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Research Article

Playable Cities: Designing Playful Urban Spaces

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ABSTRACT

The innovative approach of integrating play and interaction into urban spaces aims to transform cityscapes into dynamic, engaging and inclusive spaces that both increase the quality of life of citizens and attract tourists. Playable cities encourage social interaction, creativity and physical activity by combining interactive and/or participatory activities, digital games, etc. Playable cities, which also include smart technologies and environmentally sensitive design, increase the quality of life of citizens and support urban ecology and urban resilience. This approach, in addition to being compatible with broader urban planning goals, plays an effective role in ensuring that individuals communicate with each other and cultural characteristics to continue. As cities continue to grow and expand over the years, the integration of fun designs and/or elements into public spaces provides the opportunity to make cities more livable and enjoyable for everyone. Itu also makes it possible to redefine urban experience in different ways and to align technological innovation with social well-being and environmental sustainability. In this context, the study aims to provide urban and landscape designers with a comprehensive understanding of playable cities and playful urban spaces. It aims to examine playable cities from the perspectives of playable urban design, playable urban furniture, landscape architecture, urban identity, tourism and social sustainability and to summarize their relationships. In addition, the study examines some examples to visualize the playability of urban designs and urban elements while analyzing them. It is thought that this comprehensive approach will form an important basis for future design studies to design user-centered, environmentally and climate-compatible urban landscapes.

Keywords: *Smart cities, playable cities, playful urban design, public space, playability*

Oynanabilir Kentler: Eğlenceli Kentsel Alanlar Tasarlamak

ÖZ

Oyun ve etkileşimi kentsel alanlara entegre eden yenilikçi yaklaşım, kent peyzajını hem vatandaşların yaşam kalitesini artıran hem de turist çeken dinamik, ilgi çekici ve kapsayıcı alanlara dönüştürmeyi amaçlamaktadır. Oynanabilir kentler, etkileşimli ve/veya katılımcı aktiviteleri, dijital oyunları vb. birleştirerek sosyal etkileşimi, yaratıcılığı ve fiziksel aktiviteyi teşvik etmektedir. Akıllı teknolojileri ve çevreye duyarlı tasarımı da içeren oynanabilir kentler, vatandaşların yaşam kalitesini arttırmakta, kentsel ekolojiyi ve kentsel dayanıklılığı desteklemektedir. Bu yaklaşım, daha geniş kentsel planlama hedefleriyle uyumlu olmasının yanı sıra, bireylerin birbirleriyle iletişim kurmasını ve kültürel özelliklerin devam etmesini sağlamada etkili bir rol oynamaktadır. Kentler yıllar içinde büyümeye ve

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genişlemeye devam ettikçe, eğlenceli tasarımların ve/veya öğelerin kamusal alanlara entegre edilmesi, kentleri herkes için daha yaşanabilir ve keyifli hale getirme fırsatı sunmaktadır. Ayrıca, kentsel deneyimi farklı şekillerde yeniden tanımlamayı ve teknolojik yeniliği sosyal refah ve çevresel sürdürülebilirlikle uyumlu hale getirmeyi mümkün kılmaktadır. Bu bağlamda, çalışma kentsel tasarım ve peyzaj mimarlığı disiplinlerine oynanabilir kentler ve eğlenceli kentsel alanlar hakkında kapsamlı bir anlayış sağlamayı amaçlamaktadır. Oynanabilir kentleri oynanabilir kentsel tasarım, oynanabilir kent mobilyaları, peyzaj mimarlığı, kentsel kimlik, turizm ve sosyal sürdürülebilirlik perspektiflerinden incelemeyi ve aralarındaki ilişkileri özetlemeyi hedeflemektedir. Ayrıca, çalışmada kentsel tasarımların ve kentsel öğelerin oynanabilirliğini görselleştirmek için bazı örnekler incelenerek analiz edilmektedir. Bu kapsamlı yaklaşımın, kullanıcı merkezli, çevresel ve iklim uyumlu kentsel peyzaj alanlarını tasarlamak için gelecekteki tasarım çalışmaları için önemli bir temel oluşturacağı düşünülmektedir.

Anahtar Kelimeler: *Akıllı kentler, oynanabilir kentler, eğlenceli kentsel tasarım, kamusal alan, oynanabilirlik*

I. INTRODUCTION

In recent years, the concepts of “sustainability" and "sustainable development" have gained significant importance in all academic fields and among urban policy makers and professional practitioners. The principle of sustainable development, rooted in the broader idea of sustainability, emphasizes the necessity of satisfying basic human needs while ensuring the preservation of essential life-support systems on Earth [1, 2].

Sustainability can be viewed as a nested hierarchy encompassing the environment, society, and economy. Together, these elements form the living environment that allows human society to establish an economic system without threatening ecological stability. Today, more than half of the global population resides in urban areas, underscoring the urban-centric trajectory of humanity's future. Urban centers are pivotal to economic development, where sustainability becomes a crucial issue [1].

Cities are increasingly complex, encompassing a range of social, cultural, and political contexts. They also incorporate technological advancements that enhance their functionality and livability for residents. Planners and designers are now confronted with the necessity to reassess traditional urban models through the integration of smart technologies [3]. In this direction, in recent years, the concept of “playable cities” has come to the fore as an approach that integrates innovative technological tools and interactive, fun elements into urban life, supporting the high quality of life offered by smart cities [4].

Urban spaces are designed to encourage play and provide residents with opportunities to spend their free time. New media, advanced technology and smart features are helpful in imagining and bring these fun ideas to life, which will lead to positive changes in the environment, both physically and emotionally [3]. In this context, playable cities are considered as part of a sustainable and inclusive urban planning and design approach. They offer an interactive environment that encourages spatial exploration, strengthens the sense of community and supports urban identity for city residents and visitors in new and meaningful ways [5].

However, in the existing literature, studies addressing the issue of playable cities in the context of sustainability, urban identity and community interaction are quite limited. Most studies evaluate playable cities only in the context of technology and smart cities, and these approaches do not sufficiently address their impacts on the social sustainability of urban spaces. The aim of this study is to contribute to the development of a deeper understanding of playable cities and gamification of urban spaces for urban designers and landscape architects. The study explores playable cities beyond

their technological aspects, considering their impact on sustainable urban identity, social integration, and the public space experience. In this context, the study has the following three main objectives:

- to define and summarise the playable cities and urban spatial playability,
- to examine playable cities from the perspective of playable urban design, landscape architecture, urban identity, tourism, and social sustainability,
- to analyse and visualise the playability of urban spaces and urban furniture by providing international examples of playful urban design and urban furniture.

This study analyzes the current approaches on the subject by revealing that there are limited studies focusing on the relationship between playable cities and sustainability, urban identity and community interaction in the existing literature and aims to provide a comprehensive framework for the literature. The study discusses how the concept of playable cities is addressed in the context of urban design, landscape architecture, urban identity, tourism and social sustainability.

II. THEORETICAL FRAMEWORK

A. PLAYABLE CITIES

Smart cities integrate people with information networks to establish urban systems that enhance traffic control, promote sustainable energy usage, and implement intelligent governance. The notion of playable cities has been developed to focus on creating smart cities that prioritize human-centered design. In this context, the concept of a playable city serves as a complement to the idea of smart cities [6]. The concept of the “playable city” emerged in Bristol, using “gaming” as an alternative way of interpreting smart cities [7]. Playability is frequently perceived as 'childish' and was initially associated with spaces designed predominantly for children's play, overlooking the aspects of socialization and play opportunities for other age groups [8]. But for the creators of this movement, play is a serious concept. Through various projects, citizens can participate in playful actions, activities, games, designs etc. together with technology. In cities, sensors and actuators can be embedded in street furniture such as traffic lights, mailboxes, lamp posts, escalators, etc.; humor events can be staged; spontaneity can occur; spaces can be redesigned with play by designers with renewed needs [7]. Places in cities which can host immersive activities which stimulate individual responses or collective action in an exploratory manner will be considered to have an urban spatial playfulness [8]. It is important to examine the concept of playable cities in detail to solve urban problems in the best possible way by involving citizens [4]. Games and playfulness offer various methods for advancing exploratory urban design and providing insights into urban conditions. Playfulness can encourage interaction with experimental elements, such as lamp posts that listen to our stories and relay them to pedestrians elsewhere. An increasing number of innovative projects, characterized by a strong inclination towards technological experimentation, leverage playfulness to harmonize disruptive urban designs with everyday urban routines [5].

Playable Cities are reimagining the city at a human scale. Play is an effective tool for engaging citizens in the planning and design of public open spaces. It can be used to address collective issues, build trust, and create meaningful memories [9]. Street games and urban games are physical games that take place in urban environments and incorporate the built urban environment and urban layout. They are based on the social, political, and architectural affordances of urban sites and temporarily amalgamate the rules of everyday urban life with new or even disruptive interactions to create coherent and meaningful experiences. These games have an explicit ruleset, a beginning, and an end [5]. Cities of the future require regions to be able to imagine innovative ways to foster memorable experiences and engage citizens and tourists through interactive actions [9, 10].

In this perspective, games become a way of urban planning and design, a way of rethinking community spaces, a creative and economic engine for structuring new tourist and cultural images. Playable city design helps make urban life feel more welcoming and connected. It balances practical

solutions with creative elements to make cities more engaging without losing their unique character. Games and playful activities can drive positive change by encouraging people to take part in shaping their cities. They help communities connect, engage, and contribute to a more vibrant urban environment [4].

A playable city isn't just about adding technology or redesigning public spaces. It's about intentionally weaving play into the urban experience. In this context, the concept of "playable urban design" emerges as a crucial element. The following section explores how urban spaces are intentionally designed to encourage play and interaction.

B. PLAYABLE CITIES AND PLAYABLE URBAN DESIGN

Playable cities are the future of smart urban design. In these cities, the focus is on making urban life more enjoyable and inclusive. Features like interactive technology, public art, green spaces, and pedestrian-friendly streets encourage people to connect with their surroundings and each other. Playable urban design refers to the functional and playful planning and design of urban spaces to encourage interaction, participation and enjoyment between residents and visitors [11, 12].

Some characteristics of urban design in playable cities include:

- ***Interactive Technology:*** The inclusion of smart technologies such as sensors, interactive displays etc. enhances urban experiences and encourages participation in public spaces [8, 13].
- ***Public Art Installations:*** It is important to include social art practices such as art, sculpture, and installation into urban landscape designs to provide opportunities for curiosity and interaction [7, 14].
- ***Cultural Events and Festivals:*** Organizing events (such as theatre, music, dance, concerts, other live performances, cultural festivals, open-air exhibitions, street performances, competitions, costumed events and game festivals) that reflect local culture, heritage and diversity play an important role in enriching the cultural texture of the community. They also support the sense of belonging for the community and individuals [13, 15].
- ***Playful Infrastructure:*** Integrating playful elements into urban spaces such as lively street furniture, interactive playgrounds, slides, swings, climbing structures, musical stairs, creative signage, etc. helps design environments that encourage play and interaction [13]. Additionally, installing outdoor game tables further enriches the urban experience by providing communal spaces where people can come together to play a variety of games such as chess, football, and table tennis.
- ***Green Spaces:*** Parks, gardens, and tree-lined streets make cities more inviting, offering people places to relax, socialize, and connect with nature [8, 16].
- ***Multi-functional Spaces:*** Flexible urban spaces that can change over time (like plazas that host markets by day and concerts by night) help cities stay dynamic and responsive to community needs [17].
- ***Human-Centered Approach:*** Cities should be designed for people first, with walkable streets, opportunities for community participation, and inclusive spaces for everyone.
    - ***Pedestrian-Friendly Design:*** Cities that prioritize walking and cycling over cars create safer, more enjoyable public spaces where people can truly experience their surroundings [9].
    - ***Community Engagement:*** When residents, local businesses, and city planners work together, communities feel more connected and take pride in their neighborhoods [9].
    - ***Inclusive Design:*** Ensuring that urban spaces are accessible and inviting to people of all ages, abilities, backgrounds, etc. requires consideration of universal design principles [8].
- ***Safety and Security:*** Good lighting, clear sightlines, and well-maintained spaces make people feel safe and comfortable spending time outdoors. This will encourage people to participate in activities without fear [16].

