Summary of the doctoral dissertation entitled:

SPORT FOR EVERYONE: EVALUATING ACCESSIBILITY IN OUTDOOR PUBLIC SPACES WITH ATTENTION TO PEOPLE WITH DISABILITIES

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Outdoor public spaces have become increasingly popular venues for promoting sports and physical activities for everyone. This thesis examines how these public spaces can motivate all individuals to engage in sports activities, particularly those with disabilities. The research emphasizes the rising demand for accessible outdoor public spaces, such as streets, parks, and play areas, taking into account the growing number of people with disabilities and their low levels of sports involvement and physical activity. The thesis identifies critical barriers resulting from the physical design characteristics of public spaces that hinder disabled users from participating.

There is insufficient research exploring the relationship between people with disabilities and the physical characteristics of urban public spaces in the context of sports participation. Also, despite existing literature on universal design and accessibility standards, many renovated recreational and urban public spaces still fail to fully accommodate the needs of people with disabilities in sports settings. This dissertation seeks to address the following three key research gaps:

1. Despite growing awareness of the importance of urban public spaces in promoting sports for all, there is limited understanding of the specific factors that encourage or hinder participation. Therefore, a comprehensive analysis is needed to identify which characteristics influence the design of urban public spaces in shaping sports cities for everyone.

2. City centers have become venues for organizing street running, along with an increasing interest in participation among people with disabilities. Still, there has been limited research on how features of public spaces impact disabled runners. This thesis explores the perceived physical barriers in urban public spaces, particularly the spaces in-between buildings that hinder the independent participation of people with disabilities.

3. The participation of people with disabilities in recreational areas is limited due to design, environmental, and safety barriers. To address this problem, this thesis examines and rates the physical features of outdoor recreation areas. It also employs both qualitative and quantitative methods to understand what makes it difficult for disabled people to use recreational and play areas independently, in accordance with universal design and accessibility standards.

To fill the gaps in existing research, the main aim of this thesis is: To comprehensively explore the key factors influencing the physical characteristics of outdoor public spaces in promoting accessible sports for all. Specifically, it focuses on evaluating the accessibility and usability of features of revitalized outdoor recreational areas across different geographical contexts, based on universal design principles and international and local accessibility standards, thereby enabling people with disabilities to independently participate in outdoor recreational spaces.

To achieve this aim, this study developed four research questions. Each question is addressed in a separate chapter of this thesis. Chapter One introduces the thesis topic generally, including the importance of trends and policy developments in promoting accessible sports for all in outdoor public spaces, particularly for individuals with disabilities. It also covers research gaps, the conceptual framework, the aim and research questions, the research design, and the outline of the thesis. Chapters 2, 3, 4, and 5 are each written as individual published articles, examining different aspects of these themes.

The methods employed in this thesis include case studies (observation and evaluation), surveys of 110 individuals with disabilities (cross-sectional studies), and comprehensive literature reviews. Principles of universal design, alongside international and national accessibility standards, were applied to assess the accessibility and usability of revitalized outdoor public parks and play spaces in various countries to address diverse groups (children, youth, adults, the elderly, and people with disabilities).

The first research question addressed in Chapter Two is: **What factors facilitate or hinder sports participation, and how do they shape urban public spaces to create inclusive, accessible sports cities for everyone?**

The results of Chapter Two showed that spatial sports facilities, organization and programming, and environmental factors impacted the creation of attractive environments for organizing informal sports for all in urban settings. This research finds that increasing the number of sports facilities, ensuring their proximity to residential areas, and guaranteeing easy access and safety can encourage diverse groups, including those with disabilities and the elderly, to engage in sports. However, the study also finds that distance, inequitable access, and the uneven distribution of outdoor sports facilities in neighborhoods can discourage participation. Additionally, sports facilities can serve as social meeting places, contributing to the image of sports cities that are welcoming to all.

