International Journal of Trend in Scientific Research and Development (IJTSRD)
Volume 9 Issue 2, Mar-Apr 2025 Available Online: www.ijtsrd.com e-ISSN: 2456 – 6470

Design Management to Review Vandalism in the Spatial Area of Tropical City Park Surabaya - Indonesia

Yosef Richo Adrianto[1], Ellya Zulaikha[2], Bambang Syairudin[3]

[1]Faculty of Design and Creative Industry, Universitas Dinamika, Surabaya, Indonesia
[2,3]Doctor of Technology Management (DMT), Institut Teknologi Sepuluh Nopember, Surabaya, Indonesia

ABSTRACT

The challenge for the management of Tropical Surabaya City Park is how to increase visitor satisfaction through facility security control because of the many negative visitor behaviors in the form of vandalism that cause damage, disturbance, and inconvenience.

The deep observation method is used by the researcher to review the environmental and product design of park facilities, while Function-Behavior-Structure (FBS) is used as a strategy approach for functional security control of facilities. FBS with cluster system is developed in this article to classify priority spatial areas based on the density and diversity of visitors. The selected Surabaya park is a popular comprehensive type. The results show that enclosed - semi-closed type spatial areas are easy to become congested areas and experience more vandalism.

KEYWORDS: *Design Management, Safety, Facility, Tropical City Park, Vandalism*

How to cite this paper: Yosef Richo Adrianto | Ellya Zulaikha | Bambang Syairudin "Design Management to Review Vandalism in the Spatial Area of Tropical City Park Surabaya - Indonesia" Published in International Journal of Trend in Scientific Research and Development (ijtsrd), ISSN: 2456-6470, Volume-9 | Issue-2, April 2025, pp.979-988, URL: www.ijtsrd.com/papers/ijtsrd78620.pdf

IJTSRD78620

INTRODUCTION

Green Open Space Issues in the Tropics

(Hall et al., 2022) mentioned that open areas in urban areas in tropical countries have high temperatures, open areas with temperatures above 31ºC are in the red-black category on the Wet Bulb Globe Temperature (WBGT) which can potentially cause various health problems such as Urban Heat Island (UHI) headaches and various other health risk impacts for people who move in the area. (Hou et al., 2023) also mentioned that high temperatures in dense urban areas can lead to increased potential for bad behavior or crime and mental health disorders (Crank et al., 2023). According to (Das et al., 2022) the existence of Green Open Space for tropical open areas such as the Indian city of kalkuta, can be one of the good solutions that can reduce the effects of heat temperatures up to 3ºC. RTH in addition to being able to act as a high spot temperature reducer and can help improve public activities and health for the activities of the surrounding community.

(Putra et al., 2022) Like India, Indonesia's climate is also classified as a tropical country with an average relative temperature of 23.3ºC - up to 31.6ºC in 2014 to 2020, the data was obtained by researchers by collecting data on global horizontal radiation, air temperature, wind speed, relative humidity, precipitation, atmospheric pressure, total cloud cover, to mixing ratio at 106 climate zoning locations in Indonesia, but the effect of high temperatures also causes risks to health.Surabaya city green spaces are usually in the form of parks that are fostered and maintained under the auspices of several government agencies, one of which is the Surabaya Environment Agency. According to the Surabaya city park environmental carrying capacity study report (Dinas Lingkungan Hidup Kota Surabaya, 2017) shows that Surabaya has Green Open Spaces in the form of city parks at least 72 active parks and 232 fostered passive parks spread throughout the city of Surabaya.

Passive parks are in the form of parks that decorate road vegetation or certain areas that are not used to support visitor activities in them, while active parks are parks in addition to supporting the existence of vegetation can also support visitor activities in them and some active parks are paid. Paid active parks generally have a larger area, diverse facilities, and have a certain theme to attract visitors.While paid active parks generally have advantages that other parks do not have, according to (Mäntymaa et al., 2022) states that paid parks are more able to satisfy visitors regarding rides that are more entertaining and the facilities available are more diverse, (Halkos et al., 2022) added that visitors are willing to pay the price of the park can be influenced by various external factors such as park facility attributes and internal factors such as the demographic profile of visitors, previous visits, visitor motivation which has a significant effect on individual decisions.

