesses, opportunities and threats related to the current state of recreational development, as well as local environmental and planning conditions, it is possible to identify aspects that require improvement or modification. The methodological assumptions described in the article were applied to assess the recreational development of Szachty Park in Poznań.

Keywords: recreational development, method of recreational assessment, recreational infrastructure, SWOT analysis, recreation

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1. Introduction

Recreation is becoming an integral part of human well-being (Zwart & Ewert, 2022). In addition to its crucial role in maintaining physical and mental health, regular physical activity helps to regulate stress, thus enhancing the quality of life (Müller-Riemenschneider et al., 2020). Opportunities for such activities are pro-

[a] Wydział Nauk Geograficznych i Geologicznych, Uniwersytet im. Adama Mickiewicza w Poznaniu, https://orcid.org/0000-0003-0523-8379, dawid.abramowicz@amu.edu.pl
[b] Wydział Nauk Geograficznych i Geologicznych, Uniwersytet im. Adama Mickiewicza w Poznaniu, https://orcid.org/0000-0002-2897-3096, tritek@amu.edu.pl
[c] Wydział Nauk Geograficznych i Geologicznych, Uniwersytet im. Adama Mickiewicza w Poznaniu, https://orcid.org/0000-0003-3567-9941, grzegorz.borkowski@amu.edu.pl

vided by recreational and leisure areas (Carpenter & Harper, 2016; Hartwell et al., 2018; Cilliers & Ledwon, 2024). Recreational "green infrastructure" is essential not only from an environmental perspective but it also makes green spaces more accessible, thereby supporting people's quality of life (Lafortezza et al., 2013). Recreational areas foster social interaction and the creation of interpersonal relationships (Azhari et al., 2025). Properly managed recreational areas can also facilitate the development of various forms of education (King et al., 2010). However, recreational development has not been clearly defined in the literature. It could be analysed in the context of tourism development, but, as noted by Kurek (2007), tourism development itself does not have a clear definition and is sometimes referred to as the process of planning, adapting and equipping areas with elements of tourism and recreation infrastructure (Rogalewski 1979; Ravenscroft, 1992) or as the result of this process (Warszyńska & Jackowski, 1978; Kowalczyk & Derek, 2010). Tourism and recreational space should be distinguished primarily by its natural and cultural values, which complement each other (Butler & Pearce, 1995). An attempt to define forms of recreational development has been made by Pawlikowska-Piechotka (2009), who defined recreational infrastructure as elements of tourism infrastructure that enable the full and safe use of natural and cultural assets located in a given destination. Thus, for the purpose of this study, recreational development can be defined as the process of planning and managing recreational infrastructure, i.e. physical components (facilities) of recreational spaces.

In the following study we propose an approach for a qualitative and quantitative assessment of recreational development. In the article we argue that such evaluation should account for various functions of recreational infrastructure, including facilities for stationary physical activity and games, education, as well as objects known as street furniture. We propose a three-stage assessment of recreational infrastructure, which includes qualitative and quantitative aspects. The proposed approach can be used to determine directions of recreational or tourism development in different kinds of areas (e.g. valuable natural areas, cultural areas, urban parks), and can also help to identify potential threats to the natural environment. It takes into account social and economic needs of potential stakeholders, the area's biodiversity and geodiversity, and the rational use of the environment. Although this is primarily a methodological study, it features an application of the proposed approach to assess an urban park in Poznan (Poland).

2. Literature Review

Recreational facilities enhance the quality of life by providing attractive forms of leisure (Gitau et al., 2023). According to Cortinovis et al. (2018), the availability of such facilities enables people to engage in new activities in natural areas. When considered in terms of ecosystem services, these activities are treated as new cultural benefits provided by naturally valuable areas (Haines-Young & Potschin, 2013). The value of these recreational ecosystem services can be defined in economic terms (Kulczyk et al., 2018). Recreational infrastructure can help promote sports, thereby contributing to the physical fitness and health of local communities (Herbert & Żegleń, 2013; Mitchell et al., 2024). Small-scale facilities (e.g. waste bins, walking tracks) help to reduce the negative impact of human presence on the environment (Heagney et al., 2017). It should also be noted that recreational infrastructure is not only developed with the intention of attracting more tourists but primarily for the benefit of local residents (Mandić et al., 2018). Furthermore, recreational development stimulates economic development, especially in rural areas, by providing employment opportunities outside agriculture (Couto et al., 2020).