Organizing and programming multisport activities for all groups at different times can create lively outdoor urban environments and shape sports cities. The results of Chapter Two show that collaboration with multiple agencies and informal groups increases engagement in sports and fosters strong social relationships among participants, which can enhance the frequency of participation. However, some organizers act as barriers, leading to conflicts and reduced participation. Therefore, it might be necessary to permit diverse community groups to plan some of these events. This chapter demonstrates that public spaces can serve as venues for both organized and informal sports, enabling a wide range of sporting events near residential areas, thereby creating more opportunities for all city residents and increasing participation. However, further findings indicate that sports organizers sometimes use public spaces for marketing and revenue generation, which negatively impacts participants. Additionally, management and maintenance issues are frequently overlooked in the design of public open spaces; as a result, collaboration between local governments and private parties is critical.

Additionally, the quality of the urban environment highly influences outdoor sports. Attractive outdoor spaces could increase participation frequency. The research findings indicate that natural areas, such as green and blue spaces and water features, play a crucial role in creating attractive locations where a growing number of people engage in sports and physical activities. Additionally, the environmental quality of sporting venues—such as comfortable surfaces, feelings of safety, and living environments—can encourage participation. However, the results also indicate that a lack of accessibility and safety issues pose challenges for people to participate in outdoor sports; therefore, accessible sports facilities play a significant role in increasing participation.

According to the results of this chapter, the urban and architectural characteristics of public spaces in modern cities such as aesthetics, fascinating design, and accessibility for all age groups, including people with disabilities can entice people of all ages to participate in sports. It is important to consider safety and attractiveness in the physical environment, as they significantly impact sports participation. Inclusivity and multifunctionality are key factors in planning and designing urban regeneration programs to adapt public spaces into more accessible places for all, thereby encouraging broader participation in sports.

To conclude, this chapter found that urban public spaces are important locations for informal sports activities. Well-designed public spaces are essential to encourage everyone to participate in sports. The study identified factors that facilitate or hinder sports participation in urban public spaces, including:

- **Spatial sports facilities** (e.g., location, accessibility, relation with public space, distance and proximity, visibility, and opening).
- **Organizational and programmatic factors** (e.g., program mix, developing sports spaces and facilities, maintenance, and policy and target groups).
- **Environmental factors** (e.g., quality of sport surfaces, accessibility, natural spaces, adapting, and attracting spaces).

The second research question addressed in Chapter Three is: **What physical features in urban public spaces create barriers for physically and visually disabled street runners, and how can these barriers be identified and addressed to improve accessibility in the running environment?**

The findings of Chapter Three indicated that the assessment of perceived street surfaces and permanent street features poses barriers for physically disabled and visually impaired runners in street running. This research found that certain types of street surfaces should be avoided in running environments for both groups, including uneven and potholed surfaces, various elevated surfaces, and cobblestone pathways (as shown in Figure 1). Furthermore, barriers in-between buildings such as curbs, vehicles, cyclists, inappropriate placement of street elements, signage, lighting, trees and green areas, benches, and bins (Figure 2) negatively affect the organization of running for disabled runners. However, disabled runners also identified positive attributes in-

between buildings, such as flat surfaces and interesting architecture for physically disabled runners, and lighting, flat surfaces, sidewalk and street connectivity, and tactile pathways for visually impaired runners (Figure 3).

