Uniosun Journal of Engineering and Environmental Sciences (UJEES), Vol. 8 No. 2, Sept., 2026
DOI: 10.64980/ujees.v8i2.008 **Olatunji and Adedeji**
Published: September 30, 2026

A STUDY OF DESIGN MANAGEMENT GUIDELINES FOR RECREATIONAL PARKS IN OSOGBO, OSUN STATE, NIGERIA

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Abstract
Recreational parks that reflect the needs of the community have become increasingly important in urban Osogbo, Osun State, Nigeria, as rapid urbanization intensifies pressure on the city's green spaces. Although urban green spaces are known to benefit community health and well-being, design and management guidance tailored to the Nigerian context remains scarce - a gap that is especially pronounced for secondary cities such as Osogbo, which, despite serving as the administrative capital of Osun State and housing an estimated population of over 580,000, have received far less empirical attention than Nigeria's primary metropolitan centres such as Lagos. This study develops design management guidelines for recreational parks in Osogbo and determines the value-related factors that shape park users' expectations. A quantitative approach was used to gather data from 368 park users across three parks in the Osogbo metropolitan area. A questionnaire informed by the Value Mapping Tool (VMT) - a stakeholder-oriented technique for identifying uncaptured value in a system - and the relevant literature was developed across four pre-determined domains: physical design of parks (14 items), services and facilities (8 items), park governance and community engagement (12 items), and environmental sustainability (21 items), for a 55-item structured instrument. These domains were confirmed through Exploratory Factor Analysis (EFA), using Principal Component Analysis with Varimax rotation; sampling adequacy was good-to-excellent across all four domains (Kaiser-Meyer-Olkin values of 0.844, 0.815, 0.767, and 0.726, respectively), and Bartlett's Test of Sphericity was significant in every case ($p < .001$). The analysis produced the GREENSCAPES Guideline, comprising eleven thematic principles: Green Infrastructure, Recreation Zones, Engagement and Community, Environmental Stewardship, Navigation and Accessibility, Safety and Security, Cleanliness and Hygiene, Amenities and Facilities, Participation and Programming, Ecological Scape, and Smart Management. All eleven principles recorded high mean expectation scores (4.46–4.59 on a 0–5 scale). The developed guidelines are intended to guide park design and management in ways that respond to the expected values of urban residents in Osogbo. The results justify the need for ecologically responsive, adequately maintained, and inclusive recreational park infrastructure, and provide a basis for improving urban sustainability, community well-being, and spatial justice in Nigerian secondary cities.

Keywords
Design guidelines; Governance; Recreational parks; Urban green spaces; User expectations

1. INTRODUCTION

Parks have been identified as important urban infrastructure for physical activity, social integration, restorative mental health, and ecological function [1], [2], [22]. The rapid urbanization of African cities has amplified the need for recreational parks that are safe, accessible, and well-designed. In Nigeria, this need is compounded by rapid population growth that has outpaced the provision of recreational facilities; many parks are underused or misused as a result of neglected maintenance, poor safety, and limited responsiveness to user needs [4].

Osogbo, the capital of Osun State in south-western Nigeria, offers an instructive case for urban park research. Since it was declared the state capital in 1991, the city has experienced sustained population growth, reaching an estimated 580,000 residents by 2021 [4], a pattern of rapid urban expansion and land use/land cover change also documented in other Osun State cities such as Ilesha [20]. Nigeria's urban park research to date has concentrated disproportionately on primary metropolitan centres: in Lagos, for example, 78.4% of surveyed residents reported rarely visiting parks, and only 31.1% perceived a positive well-being impact from them, citing poor accessibility, insufficient maintenance, and fear of crime as the primary reasons for

non-use [16]. Secondary cities such as Osogbo remain markedly under-researched by comparison, despite facing similar or more acute resource constraints - an imbalance in the evidence base that is a central justification for locating this study in Osogbo rather than in a primary metropolitan centre. Osogbo's recreational parks are, moreover, characterised by poor design and construction, limited amenities, and weak park management [4]. It should be noted that Osogbo is not entirely without a formal planning history: the city was one of nine urban centres covered by a UN-Habitat-supported structure plan prepared for Osun State in 2013. However, implementation and enforcement of that plan have been limited, and its provisions did not extend to detailed design and management standards for recreational parks specifically a distinction this study makes explicit, rather than characterising the city as lacking any planning framework at all.