The character of recreational development can vary depending on the type of area. Recreational management of forests and urban green spaces is important for public health, nature conservation and the overall quality of life of local residents. As such, this topic has received much attention in the literature (Henderson & Bialeschki, 2009; Woźnicka & Janeczko, 2014; Gundersen & Vistad, 2016; Wajchman-Świtalska et al., 2022, Qviström et al., 2023; Levinger et al., 2024). Recreational development in river valleys provides opportunities not only to enjoy natural landscapes, but also towns, historical monuments, museums and other tourist attractions located along rivers. River valleys and rivers themselves can be valuable assets of the functional and spatial structure of towns and entire regions (Januchta-Szostak & Karaśkiewicz, 2018; Klizentyte et al., 2023; Fu & Wang, 2025). Thanks to recreational infrastructure along riverbanks, such as cycle paths, playgrounds, barbecue areas, visitors can enjoy a variety of activities on the shore, while boat harbours, canoe rentals or moorings provide opportunities for water-based recreation such as canoeing, sailing or cruising (Bernaciak & Cichoń, 2013). Similar recreational opportunities are afforded by lake shorelines. However, aquatic ecosystems are particularly vulnerable to excessive development along their shores (Furgała-Selezniow & Jankun-Woźnicka, 2023) and the associated physical and aesthetic degradation of the natural landscape (Meyer-Arendt, 2010).

When planning or inventorying recreational infrastructure, one should consider whether it is located in a protected area. Tourist and recreational activity can take place in such areas, although the degree of development will depend on the level of

protection associated with different measures of nature conservation (Rogowski, 2023). Any assessment of recreational development in a given area should start by identifying existing recreational infrastructure and be followed by determining the level of functions provided by these facilities using appropriate methods. Since characteristics, like the origin, functions and conditions of socio-political-economic development, of areas where recreational development is assessed will vary, such assessment should be based on qualitative and quantitative criteria.

3. Methods

3.1. The Proposed Approach to Assessing Recreational Development

Our approach includes a quantitative component based on functional multi-criterion assessment (1st stage), a group in-depth interview with stakeholders and specialists (2nd stage) and a SWOT analysis (3rd stage) (Fig. 1). While the proposed approach employs well-known research methods, they have not yet been applied in this way in order to assess recreational development.

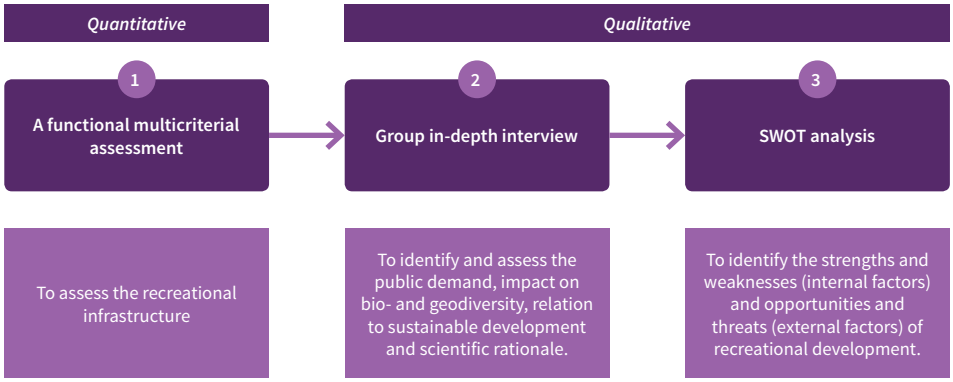

Fig. 1. A three-stage approach for assessing recreational development
Source: Own work

3.2. A Quantitative Functional Assessment of Recreational Infrastructure

The main goal of assessing an area's recreational development is to determine its suitability for active leisure and recreation. This functional approach requires an

assessment of recreational infrastructure in geographic space (natural and/or cultural) taking into account different functions relevant to recreation. We propose that recreational development should be assessed by considering four groups of facilities distinguished by their functionality (e.g. those designed for stationary or non-stationary activities), using evaluation criteria developed specifically for each group. The four groups include 1) facilities for stationary physical activity (e.g. playgrounds, outdoor gyms, swimming areas, toboggan slopes), 2) facilities for non-stationary activity (e.g. pedestrian and bicycle paths, alleys, hiking trails), 3) educational facilities (e.g. educational trails, educational boards), and 4) street furniture (e.g. benches, waste bins, tables, shelters, rain shelters, bicycle racks, directional signs, shrines, pergolas, etc.).

Functional assessment (as opposed to structural one) is based on specific criteria to determine the level of benefits that recreational infrastructure in a given area offers, e.g. how these facilities can be used, and to make recommendations for further development. In order to enable quantitative assessment of different types of recreational infrastructure, we decided to use numerical scores. The score for each criterion can vary in 0.25 increments from 0 to 1, and the scoring method is explained in Table 1. Quantitative assessment should be preceded by a field inventory, field interviews, and a detailed review of publicly available data about the area. Since such assessment requires knowledge and experience in the field of tourism, recreational development and earth sciences, it should be conducted by qualified professionals (for example, members of the research team). In the case of facilities for stationary physical activity, the following evaluation criteria were selected: attractiveness, overall condition, safety and accessibility. Facilities for non-stationary activity were assessed on the basis of three criteria: integrity, overall condition and safety. Educational facilities are evaluated using the following criteria: educational value, added value, overall condition, location, accessibility and relevance. Finally, street furniture is evaluated based on five criteria: quantity, technical condition, location, safety and accessibility.