- ***Promotion of Active Living:*** Cities that include walking paths, outdoor gyms, and sports facilities make it easier for people to stay active and healthy [9].

Playable cities are inclusive, vibrant urban environments that foster social interaction, creativity, well-being, and improve the quality of life of all residents.

While playable urban design focuses on how cities can incorporate playfulness, landscape architecture plays a fundamental role in shaping these spaces. Green areas and interactive outdoor elements provide the physical foundation for playability in cities. The next section examines the role of landscape architecture in creating engaging and playful urban environments.

C. PLAYABLE CITIES AND LANDSCAPE ARCHITECTURE

In recent years, the concept of playable cities has gained traction as a way to make urban areas more human-centered and livable [18]. This concept aims to turn urban spaces into engaging environments where people can interact, beyond just meeting basic needs like transportation and housing [19]. Landscape architecture is key in this transformation, enhancing urban aesthetics, functionality, and sustainability. It improves the urban spaces and quality of life of the people living in cities. By incorporating play-friendly designs, fostering social connections, and prioritizing sustainability, landscape architects create urban spaces that are inclusive and environmentally conscious [20, 21].

Landscape architects bring playfulness to cities by designing parks, plazas, and streets that invite people of all ages to interact and explore. They integrate natural elements to connect neighborhoods, reduce social barriers, and symbolize modern, livable cities. They design vibrant and welcoming public spaces that draw people in and promote meaningful social interactions [22]. The integration of natural elements and green spaces, in addition to their environmental impact, are crucial for connecting different neighborhoods, reducing segregation, and symbolizing a modern, progressive, and livable city [20]. By designing playful spaces that are resilient to extreme weather events and include natural elements, people can connect with nature while learning about climate change adaptation. This may include, for example, playful areas made with natural materials, water features that demonstrate water management techniques, or themed areas that highlight local ecosystems and biodiversity. These spaces encourage people to engage with nature while supporting a more sustainable urban environment [21]. Therefore, landscape architecture plays an important role in making cities both healthy and visually appealing environments for their residents [13].

In addition, landscape design that respects the natural environment can serve as both a design tool and an indicator of sustainable development and growth. Since technology plays an important role in playable cities, technological innovations are used to provide entertainment and interactive activities in cities. The tools used in landscape design to plan, design and develop smart cities require sustainable materials, information and communication technologies, smart technologies, natural resources and more. Ultimately, landscape design is at the heart of smart city development, shaping sustainable, livable environments for everyone. It aims to create more sustainable cities by improving the living environment for residents [2]. This approach not only makes urban spaces more dynamic and appealing but also fosters interaction between people and technology.

In conclusion, from the perspective of landscape architecture, playable cities represent a significant change in the design of human-centered and livable cities. This approach emphasizes that urban spaces should not only be functional, but also enjoyable and interactive. With the leadership of landscape architects, playable cities become an important component that improves people's quality of life and ensures the sustainability and livability of cities.

Playable cities are deeply intertwined with landscape architecture, as essential backdrops for play and social interaction. However, beyond their physical design, playable cities also contribute to a city's identity. The way people interact with playful spaces, how these spaces reflect local culture, and their

impact on the collective memory of a community all shape urban identity. The following section explores how the concept of playable cities strengthens urban identity by fostering a sense of belonging, cultural expression, and place-making.

D. PLAYABLE CITIES AND URBAN IDENTITY

Playable cities contribute to the rethinking and design of physical spaces and the strengthening of urban identity by integrating the character, culture, history, religion, natural heritage and socio-cultural texture of the city. The symbolic and iconic elements of the city are highlighted through playgrounds, artworks and events, thus offering an experience that is connected to the city's character and identity [23]. A city's identity emerges from the dynamic relationship between its physical design and its cultural values. If a city's identity doesn't align with the experiences of its residents and visitors, its branding can feel disconnected and unrelatable. Therefore, a key aspect of urban branding is how well the city is understood and represented. Effective branding succeeds when it communicates core urban values that are perceived as valid, distinctive, appealing, durable, and communicable. City branding is about the synthesis of different characteristics and their transformation into a unique and irreplaceable identity. Large-scale events can probably bring about significant changes in the urban landscape and functions that can be translated into the city's identity and core values. Striking elements and spaces such as street art, street performances and theme parks reflect the socio-cultural heritage of the city and play an important role in shaping urban identity and city brand [24-26]. It allows locals and visitors to interact with places. Playable cities foster interaction, strengthen social bonds, and enhance a sense of community and connection among residents [23]. When residents take part in designing playable cities, their values, preferences, and expectations shape the process, resulting in spaces that truly reflect the city's unique character [10].

Beyond shaping the identity of a city for its residents, playable cities also influence how a city is perceived by visitors. Urban identity is not only experienced by those who live in the city but also by those who explore it as tourists. Playful urban spaces create memorable experiences, encourage engagement with local culture, and enhance a city's appeal as a destination. In this context, the following section examines the relationship between playable cities and tourism, exploring how interactive and engaging urban environments contribute to a city's attractiveness for visitors.

E. PLAYABLE CITIES AND TOURISM

Playable cities contribute to the city's economy by attracting tourists' attention and contribute significantly to the development of tourism. By showcasing the city's heritage and values, playable cities give tourists a chance to experience its history, art, and culture in an immersive way [27]. Additionally, place/urban branding has been recognized as a powerful tool for gaining a competitive advantage. It facilitates a city's ability to attract investment and tourists, while also strengthening local identity and enhancing residents' identification with their city [15]. Increasingly, tourists want to become more involved in what they experience and to interact with local people in a more meaningful way [27]. The link with technology also makes the connection between the tangible and the intangible in culture more interactive and more playful. Within this framework, the connection between the playable city and creative tourism proves advantageous. It encourages both locals and tourists to engage with the city in new ways, such as through digital installations. At the same time, these interactions help people feel more connected to the city on a deeper level. This strategy not only puts the city on the map as a travel destination but also enhances its modern and vibrant appeal [28]. Playable cities offer a variety of activities, events and entertainment options to attract tourists [28, 29]. All of these efforts are designed to meet the cultural and recreational needs of local residents, while also giving the city a competitive edge in attracting tourists [30]. Iconic architecture and large-scale events are key cultural drivers for revitalizing urban identity, enhancing vibrancy, and attracting both creative individuals and tourists. Additionally, creative and playful urban spaces complement cultural tourism by invigorating and adding value to heritage sites [27]. Playful designs that enable tourists to have a pleasant time in the city encourage them to visit again. As tourism and creativity become more

intertwined, tourism gains cultural significance, while the creative sector thrives on increased visitor engagement. The increase in tourism activities adds vitality to the local economy. More tourists mean more revenue for local businesses, more job opportunities, and a more diverse local economy [27, 30].

While playable cities enhance tourism by creating engaging and memorable experiences for visitors, their impact extends far beyond attracting tourists. The same playful and interactive urban environments that make cities attractive to visitors also contribute to the well-being and social cohesion of local communities. Playable spaces foster inclusivity, encourage interaction, and create opportunities for people of all ages and backgrounds to connect. In this context, the following section explores the role of playable cities in promoting social sustainability, emphasizing their potential to strengthen community bonds and enhance urban livability in the long term.

F. PLAYABLE CITIES AND SOCIAL SUSTAINABILITY

Social sustainability encompasses a range of factors, including social justice, participation and local democracy, health, quality of life, well-being, social inclusion, community, safety, mixed tenure, cohesion, community unity, networks, interaction, a sense of community and belonging, employment, and cultural traditions. Additionally, the term emphasizes the importance of place attachment and community stability [31, 32]. Therefore, there is a strong relationship between social sustainability and playable cities.

Playable cities increase the livability of the society by meeting the social and emotional needs, and they make urban areas more human-centered, welfare-enhancing and inclusive. By offering spaces that everyone can use and enjoy, playable cities promote fairness and equality in public areas. In this way, cities become more just, inclusive and livable. They provide spaces where different cultural groups can come together, interact safely and express their own identities [8].

In addition, arts, festivals, and other cultural events showcase the diversity of a city and promote community cohesion through events. These activities encourage people to participate in community life, connect with one another, and build stronger social bonds [19, 33]. Public spaces like parks, squares, and streets serve as gathering spots where people can meet, socialize, and build relationships with their neighbors [31]. These spaces provide opportunities for local communities to come together, focus on common interests, and strengthen a sense of being part of urban life [32, 34]. Public events, street festivals, open-air concerts, and other cultural activities strengthen the sense of community and identity, deepen social ties, and increase the cultural richness of the city. As a result, communities become stronger, more connected, and socially sustainable [9].

Having explored the theoretical aspects of playable cities and their role in social sustainability, tourism urban identity, urban landscape and design; it is essential to examine real-world applications. The following section presents international case studies that illustrate how playable urban design principles have been successfully implemented.

III. MATERIALS AND METHODS

The study examines the concept of playable cities in the context of landscape architecture, urban identity, tourism, and social sustainability through playable urban design and playable urban furniture, and analyzes current approaches to this issue.

The study used literature review and case study methods. International examples of playful urban design and playful urban furniture were examined.

Data Collection: In the first stage of the research, academic studies on playable cities and urban spatial playability were examined. The literature review was conducted in academic databases such as

Scopus, Web of Science, and Google Scholar. The keywords *"playable cities", "urban playability", "interactive urban spaces", "public space gamification", "urban identity and playable cities", "tourism and playable cities", "playful urban furniture", "social sustainability in public spaces",* and *"social sustainability and playable cities"* were used. As a result of this review, a theoretical framework was created that addresses the effects of playable cities on urban identity, tourism, and social sustainability in terms of landscape architecture. In addition, the characteristics of playable cities and urban design in playable cities were determined and the evaluation framework to be used in the analysis of the case studies was presented.

Case Study Selection: The examples discussed in the study were selected from different countries to demonstrate the diversity and applicability of playful urban design on a global scale. The following criteria were taken into account in the selection process:

- **User Interaction:** The extent to which the space or urban furniture encourages individuals to play and interact.
- **Technology Integration:** Integration of technological elements to the design such as digital installations, smart/interactive lighting, interactive sensors, etc.
- **Accessibility and Inclusiveness:** The possibility of using the space or design for different age and socio-economic groups.
- **Urban Identity and Cultural Context:** The relationship between the design and the cultural identity of the city, local art and community events.
- **Social Sustainability:** The capacity of the public space to encourage social interaction and strengthen community unity.
- **Flexibility and Multifunctionality:** The ability of spaces to transform over different time periods and events.