Increasing Problems in Urban Parks

The development of security design management in the environmental facilities of urban parks in the form of parks continues to be challenged, according to (Farkas et al., 2023) it is stated that in two decades there have been more and more cases related to vandalism and negative behavior of city visitors starting from green open areas in the form of forests in the early decades of 1994 to urban parks in the decade of 2020 due to increasing diversity and density of visitors. vandalism or negative behavior itself is closely related to public facilities, according to (Mahrous et al., 2018), (He et al., 2017), (Chuang et al., 2022), (Bhuiyan et al., 2021), (Shackleton & Njwaxu, 2021),(J. H. Wu et al., 2020) mention is a form of activity oractivity of park visitors that can be considered "disturbing, making noise, harassing, damaging or deteriorating" the quality of facilities in public areas.

(Bhati & Pearce, 2017) stated that vandalism is a negative behavior of individuals who disturb and damage facilities in public areas, such as the environment and property. Meanwhile, (Toet & van Schaik, 2012) explained that vandalism can also be a social nuisance, (Odufuwa et al., 2019) stated that types of vandalism can be divided into three categories based on their nature, namely: Public Space Offenses, which is vandalism that violates the rules, Violent Crime Vandalism that disturbs others, and Property Crimes, which is vandalism that damages property.

Design of Environmental Facilities Forest or City Park

(Zhai et al., 2021) explain Park facility is an environmental design consisting of various vegetation within a certain or spatial area. This area can be recognized and classified based on the size of the environmental area for certain types of visitor activity movements, within the area can have several vegetation that support each other for certain types of activities. (Yin et al., 2020) continued that the types of spatial environmental facilities have two main qualifications, namely the type of high hierarchy area or active area where there is a comprehensive variety of vegetation, products, various activities (diversity), and the density of the number of visitors (density) and Low hierarchy area, but high density and diversity areas need more attention because they tend to have problems with users related to negative activities and vandalism.

(Z. Sadeghi & Haghighat Bin, 2023) explained Activities in the park environment are strongly influenced by the design of environmental vegetation that supports ease of activity and visibility. The researchers divided three categories of park spatial environment design based on vegetation design, namely: Enclosed (park area covered by vegetation), Semi-open (park environment area with semi-closed vegetation), and Open (park environment area with open conditions).

(Z. Sadeghi & Haghighat Bin, 2023) explained Activities in the park environment are strongly influenced by the design of environmental vegetation that supports ease of activity and visibility. The researchers divided three categories of park spatial environment design based on vegetation design, namely: Enclosed (park area covered by vegetation), Semi-open (park environment area with semi-closed vegetation), and Open (park environment area with open conditions).

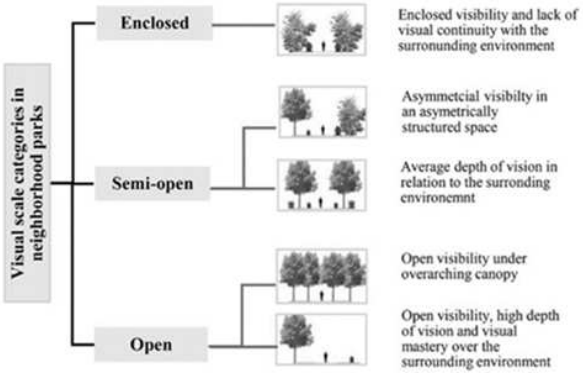

Figure 1. Design types of park environment facilities (Z. Sadeghi & Haghighat Bin, 2023)

Problems

How do we know which environmental design and park cause bad behavior or vandalism among urban park visitors?

Limitations

This research was conducted on a prioritized city park facility.