Table 1. Criteria for assessing recreational infrastructure — the functional approach

Facility category	Assessment criterion	Description (0 – 0.25 – 0.5 – 0.75 – 1)
Facilities for stationary physical activity	attractiveness	To what extent is the use of the facility attractive: can it be used individually and collectively, is it multifunctional, does it affect different senses? (0 — low attractiveness, 0.5 — average attractiveness, 1 — high attractiveness).
	overall condition	Is it damaged, defective, what is its general aesthetic quality? (0 — destroyed, 0.5 — average condition, visible signs of use, 1 — very good condition)
	safety	Can it be used safely; does it offer any forms of protection when in use, is it resistant to damage? (0 — potentially dangerous, 0.5 — relatively safe, 1 — very safe)
	accessibility	Is it accessible to children, people with disabilities? (0 — difficult access, 0.5 — limited access, 1 — full access)

Facility category	Assessment criterion	Description (0 – 0.25 – 0.5 – 0.75 – 1)
Facilities for non- stationary physical activity	integrity	Is the system of transport connections fully integrated? Does it enable access to the most important attractions (natural, cultural), points of interests? (e.g. entrances, parking lots, etc.). (0 — poorly integrated, 1 — highly integrated)
	overall condition	is it damaged, defective, what is its general aesthetic quality? (0 — destroyed, 0.5 — average condition, visible signs of use, 1 — very good condition)
	safety	Can it be used safely; does it offer any forms of protection when in use, is it resistant to damage? (0 — potentially dangerous, 0.5 — relatively safe, 1 — very safe)
Educational facilities	educational value	Is the educational content factually correct and error-free, is it relevant for formal (school) and/or an informal education? (0 — low value, 0.5 — average value, 1 — high value)
	added value	Are forms of presentation varied? Is it visually engaging? the presence of references to digital data (e.g. QR codes), writing in a foreign language or Braille, other features indicative of modernity (0 — no forms, 0.5 — presence of some forms, 1 — the existence of various forms)
	overall condition	Can it be used safely; does it offer any forms of protection when in use, is it resistant to damage? (0 — potentially dangerous, 0.5 — relatively safe, 1 — very safe)
	location	Can it be seen or accessed with the need to change other elements of the infrastructure and without affecting the aesthetics, natural or cultural qualities? (0 — bad location, 0.5 — average location, 1 — good location)
	accessibility	Is it accessible to children, people with disabilities? (0 — difficult access, 0.5 — limited access, 1 — full access)
	relevance	Is the presented content relevant to the specific character of the area and the site, its relationship with the surrounding environment, social phenomena, heritage? (0 — not very relevant, 0.5 — relatively relevant, 1 — highly relevant)
Street furniture	quantity	Is there a sufficient number of facilities to maintain a satisfactory level of service, based on regular observations of the number of users in the area and a subjective assessment of the apparent demand? (0 — too few/too many, 0.5 — average number of facilities, 1 — an appropriate number)
	overall condition	Is it damaged, defective, what is its general aesthetic quality? (0 — destroyed, 0.5 — average condition, visible signs of use, 1 — very good condition)
	location	Can it be seen or accessed with the need to change other elements of the infrastructure and without affecting the aesthetics, natural or cultural qualities? (0 — bad location, 0.5 — average location, 1 — good location)
	safety	Can it be used safely; does it offer any forms of protection when in use; is it resistant to damage? (0 — potentially dangerous, 0.5 — relatively safe, 1 — very safe)
	accessibility	Is it accessible to children, people with disabilities? (0 — difficult access, 0.5 — limited access, 1 — full access)

Source: Own work

The proposed quantitative assessment of recreational infrastructure is the starting point for qualitative assessment described in the following section. However, it is worth noting that the numerical scores indicate the level of satisfaction with the existing recreational infrastructure. The mean score calculated for all facilities or equipment available in a given area indicates the overall assessment of its recreational infrastructure. Given the subjective character of the Likert scale, the mean score can serve as an approximate measure of central tendency. A single facility or a specific group of facilities can also be rated in this way. Scores of 0.25 and below indicate a low quality of recreational infrastructure, scores around 0.5 indicate an average quality, while scores above 0.75 indicate a relatively high quality.

3.3. An Group In-depth Interview as a Tool of Qualitative Assessment of Recreational Development

In order to identify determinants of the quantitative assessment obtained in the first stage, in the second stage we propose conducting a group in-depth interview (focus group interview) with local stakeholders responsible for managing recreational development (especially managers, land use planning officials, community and business sector representatives) and professionals who conduct analytical studies about the tourism and recreational development in the region. Given the specific characteristics of each area, the final decision as to who should participate in a group in-depth interview should be made by the research project coordinator.

For the purpose of qualitative assessment, a group in-depth interview should account for a broad scope of impacts of current or future recreational infrastructure available in a specific area. We propose the following questions to assess recreational development:

1. What is the current demand for recreational facilities and what are stakeholders' intentions regarding recreational development?
2. How do recreational facilities affect existing biodiversity and geodiversity?
3. How do existing or planned recreational facilities contribute to the goals of sustainable development (including sustainable tourism)?
4. What is the scientific rationale for recreational development?