In line with these criteria, examples of playable urban design such as Superkilen Park (Denmark), Millennium Square (England), Gardens By The Bay (Singapore), The Bentway (Canada), The Lawn on D (USA), Millennium Park (USA) and playable urban furniture such as Musical Swings (Canada), Waterfall Swing (USA), Piano Stairs (Sweden), Sonic Light Bubble (Australia), Dancing Traffic Lights (Portugal), Garment District (USA) were considered.

Analysis and Evaluation: Descriptive analysis and comparative evaluation methods were used to evaluate the selected case studies. The analysis process consists of the following stages:

- **Examination of Spatial Organization and Playable Strategies:** The examples discussed in the study were evaluated in terms of spatial organization, user interaction and playable approaches. In addition, interactive technology (sensors, interactive screens, etc.), public art and installations, cultural events and festivals, playable urban furniture (swings, slides, climbing structures, musical steps, etc.), green areas and recreation areas, multifunctional areas, pedestrian-friendly and inclusive design, security and active living promotion were evaluated in terms of playable city design principles.
- **User Experience and the Impact of Playability on Urban Life:** How the selected examples interact with users, their effects on urban identity, tourism and social sustainability were analyzed. Thus, the contributions of playability to the use of urban space were addressed and its role on community interaction and public space experience was investigated.
- **Comparative Evaluation:** The selected examples were compared in terms of similarities and differences in playability approaches. Evaluations were made among the examples in terms of integration of natural and technological elements and user experience.

The study provides a general framework for playable city applications.

IV. PLAYFUL URBAN DESIGN EXAMPLES

A. Superkilen Park (Denmark)

Superkilen park, which is located in Copenhagen (Denmark) as a public park, designed by Topotek 1 (Landscape Architects), BIG Architects (Architects) and SUPERFLEX (Architects). It has an area of 27000m^2. This innovative urban space is divided into three zones. Each zone is characterized by distinct colors and themes as the Red Square, the Black Market, and the Green Park (Figure 1). The park aims to celebrate the diversity of the surrounding community by incorporating objects and design elements from 60 different countries, representing the varied backgrounds of the residents. This park includes various elements designed with inspiration from different cultures. Elements such as colorful benches, exotic plant species, playgrounds and exercise equipment make the park interactive and fun [35].

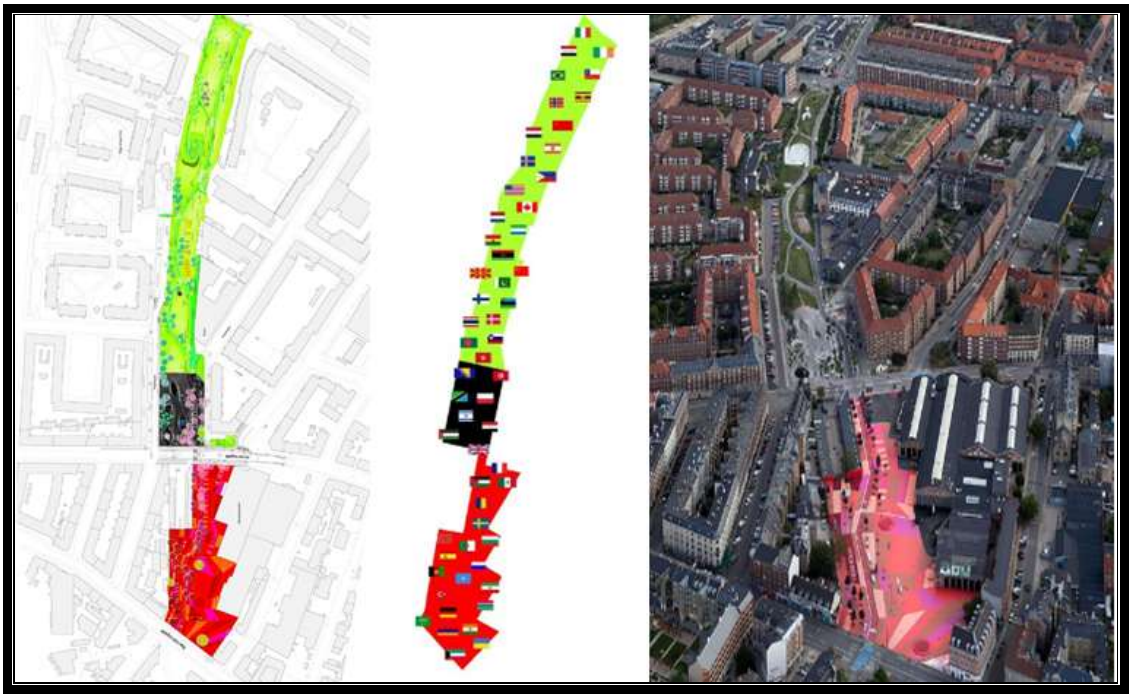

Figure 1. *Superkilen Park [35]*

The Red Square is a vibrant area designed for recreational activities, featuring sports facilities and a colorful urban landscape. The square features a fitness area, Thai boxing facilities, and a playground with diverse elements such as a slide from Chernobyl, swings from Iraq, and climbing structures from India. It also includes a sound system from Jamaica, a stencil of Salvador Allende, numerous benches sourced from Brazil, classic UK cast iron litter bins, and items from Iran and Switzerland. Additionally, there are bike stands and a designated parking area. Only red trees were added, aside from the existing ones. The Black Market serves as a more relaxed zone, with spaces for social gatherings and community events, featuring traditional elements like a Moroccan fountain and Japanese cherry trees. A significant portion of the square is covered with a versatile rubber surface designed to accommodate ball games, markets, parades, and ice skating rinks during the winter. This space serves as a gathering spot for locals around the Moroccan fountain, Turkish bench, and Japanese cherry trees, extending the area's patio. During weekdays, permanent tables, benches, and grilling facilities function as an urban living room for activities such as backgammon and chess. Lastly, the Green Park provides a more natural environment with grassy areas and pathways, encouraging outdoor leisure and play. The park features an existing hockey field combined with an integrated basketball court, designed to serve as a natural gathering place for local youth from Mjolnerpark and the nearby school. It includes a green landscape and a playground where families with children can gather for

picnics, sunbathing, and relaxation on the grass. Additionally, the park accommodates hockey tournaments, badminton games, and workouts amidst the hills (Figure 2) [35].

Superkilen Park in Copenhagen is known for its innovative design that incorporates climate-adaptive features along with playful elements. The park features a variety of climate-resilient landscapes and materials, including water management systems, green spaces, and interactive installations. For example, the park includes a stormwater management system that collects and filters rainwater, while also providing recreational spaces for residents [35].

Superkilen not only enhances the aesthetic and recreational value of the neighborhood but also fosters social interaction and cultural exchange. It is a pioneering example of how urban design can integrate multicultural elements to create a vibrant, inclusive public space [35].

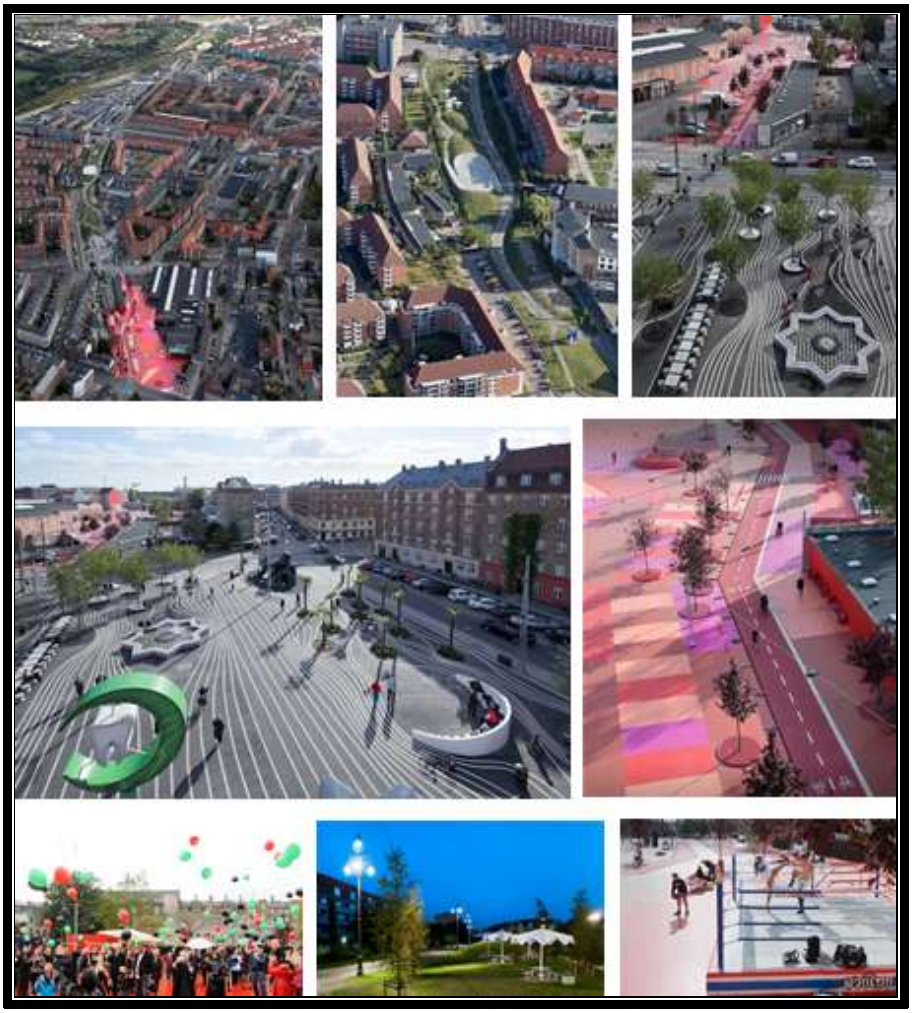

Figure 2. *Images from Superkilen Park [35]*

Evaluation:

Examination of Spatial Organization and Playable Strategies
The park is divided into three different thematic zones:

1. Red Square:
    - Interactive Technology: User interaction is encouraged with a sound system and digital media screens.

- Public Art and Installations: Objects from various countries reflect the cultural diversity of the park.
- Playable Urban Furniture: Slides, swings, climbing structures and sports areas encourage physical activity.
- Multifunctional Areas: Offer flexible use for events, sports matches and social gatherings.

2. Black Market:
   - Community Participation and Social Sustainability: Offers social interaction areas where backgammon and chess are played in daily use.
   - Green Area and Recreation: Resting points were created with a fountain and Japanese sakura trees brought from Morocco.
   - Inclusive Design: Includes seating areas that appeal to the elderly and different age groups.

3. Green Park:
   - Active Life Promotion: It offers sports and recreation opportunities with hockey fields, basketball courts and large grass areas.
   - Ecological Design: Sustainable urban areas have been created with permeable surfaces and natural landscape elements.