Objective

To find out the causes and types of vandalism committed by visitors to city park facilities and to find out the activities at the facilities that cause vandalism.

MATERIAL AND METHOD

Park Vandalism Due to Poor Management of Functional Design Facility

(Taylor et al., 2020) explained that poor design management in the area around facility products can increase the influence of crime or vandalism on park facilities, the researcher mentioned that the bad behavior of visitors in the park is due to the lack of park management in handling the conditions of the park's environmental area which is dense density and diversity of activities. (Chuang et al., 2022) also agrees with Taylor that the environmental conditions of the park area (spatial) density and diversity can affect behavior that is difficult to predict, in the study shows that the spatial density of visitors and spatial diversity because it is driven by a series of different park characteristics. On the one hand, the high density of nearby visitors and the variety of family-oriented facilities, such as playgrounds, result in higher densities.

Related to the components in the area of diversity and density (Mahrous et al., 2018) further explains that there are components in the design of the environment around the facility that can cause dissatisfaction and lead to visitor vandalism such as: lack of visitor understanding of the use of spatial areas, density of vegetation, level of facility maintenance, signs of vandalism, amount of light, amount of signage or instructions around, ease of area visible in various directions, the possibility of users being able to see the surrounding environment.

(Othman El Sayed, 2019) states that poor management of the design of facilities supporting activities can affect the occurrence of intentional or unintentional vandalism by visitors, for this reason, good management is needed in managing the design of facilities provided for visitors and visitors. Design factors are important for the implementation of safe and comfortable park management. (K. C. Wu & Song, 2017) added that poor management factors in designing unsafe and unmaintained facility products cause negative behavior.

(Ottoni et al., 2016) continue that vandalism or negative behavior of visitors can be caused by functional factors in the design of facilities that do not function optimally. (Kong et al., 2022) continued that facility products that do not function well as supporting activities, supporting entertainment and recreation values, and less functional designs can reduce visitor satisfaction, thereby increasing negative behavior or vandalism. (Restrepo et al., 2022) mentioned that the importance of safety management in the design of facility functionality needs to be carried out by designers in an effort to cause negative activities to unwanted actions by users.

Conclusion: Based on the above review, there is a need for management strategies to prevent injuries to users through safe facility management design to reduce the impact of negative visitor behavior.

Function Behavior Structure (FBS)

According to (Renaud et al., 2019) FBS or Function-Behavior-Structure is an appropriate management strategy to explain that the relationship between functional design features in a facility or product can affect the comfort and safety of its user activities and functional analysis. (Luo et al., 2023) In design studies, FBS can be used as a designer's intuitive consideration of how facility functions can be subjected to more systematic design use. The analysis of the stages of the design process can be more detailed but more diverse in concept.

(Li et al., 2018) FBS has advantages over some previous design theories that utilize separate functional requirements and design parameters such as Quality Function Deployment (QFD), innovative solutions with the Theory of Inventive Problem Solving (TRIZ), and design alternatives that can be evaluated with Analytic Hierarchy Process (AHP). Design methods for product representation include Computer-Aided Design (CAD), Finite Element Analysis (FEA), and others. In the FBS framework, system analysis and design is done by understanding and combining these three elements. The functions and behaviors of the system are used as a guide to design an appropriate structure, while the structure of the system can influence the desired functions and behaviors. FBS can be used in a variety of systems engineering contexts, including software systems, manufacturing systems, transportation systems, and more. By understanding

the interactions between system functions, behaviors, and structures, this framework helps system designers to develop effective and efficient solutions.

Furthermore, the application of functions, behaviors and structures required for security in the product features itself with the theoretical attributes of FBS Functions, Behaviors and Structures. (Cascini et al., 2013) explains the literal concept of FBS is an operational strategy management feature on a product that can be applied to help achieve a level of comfort and safety of its users so as to reduce the impact of deviant behavior, dissatisfaction and vandalism, Function or function is how the product works according to the function expected by its users, Behavior or behavior is how the product derived from its function can be used ergonomically with comfortable and comfortable behavior, Structure or structure is the elements of product parts or product mechanisms that are tangible and interact directly with its users.