The first question concerns the demand for recreational development expressed by the local community and the local authority (Dahmann et al., 2010). Planning and strategic land-use documents are the basis for decisions regarding such development (Maliszewski, 2014; Bielska et al., 2023). From the governance point of view, autonomous decisions by managers to adapt urban land, including for recreational purposes, play an important role (Saarinen, 2014). Public interest can also be expressed through modern management styles, including the introduction of co-governance practices (Jansson et al., 2019), for example in the form of participatory budgets, whereby residents can suggest projects that are to be financed from the municipal budget (Ikeda et al., 2012; Kozłowski & Bernaciak, 2022). As examples from many countries show, public participation in the management of public space often involves recreational green space initiatives (Gulsrud et al., 2017; Falanga et al., 2021). In this context, the identification of public demand for recreational development is the starting point for a group in-depth interview (Czepkiewicz et al., 2018; Cichoń et al., 2021).

As for the second question, we recognise that potential impacts of recreational development should be assessed from the point of view of environmental interest, with emphasis on actual or predicted damage to biodiversity and geodiversity, which are the main determinants of how natural systems function (Tukiainen et al., 2023). During the interview attention should therefore focus on damage that can result from the transformation of natural habitats, threats to flora and fauna, as well as impacts on the geological structure, relief or hydrographic system. Any activities that may enhance or impair the provision of ecosystem services should also be assessed (Maron et al., 2017; Schröter et al., 2017). In this case, emphasis should be placed on regulatory (RES) and provisioning (PES) ecosystem services, followed by cultural ecosystem services (CES), which reflect benefits resulting from the presence of recreational facilities. Regardless of what kind of impacts of recreational development are assessed, they should be considered in the local context, since their regional implications are usually marginal.

By determining the demand for recreational development and its impact on the natural environment one can further assess to what extent recreational facilities in an given area are consistent with the concept of sustainability (Krippendorf, 1986). Especially important in this case is the socio-economic-natural integrity determined by recreational development.

The third question is designed to find out how recreational development can help to involve all social groups in development processes by stimulate economic activity, for example by creating employment opportunities, without damaging the natural environment (Mandić et al., 2018). It is also important to identify areas of cooperation between stakeholders and determine whether objectives of such cooperation are compatible with sustainable development. Another aspect to consider is whether recreational development aligns with sustainable tourism in terms of adequacy and type of development suitable for current or projected tourism flows (Leisinger, 1998; Khan et al., 2021).

The purpose of the last question is to identify relevant scientific findings and recommendations, contained in published works and research reports on recreational development, and compare them with the observed state of existing recreational facilities, stakeholders' expectations and planned recreational development activities.

3.4. SWOT Analysis

The third step of the proposed approach involves a SWOT analysis, a tool typically used in processes and management studies (Vlados, 2019).

In the field of tourism and recreation, SWOT analysis has been applied to assess the development of tourism development strategies (Goranczewski & Puciato, 2011).

For example, it has been used to determine the impact of tourism on the local economy (Nezha et al., 2021), the functioning of tourism during the COVID-19 pandemic (Fernando, 2021), and the feasibility of creating forms of forest recreation (Juang, 2022). SWOT analysis has also been used to determine the potential of geotourism and geoeducation (Kubalíková & Kirchner, 2016; Kubalíková, 2017, 2019). In the case of recreational development, the SWOT analysis can be used for the purpose of strategic planning, i.e. priority setting, the implementation of new initiatives, and its results should be the basis for recommendations regarding the management of the area.

4. Case Study Results: An Assessment of Recreational Development in Poznań's Szachty Park

The proposed three-stage approach was applied to assess recreational development of an urban park called Szachty (Fig. 2). The park has an area of roughly 114 ha and is located in Poznań — Poland's fifth largest city (approx. 540,000 inhabit-