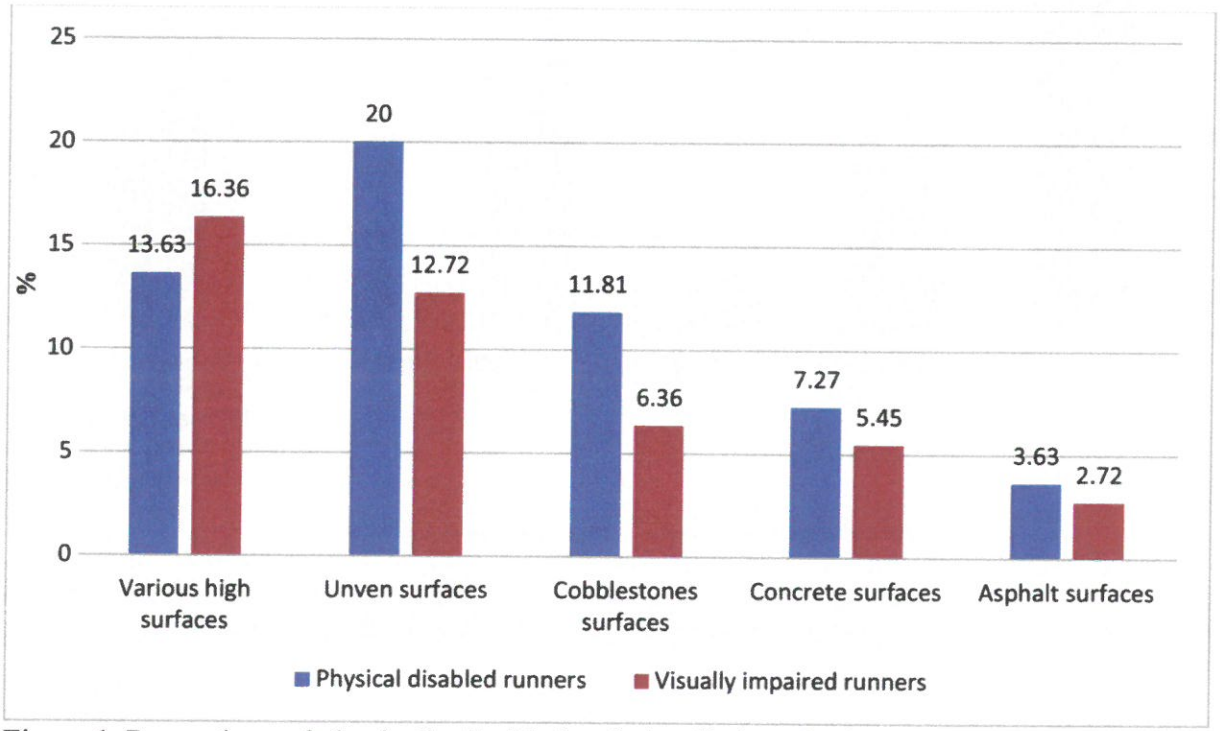

Figure 1. Perceptions of physically disabled and visually impaired runners on avoiding different running surfaces in the running environment.