Methodology

This research uses the development of park facility security design measurements using the security theory approach to functional design with FBS. The data collection method and the mechanism used to interpret the data is to use the method of in-depth observation of the subject and visitor behavior or called focused ethnography of various park facility products based on (Roeschley, 2023) which states that this type of method, researchers can limit the focus of observation on certain aspects or phenomena in a particular subject or environment. For example, researchers can focus on patterns of social interaction in the site area, changes in the research subject's system, or the influence of security attributes on visitor behavior. The main goal is to gain a deeper understanding of the phenomenon.

The research attributes use the FBS Function-Behavior-Structure theory approach. (FBS) According to (L. Sadeghi et al., 2017)based on the development of the FBS theoretical basis The Function-Behavior-Structure Framework (Gero & Kannengiesser, 2004) is a framework used in systems engineering to analyze and design complex systems. This framework combines three main elements: function, behavior, and system structure.

1. Function: Function refers to the primary purpose or task of a facility or system. The function of a facility is usually related to its desired output or achieving a specific goal.
2. Behavior: refers to the way the facility system is used or responds to user actions. It answers the question "How is the activity in the facility area?" System behavior involves interacting with inputs, processing information, and producing corresponding outputs.
3. Structure: refers to the components of the facility and the relationships between them. Product structure involves modeling element components, relationships, and physical or logical layouts.

In the FBS framework, system analysis and design is done by understanding and combining these three elements. System functions and behaviors are used to guide the proper structure, while the system structure can influence the desired functions and behaviors.

Research Data Source

The main data source in this study uses observational data through the collection of photos of spatial area objects that have been categorized with IoT (Internet of Things) technology real-time object detection camera with Tiny YOLO v3 program application. This technology can be used for safety management systems such as (Khan et al., 2022) which uses IoT systems with real-time cameras to evacuate the number of fire victims in multi-story buildings [30]. IoT device systems with real-time cameras are more practical and faster touse to evaluate the number and activity in spatial areas than other technologies such as (Zhai et al., 2023) which uses Actigraph wGT3X-BT accelerometer technology (Actigraph, Pensacola, FL, USA), where this technology must be attached to each respondent to determine the effectiveness of activities in spatial areas as well as better than Global Positioning System (GPS) cameras because the data shown is not real-time.

In relation to the research location, researchers used a multifunctional or comprehensive type of urban park in Surabaya City. Comprehensive parks according to (Kong et al., 2022), (Mahmoudi et al., 2022), (Zhang & Zhou, 2018) explain this type of park has complete facilities and a larger area, as well as a variety of uses than other parks. For this reason, researchers used the most complete active paid park in Surabaya City, Surabaya Zoo-KebunBinatang Surabaya (KBS), which is the most complete park that is most widely known by the public.

Figure 2. Photo of KBS Maps

Figure 3. Graphic of KBS Maps

RESULT AND DISCUSSION

Observation Result

Researchers conducted in-depth observations or focused ethnography of the KBS area on two weekend weeks and holidays, namely which were carried out from 9 am until 3 pm on the 3rd date in the spatial area of the most crowded environment according to (Z. Sadeghi & Haghighat Bin, 2023).

At this stage, observations are also made of facility products contained in all spatial park areas such as seating, tables, trash cans, or facilities affected by visitor vandalism.

Figure 4. The Atmosphere of Density in KBS Area

1. Enclosed Area

Figure 5. KBS enclosed area density scene with real-time object detection camera

2. Semi-closed Area

Figure 6. KBS semi-closed area density scene with real-time object detection camera

In this enclosed area is a closed area with wood and tree vegetation from both the right and left sides and the areas with the most visitors and various activities are the souvenir stand area, center stage area, and food court.