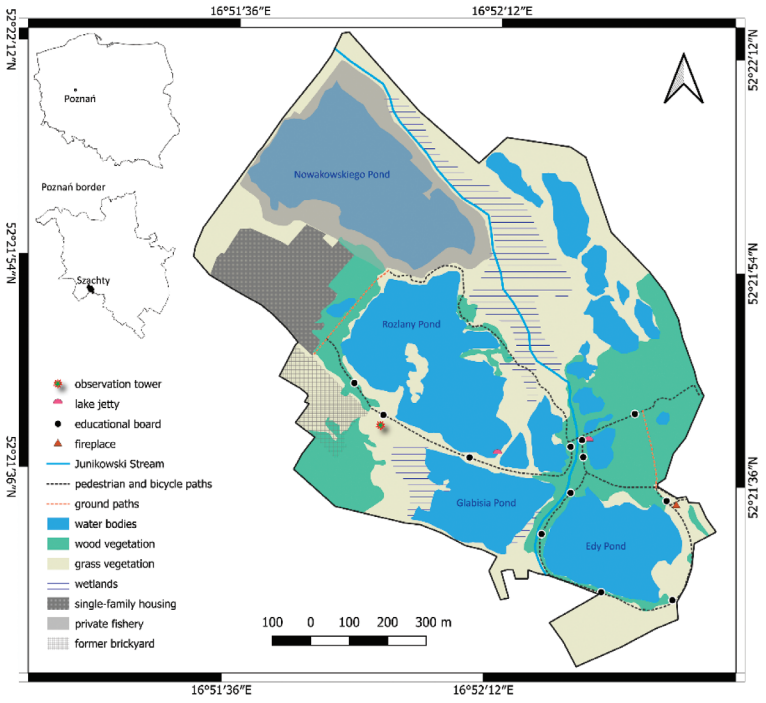

Fig. 2: A map of Szachty Park
Source: Own work

ants). This park is part of the green urban infrastructure of the Junikowski Stream Valley and is an example of a revitalised area, which from the second half of the 19th century to the 1960s was used for the purpose of clay extraction (Stępniewska & Abramowicz, 2016). There are about 20 post-mining reservoirs of varying size (from about 0.2 to 13 ha), as well as a private fishery (excluded from the study). On account of the area's natural values and recreational potential, in 2010, the local community initiated measures to develop the park for recreational purposes (Mazurek & Abramowicz, 2022). Various forms of recreational infrastructure created in the park since then were assessed during our study.

In the first stage of the assessment process, we used data from many years of observations, inventories (the latest made in March 2024) and photographic documentation, to conduct a functional multi-criterion assessment of the park's recreational infrastructure (Table 2).

Table 2. Assessment of Recreational Infrastructure in Szachty Park

Type of facilities	**Assessment criteria**						
	Facilities for stationary physical activity						
	condition	safety	attractiveness	accessibility	Total avg score		
fireplace	0.75	1	0.75	1	0.88		
lake jetty 1	1	1	0.75	1	0.94		
lake jetty 2	1	1	0.75	1	0.94		
Average score	0.92	1	0.75	1	0.92		
	Facilities for non-stationary physical activity						
	condition	safety	integrity	*Total avg score*			
pedestrian and bicycle paths	0.5	0.75	1	*0.75*			
Average score	0.5	0.75	1	*0.75*			
	Educational facilities						
	educational value	added value	condition	location	accessibility	relevance	Total avg score
nature educational trail	1	1	0.5	1	1	1	0.92
geographical educational trail	1	1	0.5	1	1	0.75	0.86
observation tower	0.5	0.5	1	1	0.75	1	0.79
Average score	0.75	0.67	0.67	1	0.92	0.92	0.86
	Street furniture						
	condition	location	safety	quantity	accessibility	Total avg score	
benches	0.75	1	1	1	1	0.95	
waste baskets	0.5	1	0.75	1	1	0.85	
outdoor tables	0.25	1	0.5	0.25	1	0.6	
bicycle stand	1	1	1	0.5	1	0.9	
directional signs	1	1	1	1	1	1	
baby changing station	1	1	1	0.25	1	0.85	
Average score	0.75	1	0.88	0.67	1	0.86	

Source: Own work

After averaging scores for each category of facilities across all criteria, the overall score of the park's recreational infrastructure was 0.85, which represents a relatively high quality. Physical activity facilities (jetties, fireplace) are accessible to the public,

located along pedestrian and bicycle paths, in places with a high volume of visitor traffic. The facilities are new (3–4 years old), made of good quality materials and safe to use. Their overall score is very high (0.92). In addition, the jetties are located in places where there were previously unprotected slopes, which is an additional benefit. However, observation of visitor traffic shows that many people do not use the facilities. The fireplace bears traces of use, minor defects are noticed, but these do not affect its safe use. The network of pedestrian and bicycle paths received a relatively high score of 0.75, since it is integrated with other elements of the transport system, it is properly signed, and the path surface is sufficiently good to be used even by visitors on wheelchairs. However, in the process of field evaluation, some alley sections were partly damaged, especially on the eastern side of the Rozlany Pond, which may be due to the inappropriate adaptation of the alley substructure in relation to the type of subsoil and lack of ground protection, especially in places where the alley runs close to the pond bank. The high score for educational facilities can be attributed to the high quality of the nature trails

Fig. 3: Positive and negative examples of recreational infrastructure in Szachty Park
A — an observation tower, B — a lake jetty and an educational board, C — street furniture and a lake jetty, D — a pavement at risk of sliding, E — poor aesthetics in the alley, F — a devastated bench.
Source: Own work

(educational value, content, applicability to school education as part of geographic education), which are directly related to the area's biodiversity and geodiversity and the attractive and modern observation tower equipped with information panels and video monitoring (0.82). These facilities are located along the main walking and cycling routes, which are visually attractive in their own right. The signage of the paths, however, was found to be undergoing deterioration — some of the

signs were taped off, vandalised and heavily soiled. The park's street furniture was also evaluated highly (0.86) because it is easily accessible, suitably located (directly along the paths and other physical activity and educational facilities) and is available in sufficient numbers, especially when it comes to benches (55) and waste baskets (40). Some of them bear evident signs of use or are slightly damaged. Examples of the park's recreational infrastructure are presented in Figure 3. In conclusion, the overall high scores given to the different elements of the park's recreational infrastructure are probably the result of the high standards of park management and the fact that most of the facilities are still relatively new.