User Experience and the Impact of Playability on Urban Life

- User Experience: Superkilen Park adds a different dimension to city life by offering its visitors an interactive and dynamic public space. Due to its design that encourages people to interact with their surroundings, it enriches the social experiences of individuals of all ages. The park's play and sports areas that appeal to different age groups allow people to spend more time in the city and interact with each other. In addition, its pedestrian-friendly structure and location close to public transportation increase its accessibility, allowing more people to benefit from this public space. In addition, the cultural events and daily socialization opportunities organized in the park have preserved the liveliness of the space and made it an important meeting point for city residents.
- Urban Identity: Superkilen Park stands out as an important public space reflecting Copenhagen's multicultural identity. The design elements used in the park and the objects brought from different parts of the world symbolize the global character and diversity of the city. While these elements strengthen the city's identity, they also support the sense of belonging for immigrant communities living in the city. This place, where individuals from different cultures can come together and find their own traces, is a symbol that makes the cosmopolitan structure of the city visible.
- Tourism: Superkilen Park has become an important center of attraction that attracts the attention of international tourists with its unique design and structure reflecting cultural diversity. Iconic objects brought from different countries and extraordinary landscape design offer a special experience for photographers, design enthusiasts and visitors who want to discover the city culture. In this respect, the park has become one of the places visited by both locals and tourists, and has become one of the elements that increase the touristic appeal of Copenhagen.
- Social Sustainability: Superkilen Park supports social sustainability as a community area that brings together individuals with different cultural backgrounds. While reinforcing the sense of belonging for immigrant communities, it offers a safe and inclusive public space where different social groups can spend time together. The playgrounds, sports facilities and recreational areas in the park are designed for the use of individuals of all ages and encourage interaction. In addition, it creates an environment that strengthens social solidarity by bringing city residents together through cultural events and public activities.

B. Millennium Square (England)

Millennium Square in Bristol's harbourside is a versatile 55m x 40m pedestrian area, featuring artworks, water features, light sculptures, and the Planetarium (Figure 3). It's ideal for large events, photoshoots, and promotions. The Big Screen showcases films and live streams from local creatives. It provides an important city-centre platform. The venue is supported by a dedicated event team [36]. The outdoor water fountains at Cascade Steps provide an enjoyable splash area for children in the square [37].

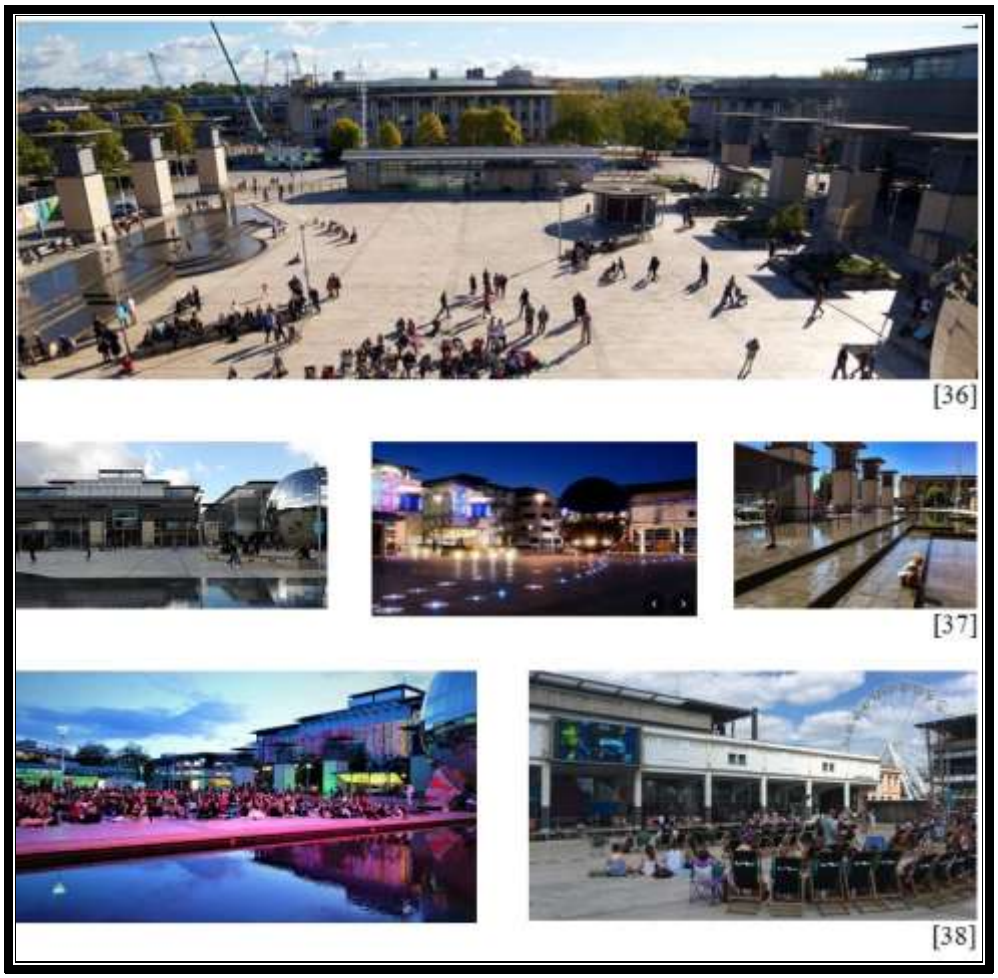

Figure 3. *Images from Millennium Square [36-38]*

Evaluation:

Examination of Spatial Organization and Playable Strategies

- Interactive Technology: The Big Screen located in the square increases public interaction as a media platform with film screenings and live broadcasts.
- Public Art and Installations: Light installations and artworks placed at different points of the square offer an interactive experience to visitors at all hours of the day.
- Playable Urban Furniture: The outdoor water fountains in Cascade Steps create an interactive play area for children and serve as a relaxing water feature for adults.
- Multifunctional Areas: Millennium Square is designed to allow for different uses such as large events, artistic performances, outdoor exhibitions, markets and promotional organizations. The open structure of the square and the adjustable event areas are flexible enough to host different cultural and social events.
- Community Participation and Social Sustainability: The Big Screen is used not only for art screenings but also for community announcements, cultural events and social awareness

projects. The square supports local cultural production by providing an open-air platform for artists, performers and creative communities. It has also become an area that strengthens social unity by functioning as a meeting point for city residents and tourists.

- Green Area and Recreation: Although natural green areas and recreational elements are limited in the design of Millennium Square, water playgrounds and resting areas increase spatial quality.
- Inclusive Design: Its pedestrian-friendly infrastructure provides barrier-free access, allowing people of different age groups and physical capacities to use the square comfortably.
- Safety and Active Life Promotion: The wide and open structure of the area provides a safe public space, while constantly being visible, contributing to users feeling safe. Water playgrounds and interactive media elements offer important elements that encourage physical activity for children and young people.

User Experience and the Impact of Playability on Urban Life

- User Experience: Millennium Square is a dynamic public space that appeals to different age groups and interests due to its versatile use opportunities. Its pedestrian-friendly structure and central location make the square one of the most accessible points of the city, while increasing the mobility and interaction in the public space. The artistic and cultural events organized in the square ensure that the area is a constantly renewed and living space, thus enriching the user experience.
- Urban Identity: Millennium Square, where art, technology and public spaces intertwine, is considered one of the important public spaces that strengthen Bristol's urban identity. It stands out as the focal point of cultural events and community gatherings.
- Tourism: Millennium Square has become an attractive destination for both locals and tourists by hosting large-scale outdoor events, concerts and festivals. The variety of events offered by the square supports cultural tourism in the city.
- Social Sustainability: Millennium Square functions as an important public space that encourages social participation through artistic and cultural events. It provides dynamism to city life by providing social interaction opportunities for city residents and visitors through various events and public use opportunities.

C. Gardens By The Bay (Singapore)

Gardens by the Bay in Singapore is designed by Grant Associates, is a groundbreaking urban park project that spans 101 ha and features three main gardens: Bay South, Bay East, and Bay Central. The design blends nature, technology, and sustainable practices, highlighted by iconic elements such as the Supertrees, Cooled Conservatories, and diverse horticultural and garden artistry displays (Figure 4). It aims to embody Singapore's "City in a Garden" vision, offering educational and recreational experiences while promoting biodiversity and environmental awareness [39].

Drawing inspiration from the form of the orchid, masterplan represents a sophisticated blend of nature, technology, and environmental management. It integrates striking architectural structures with diverse horticultural displays, daily light and sound shows, lakes, forests, event spaces, and various dining and retail options. The entire plan features an advanced environmental infrastructure, enabling endangered plants that would not typically thrive in Singapore to flourish, thus providing both recreational and educational benefits to the nation. Together with extensive flowering and colorful foliage, they create a vibrant display of color, texture, and fragrance throughout the Gardens [39].

Figure 4. *Images from Gardens By The Bay [39]*

It showcases climate-adaptive design principles within a playable urban environment (Figure 5). The gardens feature a range of sustainable technologies, including water recycling systems, solar panels, and natural ventilation strategies. The Cloud Forest and Flower Dome conservatories demonstrate innovative approaches to climate control, with misting systems and controlled environments that mimic different climates from around the world. Visitors can explore these climate zones while enjoying recreational activities and educational experiences [39].

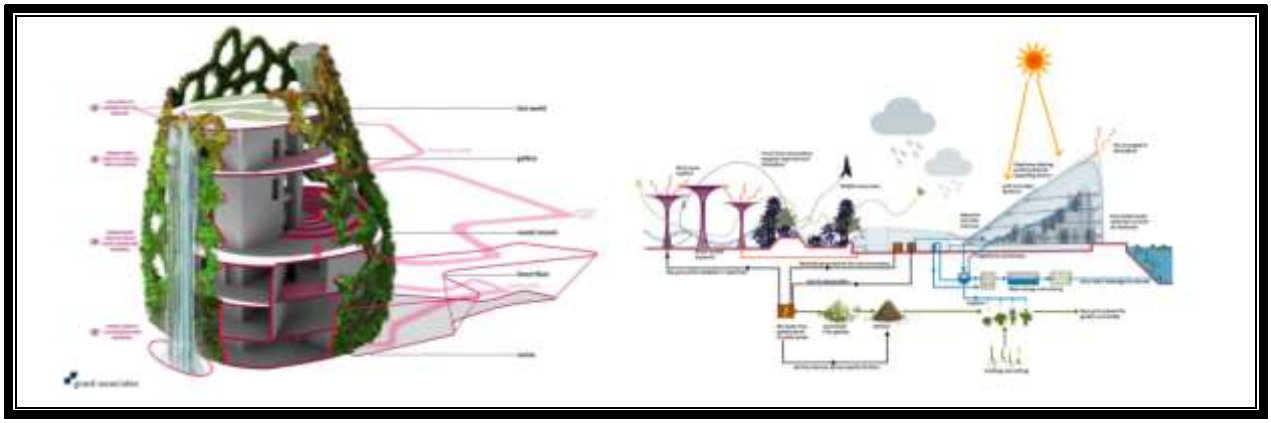

Figure 5. *Climate-adaptive design [39]*

Standing between 25m and 50m tall, the 18 Supertrees designed by Grant Associates are iconic vertical gardens that aim to create a striking visual impact through the vertical arrangement of tropical flowering climbers, epiphytes, and ferns. At night, these canopies are illuminated with lighting and projected media, bringing them to life (Figure 6). The Supertrees incorporate sustainable energy and water technologies that are essential for the cooling of the Cooled Conservatories [39].