Decent park design and management benefits the community. Good park design brings a host of social, ecological, and public health benefits, while poorly designed and managed parks encourage social exclusion and discourage use [5], [6]. Effective park design has to be based on evidence and the concerns of the community.

Existing park design frameworks - including EFA-derived models developed in Malaysia [5] and China [13] - offer valuable methodological precedents but were developed under institutional, climatic, and socio-economic conditions that differ substantially from those of a Nigerian secondary city. Design standards built primarily on evidence from higher-income or better-resourced municipal contexts may therefore not translate directly to Osogbo, where budget constraints, informal land use, and differing cultural expectations of public space shape how residents value and use parks, reflecting wider patterns of informal and slum development in Nigerian secondary cities [21]. This study extends the EFA-based approach used in comparable international studies but grounds it empirically in Osogbo, producing what is, to the authors' knowledge, the first evidence-based park design and management framework developed specifically for a Nigerian secondary city, rather than adapted post hoc from a framework built elsewhere.

This study was initiated on the premise that parks are public spaces designed for socio-ecological and recreational use, and require effective design management grounded in evidence. It aims to identify the value-centred preferences of park users in Osogbo and to develop design management strategies for the city's recreational parks. Effective, evidence-based design management strategies for recreational parks in Osogbo are currently lacking. This study addresses that gap by systematically identifying value-driven expectations from park users through the Value Mapping Tool and Exploratory Factor Analysis, based on a structured survey of 368 park users.

This study posed two main questions. The first was: what are the physical attributes, management approaches, and perceptual valuations of recreational parks in Osogbo that impact park users' choices in utilizing these spaces? The second was: what are the appropriate design, service, and management strategies of recreational parks in Osogbo that respond to the needs and perceptual valuations of urban dwellers?

The focus of this research is on determining the value-based factors that influence park users in Osogbo, so as to develop adequate and effective management, design, and physical-utilization frameworks for recreational parks. The goal is to develop management strategies that are Osogbo context-specific and are backed empirically using the Value Mapping Tool and Exploratory Factor Analysis (EFA).

More research is now demonstrating the central contribution recreational parks make to urban living, health, and the environment. Recent studies [2], [1], [7] show that urban green spaces with thoughtful design bring physical, mental, and social benefits to urban citizens; conflict and non-use of a park become likely when it is badly managed. New methods and standards are imperative for the effective design and management of recreational parks in African urban centres like Osogbo, where significant contextual evidence is lacking due to the absence of an established framework and guidelines.

Numerous studies have shown the positive impact urban parks have on human well-being. Parks help combat non-communicable diseases by providing places to exercise and be active [8], [6]. They provide people with restorative environments that lower stress levels and enhance positive moods [2]. They can also serve to increase social bonds and support community cohesion, a mechanism increasingly documented in recent African park research examining user attitudes, perceived safety, and social-spatial design [9], [10]. Parks also help mitigate the urban heat island effect and improve air quality by providing ecosystem services such as habitat and stormwater assistance [11], [12].

For the majority of Nigerians, these positive impacts are not fully realized due to the inadequate state of park facilities. Most State residents recognized the significance of urban parks but did not use them, mostly citing the state of the facilities as the reason for the lack of use [16]. This pattern is echoed elsewhere in sub-Saharan Africa, where the compounding pressures of rapid urbanization on healthy public-space provision are increasingly documented [3]. Due to a lack of funds, staff, and community collaboration, recreational parks across the region remain under-resourced [4].

The design of urban parks has measurable effects on their usage and the consequent improvement to public well-being. Xu et al. [7] noted that the 'being clean and well-kept' design criterion of urban sustainability parks was the most important of the criteria, ranking, on average, 4.86 on a 5-point scale, based on 318 respondents. Their Exploratory Factor Analysis grouped the design parameters into six factors that accounted

for approximately 60% of the total variance: ecological environment, recreational facilities, safety and accessibility, social spaces, maintenance and management, and service facilities.

Au-Yong et al. [5] also used EFA to classify park facilities, and found that 19 facilities consolidated into two constructs: essential facilities and value-added facilities, with the importance of maintenance emerging across both constructs. In another context, Liu et al. [13] used text mining and EFA to analyze visitors' online reviews of parks, and identified four destination-attribute factors that characterized visitors' behavioural intent: ecology, recreation, safety and ease of access, and social atmosphere.