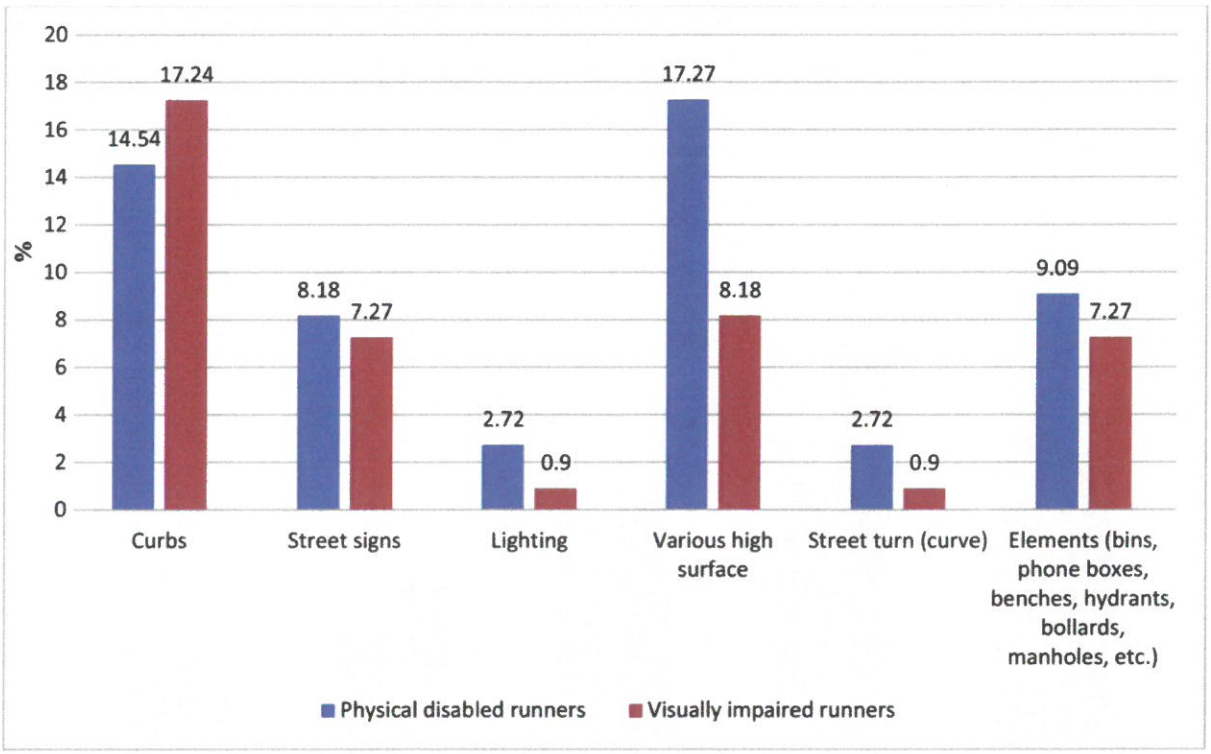

Figure 2. Perceptions of physically disabled and visually impaired runners on permanent street elements that negatively impact the organization of running in the urban environment.

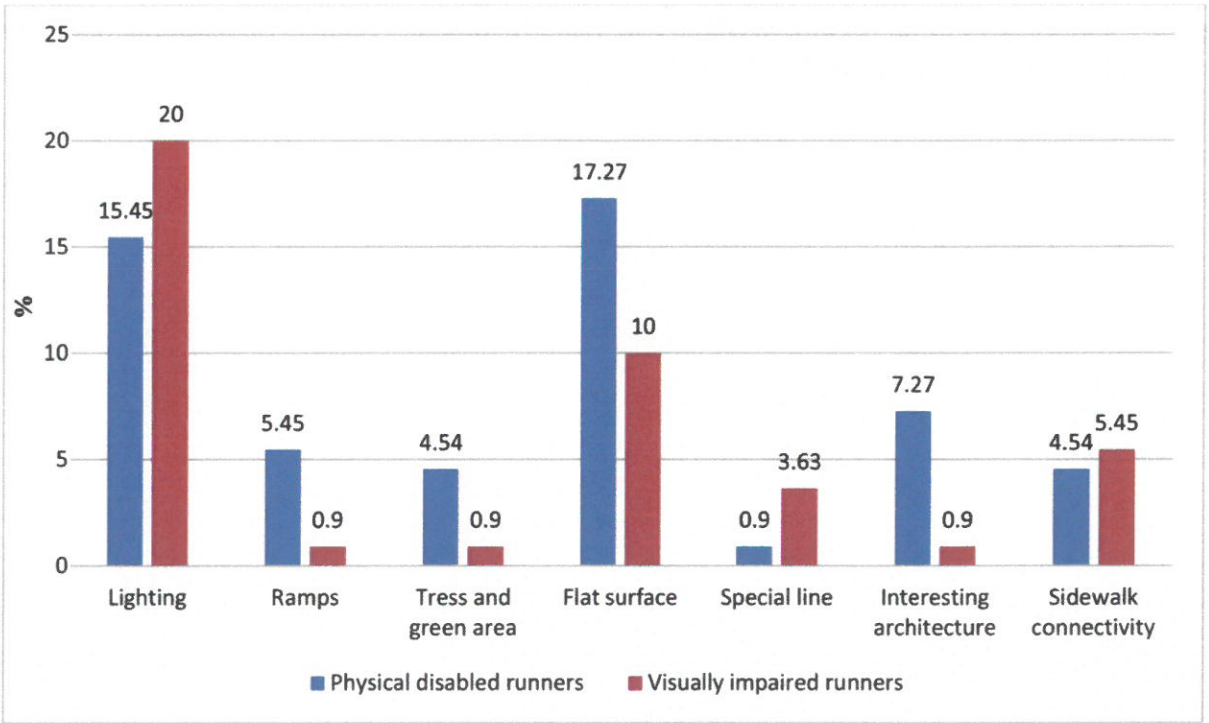

Figure 3. Perceptions of physically disabled and visually impaired runners on permanent street elements that positively impact the organization of running in the urban environment.

This research concluded that poorly designed public spaces hinder and prevent disabled runners from participating in street running independently. Therefore, urban practitioners must prioritize revitalizing in-between buildings through accessibility improvements to remove impediments and encourage participation for all.