Figure 6. *Images from Supertrees [39]*

Evaluation:

Examination of Spatial Organization and Playable Strategies

- Interactive Technology: Supertrees offer a dynamic experience that fascinates visitors by turning into a light and sound show with LED lighting and projection systems at night. Cooled greenhouses such as Cloud Forest and Flower Dome are climate-controlled areas that give visitors the opportunity to experience different climates of the world.
- Public Art and Installations: The master plan inspired by the orchid form offers an aesthetic and functional design that brings art and nature together. Different thematic landscaping arrangements in the gardens provide visitors with both an artistic and educational experience.
- Playable Urban Furniture: Walking paths offer an immersive experience that can be walked between the Supertrees. Interactive spaces encourage play by allowing visitors to interact with nature.
- Multifunctional Areas: The gardens are designed to host festivals and educational programs in addition to daily recreational activities.
- Community Participation and Social Sustainability: Designed to create environmental awareness, the areas aim to increase sustainability awareness. It provides a social and educational meeting place for locals and tourists, encouraging cultural interaction.
- Green Area and Recreation: Botanical gardens, ponds, and ecological walking paths offer a recreational area intertwined with nature. Advanced landscape design and biodiversity create an environment that allows visitors to both relax and explore.
- Inclusive Design: Walking paths and interactive greenhouses appeal to different user groups by creating educational and entertaining spaces for both children and adults.

- Safety and Active Life Promotion: Illuminated paths, high security measures, and supervised areas allow visitors to experience the park safely day and night.

User Experience and the Impact of Playability on Urban Life

- User Experience: Gardens by the Bay offers visitors fun experiences that allow them to interact with nature, creating a unique green space within urban life. This dynamic urban park, where technology and natural elements come together, has an innovative design that encourages being in touch with nature. The greenhouses and ecological areas within the park provide visitors with educational experiences, increasing their awareness of nature and creating awareness about sustainable living.
- Urban Identity: Embodying Singapore's "City in a Garden" vision, Gardens by the Bay has become an important symbol reflecting the city's modern and sustainable urban identity. Iconic structures such as Supertrees and Cooled Conservatories offer a view that is compatible with the city's sustainability goals with their high-tech nature design. With these features, Gardens by the Bay presents an innovative perspective on how the urban landscape can be shaped for the future.
- Tourism: Gardens by the Bay stands out as one of Singapore's most visited tourist destinations. Supertrees in particular attract thousands of tourists every day, while greenhouses such as Cloud Forest and Flower Dome support ecotourism by providing education about global ecosystems. In addition, elements such as the Skyway and light shows increase the attraction of the place by offering visitors different experiences during the day and at night.
- Social Sustainability: As a public green space, Gardens by the Bay supports social sustainability with both recreational and educational functions. It strengthens social interaction by providing an accessible meeting point for local people with walking trails, event areas and natural rest areas. In this way, it goes beyond being just a place to visit for city dwellers and creates a sustainable and socially inclusive urban space.

D. The Bentway (Canada)

The Bentway is a 1.75 km revitalized public space under Toronto's Gardiner Expressway, and designed by Public Work. It offers a variety of activities that connect seven neighborhoods and increase access to the Fort York National Historic Site. Visitors looking out from the bridge can examine the historic site of Fort York. This increases both the accessibility and visibility of this historic site. The project includes land uses such as a skateboarding track, an amphitheater, and sustainable landscaping. Various events such as outdoor performances, art exhibitions, sports events, and interactive games are held in the project. In addition, the area is used as an ice rink during the winter months. The project, financed through a public-private partnership, exemplifies the innovative use of urban infrastructure to create vibrant public spaces (Figure 7) [40].

Figure 7. *Images from The Bentway [40]*

Evaluation:

Examination of Spatial Organization and Playable Strategies

- Interactive Technology: Special lighting systems encourage night-time use of the area and increase security.
- Public Art and Installations: Periodic art exhibitions and permanent public art pieces strengthen the artistic identity of the area. Artistic elements associated with Fort York's historical identity enrich the cultural context of the area.
- Playable Urban Furniture: The skateboard park functions, periodic art exhibitions and permanent public art pieces as a playful element that encourages visitors to an active urban experience.
- Multifunctional Areas: The area is used as an ice rink in the winter months and functions as a performance and event area in the summer.
- Community Participation and Social Sustainability: The Bentway is a social meeting point that brings together different segments of society. It has a structure that strengthens the spatial belonging of city residents through art, sports and cultural events. The amphitheater and sports areas offer a variety of activities that appeal to different age groups and interests. It encourages sustainable transportation options with pedestrian and bicycle paths.
- Green Space and Recreation: Ecological benefits are provided by preserving the natural structure of the area with sustainable landscape design.
- Inclusive Design: It appeals to a wide range of users due to its multifunctional areas.

- Safety and Active Life Promotion: Advanced lighting systems provide safe night use. It supports active life in the city with different sports opportunities and walking paths.

User Experience and the Impact of Playability on Urban Life

- User Experience: The Bentway offers an innovative public space that goes beyond the traditional park concept and evaluates the urban infrastructure below. It provides its visitors with a constantly changing and dynamic experience thanks to playful elements and seasonal transformation mechanisms. It creates a public space model that increases social interaction by bringing city residents together with art, culture and sports events.
- Urban Identity: Transforming Toronto's infrastructure into a playable public space, The Bentway supports the city's transformation-oriented identity. The project strengthens the users' relationship with Fort York through the visual and physical connections it establishes with the historical texture.
- Tourism: Art installations, sports events and seasonal activities make The Bentway an attractive place in Toronto. Especially in the winter months, seasonal events such as the ice rink attract the attention of visitors and ensure that the space remains active throughout the year.
- Social Sustainability: As a project connecting seven different neighborhoods, The Bentway offers a public space that encourages social interaction. It strengthens community unity by providing common use areas for city residents through different activities and recreation areas.

E. The Lawn on D (USA)

The Lawn on D is a versatile and vibrant public space in Boston's Seaport neighborhood. It is designed by Sasaki in collaboration with the Massachusetts Convention Center Authority. It features flexible areas for events, art installations, and interactive activities, integrating elements like colorful furniture and smart lighting. The Lawn on D, which is a playground and event space, features giant spinning chairs, illuminated swings, interactive art installations, play areas, musical instruments, and game tables, among many other attractions. Events such as concerts, movie screenings, and picnics are organized during the summer. The venue emphasizes inclusivity and community engagement, providing a platform for local artists and visitors to enjoy a variety of cultural activities. Initially presented as a temporary project, its features make it a permanent structure, strengthening urban life and connectivity in the area (Figure 8) [41].

On the other hand, "Swing Time" in Boston features 20 LED-lit swings. It is designed by Höweler + Yoon Architecture. Located at the Lawn on D, these swings light up and change color based on movement, offering a unique, interactive experience that blends design and technology (Figure 9). This installation aims to activate public spaces and foster community engagement. The swings cater to all ages, enhancing the urban environment while promoting local creativity and innovation [42].

Figure 8. *Images from The Lawn on D [41]*

Figure 9. *Swing Time [42]*

Evaluation:

Examination of Spatial Organization and Playable Strategies

- Interactive Technology: Smart lighting systems increase security by adjusting lighting levels according to the usage intensity of different sections of the area. LED-lit swings called “Swing Time” offer an interactive experience by changing color according to the movement of the users with motion sensors.
- Public Art and Installations: Temporary and permanent art installations strengthen the artistic identity of the area. They encourage community participation by providing an exhibition platform for events.
- Playable Urban Furniture: Giant rotating chairs gamify the spatial experience by allowing users to both relax and have fun. Musical instruments and game tables are among the elements that support social interaction.
- Multifunctional Areas: It offers large green areas used for concerts, film screenings and picnics in the summer months. It supports social sustainability by hosting various community events and cultural programs.
- Community Participation and Social Sustainability: The Lawn on D strengthens social ties by hosting events that bring the community together. It contributes to the city's economy by providing an exhibition and event platform for local artists and entrepreneurs. It appeals to a wide range of visitors due to its highly accessible location.
- Green Area and Recreation: Despite being in the city center, it increases interaction with nature with its wide green areas. The flexible use of open areas creates an ideal environment for individual and collective recreational activities.
- Inclusive Design: There are design elements that individuals of all ages and physical capacities can use comfortably. Interactive art and play areas attract different user groups to the area.
- Safety and Active Life Promotion: Well-planned lighting systems make night use safe. Play areas and sports activities encourage users to participate in physical activity.

User Experience and the Impact of Playability on Urban Life

- User Experience: The Lawn on D combines art, gaming, and technology to create a dynamic and inviting public space. Initially designed as a temporary project, it has become a permanent structure due to its high level of interest. Interactive elements such as “Swing Time” encourage users to explore the space, creating a playful experience.
- Urban Identity: With its modern and innovative structure, The Lawn on D contributes to the urban character of Boston’s Seaport district. It supports the development of urban art and cultural events by providing an exhibition space for local artists.
- Tourism: The iconic LED swings and various event spaces have made The Lawn on D an attractive entertainment destination for both locals and tourists. Its interactive design and variety of events position the venue as one of the city’s tourist attractions.
- Social Sustainability: Participatory art installations, concerts, and social events create an inclusive public space that brings together diverse communities. This diversity increases social interaction and contributes to the city’s social sustainability.

F. Millennium Park (USA)

Millennium Park in Chicago, completed in 2004, is a 24.5 acre public space featuring iconic art and architecture. Key attractions include Frank Gehry's Pritzker Pavilion, Anish Kapoor's Cloud Gate ("The Bean"), and Jaume Plensa's Crown Fountain. The park integrates public art with green spaces, offering a unique cultural experience. It also serves as a hub for community events and outdoor performances, enhancing Chicago's global cultural reputation (Figure 10) [43].

The Pritzker Pavilion enhances access to outdoor performances such as the Grant Park Music Festival. An overhead trellis of intersecting steel pipes extends from the stage over the large lawn, housing a

sophisticated sound system (Figure 11). The popularity of Cloud Gate is partly attributed to its interactive nature, allowing visitors to walk around and beneath it, view their reflections, and even take photos (Figure 12). Crown Fountain, consisting of a pair of 15m block towers set in a plaza of black Zimbabwe granite, serves as a public space where people of all ages can enjoy running and splashing in the reflecting pool (Figure 13) [43].