During the second stage of the assessment, a group in-depth interview was conducted with 6 respondents (3 representatives of science, 1 representative of the local government, 1 representative of the community council, 1 representative of an NGO concerned with the protection of the natural environment). The interview was conducted by the moderator and focused on the topics related to the 4 questions listed earlier.

Given the current demand and stakeholders' intentions for recreational facilities, the interviewees' assessment of recreational development was generally positive. They appreciated the creation of walking and cycling paths, which they considered to be essential for the development of recreation in the area was. In their opinion, the observation tower was the highest rated element of the park's recreational infrastructure. However, some respondents questioned the appropriateness of the material used for the paths, arguing that asphalt paths changed the area's character, and it would have been better solution if they had been made of mineral aggregate. The respondents also discussed the pros and cons of creating a swimming area, an idea that was being considered by the local community. Concerns were voiced regarding potential impacts of such a project on the local fauna. Given the characteristics of the bottom of the post-mining reservoirs (steep banks, an irregular bottom), such a bathing area could be dangerous and, therefore, was not recommended. This was followed by a discussion concerning the inadequate maintenance of the educational boards (some of which are dirty and damaged), the lack of a public toilet in the proximity of the park, and a safe car park. Among the suggestions for potential new development, the installation of an outdoor gym was suggested.

The discussion about the impact of recreational development on the park's biodiversity and geodiversity returned to the subject of the negative impact of asphalt alleys, which have transformed the land between the ponds and attract increased pedestrian and bicycle traffic. This traffic can disturb animals (especially birds), including those under legal protection, potentially causing a decline in their local populations. The interviewees also talked about the wooded area, where some paths cross migration routes that amphibian species (frogs, newts) use to move

between the ponds, which also pose a threat. It was concluded that the recreational infrastructure did not contribute to the loss of geological and geomorphological diversity, and actually fosters the potential development of geotourism.

Faced with anthropogenic pressure caused by recreational infrastructure the respondents found it necessary to protect the park's natural values. Although the cultural needs of the local community have been met and the park has become more attractive for housing development, steps need to be taken to maintain the ecosystem balance. The interviewees believed that the alley network in the park should not be expanded. Instead, decision-makers should focus on maintaining the quality of the current infrastructure. The wooded area surrounding the park ponds, despite its potential for alley expansion, should only be tidied up without any further development. With regard to sustainable tourism, it was suggested that future efforts should concentrate on updating educational trails, adding an information board about the sustainable use of the environment and forms of environmental protection.

In response to the last question, the interviewees referred to the work of Kaniecki (1995), who emphasised the area's high potential for educational use and the need to counteract development that would adversely affect the local flora and fauna and water relations. Mention was also made of a recommendation made by Abramowicz et al. (2022) to create a geosite highlighting the area's geotourism values. Studies by Stępniewska and Abramowicz (2016) and Abramowicz and Stępniewska (2020) draw attention to the negative impact of pedestrian and bicycle paths on nursery populations and habitats, and, consequently, regulation and maintenance ecosystem services. On the other hand, according to Markuszewska (2024), the presence of pedestrian and bicycle paths makes some residents reluctant to visit the park, which was previously perceived as a sanctuary of peace and wild nature; the changes brought about by recreational development have caused the sense of loss (solastalgia). Prompted by research and scientific recommendations, the interviewees were also opposed to any investments that could exert pressure on the natural environment and supported measures to ensure proper management of water resources, land use, the monitoring of ecosystem services, and the protection of the natural environment by introducing legal forms of nature protection (Abramowicz et al., 2022; Graf et al., 2022; Stępniewska & Pieczka, 2022).

The quantitative assessment and findings from the group in-depth interview were used to identify the strengths and weaknesses of the park's current recreational infrastructure as well as opportunities and threats regarding future development (Table 3). The park's relatively new facilities received generally high scores, which confirms its important role in enabling recreational activities of the local community. Thanks to facilities created as part of the rehabilitation programme of

the degraded area (such as the observation tower and nature trails), and observed instances of public participation, the area has become the focus of numerous scientific studies. Future development should focus on weaknesses and threats identified in the SWOT analysis, such as examples of damage or devastation of some facilities or the impact on of anthropogenic pressure associated with increasing visitor traffic. It seems that the most intrusive changes to the park's natural environment have already been made, and possible future recreational development, such as an outdoor gym, toilets or car parking, should not have a negative effect on the ecosystem balance.