While the importance of maintenance and hygiene as design priorities is well established internationally [5], [7], the meaning and weight attached to these factors is likely to differ in the Nigerian context. In cities such as Osogbo, where municipal solid-waste collection and public-facility maintenance are inconsistently funded, and where informal, self-organised community maintenance arrangements often substitute for formal municipal services, park users' expectations for cleanliness may be shaped less by an assumption of guaranteed municipal upkeep - as might be the case in the contexts studied by Xu et al. [7] and more by a heightened, almost compensatory demand for visible cleanliness as a signal that a public space is being actively cared for, and is therefore safe and legitimate to use. This cultural and infrastructural framing is revisited , where the priority Osogbo park users place on maintenance and hygiene is interpreted against this backdrop of resource-constrained urban service delivery.

The Value Mapping Tool (VMT) is a stakeholder-oriented technique originally developed at the University of Cambridge [15] to identify 'value uncaptured' - value that is missed, destroyed, in surplus, or absent in an exchange between a system and its stakeholders. In its original business-modelling application, VMT prompts a structured review of value flows between a focal organisation and four stakeholder categories: the focal organisation itself, the value network (partners, suppliers), customers/users, and society/the environment. The broad range of applications VMT has found in design-oriented social research, including sustainable design and innovation management [15], provides the basis for its adaptation to a public-realm, non-commercial setting such as this study.

For the purposes of this study, VMT was operationalised by substituting the four generic stakeholder categories with park-specific counterparts: park management and local authorities (the 'focal organisation'), service providers and maintenance contractors (the 'value network'), park users (the 'customer'), and the wider Osogbo community and natural environment (the 'society/environment' category). Using this adapted structure, informed by preliminary field observation and informal discussion with park users and management staff at the three case-study parks, the research team mapped where value was currently missed (e.g., unmet user expectations for safety or maintenance), destroyed (e.g., degraded ecological features), in surplus (facilities present but under-used), or absent (services or amenities lacking entirely). These value-uncaptured themes were translated into candidate questionnaire domains and items physical design, services and facilities, governance and community engagement, and environmental sustainability which were then refined against the wider design-and-management literature reviewed, before EFA was used to empirically confirm the resulting factor structure . This operationalization is consistent with VMT's stated aim of examining value exchange in public-service environments [15], and situates the present study's use of VMT alongside more recent applications of structured, factor-analytic approaches to park design and management in African cities [9], [10], which similarly translate a conceptual value-assessment tool into a locally-grounded empirical instrument.

2. MATERIALS AND METHOD

2.1 Sample Group and Recruitment

The sample comprised 368 persons aged 18 years and above living in the Osogbo metropolitan area. A purposive sampling method was used to reach individuals with direct experience and working knowledge of recreational parks in Osogbo specifically of their design, management, and services since random sampling of the general population would have captured a large proportion of non-users unable to meaningfully evaluate park attributes.

Recruitment and data collection took place through structured intercept surveys conducted on-site at the three parks, at varied times of day and on both weekdays and weekends, to capture a range of visitor types. Field assistants approached park users at park entrances, seating areas, and activity zones, screened them for eligibility (aged 18 and above; either a regular user of the specific park or an Osogbo resident with prior experience visiting recreational parks in the city), and administered the questionnaire in person. Response quotas were distributed across the three parks in approximate proportion to their typical daily visitor volumes: the achieved sample was almost exactly evenly split across sites (Osun-Osogbo Sacred Grove, n = 123, 33.4%; Nelson Mandela Freedom Park, n = 123, 33.4%; Bristol Family Fun Park, n = 122, 33.2%), consistent with the intended quota design.

The achieved sample was 51.1% female (n = 188) and 48.9% male (n = 180). By age group, 23.6% were 18–25 years (n = 87), 33.4% were 26–35 (n = 123), 22.8% were 36–45 (n = 84), 12.0% were 46–55 (n = 44), and 8.2% were 56 and above (n = 30) - a distribution weighted toward working-age adults, consistent with the

daytime intercept-survey method used. By educational attainment, 10.3% had completed secondary education only (n = 38), 19.6% held an OND/NCE (n = 72), 49.7% held an HND or Bachelor's degree (n = 183), and 20.4% held a postgraduate qualification (n = 75). By self-reported visit frequency, 8.7% were first-time visitors (n = 32), 33.4% visited occasionally (n = 123), 31.0% visited monthly (n = 114), and 26.9% visited weekly or more often (n = 99); restricting the purposive sample predominantly to repeat visitors (91.3% had visited before) supports the sample's suitability for evaluating park design and management attributes based on direct experience.