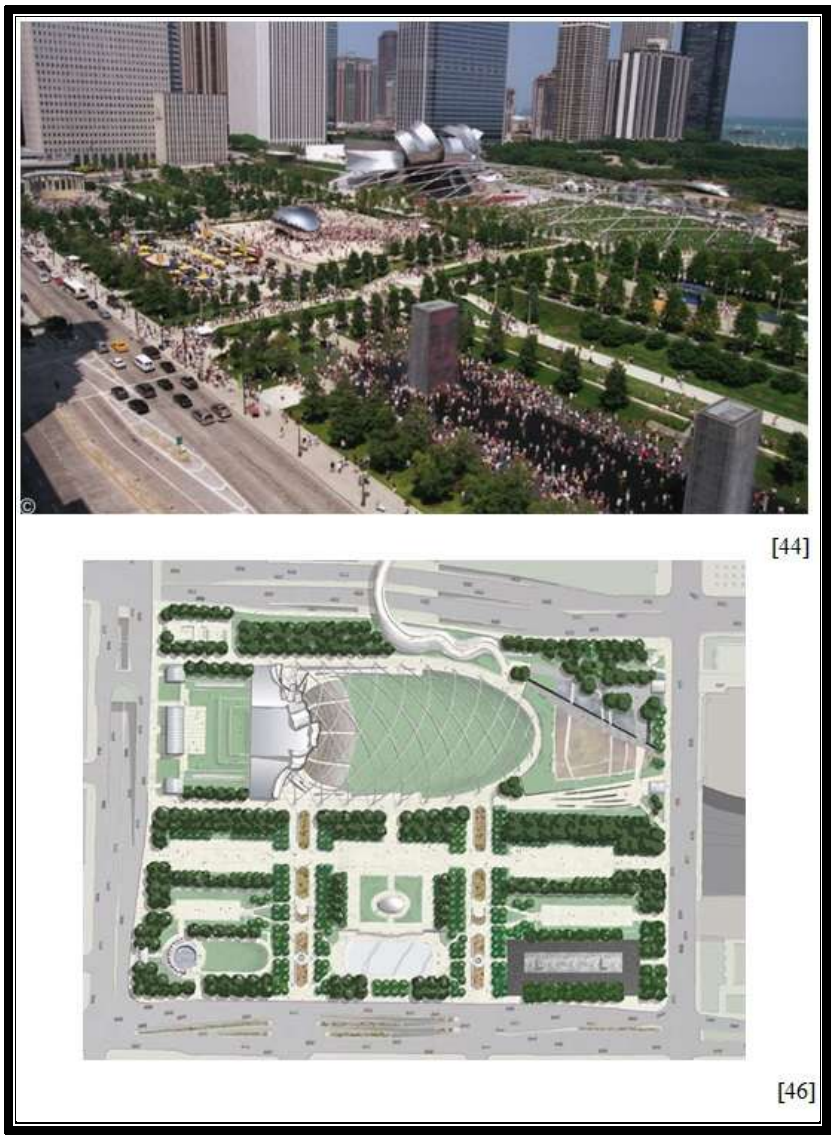

Figure 10. *Millennium Park [44, 46]*

Figure 11. *Frank Gehry's Pritzker Pavilion [44]*

Figure 12. *Anish Kapoor's Cloud Gate (The Bean) [45]*

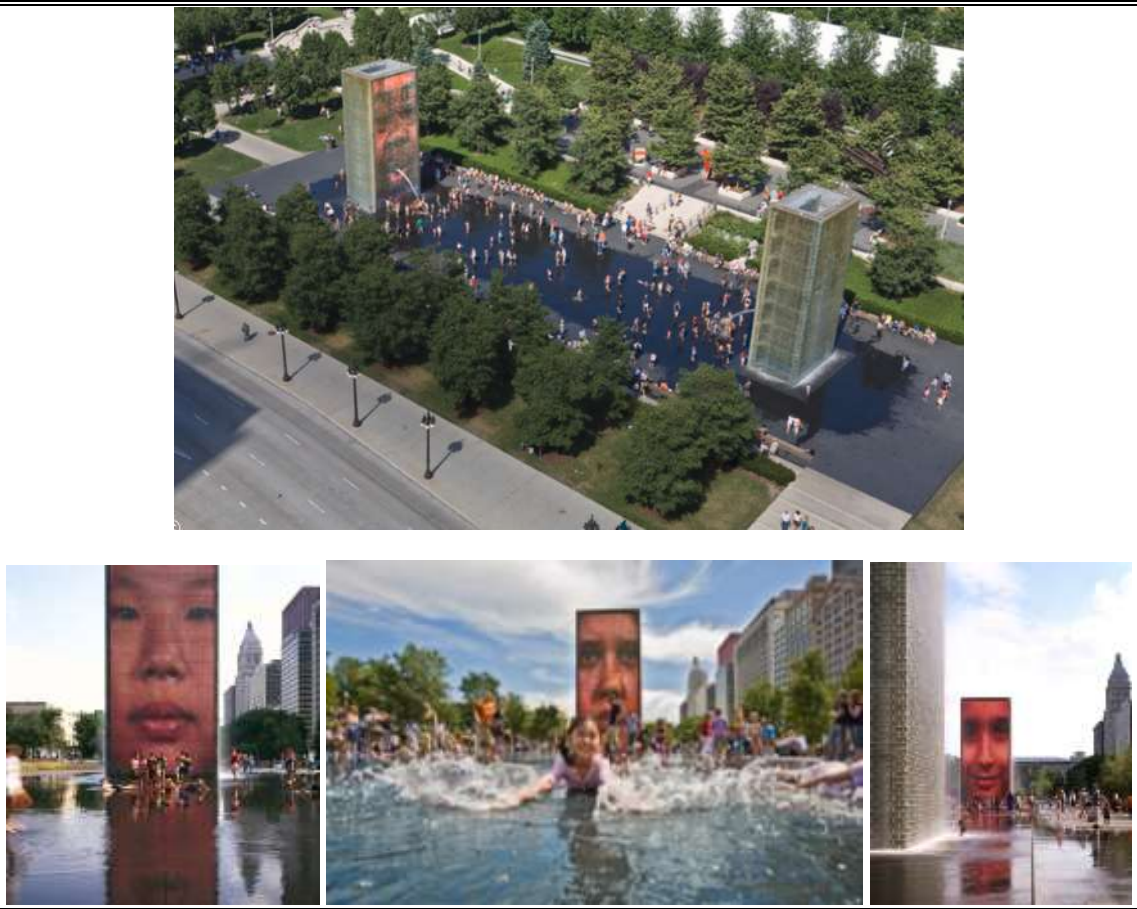

Figure 13. *Jaume Plensa's Crown Fountain [46]*

Evaluation:

Examination of Spatial Organization and Playable Strategies

- Interactive Technology: Consisting of glass block towers, Crown Fountain offers an interactive experience by displaying different facial expressions through LED screens. Visitors can interact with this artistic structure by walking on the black granite surface where the water flows or by playing in the water.
- Public Art and Installations: "Cloud Gate" (The Bean) is an iconic artwork where visitors can watch and interact with their reflections. Crown Fountain combines visual art and play, making the city's public spaces more interactive. Pritzker Pavilion is a center where modern architecture and public events come together.

- Playable Urban Furniture: With its reflective surface, "Cloud Gate" allows visitors to have fun experiences by interacting with the artwork. Crown Fountain acts as a water playground for children and adults, creating a fun and interactive space.
- Multifunctional Areas: Pritzker Pavilion is used for large-scale outdoor concerts, festivals and other cultural events. Grassy areas and pedestrian paths provide flexible use for both individual and group activities.
- Community Participation and Social Sustainability: Millennium Park is an important community space that strengthens Chicago's cultural identity. Art and music events bring the park to the center of the city's socio-cultural life. Being free and accessible encourages everyone to use the park.
- Green Space and Recreation: It increases interaction with nature by providing a large green area in the city center. Walking paths, rest areas and large lawns create suitable environments for recreation and socialization.
- Inclusive Design: There are accessible paths, rest areas and interactive art works for individuals with disabilities. It offers activities and spatial arrangements that appeal to different age groups.
- Safety and Active Life Promotion: It serves as a safe public space due to extensive lighting systems and security cameras. It has a design that encourages visitors to walk, do sports and participate in outdoor activities.

User Experience and the Impact of Playability on Urban Life

- User Experience: Millennium Park is an important example of a public space where art and play are successfully blended. One of the most iconic elements of the park, Cloud Gate (The Bean), provides visitors with direct interaction with the space, creating a strong connection between public art and individual experience. In addition, Crown Fountain supports the culture of play within the city by offering a fun water play area for children and adults. Another important element of the park, Pritzker Pavilion, is the center of cultural events and makes significant contributions to the artistic and social life of the city.
- Urban Identity: Millennium Park stands out as an important public space representing Chicago's modern architectural and artistic identity. Iconic structures such as Cloud Gate, Crown Fountain and Pritzker Pavilion support Chicago's cultural vision by strengthening the city's art and design-focused urban identity.
- Tourism: Hosting millions of visitors annually, Millennium Park has become one of Chicago's most important tourist destinations. The park, which is a center of attraction for both locals and international tourists, increases the city's tourism potential by bringing together urban art and entertainment.
- Social Sustainability: Millennium Park, which brings together different age groups and communities through art, culture and community events, makes significant contributions to supporting social sustainability. Through the effective use of public spaces, social interaction between individuals is encouraged and city life is provided with a more inclusive and dynamic structure.

Beyond large-scale urban spaces, playability can also be embedded in smaller elements of the city. Playful urban furniture designs offer interactive experiences that enhance the public space on a more localized level. The next section presents innovative examples of urban furniture that incorporate play and interaction.

V. PLAYFUL URBAN FURNITURE DESIGN EXAMPLES

A. Musical Swings (Canada)

The Musical Swings in Montreal are an example of a fun public space where people can come together, interact, and make music. The art is an urban, interactive work of art that encourages human connection in the public space, and designed to be a collective experience. These 21 swings have sensors that each produce a different note, and as people use the swings, they create music. This encourages people to interact and enjoy the public space (Figure 14) [47].

Flanked on either side by a new music complex and science center, designers Mouna Andraos and Melissa Mongiat decided to bridge the gap by transforming a narrow strip of land into a large interactive instrument. Pre-recorded sounds from instruments like a xylophone and piano were programmed into color-coded swings that play various notes when in motion. However, when swung in unison with careful coordination, these swings create more complex melodies and harmonies. Additionally, a "secret mode" was programmed to activate only when all 21 swings are in use [48].

Figure 14. *Images from Musical Swings [48]*

Evaluation:

Examination of Spatial Organization and Playable Strategies

- Interactive Technology: Each swing produces a different note, and 21 swings are equipped with motion sensors. Visitors can create music directly using the swings. The color-coded system produces melodies using pre-recorded sounds of instruments such as pianos and xylophones.
- Public Art and Installations: The project is a successful example of combining public art and interactive urban furniture. The swings function not only as entertainment tools but also as musical instruments. In this respect, it offers an inspiring model of how art can be playable in public spaces.
- Playable Urban Furniture: While basic melodies are produced when used individually, more complex harmonies are created with the coordinated movements of more than one person.

When all the swings are used simultaneously, the "hidden mode" is activated and different melodies are produced. This situation encourages individuals to have collective experiences and social interaction.

- Multifunctional Areas: It constitutes an example that enriches urban areas both artistically and recreationally.

User Experience and the Impact of Playability on Urban Life

- User Experience: Musical Swings is an innovative example of urban play that strengthens social bond through interactive art. Encouraging participants to interact with public space, this project offers individuals the opportunity to experience art while also creating a sensory exploration area. Offering a multifaceted experience with the combination of visual and auditory stimuli, Musical Swings enables users to collectively produce music, making public spaces more social and participatory.
- Urban Identity: Supporting Montreal's urban identity, Musical Swings contributes to the character of the city by transforming public spaces through play and art. This project is an important project that encourages artistic experiences in urban spaces.
- Tourism: Offering a unique experience for visitors, Musical Swings is among the designs that increase Montreal's appeal. Strengthening the city's artistic texture, this application allows tourists to experience the interaction of art and public space in Montreal together.
- Social Sustainability: With its design that encourages people to act together, Musical Swings strengthens community bond and increases the use of public spaces. It contributes to urban life becoming more dynamic and inclusive by increasing social interaction.