While the Semi-open area is covered on one side by vegetation and the other is exposed to direct sunlight, this area is the most crowded with visitors in the mammal and aves cage access area. Finally, the open area is an area that is exposed to direct sunlight and not covered by vegetation, the most crowded areas in this area are open fields and play areas. The results of observations made by researchers found that enclosed and semi-open areas get many forms of vandalism and property damage, the following types of visitor vandalism:

Table 1. Types of Visitor Vandalism in Each Priority Area of the KBS Environment

	Types of Vandalism	Enclosed	Semi-Open	Open
1	Individual Vandalism	Damaging facilities, Damaging Vegetation	Damaging facilities, Damaging Vegetation	
2	Vandalism Violates the Rules	Stepping on Plants, Littering, Crossing the Barrier	Stepping on Plants, Littering, Crossing the Barrier	Stepping on Plants, Littering, Crossing the Barrier
3	Social Vandalism	Disturbing Others, Loud Voice, Damaging facilities	Disturbing Others, Loud Voice, Damaging facilities	

Figure 8. Forms of Vandalism by KBS Visitors

Table 2. Product Measurement Audit of Prioritized KBS Facilities Based on FBS

Facilities	There is a problem with the product facility (Function)			Problems in using the product facility (Behavior)			There are problems with product facility components (Structure)		
	Enclosed area	Semi-Open area	Open Area	Enclosed Area	Semi-Open Area	Open Area	Enclosed Area	Semi-Open Area	Open Area
Bench	✓	✓	✓	✓	✓		✓	✓	
Table	✓	✓		✓	✓		✓	✓	✓
Trash Bin	✓	✓	✓	✓	✓	✓	✓	✓	✓
Guardrail	✓	✓		✓	✓		✓	✓	
Lamp	✓			✓			✓		
Washbasin	✓	✓		✓	✓		✓	✓	✓
Table	✓	✓		✓	✓		✓	✓	
Accessories	✓			✓			✓		
Plant	✓	✓		✓	✓		✓	✓	
Plant Pots	✓			✓			✓		
Tree	✓	✓	✓	✓	✓	✓	✓	✓	✓
Signage		✓		✓			✓		
Toilet			✓			✓			
Games	✓	✓		✓	✓		✓	✓	

Audit of vandalism on product facilities through FBS

Furthermore, researchers conducted in-depth observations to assess the impact of vandalism on existing facility products in the KBS priority area. Researchers observed the existence of forms of problems and damage based on a review of visitor activity based on the FBS attributes.

DISCUSSION

Based on the audit results from tabulated observations, it appears that there is a form of damage to park facility products based on the FBS attribute. Facilities that experience the form of vandalism get the most done in the enclosed area and the next is semi-close, while the open area gets the least vandalism. This answers the question of the problem that environmental design influences park facilities and visitors' negative activities because visitors prefer to crowd and do activities in enclosed area. In the open area or area exposed to direct sunlight is the least form of vandalism because visitors do not linger because of the annoying heat. While in the semi-open area, the form of damage and vandalism of the facility is also in the area covered by sunlight. While facility products that get problems in each area based on their functionality design are trash bin products, this is because trash bins are found in each area location and several problems related to FBS are found such as:

1. Function: The lid of the trash bin is difficult to open so that many visitors throw garbage around the product.
2. Behavior: some trash bins in the park location area are in hard-to-reach areas such as damaged soil areas, so that visitors choose to dispose of waste elsewhere.
3. Structure: trash bin materials are also found in several locations that have been damaged so that the garbage comes out.

Figure 7. (a) The lid of the trash bin is difficult to open, (b) the material structure of the trash bin is damaged

CONCLUSION

This article provides an overview of the audit of public facilities in city parks by considering the design and functional aspects of the facilities. The results obtained correlate with the causes of visitor vandalism due to confusion and dissatisfaction when using facilities based on function, behavior, and structure due to not maximizing activities due to environmental areas and visitor density that affect various obstacles.