The sampling was restricted to the three primary recreational parks in Osogbo:

- Nelson Mandela Freedom Park
- Osun-Osogbo Sacred Grove
- Bristol Family Fun Park

These three parks were deliberately selected to represent the principal typologies of recreational open space available to residents of Osogbo: a civic/public park (Nelson Mandela Freedom Park), a cultural and heritage site with recreational use (the Osun-Osogbo Sacred Grove, a UNESCO World Heritage Site), and a privately-operated commercial entertainment park (Bristol Family Fun Park). Rather than treating this typological diversity as a threat to comparability, the study treats it as a deliberate design choice: because the GREENSCAPES Guideline is intended as a generalisable design-management framework applicable across the range of recreational spaces actually available to Osogbo residents - rather than a guideline for a single park type - it was necessary to sample across typologies capturing the breadth of governance models (public/civic, cultural/heritage, and private/commercial) under which Osogbo's parks currently operate.

This typological diversity was tested directly with one-way analysis of variance (ANOVA) comparing mean domain-level expectation scores across the three parks. Expectations did not differ significantly by park for the physical design ($F = 1.61$, $p = .201$), services and facilities ($F = 1.78$, $p = .170$), or governance and community engagement ($F = 0.03$, $p = .974$) domains - indicating that these expectations are held broadly consistently by users regardless of which park typology they were sampled from, and supporting the guideline's applicability across typologies for these three domains. Environmental sustainability expectations, by contrast, differed significantly by park ($F = 6.02$, $p = .003$), rising from the Sacred Grove (mean = 4.547) to Nelson Mandela Freedom Park (mean = 4.586) to Bristol Family Fun Park (mean = 4.617). One plausible explanation is that users of the Sacred Grove a site already perceived as ecologically intact heritage forest hold comparatively lower incremental expectations for additional ecological intervention than users of the more built, commercially-operated Bristol Family Fun Park, where the baseline ecological provision is lower and the perceived need for improvement correspondingly higher. This finding is itself evidence that typology-specific weighting of at least the sustainability related GREENSCAPES principles is worth considering in future guideline refinement, even though the overall eleven-factor structure held consistently across all three sites.

2.2 Research Tools and Questionnaire Development

The survey instrument was a structured questionnaire developed through the adapted Value Mapping Tool process described, combined with a review of the literature on recreational park design and management and informal, in-depth conversations with park users and park management staff conducted during preliminary site visits. Candidate items generated through this VMT-and-literature process were organised into the four thematic domains subsequently confirmed by EFA : physical design of parks (14 items, A1–A14), park services and facilities (8 items, B1–B8), park governance and community engagement (12 items, C1–C12), and environmental sustainability (21 items, D1–D21), together comprising the full 55-item structured instrument. Items were drafted to be behaviourally concrete (e.g., referring to specific facilities, services, or management practices - such as “prompt repair of damaged facilities” or “ramps and accessible entrances are provided”) rather than abstract, to support clear interpretation by respondents with varying levels of formal education. The full item wording for every domain is reported in Tables 1, 3, 5, and 8.

Content validity of the instrument rests on this triangulated development process - combining the structured VMT value-mapping exercise, the design-and-management literature, and direct field consultation with park users and management rather than on a separately reported quantitative pilot study. This is noted explicitly as a methodological limitation: a formally documented pilot phase, with pre-registered refinement criteria, was not part of the development process reported here, and is recommended for future revisions of the instrument.

The survey employed a Likert-type expectation scale where 0 = no expectation [15] and 5 = very high expectation, to gauge users' expectations of rather than satisfaction with - park design, services, and governance: respondents were asked to rate how strongly they expected each attribute to be present in a well-managed recreational park, not how satisfied they currently were with existing conditions.

2.3 Data Analysis

Along with ensuring analytical rigor, the goal was to verify the findings by subjecting the data collected from the structured questionnaire to a three-step statistical plan incorporating descriptive statistics, assessment of the data's suitability for factor analysis, and Exploratory Factor Analysis (EFA). All analyses were conducted

in Python , applying the same statistical procedures Principal Component Analysis with Varimax rotation conventionally implemented in IBM SPSS Statistics.