B. Waterfall Swing (USA)

The Waterfall Swing in New York City allows people to jump forward at high speeds without being left behind by a curtain of water when they ride the swing. It allows people to swing forward at high speed without getting wet, as the water curtain moves aside. This interactive experience offers people the opportunity to interact with a fun and exciting swing as well as a refreshing sensation of interacting with a curtain of water (Figure 15). The towering steel swing set features arrays of mechanical solenoids that generate a curtain of water falling in the path of its riders. Inspired by the exploration of water's interactions in spatial settings, this swing is the first in a series that explores interactive elements in rides and installations. Riders experience the thrill of narrowly escaping obstacles as they pass through openings in the waterfall, which are created by precisely tracking their movement with axle-housed encoders [49].

Figure 15. *Waterfall Swing [49]*

Evaluation:

Examination of Spatial Organization and Playable Strategies

- Interactive Technology: The swing is equipped with sensors and mechanical solenoid systems. It creates instant gaps in the water curtain by precisely tracking the positions of moving individuals. In this way, users experience "passing through the water curtain" without water spilling on them while swinging rapidly.
- Public Art and Installations: Waterfall Swing offers a spatial experience that combines traditional playgrounds with art and technology. The combination of water and movement creates a visually impressive performance for the audience. In this respect, it is not only a playground but also a dynamic art installation.
- Playable Urban Furniture: Users do not only experience a swing, they also play a game that tests their reflexes by interacting with water. The water curtain, which adapts to every swing movement thanks to the sensors, allows users to connect with the space more actively.

User Experience and the Impact of Playability on Urban Life

- User Experience: Waterfall Swing is an innovative example of public art and play that offers city dwellers the opportunity to experience water and movement in a fun and interactive way. This interactive design, which has a dynamic game mechanism that allows users to test their reflexes, encourages physical activity and allows individuals to directly interact with the space. Swings, which can be used both individually and in groups, contribute to making public spaces more lively and participatory.
- Urban Identity: Waterfall Swing has become an urban symbol where interactive art and experiential space design are at the forefront. The combination of water and movement strengthens the dynamic character of New York.
- Tourism: With the combination of water and movement, it has become a visually and sensorily striking attraction for both locals and tourists.
- Social Sustainability: Waterfall Swing, which offers its users a fun experience, increases social interaction among city dwellers. The water curtain, which provides a cooling effect especially in the summer months, increases the use of public spaces and adds dynamism to city life.

C. Piano Stairs (Sweden)

The Piano Stairs in Stockholm allow people to play piano notes as they walk up or down the stairs. To encourage the use of stairs instead of the escalator, the regular stairs at the Odenplan subway station were transformed into piano keys. Each step produces a different note, and as people ascend or descend, they create a melody. This installation encourages physical activity while making the use of public spaces more interactive and enjoyable (Figure 16). Unsurprisingly, after the piano stairs were installed, 66% more people opted for the stairs over the escalator [50].

Figure 16. *The Piano Stairs in Stockholm [50]*

Evaluation:

Examination of Spatial Organization and Playable Strategies

- Interactive Technology: Each step is equipped with electronic sensors that correspond to a piano note. As users take steps, the relevant note plays and individuals unconsciously create a melody. This interactive feature transforms an ordinary staircase into both a musical and playable experience area.
- Public Art and Installations: Stairs carry an artistic element beyond being functional. While adding fun to visitors' daily routines, they add an artistic touch to city life.
- Playable Urban Furniture: The project offers a fun design that encourages people to use the steps instead of escalators. Since individuals create a melody as they move, using the stairs can become a habit. Users' enjoyable use of the stairs allows them to evaluate the public space more actively.
- Inclusive Design: It is a design that appeals to different age groups; everyone from children to adults can participate in this experience. It stands out as a playable urban element that is pedestrian-friendly and accessible to everyone.

User Experience and the Impact of Playability on Urban Life

- User Experience: Piano Stairs is an innovative and fun design that encourages physical activity. By providing musical feedback with every step, it allows users to not only move but also become a part of art. Using stairs, an ordinary action of daily life, turns into an enjoyable experience thanks to this playable design. Observations show that the use of stairs has increased by 66%, revealing that individuals consciously prefer a physically active option instead of escalators.
- Urban Identity: In line with Stockholm's pioneering identity in sustainability, Piano Stairs supports the adoption of an innovative and participatory design approach in the city. This design is one of the examples that make daily life more enjoyable.
- Tourism: Piano Stairs increases the touristic appeal of Stockholm by offering interactive city experiences. Its fun and original structure offers a city experience that encourages visitors to participate physically.
- Social Sustainability: Piano Stairs, which encourages healthy living by directing city residents to physical activity instead of escalators, transforms public spaces into not only functional but also fun and interactive spaces.

D. Sonic Light Bubble (Australia)

The Sonic Light Bubble in Sydney, created by ENESS, is designed as a large inflatable capsule that responds with music and colorful lights when people enter it (Figure 17). This interactive installation allows people to gather and engage with each other, while enjoying a visual and auditory experience. The distinctive inflatable structure utilizes a series of addressable LED disks to illuminate both the interior and exterior of the bubble. These disks also function as a volumetric video screen, providing viewers with a 360-degree visual experience [51].

Figure 17. *Images from Sonic Light Bubble [51]*

Evaluation:

Examination of Spatial Organization and Playable Strategies

- Interactive Technology: It is a structure that detects the presence of visitors with motion detection systems and reacts. Addressable LED disks provide lighting in the interior and exterior spaces while also acting as a volumetric video screen. It encourages users to interact with the space by offering a sensory experience with the combination of sound and light.
- Public Art and Installations: It offers an experience where digital art and physical space merge. Interactive color transitions and musical feedback activate visitors' visual and auditory perception. It increases the appeal of the public space by creating a visually striking focal point at night.
- Playable Urban Furniture: Sonic Light Bubble, as a playable urban furniture, encourages individuals to directly interact with the space. Participants can interact both individually and in groups while exploring color and sound changes.
- Inclusive Design: It is an accessible art installation that appeals to all age groups. Even individuals with limited mobility can easily enter the interior and participate in the experience.

User Experience and the Impact of Playability on Urban Life

- User Experience: Sonic Light Bubble provides an attractive and interactive public art experience within the city, enabling individuals to connect with the space. The dynamic combination of light and sound encourages visitors to explore and directly interact with the space. In this way, the public space ceases to be just a transit point and becomes an engaging experience area that supports social interaction.
- Urban Identity: Reflecting Sydney's urban identity integrated with art and technology, Sonic Light Bubble contributes to the urban texture with its modern and innovative design approach. The integration of digital art into public spaces in the design reinforces the identity and power of the city.
- Tourism: Creating a strong visual attraction point with the combination of colorful light effects and music, the design has become an attractive destination. It increases the city's touristic appeal by hosting cultural events.
- Social Sustainability: Bringing people together by offering interactive and sensory experiences, Sonic Light Bubble creates a public space that strengthens social unity. With the combination of technology and art, spontaneous interactions between individuals are encouraged and shared public experiences within the city are increased.

E. Dancing Traffic Lights (Portugal)

In Lisbon, there is an amusing and interactive traffic light project called Dancing Traffic Lights. This initiative is designed to make the waiting time at red lights more entertaining. When the traffic light is red, it transforms into animated dancing human figures that move to the rhythm of music. The aim is to provide entertainment for drivers and pedestrians while they wait [52].

The Dancing Traffic Lights project offers a creative approach to drawing public attention to traffic signals and encouraging compliance with traffic rules. Additionally, it provides a touch of entertainment and an unexpected experience in people's daily routines. Such projects aim to enhance urban life by integrating aesthetic and playful elements into public spaces, making them more enjoyable [52].

The dancing movements of the red figure were generated by members of the public who were recorded in a booth situated in a nearby square. This temporary black structure featured a small dance floor and cameras to capture each participant's movements. These movements were then translated into the actions of the red figure on the traffic lights in real-time, and were also displayed on a screen in front of the participant. Additionally, video screens on either side of the booth broadcasted live reactions to the dancing from the pedestrian crossing (Figure 18) [52].

Figure 18. *Dancing Traffic Lights [52]*

Evaluation:

Examination of Spatial Organization and Playable Strategies

- Interactive Technology: Using real-time motion detection technology, participants' dance moves are reflected on the red light figure. A two-way interaction is created between pedestrians and drivers through video screens. This playful strategy increases people's awareness by drawing attention to traffic safety.
- Public Art and Installations: Dancing Traffic Lights is an interactive project that city residents can actively participate in their daily lives. It creates a surprising and entertaining public interaction in the city by improving pedestrian and driver experiences.
- Playable Urban Furniture: It is an application that encourages the use of public spaces in the city through play. The project allows people to pay more attention to traffic rules, while also making the waiting time more enjoyable.
- Inclusive Design: It is open to the participation of individuals from all age groups and allows people to interact in different ways. It creates a fun traffic awareness especially for children and the elderly, and supports urban mobility.

User Experience and the Impact of Playability on Urban Life

- User Experience: Dancing Traffic Lights makes the pedestrian experience more enjoyable by making a fun intervention in an ordinary and routine area within the city. This interactive design, which reduces the stress of waiting at traffic lights, attracts pedestrians' attention and adds dynamism to urban life.
- Urban Identity: Dancing Traffic Lights reflects the understanding of making innovative and art-oriented interventions in the city's public areas. Such interactive projects add dynamism to the urban texture while also emphasizing the creative spirit of the city.
- Tourism: Unexpectedly encountered interactive art installations offer surprising and fun experiences for visitors. Dancing Traffic Lights has become an interesting area for both city residents and tourists.
- Social Sustainability: This project draws attention to traffic safety and encourages pedestrians to comply with the rules. By adding a fun touch to the daily routine, it makes the use of public areas more enjoyable and contributes to social sustainability..

F. Garment District (USA)

Lateral Office's intervention introduces playful and interactive elements to the Garment District in New York City, transforming the area with innovative design strategies. The project seeks to enhance the urban experience by creating vibrant, enjoyable environments that invite people to engage with the city in new ways. Spanning from 4.8m to 7.3m, the 12 seesaws illuminate and produce sounds when in use. As part of the Garment District Art on the Plazas street program, the installation activates when individuals sit on either end of the planks and grasp the handle. Even when at rest, the seesaws emit a soft, dimmed light. It aims to foster a sense of playfulness and creativity in an otherwise utilitarian district. The intervention includes various dynamic and engaging features such as colorful installations and interactive play structures, aimed at revitalizing public spaces and encouraging community interaction (Figure 19). The design encourages social interaction and community involvement, making public spaces more accessible and engaging for both residents and visitors [53].

Figure 19. *Images of 12 seesaws in Garment District [53]*

Evaluation:

Examination of Spatial Organization and Playable Strategies

- Interactive Technology: LED lights and sound effects integrated into interactive seesaws in the Garment District work in synchronization with users' movements. Changing light levels and sounds as users move increase interaction by making them a part of the play.

- Public Art and Installations: This project, which is part of the "Art on the Plazas" program, makes public spaces more attractive through art and play. It changes the perception of urban space by offering different visual effects during the day and at night.
- Playable Urban Furniture: 12 interactive seesaws offer a dynamic public space element that encourages people to interact beyond general urban furniture. As users actively use the seesaws, they transform the space from a passive area into a living experience area.
- Inclusive Design: A playable model that everyone can participate in regardless of age and physical ability. Seesaws that require users to move together encourage social interaction while making the area accessible to different age groups.