Table 3. SWOT analysis of the park's recreational development

	Positive factors	Negative factors
Internal factors	*Strengths* • An overall high score for recreational infrastructure, • the observation tower is a distinctive element of Szachty Park in the region, • a high level of interest exhibited by the local authorities in the recreational development of Szachty Park, • evidence of social participation on the part of the local community in the development of recreational infrastructure, • numerous references in scientific studies to the recreational development of Szachty Park.	*Weaknesses* • Examples of neglect (damage to infrastructure) with respect to the upkeep of recreational facilities, • devastation of some educational boards, • lack of parking spaces, toilets, outdoor gym equipment, anthropopressure associated with the use of recreational infra • structure that can affect biodiversity, • a sense of loss felt by some people following the creation of pedestrian and bicycle paths.
External factors	*Opportunities* • The implementation of legal forms of nature conservation, which could foster the park's future recreational development, • the current state of recreational development enables the creation of a geosite, • securing funds to improve the educational infrastructure in order to popularise knowledge of nature protection and sustainable tourism.	*Threats* • Residential development may lead to the creation of new recreational infrastructure, which could be detrimental to biodiversity, • failure to repair damaged infrastructure (pedestrian and bicycle paths, educational boards) will result in further devastation.

Source: Own work

5. Discussion

Recreational infrastructure is generally treated as part of tourism infrastructure, which can be divided into four basic groups (Panasiuk, 2007): 1) facilities that enable tourists to experience attractions available in a given area; 2) facilities that enable tourism; 3) cultural and entertainment facilities; and 4) service facilities that enable tourists to meet their daily needs. According to this classification, recreational infrastructure mainly serves the needs of tourists. But recreational facilities can also improve the quality of life, so they should be accessible to not only to visitors but to local residents as well (Mandić et al., 2018). Recreational infrastructure is also a broad term, which includes facilities like hiking, trekking and thematic trails, or sports arenas, water parks and swimming pools, to name just a few. Recreational facilities in urban parks and forests are described in slightly different terms. Wajchman (2013) proposes dividing recreational infrastructure located in urban greenery into three groups: areal recreational facilities,

recreational devices and linear recreational facilities. The first group includes recreational clearings, playgrounds, recreational and ecological meadows, toboggan slopes, dog runs and parking lots. The category of recreational devices includes stairways, campfire sites, viewpoints, tables, benches, trash garbage cans, and small refreshment points. Among examples of linear facilities Wajchman lists nature and forest trails, horse paths, and recreational roads and paths.

The literature contains other classifications of recreational infrastructure, which depend on the approach of a given study and its objectives (e.g. Gobster, 2002; Kaczynski & Henderson, 2007; Ries et al., 2008). The simplest classification criterion is activity type. According to this criterion, recreational infrastructure can be divided into facilities and equipment for various physical activities, such as running, cycling, swimming, playground games, team games, etc. If recreational infrastructure is classified based on its location, it can be classified into urban, rural, coastal, mountain or forest facilities, with further subdivisions according to specific environmental and geographic features.

Tourism infrastructure can also be designed for different target groups, depending on age (children, young people, adults, older people), or other factors (disabled individuals, families, athletes). Another classification is based on physical characteristics, such as size, shape, level of difficulty, availability, safety. Recreation facilities can also serve different functions, like sports, play, outdoor recreation. From a practical point of view, i.e. in the case of the study described in this article, the functional criterion is the most useful one for assessing recreational infrastructure, which represents the current state of recreational development (Table 4).

Table 4. Classifications of recreational facilities

Source	Criterion	Categories
Gobster (2002)	Activity	**Passive:** Facilities for sitting, relaxing, watching sports, etc. **Active-individual:** Running and walking paths, exercise facilities, roller/skateboarding facilities, etc. **Active-group:** Playing fields, playgrounds, etc. **Water sports:** Bathing areas, fishing piers, marinas, etc. Other
Wajchman (2013)	Spatial dimansion	**Areal facilities:** recreational clearings, farm clearings, playgrounds, 50+ exercise area, car parking areas, toboggan slopes, recreational meadows, ecological meadows, dog runs. **Linear facilities:** nature and forest trails, horse roads, roads and recreational paths. **Recreational facilities:** stairs, rain shelters, fire pits, viewpoints, existing tables, existing baskets, existing benches, food kiosks.
Cavnar et al. (2004)	No classification criteria	Playgrounds, football fields, soccer fields, baseball/softball diamonds, tennis courts, outdoor basketball courts, aquatic facilities, recreation facilities
Bedimo Rung et al. (2006)		Benches, bike racks, shelters, restrooms, concession stands, buildings, drinking fountains, picnic tables, water features, art and monuments, car parks
Jalinik & Selwesiuk (2023)		**Recreational facilities in the accompanying base of tourism development:** swimming pools, swimming baths, aqua parks, cable cars, cable parks, ski lifts and ski runs, hiking trails, marinas, stadiums, golf courses, bowling alleys, tennis courts, observation towers, etc.