Step 1: Descriptive Statistics. Descriptive statistics, in the form of means and standard deviations, were used to characterise respondents and to summarise park users' expectations across all domains (Tables 2, 4, 6, and 9).

Step 2: Assessment of Factorability. The Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy was conducted prior to factor extraction, together with Bartlett's Test of Sphericity, to evaluate whether the correlation matrix differed significantly from an identity matrix and therefore warranted the use of EFA. Both tests exceeded the conventional cut-off values recommended for EFA suitability (KMO > 0.60; Bartlett's $p < .05$) for every domain: physical design, KMO = 0.844, $\chi^2(91) = 1156.32$, $p < .001$; services and facilities, KMO = 0.815, $\chi^2(28) = 477.60$, $p < .001$; governance and community engagement, KMO = 0.767, $\chi^2(66) = 801.76$, $p < .001$; and environmental sustainability, KMO = 0.726, $\chi^2(210) = 1480.34$, $p < .001$. Across the pooled 55-item instrument, KMO = 0.704 and Bartlett's $\chi^2(1485) = 4965.41$, $p < .001$, confirming the overall appropriateness of factor analysis for this dataset.

Step 3: Exploratory Factor Analysis (EFA). Principal Component Analysis (PCA) was employed with Varimax rotation, aiming to maximize interpretability and ensure orthogonality of the extracted components. The primary criterion for factor retention was an eigenvalue cutoff of 1.0, with factor loadings of 0.40 considered statistically meaningful, based on Stevens [17]. Applying this criterion to the physical design, services and facilities, and governance and community engagement domains recovered exactly the three, two, and three-factor structures, respectively, that had been anticipated from the instrument's a priori thematic design . For the 21-item environmental sustainability domain, the eigenvalue > 1 criterion retained five factors rather than the three sustainability-related GREENSCAPES principles hypothesised at instrument design; because over-extraction is a known risk with larger item pools under a pure eigenvalue rule [5], [7], the five-factor solution was retained and reported in full rather than forced to three, and its translation into the GREENSCAPES structure is addressed explicitly in Section 3.5. Across the four domains, the extracted factors together explained 51.2% of total variance for the physical design domain, 50.7% for services and facilities, 53.0% for governance and community engagement, and 52.1% for environmental sustainability values consistent with the ~50–60% range typically reported as acceptable in comparable social-science EFA studies of park facilities [5], [7].

Cross-loadings, item retention, and reliability. Cross-loading items would have been retained under the factor on which they showed the higher (dominant) loading, provided that loading exceeded the 0.40 threshold and the item's conceptual content was substantively consistent with that factor's theme. In practice, applying a strict 0.40 cross-loading check across all four domains identified no items loading at or above 0.40 on more than one factor: every one of the 55 items loaded cleanly and exclusively on a single factor, indicating a well-defined simple structure. No items were removed from the analysis. Internal consistency (Cronbach's α [19]) was additionally computed for every extracted factor with two or more items, to evaluate the reliability implications of the smaller (single- and two-item) factors identified; these results are reported alongside each factor and discussed.

3. RESULTS AND DISCUSSION

The analysis of park users' expectations focuses on potential improvements to the design and management of recreational parks in Osogbo. The study utilized Exploratory Factor Analysis (EFA) to draw out the principal factors based on the survey of 368 participants across four thematic areas, comprising 55 questions in total (14 physical design items, 8 services and facilities items, 12 governance and community engagement items, and 21 environmental sustainability items).

3.1 Park Users' Expectations Regarding Physical Space Design

Through Varimax rotation, the physical space domain - comprising all 14 survey questions (A1–A14) - was found to be composed of three key components, as shown in Table 1 (KMO = 0.844; Bartlett's $\chi^2(91) = 1156.32$, $p < .001$; 51.2% cumulative variance explained).

Table 1. Varimax Rotation - Park Users' Expectations Regarding Physical Space Design

Item	Activity	Safety	Equipment	Observed Variable / Description
A1	0.726			Dedicated spaces for active recreational activities
A8	0.725			Fitness and exercise spaces
A3	0.683			Spaces for passive recreation and relaxation
A11	0.671			Children's play and recreation spaces
A14	0.660			Flexible spaces for different recreational activities
A5	0.651			Jogging and walking spaces
A13	0.635			Family-oriented recreational spaces
A7	0.631			Multi-purpose recreation areas

A4		0.712		Adequate lighting for safe movement
A12		0.707		Emergency and safety facilities
A9		0.703		Protection from crime and unsafe activities
A6		0.679		Security measures for park users
A10		0.678		Visible security or park personnel
A2			0.926	Adequate recreational equipment for park users

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. KMO = 0.844; Bartlett's $\chi^2(91) = 1156.32$, $p < .001$; cumulative variance explained = 51.2%.