User Experience and the Impact of Playability on Urban Life

- User Experience: This playable public space that is located in the Garment District, one of the busiest areas of New York, offers visitors a fun and interactive experience by breaking the monotony of urban life. This design, which transforms the public space from being just a transit point to a place where individuals can actively interact, also allows for social connections to be established between individuals. The lighting and spatial experience that change at different times of the day create a dynamic structure suitable for day and night use.
- Urban Identity: This application, which allows the public space to gain an artistic and experiential dimension, reinforces the innovative and participatory structure of the city.
- Tourism: Colorful installations and interactive elements offer surprising and entertaining experiences. The design is attractive to both city residents and tourists.
- Social Sustainability: Offering a short break from the fast pace of the city, this project transforms public spaces into a playground that encourages social interaction. Individuals not only use the space, but also communicate with others and experience a common experience. Thus, it contributes to the establishment of stronger community ties within the city.

VI. COMPARISON AND DISCUSSION

The comparative analysis of selected case studies reveals both shared characteristics and distinctive approaches in the application of playful urban design. Despite differing contexts, all examples aim to enhance social interaction, foster community participation, and enrich urban life through interactive, artistic, and often technology-driven interventions. This section synthesizes the main themes, typological distinctions, and design strategies that emerge from the comparative review (Table 1).

Playable urban interventions generally fall into two primary categories:

- **Playable Public Spaces:** This group includes large-scale projects such as Superkilen Park, Millennium Square, Gardens by the Bay, and The Bentway. These spaces typically transform existing infrastructure or underutilized areas into dynamic environments through multifunctional design, thematic zoning, or seasonal flexibility.
- **Playable Urban Furniture:** Representing a smaller spatial scale, examples like Musical Swings, Waterfall Swing, Piano Stairs, and Dancing Traffic Lights provide targeted sensory or physical experiences. These interventions often require minimal spatial modification yet offer high levels of engagement.

Key themes were identified and explained across case studies. Projects like Superkilen Park and Millennium Park illustrate how playful design can express and reinforce local cultural narratives, whether through multicultural references or iconic artworks. Examples such as Gardens by the Bay and Waterfall Swing show how interactive technologies—ranging from responsive lighting to sensor-based systems—can enhance user engagement and urban experience. Interventions like Musical Swings and Piano Stairs foreground the multisensory aspects of urban play by incorporating sound, movement, and tactile interaction, offering immersive experiences. Several cases—most notably The Bentway, The Lawn on D, and Dancing Traffic Lights—demonstrate the potential of playful

interventions to foster inclusivity, safety, and a sense of belonging within diverse urban communities. Projects such as The Bentway and The Lawn on D highlight the importance of modular, temporary, or seasonally adaptable designs that respond to evolving urban needs and encourage repeat visitation.

Table 1. *Comparison of case studies.*

Project Name	Type	Play Strategy	Key Themes	Technology Use	Social Contribution
Superkilen Park	Public space	Cultural elements	Urban identity, diversity	Low	Social cohesion
Millennium Square	Public space	Digital media & water play	Art, flexibility, interactivity	Medium	Multi-generational engagement
Gardens by the Bay	Public space	Biophilic/tech integration	Nature, sustainability, tech, urban identity	High	Environmental awareness
The Bentway	Public space	Infrastructure reuse	Sustainability, seasonality	Low	Community engagement
The Lawn on D	Public space	Interactive events & art	Art, community, adaptability	Medium	Event-based social interaction
Millennium Park	Public Space	Art and performance	Culture, interactivity, tourism, urban identity	High	Year-round cultural participation
Musical Swings	Urban Furniture	Music & collective movement	Sound, rhythm, coordination	Medium	Collective creativity
Waterfall Swing	Urban Furniture	Water-motion interaction	Tech, dynamic play	Medium	Sensory and emotional engagement
Piano Stairs	Urban Furniture	Sound-feedback stairs	Health, individual play	Low	Promotes physical activity
Sonic Light Bubble	Installation into Urban Furniture	Light-sound sensory play	Sensory, social interaction	High	Artistic exploration
Dancing Traffic Lights	Installation into Urban Furniture	Digital media-motion interaction	Observation, public awareness	Medium	Safety, civic engagement
Garment District (USA)	Urban Furniture	Sound-feedback seesaws	Community, coordination	Medium	Collective physical activity

Taken together, the reviewed projects demonstrate that playful urban design can be implemented across a spectrum of scales and contexts. Whether through expansive public parks or compact digital installations, these interventions contribute to more inclusive, engaging, and socially resilient urban

environments. A notable trend across examples is the integration of digital interactivity with physical engagement, often aligned with cultural expression or environmental messaging. Moving forward, urban designers and planners can draw on these patterns to inform interventions that are not only playful and innovative but also contextually grounded and socially meaningful.

Playful urban spaces are essential for people of all ages, not just children. They encourage participation from people of different cultural and social backgrounds, while providing entertainment and relaxation. One of the most significant findings is that play enhances interactions across different age groups and demographics. Spaces like Superkilen Park (Denmark) and The Lawn on D (USA) demonstrate how playful interventions create shared experiences that bring diverse communities together. Interactive installations such as Musical Swings (Canada) and Piano Stairs (Sweden) encourage collective participation, strengthening a sense of belonging in urban environments. Moreover, Dancing Traffic Lights (Portugal) illustrates how play can transform mundane urban routines into moments of social engagement, encouraging both passive and active participation. These findings suggest that integrating play in urban spaces promotes inclusivity by making public environments more engaging and accessible.

Playful urban design contributes to the distinctiveness of cities by creating recognizable landmarks and experiential attractions. Projects like Cloud Gate in Millennium Park (USA) and Waterfall Swing (USA) have become emblematic of their respective locations, reinforcing their cultural identity. The Garment District seesaws (USA) illustrate how temporary installations can reshape the perception of a commercial district, making it more inviting. This study highlights that playful elements often become part of a city's brand, drawing both locals and visitors. The success of projects like Superkilen Park shows that integrating cultural symbols into design can celebrate diversity while also defining a unique urban aesthetic.

Moreover, they often become iconic landmarks, reinforcing city identity and branding. This attracts tourists and boosts the local economy. Tourists are drawn both to the playful experiences, and to the unique cultural aspects these spaces offer. They contribute to a vibrant and dynamic urban life. Findings indicate that playful urban spaces are not only designed for local residents but also act as major tourist attractions. Sites such as Millennium Park (USA) and The Lawn on D (USA) attract visitors through interactive installations, festivals, and entertainment programming. Similarly, Musical Swings (Canada) and Piano Stairs (Sweden) have gained international recognition, leading to an increase in visitor numbers. Tourists seek engaging, Instagrammable experiences, and playful interventions provide visually compelling and participatory opportunities. In turn, these attractions boost foot traffic in surrounding businesses, stimulate local economies, and enhance a city's reputation as a creative and livable destination.

Technological integration in these spaces can enhance the interactive experience. Technology plays a growing role in making public spaces more interactive and adaptable. Installations such as Swing Time (USA) and Sonic Light Bubble (Australia) use digital lighting and motion sensors to create immersive experiences that respond to human interaction. Similarly, the Waterfall Swing (USA) employs precise motion tracking to create a dynamic and responsive environment. The study finds that integrating technology into urban play spaces enhances engagement by providing real-time, adaptive interactions. This not only increases the appeal of these spaces but also allows for better monitoring and data-driven improvements in urban design.

Playful cities contribute to mental well-being and support overall health by providing spaces where people can relieve stress and engage in physical activity. Many of the analyzed interventions promote movement and exercise. Piano Stairs (Sweden), for example, successfully encouraged more people to take the stairs instead of using an escalator. Similarly, Musical Swings (Canada) requires coordinated movement, while seesaw installations like those in the Garment District (USA) activate physical play. These examples suggest that play can be an effective strategy for promoting healthier lifestyles. By integrating playful movement into everyday urban infrastructure, cities can encourage physical activity while making exercise an enjoyable and social experience.

While some playable spaces are designed to be permanent, others are temporary but leave a lasting impact. The Dancing Traffic Lights (Portugal) and Garment District seesaws (USA) were short-term interventions, yet they generated widespread public engagement and media attention. Findings suggest that even temporary installations can reshape urban behaviors, influence future design strategies, and contribute to long-term urban identity.

While play-based interventions enhance urban life, their sustainability remains a key consideration. Some projects, like Millennium Park (USA), integrate green infrastructure and climate-responsive design. However, others, such as temporary installations, raise concerns about resource consumption and long-term viability. Findings suggest that future projects should emphasize eco-friendly materials, renewable energy integration, and adaptive reuse strategies. Playful cities should not only engage users but also educate them about sustainability through interactive experiences.

VII. CONCLUSION

This study demonstrates that integrating playable elements into urban design plays a critical role in creating vibrant, inclusive, and socially sustainable cities. Through various case studies, it is emphasized that landscape architects and urban planners can design dynamic spaces that encourage social interaction, support creativity, and enhance individual well-being.

Some suggestions can be developed to take playable city design and urban furniture further. It can offer digital games and smart features that engage users in new ways. This integration can also help with real-time monitoring and adaptive management of spaces, making them more efficient and responsive to changing needs. Such spaces can be designed to adapt to climate change by adding features that educate visitors about sustainability and resilience. These spaces can serve as important educational tools to help the public understand environmental challenges and solutions. Topics such as water saving, renewable energy, and ecological restoration can be conveyed to visitors through interactive experiences. More research should be done on the integration of emerging technologies such as augmented reality (AR), virtual reality (VR), and artificial intelligence (AI) into playable city spaces. Smart urban furniture, responsive lighting, and sensor-based installations can enrich the user experience by making public spaces more personalized and inclusive. Playability in cities should be considered not only as an entertainment tool, but also as a mechanism that strengthens social harmony and inclusiveness. Studies focusing on accessibility, diversity, and equality in particular will contribute to making playable spaces more inclusive. Spaces specifically designed for people with disabilities, the elderly, and disadvantaged communities will reinforce the accessibility and fairness of playable urban spaces for all. The functionality of public spaces can be increased by repurposing existing infrastructure. Future projects should develop more holistic and contextual solutions through the collaboration of different disciplines. In addition, participatory design methods that include local communities in the design and implementation processes should continue to be used. In this way, playable interventions and playable urban furniture can be made culturally relevant and sensitive to the unique needs of the city. Future research should develop metrics that can evaluate factors such as user interaction, social interactions, mental and physical health effects, and economic contributions. Data-driven analyses and long-term studies can provide important findings in understanding the impacts of these spaces on urban life and determine the best strategies for future implementations. In this context, the future of playable urban design and urban furniture lies in the capacity to balance innovation with sustainability. The ability of these areas to adapt to changing urban dynamics, increase interaction with users and create social value will contribute to the transformation of cities into more livable and participatory spaces.

As a result, playable urban spaces are moving beyond being mere entertainment elements and are transforming into dynamic public spaces that encourage interaction, support environmental sustainability, and are enriched with technological innovations. Future design and research studies

should increase the inclusiveness of these spaces, ensuring that they appeal to all segments of society and considering their long-term effects. These approaches, which strengthen the identity of cities and deepen the connection that users establish with the space, have the potential to make cities more livable, accessible, and sustainable by using games and interaction as a tool. In this direction, considering playable urban design as a powerful tool in the transformation process of cities will make the cities of the future more inclusive, resilient, and innovative.

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VIII. REFERENCES

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