This research has shortcomings, namely the incomplete testing of measuring instruments carried

out, although it can still provide simple and fast results due to the real-time camera object-detected technology. However, researchers hope that future research can use better statistical measuring instruments and more respondents to make the results more credible. Furthermore, it is hoped that for future research, this FBS method can be developed and collaborated with other methods so that the research is more comprehensive in providing results and more diverse location areas can also make different research results.

Acknowledgement

Thank you to the parents, lecturer team, and friends of the Doctor of Technology Management (DMT), Institut Teknologi Sepuluh Nopember, Surabaya and Faculty of Design and Creative Industry, Universitas Dinamika, Surabaya who always provide encouragement and guidance.

REFERENCES

[1] Bhati, A., & Pearce, P. (2017). Tourist attractions in Bangkok and Singapore; linking vandalism and setting characteristics. *Tourism Management*, *63*, 15–30. https://doi.org/10.1016/j.tourman.2017.05.014

[2] Bhuiyan, M. A. H., Darda, M. A., & Hasan, M. R. (2021). Tourist perception and satisfaction on safari tourism at Bangabandhu Sheikh Mujib Safari Park in Bangladesh. *International Journal of Geoheritage and Parks*, *9*(4), 430–440.https://doi.org/10.1016/j.ijgeop.2021.11.005

[3] Cascini, G., Fantoni, G., & Montagna, F. (2013). Situating needs and requirements in the FBS framework. *Design Studies*, *34*(5), 636–662. https://doi.org/10.1016/j.destud.2012.12.001

[4] Chuang, I. T., Benita, F., & Tunçer, B. (2022). Effects of urban park spatial characteristics on visitor density and diversity: A geolocated social media approach. *Landscape and Urban Planning*, *226*(July), 104514. https://doi.org/10.1016/j.landurbplan.2022.104514

[5] Crank, P. J., Hondula, D. M., & Sailor, D. J. (2023). Mental health and air temperature: Attributable risk analysis for schizophrenia hospital admissions in arid urban climates. *Science of the Total Environment*, *862*(December 2022), 160599. https://doi.org/10.1016/j.scitotenv.2022.160599

[6] Das, M., Das, A., & Momin, S. (2022). Quantifying the cooling effect of urban green space: A case from urban parks in a tropical mega metropolitan area (India). *Sustainable Cities and Society*, *87*(July), 104062. https://doi.org/10.1016/j.scs.2022.104062

[7] Dinas Lingkungan Hidup Kota Surabaya. (2017). Laporan Kajian Daya Dukung Lingkungan Hidup Taman Kota di Surabaya. *Kajian Daya Dukung Lingkungan Hidup Taman Kota Surabaya*, 1–135.

[8] Farkas, J. Z., Hoyk, E., de Morais, M. B., & Csomós, G. (2023). A systematic review of urban green space research over the last 30 years: A bibliometric analysis. *Heliyon*, *9*(2), 1–14. https://doi.org/10.1016/j.heliyon.2023.e13406

[9] Gero, J. S., & Kannengiesser, U. (2004). The situated function-behaviour-structure framework. *Design Studies*, *25*(4), 373–391. https://doi.org/10.1016/j.destud.2003.10.010

[10] Halkos, G., Leonti, A., & Sardianou, E. (2022). Determinants of willingness to pay for entrance to urban parks: A quantile regression analysis. *Economic Analysis and Policy*, *74*(1640), 421–431.https://doi.org/10.1016/j.eap.2022.03.013

[11] Hall, A., Horta, A., Khan, M. R., & Crabbe, R. A. (2022). Spatial analysis of outdoor wet bulb globe temperature under RCP4.5 and RCP8.5 scenarios for 2041–2080 across a range of temperate to hot climates. *Weather and Climate Extremes*, *35*, 100420. https://doi.org/10.1016/j.wace.2022.100420

[12] He, L., Páez, A., & Liu, D. (2017). Built environment and violent crime: An environmental audit approach using Google Street View. *Computers, Environment and Urban Systems*, *66*, 83–95. https://doi.org/10.1016/j.compenvurbsys.2017.08.001