From Table 1, the clustering and grouping analysis of observed variables revealed that park users' expectations could be categorised into three key components: (1) Activity Spaces - provision of spaces for a variety of physical and recreational activities, represented by eight survey questions (A1, A3, A5, A7, A8, A11, A13, A14; $\alpha = 0.828$); (2) Safety Measures - security measures and management frameworks to maintain safety and ease-of-use, represented by five items (A4, A6, A9, A10, A12; $\alpha = 0.735$); and (3) Equipment adequate and appropriately maintained recreational equipment, represented by one questionnaire item (A2, "Adequate recreational equipment for park users"; loading = 0.926).

Applying the 0.40 cross-loading threshold established, no item in this domain loaded above 0.40 on more than one factor: A2 in particular loaded exclusively and very strongly on its own factor (0.926), with negligible loadings on Activity (0.004) and Safety (0.013). This is a stronger and cleaner simple structure than is sometimes reported in comparable EFA park studies, and provides good evidence of discriminant validity for the three physical-design constructs in this Osogbo sample.

Equipment nonetheless remains a factor defined by a single indicator, for which internal consistency cannot be computed. Two remedies are available: (a) treat equipment adequacy as a sub-theme within the broader Recreation Zones principle, as adopted in the final GREENSCAPES structure, rather than as a stand-alone principle, or (b) expand the item pool for equipment-related expectations in future revisions of the instrument to allow a robust multi-item factor. The present study adopts approach (a); the single-item nature of this factor is acknowledged as a limitation.

Table 2: Average and Standard Deviation - Park Users' Expectations Regarding Physical Space Design

Group of Observed Variables	Number of Questions	Average[1]	S.D.	Cronbach's α
Activity	8	4.519	0.356	0.828
Safety	5	4.548	0.358	0.735
Equipment	1	4.595	0.497	n/a (1 item)

As depicted in Table 2, the analysis of park users' expectations for physical space illustrates that all three key components reflect high overall expectations, with average scores of 4.519 for activity spaces, 4.548 for safety measures, and 4.595 for equipment - indicating that park users expect safety, equipment, and space to support a range of activities.

3.2 Park Users' Expectations Regarding Park Services and Facilities

The Varimax rotation of all 8 survey questions in the services domain indicated two components, as shown in Table 3 (KMO = 0.815; Bartlett's $\chi^2(28) = 477.60$, $p < .001$; 50.7% cumulative variance explained).

Table 3: Varimax Rotation - Park Users' Expectations Regarding Park Services and Facilities

Item	Amenities & Facilities	Maintenance	Observed Variable / Description
B5	0.710		Adequate toilet facilities
B2	0.700		Adequate seating and rest facilities
B1	0.693		Adequate drinking-water facilities
B4	0.667		Adequate shade structures
B7	0.664		Food and beverage/service kiosks
B8	0.655		Adequate event and gathering facilities
B3		0.786	Regular maintenance of park facilities
B6		0.775	Prompt repair of damaged facilities

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. KMO = 0.815; Bartlett's $\chi^2(28) = 477.60$, $p < .001$; cumulative variance explained = 50.7%.

As shown in Table 3, two key components were identified: (i) Amenities and Facilities - services, utilities, and amenities supporting comfortable and enjoyable park use, including drinking water, seating, shade, toilet facilities, kiosks, and event spaces, represented by six survey items (B1, B2, B4, B5, B7, B8; $\alpha = 0.769$); and (ii) Maintenance ongoing upkeep practices preserving the park's physical condition and usability, represented

by two survey items, B3 ("Regular maintenance of park facilities") and B6 ("Prompt repair of damaged facilities"); α = 0.390.