The third research question, addressed in Chapter Four, is: **What specific design interventions and accessibility improvements are needed to optimize the inclusivity and usability of the Activity Zone in Chorzów City, Poland, for individuals with disabilities, based on universal design principles and local standards?**

The results of Chapter Four revealed the significance of incorporating universal design principles alongside Warsaw Accessibility Standards and regulations for evaluating the elements of revitalized recreational public spaces (the Activity Zone in Poland, Figure 5) for people with disabilities. These elements include entrances, pathways, surfaces, play equipment, urban furniture (signs, lighting, benches, trash bins), and parking spaces.

This research found that the entrance is not fully accessible due to its elevated height level. The pathway surfaces are level, stable, and well-maintained, enabling effortless movement for people using mobility aids such as wheelchairs or walkers. However, the pathways are not entirely free from barriers caused by some elements within the space, and there is a lack of tactile indicators to assist people with visual impairments in navigating the recreation space.

Figure 5: Location of the Activity Zone in Chorzów, Poland

Some play areas are accessible to users of all ages and groups. However, a few equipment spaces are inaccessible to people with disabilities due to varying surface levels. The trash bins in the area offer various placements and suitably sized options. Some benches cater to diverse needs and are conveniently located, but not all are suitable for people with disabilities. Although the area provides adequate lighting, its placement can pose barriers. The information board includes a plan of the area with detailed explanations, but visually impaired individuals cannot comprehend the provided information. Additionally, there is a lack of clear signage directing individuals to parking areas. Based on assessments of Universal Design (UD) and Warsaw Accessibility Standards (WAS), this study concluded that the Activity Zone overlooks some features that would make it a more welcoming recreational place for everyone.

The fourth research question addressed in Chapter Five is: **What are the differences in accessibility and usability of outdoor play spaces for individuals with disabilities in urban**

public parks across Hungary, Poland, Iraq, and Saudi Arabia, and how do national policies, awareness, and planning practices impact the design of inclusive play environments in these countries?

The results of Chapter Five revealed key issues related to the design, environment, and safety of parks and play spaces in four urban public parks including City Park (Hungary), Silesia Park (Poland), Azadi Park (Iraq), and King Fahd Central Park (Saudi Arabia) potentially impeding the involvement of people with disabilities. This research evaluates and compares several issues in the parks: accessible car parking, path surfaces, access to play equipment, restroom facilities, fencing, and lighting (Figure 10).

This research found that only City Park provided accessible car parking, whereas Silesia Park, Azadi Park, and King Fahd Central Park were not fully accessible. None of the evaluated parks met all the required criteria for fully accessible parking spaces. Azadi Park and King Fahd Central Park had several issues, such as high curbs, narrow paths, and uneven surfaces, unlike City Park and Silesia Park. These issues create challenges for mobility device users and pose safety risks. Irregular path surfaces are key obstacles in outdoor sports and physical activities for individuals with disabilities (Table 1).

In City Park and Silesia Park, most play spaces have flat surfaces without steps from the orientation path to the play equipment, making them more accessible (Figures 6 and 7). However, in Azadi Park and King Fahd Central Park, most play equipment lacks accessible walkways to ground-level components, making the play areas difficult for people with disabilities to use (Figures 8 and 9). Only City Park and Silesia Park provided fencing for play spaces, though fences may unintentionally reduce inclusiveness by limiting access points.

King Fahd Central Park and City Park offer adequate lighting along circulation paths, while only King Fahd Central Park and Azadi Park provided adequate lighting in play areas. Most of Silesia Park and Azadi Park, along with their primary access routes, lacked lighting. Adequate lighting in multi-purpose areas (e.g., tennis courts, basketball courts, skate parks, and playgrounds) is recommended to facilitate evening activities for older children and adults.