[13] Hou, K., Zhang, L., Xu, X., Yang, F., Chen, B., Hu, W., & Shu, R. (2023). High ambient temperatures are associated with urban crime risk in Chicago. *Science of the Total Environment*, *856*(June 2022), 158846. https://doi.org/10.1016/j.scitotenv.2022.158846

[14] Khan, M., Khalid, R., Anjum, S., Khan, N., Cho, S., & Park, C. (2022). Tag and IoT based safety hook monitoring for prevention of falls from height. *Automation in Construction*, *136*(December 2021), 104153. https://doi.org/10.1016/j.autcon.2022.104153

[15] Kong, L., Liu, Z., Pan, X., Wang, Y., Guo, X.,

& Wu, J. (2022). How do different types and landscape attributes of urban parks affect visitors' positive emotions? *Landscape and Urban Planning*, *226*(19), 104482. https://doi.org/10.1016/j.landurbplan.2022.104482

[16] Li, L., Yu, S., Tao, J., & Li, L. (2018). A FBS-based energy modelling method for energy efficiency-oriented design. *Journal of Cleaner Production*, *172*, 1–13. https://doi.org/10.1016/j.jclepro.2017.09.254

[17] Luo, Y., Ni, M., & Zhang, F. (2023). A design model of FBS based on interval-valued Pythagorean fuzzy sets. *Advanced Engineering Informatics*, *56*(October 2022), 101957. https://doi.org/10.1016/j.aei.2023.101957

[18] Mahmoudi, B., Sorouri, Z., Zenner, E. K., & Mafi-Gholami, D. (2022). Development of a new social resilience assessment model for urban forest parks. *Environmental Development*, *43*(April), 100724. https://doi.org/10.1016/j.envdev.2022.100724

[19] Mahrous, A. M., Moustafa, Y. M., & Abou El-Ela, M. A. (2018). Physical characteristics and perceived security in urban parks: Investigation in the Egyptian context. *Ain Shams Engineering Journal*, *9*(4), 3055–3066. https://doi.org/10.1016/j.asej.2018.07.003

[20] Mäntymaa, E., Jokinen, M., Louhi, P., & Juutinen, A. (2022). Visitors' heterogeneous preferences for urban park management: The case of a city park in Oulu, Finland. *Urban Forestry and Urban Greening*, *77*. https://doi.org/10.1016/j.ufug.2022.127751

[21] Odufuwa, B., Badiora, A. I., Olaleye, D. O., Akinlotan, P. A., & Adebara, T. M. (2019). Perceived personal safety in built environment facilities: A Nigerian case study of urban recreation sites. *Journal of Outdoor Recreation and Tourism*, *25*(May 2018), 24–35. https://doi.org/10.1016/j.jort.2018.11.002

[22] Othman El Sayed, R. (2019). Design Against Vandalism As a Newapproach To Landscape Maintenance in Urban Open Spaces. *JES. Journal of Engineering Sciences*, *47*(2), 218–235. https://doi.org/10.21608/jesaun.2019.115124

[23] Ottoni, C. A., Sims-Gould, J., Winters, M., Heijnen, M., & McKay, H. A. (2016). "Benches become like porches": Built and social environment influences on older adults' experiences of mobility and well-being. *Social Science and Medicine*, *169*, 33–41. https://doi.org/10.1016/j.socscimed.2016.08.044

[24] Putra, I. D. G. A., Nimiya, H., Sopaheluwakan, A., Kubota, T., Lee, H. S., Pradana, R. P., Alfata, M. N. F., Perdana, R. B., Permana, D. S., & Riama, N. F. (2022). Development of climate zones for passive cooling techniques in the hot and humid climate of Indonesia. *Building and Environment*, *226*(2), 109698. https://doi.org/10.1016/j.buildenv.2022.109698

[25] Renaud, J., Houssin, R., Gardoni, M., & Armaghan, N. (2019). Product manual elaboration in product design phases: Behavioral and functional analysis based on user experience. *International Journal of Industrial Ergonomics*, *71*(February), 75–83. https://doi.org/10.1016/j.ergon.2019.02.003