No items cross-loaded above 0.40 in this domain. Both B3 (0.786) and B6 (0.775) loaded strongly and exclusively on the Maintenance factor. However, the reliability coefficient for this two-item factor (α = 0.390) is well below the conventional 0.70 threshold for acceptable internal consistency, despite the strength of the individual loadings. Combined with the single-item Equipment factor, this is direct empirical evidence - rather than a hypothesised concern - that Maintenance should be interpreted cautiously as a psychometric construct, even though its substantive content (routine cleaning versus infrastructural repair) is clearly and consistently endorsed by respondents. B3 and B6 concern conceptually distinct maintenance activities, yet load on a single factor; this suggests Osogbo park users evaluate 'maintenance' holistically - as a general perception of whether a park is being cared for - rather than distinguishing sharply between specific maintenance sub-tasks, consistent with the cultural and infrastructural framing discussed. Expanding the item pool for this factor is recommended.

Table 4: Average and Standard Deviation - Park Users' Expectations Regarding Park Services and Facilities

Group of Observed Variables	Number of Questions	Average[1]	S.D.	Cronbach's α
Amenities & Facilities	6	4.490	0.355	0.769
Maintenance	2	4.543	0.414	0.390

As Table 4 shows, Maintenance (mean = 4.543) was rated slightly higher than Amenities and Facilities (mean = 4.490), indicating that Osogbo park users prioritise the upkeep of existing provisions at least as much as the addition of new ones. This ordering carries a specific implication for the Nigerian resource-constrained context: where municipal and private park operators face tight budgets, this finding provides an evidence-based justification for prioritising maintenance spending alongside capital expansion, since it is a dimension users value highly relative to what is currently provided. This mirrors findings from Malaysian [5] and broader sub-Saharan African contexts [4], where maintenance repeatedly emerges as a strong driver of user satisfaction irrespective of the overall facility inventory available.

3.3 Park Users' Expectations Regarding Governance and Community Engagement

The Varimax rotation of all 12 questions in the governance domain indicated three components, as shown in Table 5 (KMO = 0.767; Bartlett's $\chi^2(66) = 801.76$, $p < .001$; 53.0% cumulative variance explained).

Table 5: Varimax Rotation - Park Users' Expectations Regarding Governance and Community Engagement

Item	Community Engagement	Accessibility	Sustainability	Observed Variable / Description
C2	0.723			Stakeholders participate in park management
C8	0.697			Youth and community groups are involved
C7	0.694			Residents participate in park programming
C4	0.692			Community events are supported in the park
C1	0.687			Residents are consulted on park development
C5	0.668			Local cultural activities are accommodated
C9		0.746		Ramps and accessible entrances are provided
C6		0.734		Accessible routes are provided for diverse users
C11		0.698		Facilities are accessible to persons with disabilities
C10		0.675		Wayfinding signage is clear and inclusive
C12			0.832	Long-term conservation of park resources is supported
C3			0.832	Environmentally responsible park management

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. KMO = 0.767; Bartlett's $\chi^2(66) = 801.76$, $p < .001$; cumulative variance explained = 53.0%.

As shown in Table 5, three key governance components were identified: (1) Community Engagement - residents and stakeholders participating in park programmes, events, and management decisions, represented by six items (C1, C2, C4, C5, C7, C8; α = 0.785); (2) Accessibility - social and physical accessibility of parks for different user groups, represented by four items (C6, C9, C10, C11; α = 0.681); and (3) Sustainability governance-level commitment to environmentally responsible and long-term park management, represented by two items, C3 ("Environmentally responsible park management") and C12 ("Long-term conservation of park resources is supported"); α = 0.562.

No cross-loadings above 0.40 were found in this domain. Table 6 shows that Sustainability (mean = 4.579) was rated more highly than Accessibility (mean = 4.464) - a finding that is, at first glance, counter-intuitive

given the well-documented accessibility deficits (e.g., limited wheelchair provision, inconsistent signage, poor last-mile transport connections) that characterise Nigerian urban infrastructure generally. Two non-exclusive explanations are offered. First, governance-level sustainability commitments may be evaluated by respondents in relatively abstract, aspirational terms, informed by growing public discourse around climate and environmental stewardship, whereas accessibility expectations are evaluated against a backdrop of entrenched, longstanding infrastructural neglect - respondents may have adapted their expectations downward for accessibility precisely because these deficits are so pervasive and familiar. Second, because none of the three study parks currently provides extensive accessibility infrastructure, users may have limited direct reference experience against which to calibrate a high expectation for accessibility. This finding warrants further investigation, ideally through qualitative follow-up with users with mobility impairments specifically, who were not oversampled in the present quantitative design.