Table 1. Evaluating accessibility and usability of play spaces in City Park (Hungary), Silesia Park (Poland), Azadi Park (Iraq), and King Fahd Central Park (Saudi Arabi)

Evaluation items	Evaluation questions	City Park in Budapest	Silesia Park in Chorzów	Azadi Park in Sulaimani	King Fahd Central Park in Maddnah
		Appropriate / Inappropriate			
Car parking spaces and bus stops	• Are there accessible car parks? • Is the nearest bus stop within walking distance of the play space entrance?	Appropriate Appropriate	Inappropriate Inappropriate	Inappropriate Inappropriate	Inappropriate Inappropriate
Path surfaces	• Are the main paths at least 1.5 m wide? • Is the main path surface regular and even?	Appropriate Appropriate	Appropriate Appropriate	Inappropriate Inappropriate	Appropriate Inappropriate
Play equipment access and usability	• Are the ground level components accessible? • Are there accessible routes to at least 50% of the elevated components? • Are there high contrast colours between play equipment and the orientation path?	Appropriate Appropriate Appropriate	Appropriate Appropriate Inappropriate	Inappropriate Inappropriate Inappropriate	Appropriate Inappropriate Inappropriate
Lighting and fencing	• Is there adequate lighting in the play spaces or secondary paths? • Is the play area fenced and at least 1.2 m high?	Appropriate Appropriate	Inappropriate Appropriate	Inappropriate Inappropriate	Appropriate Inappropriate
Rest areas	• Is there a rest area? • Is there a suitable space for a wheelchair to be placed beside the rest area? • Is there a quiet, less stimulating and safe space to have peace or relax?	Appropriate Appropriate Appropriate	Appropriate Appropriate Appropriate	Inappropriate Inappropriate Appropriate	Appropriate Inappropriate Appropriate
Restrooms	• Is there a restroom present? • Is the path to the toilet accessible?	Appropriate Appropriate	Appropriate Appropriate	Appropriate Inappropriate	Appropriate Inappropriate

We concluded that City Park exemplifies good practice in accessibility, while Silesia Park and King Fahd Central Park require improvement. Azadi Park demands a complete transformation to ensure accessible park and play spaces for all.

Figure 6. An example of a designated parking space for people with disabilities near a play area in Silesia Park, Poland.

Figure 7. An example of a high curb and stairs along the main path of play space in King Fahd Central Park, Saudi Arabia.

Figure 8. An example of play equipment and a rest area in City Park, Hungary.

Figure 9. An example of stairs on the main path to the restrooms in Azadi Park, Iraq.

Chapter Six presents recommendations and practical implications for practitioners, policymakers, and local authorities in urban planning and design, as well as in the fields of disability and sports, to implement measures that enhance inclusivity across all case studies. It also provides recommendations for future research and policies, emphasizing universal design and accessibility standards in the revitalization of public spaces to promote participation in sports and physical activities among people with disabilities.