Source: Own work based on Gobster (2002), Cavnar et al. (2004), Bendimo Rung et al. (2006), Wajchman (2013), Jalinik & Selwesiuk (2023)

Recreational infrastructure can be assessed in terms of its suitability for physical activity. Bedimo-Rung et al. (2006) attempted to develop audit tools to assess specific features of park environments for physical activity. Lee et al. (2013) developed an extensive audit tool to assess features of recreational facilities in 10 domains, including accessibility of sports facilities, facility accessibility, the accessibility of ancillary facilities, locker room conditions, restroom conditions, management, policies, environmental safety, aesthetics and social environment. With an emphasis on the development of physical activity in urban systems, among others, Cavnar et al. (2004) developed a tool to assess the quality of amenities of public recreational facilities. They suggested three specific categories that were included in the assessment questionnaire: condition, safety, and maintenance (condition, safety, and maintenance).

The above approaches to classifying recreational facilities have so far been based on physical characteristics of recreational infrastructure (Wajchman, 2013), possible forms of activity (Gobster, 2002) or have not been ordered according to any criterion. This is why we argue that recreational development should be assessed from a functional perspective, which provides a comprehensive picture of the attractiveness, legitimacy and quality of recreational development of a given area.

The proposed approach for assessing recreational development is comprehensive but has certain limitations or weaknesses. Despite the use of tools such as SWOT analysis and group in-depth interviews, the assessment of recreational development may be affected by subjective interpretations and opinions of experts and stakeholders. In addition, this approach may not take into account dynamic changes in the environment, such as changing recreational trends, population growth or decline and climate or infrastructure changes. The complexity of implementation may also be a disadvantage of the approach, as a comprehensive SWOT analysis and group interviews are usually time-consuming and require the involvement of many people. As a result of changes in land use, as well as progressive damage to infrastructure, a quantitative assessment made some time in the past may no longer be valid, as things tend to change over time. Given the limitations of our approach, its functional character may be useful from the point of view of institutions involved in the development and maintenance of urban parks and other green spaces with recreational infrastructure. It also meets the demand for recreation in green areas, while considering the needs of the natural environment.

6. Conclusions

Despite a large body of research on tourism development, no methodical approach has been proposed to assessing and classifying recreational development in its broadest sense. New urban planning concepts give rise to new recreational spaces, and public space is becoming an important element of the cityscape and the suburbs (Mokras-Grabowska, 2019). Such developments motivate efforts to define a method of measuring the use value of recreational public spaces and determine the relationship between the use value of a space and its users or to develop a model of recreational ecosystem services (Heagney et al., 2017; Kulczyk et al., 2018).

The main aim of the paper was to bridge the gap described above. The approach proposed in the article creates a frame of reference for decisions regarding changes in recreational development of a specific area. By analysing strengths, weaknesses, opportunities and threats of current recreational development, the approach can be used to identify problems that need improvement or change. The focus on the functionality and quality of existing recreational infrastructure and on social and environmental needs makes it possible to determine what new facilities or services might be beneficial to an area. The approach can also help to assess whether new facilities meet the principles of sustainability and to what extent they can meet expectations of the local community and other stakeholders. The proposed approach is a comprehensive tool enabling comparisons of different areas in terms of their suitability for active leisure and recreation. It can facilitate the planning and management of recreational areas and improve their tourist attractiveness, ultimately enhancing the quality of life of local residents.

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Conceptualization: **D.A.**, **R.T.**; data curation: **G.B.**; formal analysis: **R.T.**, **G.B.**; methodology: **D.A.**; resources: **D.A.**, **R.T.**, **G.B.**; visualization: **R.T.**; supervision: **D.A.**, validation: **R.T.**; writing: **D.A.**, **R.T.**, **G.B.**; review & editing: **D.A.**

Declaration of Competing Interest

None.

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Jakościowa i ilościowa ocena zagospodarowania rekreacyjnego na przykładzie parku Szachty w Poznaniu

Streszczenie. W związku z rosnącą potrzebą aktywnego spędzania wolnego czasu, a co za tym idzie, coraz większą wagą, jaką ludzie przywiązują do rekreacji, szczególnego znaczenia nabiera kwestia właściwego zarządzania zapleczem i zagospodarowaniem rekreacyjnym. Autorzy proponują trójetapową ocenę infrastruktury rekreacyjnej, która uwzględnia zarówno aspekt jakościowy, jak i ilościowy. Zaproponowane podejście może stanowić użyteczne narzędzie do wyznaczania kierunków rozwoju zaplecza rekreacyjnego na terenach o zróżnicowanym charakterze, a także pomóc w tworzeniu ram decyzyjnych dotyczących zmian w zagospodarowaniu rekreacyjnym na danym obszarze. Analiza mocnych i słabych stron, szans oraz zagrożeń związanych z aktualnym stanem zagospodarowania rekreacyjnego, a także lokalnych uwarunkowań środowiskowych i planistycznych umożliwia identyfikację cech wymagających ulepszenia lub modyfikacji. Przedstawione założenia metodologiczne zostały zastosowane do oceny zagospodarowania rekreacyjnego w parku miejskim w Poznaniu.

Słowa kluczowe: zagospodarowanie rekreacyjne, metody oceny zagospodarowania rekreacyjnego, infrastruktura rekreacyjna, analiza SWOT, rekreacja