[26] Restrepo, F., Mali, N., Sands, L. P., Abrahams, A., Goldberg, D. M., White, J., Prieto, L., Ractham, P., Gruss, R., Zaman, N., & Ehsani, J. P. (2022). Injury prevention for older adults: A dataset of safety concern narratives from online reviews of mobility-related products. *Data in Brief*, *42*, 108044. https://doi.org/10.1016/j.dib.2022.108044

[27] Roeschley, A. (2023). "They care enough to document people's stories": Using ethnographic methods to understand collection day outreach events in participatory archives. *Library and Information Science Research*, *45*(2). https://doi.org/10.1016/j.lisr.2023.101234

[28] Sadeghi, L., Dantan, J. Y., Mathieu, L., Siadat, A., & Aghelinejad, M. M. (2017). A design approach for safety based on Product-Service Systems and Function–Behavior–Structure. *CIRP Journal of Manufacturing Science and Technology*, *19*, 44–56. https://doi.org/10.1016/j.cirpj.2017.05.001

[29] Sadeghi, Z., & Haghighat Bin, M. (2023). Enhancing recreational activities through planting design in neighborhood parks. *Journal of Outdoor Recreation and Tourism*, *42*(February), 100591. https://doi.org/10.1016/j.jort.2022.100591

[30] Shackleton, C. M., & Njwaxu, A. (2021). Does the absence of community involvement underpin the demise of urban neighbourhood parks in the Eastern Cape, South Africa? *Landscape and Urban Planning*, *207*(May 2020), 104006.

https://doi.org/10.1016/j.landurbplan.2020.104006

[31] Taylor, L., Leckey, E. H., Lead, P. J., & Hochuli, D. F. (2020). What Visitors Want From Urban Parks: Diversity, Utility, Serendipity. *Frontiers in Environmental Science*, *8*(December), 1–12. https://doi.org/10.3389/fenvs.2020.595620

[32] Toet, A., & van Schaik, M. G. (2012). Effects of signals of disorder on fear of crime in real and virtual environments. *Journal of Environmental Psychology*, *32*(3), 260–276. https://doi.org/10.1016/j.jenvp.2012.04.001

[33] Wu, J. H., Lin, H. W., & Liu, W. Y. (2020). Tourists' environmental vandalism and cognitive dissonance in a National Forest Park. *Urban Forestry and Urban Greening*, *55*(August), 126845. https://doi.org/10.1016/j.ufug.2020.126845

[34] Wu, K. C., & Song, L. Y. (2017). A case for inclusive design: Analyzing the needs of those who frequent Taiwan's urban parks. *Applied Ergonomics*, *58*, 254–264. https://doi.org/10.1016/j.apergo.2016.06.015

[35] Yin, J., Su, B., Fan, C., & Li, Q. (2020). Location of the public service facilities in an urban comprehensive park using a multi-hierarchy and multi-constrained configuration model. *Journal of Urban Management*, *9*(2), 205–215. https://doi.org/10.1016/j.jum.2020.04.001

[36] Zhai, Y., Li, D., Wu, C., & Wu, H. (2021). Urban park facility use and intensity of seniors' physical activity – An examination combining accelerometer and GPS tracking. *Landscape and Urban Planning*, *205*(1239), 103950. https://doi.org/10.1016/j.landurbplan.2020.103950

[37] Zhai, Y., Li, D., Wu, C., & Wu, H. (2023). Spatial distribution, activity zone preference, and activity intensity of senior park users in a metropolitan area. *Urban Forestry and Urban Greening*, *79*(1239), 127761. https://doi.org/10.1016/j.ufug.2022.127761

[38] Zhang, S., & Zhou, W. (2018). Recreational visits to urban parks and factors affecting park visits: Evidence from geotagged social media data. *Landscape and Urban Planning*, *180*(18), 27–35. https://doi.org/10.1016/j.landurbplan.2018.08.004