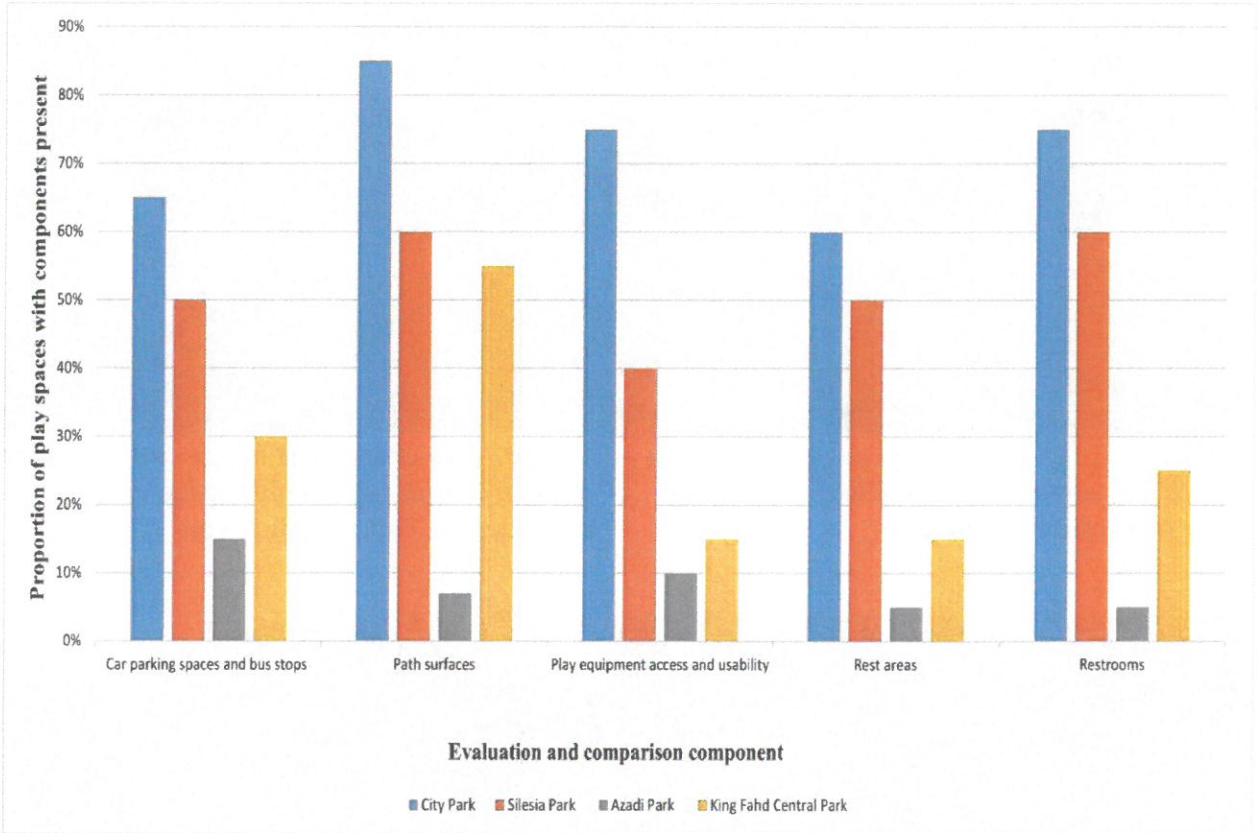

Figure 10. A comparison of all evaluated items, including parking and path surfaces, play equipment, rest areas, and restrooms across all public parks.

The findings of this thesis highlight the critical role of surface quality, inclusive design elements, well-equipped facilities, safety measures, and overall accessibility in outdoor public spaces. For individuals with disabilities, these factors determine whether they can fully engage in sports and physical activities. Uneven or unsuitable surfaces, a lack of adaptive sports equipment, or inadequate wayfinding can create significant barriers. **This research advocates for increased awareness among urban planners, landscape architects, policymakers, and practitioners regarding the need for inclusive sports infrastructure.** It emphasizes the importance of adhering to accessibility standards, actively involving individuals with disabilities in the planning process, and collaborating with disability advocacy organizations to create universally accessible environments. By doing so, outdoor spaces can evolve into dynamic, inclusive areas where everyone, regardless of ability, can participate in recreational and sports activities.

Ultimately, this thesis contributes to the development of inclusive and vibrant sports cities, where outdoor public spaces serve as welcoming arenas for individuals of all ages and abilities. This research advocates for improved policy frameworks, the integration of assistive technologies,

and the implementation of practical design guidelines to ensure that public recreational spaces are truly inclusive. As a result, urban public spaces can become hubs for sports for everyone. Well-designed, universally accessible sports facilities also strengthen social connections, enhance well-being, and improve overall community health.

A SUMMARY OF THE AUTHOR'S OWN CONTRIBUTION:

Capter one: **Introduction**

— conceptualization of the chapter, preparation of the original version of the study.

Chapter two: **What factors influence the shaping of urban public spaces for sports cities? A systematic review**

— conceptualization of individual chapters, proposal of methodology, own research: analysis - synthesis - conclusions, preparation of the original version of the study.

Chapter three: **Introducing the physical barriers in the city in-between buildings for disabled runners**

— conceptualization of individual chapters, proposal of methodology, own research: analysis - synthesis - conclusions, preparation of the original version of the study.

Chapter four: **Enhancing accessibility and usability of outdoor recreation spaces for individuals with disabilities: A case study of the Activity Zone in Chorzów City, Poland**

— conceptualization of individual chapters, proposal of methodology, own research: analysis - synthesis - conclusions, preparation of the original version of the study.

Chapter five: **Comparative study on evaluating accessibility and usability of parks and play areas for people with disabilities in urban public parks: A case study of Hungary, Poland, Iraq, and Saudi Arabia**

— conceptualization of individual chapters, proposal of methodology, own research: analysis - synthesis - conclusions, preparation of the original version of the study.

Chapter six: **Conclusions and recommendations**

— conceptualization of the chapter, preparation of the original version of the study.

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