The governance-level Sustainability factor (C3, C12; $\alpha = 0.562$) also returned a below-threshold reliability coefficient, echoing the pattern found for the two-item Maintenance factor. This factor is conceptually and empirically distinct from the much larger, dedicated environmental sustainability domain analysed: C3 and C12 capture broad governance-level commitment to environmental responsibility, whereas the 21-item domain D captures specific operational and technical sustainability practices. Both are retained and their relationship is addressed explicitly in the GREENSCAPES synthesis.

Table 6: Average and Standard Deviation - Park Users' Expectations Regarding Governance and Community Engagement

Group of Observed Variables	Number of Questions	Average[1]	S.D.	Cronbach's α
Community Engagement	6	4.523	0.360	0.785
Accessibility	4	4.464	0.376	0.681
Sustainability	2	4.579	0.423	0.562

3.4 Park Users' Expectations Regarding Environmental Sustainability

The environmental sustainability domain comprised 21 survey questions (D1–D21) - substantially more than the other three domains - reflecting its role as one of the four pre-determined thematic domains underlying the questionnaire. The Varimax rotation of all 21 items indicated five components, as shown in Table 7 (KMO = 0.726; Bartlett's $\chi^2(210) = 1480.34$, $p < .001$; 52.1% cumulative variance explained). As discussed, this five-factor solution exceeds the three sustainability-related principles (Environmental Stewardship, Ecological Scape, Smart Management) originally hypothesised for the GREENSCAPES structure, and is reported here in full rather than forced to three factors.

Table 7: Varimax Rotation - Park Users' Expectations Regarding Environmental Sustainability

Item	Ecological Scape	Resource & Waste	Water Mgmt & Monitoring	Energy & Awareness	Smart Mgmt	Observed Variable / Description
D9	0.742					Biodiversity-supporting planting is provided
D1	0.725					Native vegetation is incorporated into park landscaping
D19	0.724					Green infrastructure is maintained over time
D2	0.704					Tree canopy and shade are adequately provided
D13	0.679					Soil and landscape resources are protected
D6		0.759				Composting of organic waste is encouraged
D11		0.738				Water-efficient landscaping is used
D5		0.691				Waste is separated for appropriate management
D15		0.657				Ecological features are integrated with recreation
D21		0.652				Resource use is monitored for efficiency
D4			0.703			Stormwater runoff is reduced through landscape design
D20			0.678			Environmental performance is periodically assessed
D14			0.678			Pollution from park activities is

						minimized
D10			0.670			Green corridors connect ecological areas
D3			0.587			Rainwater is managed through nature-based measures
D16				0.792		Environmental information is provided to visitors
D7				0.730		Energy-efficient lighting is used
D12				0.712		Local plant species are prioritized
D8				0.644		Renewable energy is incorporated where feasible
D18					0.806	Users can provide digital maintenance feedback
D17					0.801	Digital systems support efficient park management

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. KMO = 0.726; Bartlett's $\chi^2(210) = 1480.34$, $p < .001$; cumulative variance explained = 52.1%.

Five components were identified. (1) Ecological Scape - vegetation, biodiversity, and green-infrastructure maintenance, represented by five items (D1, D2, D9, D13, D19; $\alpha = 0.762$). (2) Resource and Waste Stewardship - waste separation, composting, water-efficient landscaping, and resource monitoring, represented by five items (D5, D6, D11, D15, D21; $\alpha = 0.741$). (3) Water Management and Environmental Monitoring - nature-based rainwater and stormwater management, green corridors, pollution minimisation, and periodic environmental performance assessment, represented by five items (D3, D4, D10, D14, D20; $\alpha = 0.690$). (4) Energy Efficiency and Environmental Awareness - energy-efficient lighting, renewable energy, prioritisation of local plant species, and visitor environmental information, represented by four items (D7, D8, D12, D16; $\alpha = 0.697$). (5) Smart Management - digital tools supporting park operations and maintenance feedback, represented by two items, D17 ("Digital systems support efficient park management") and D18 ("Users can provide digital maintenance feedback"); $\alpha = 0.504$.

No cross-loadings above 0.40 were found among the 21 items, indicating a well-defined, if more granular, structure within this domain. The clean separation of the Smart Management factor (D17, D18) from the four other, more traditionally "green" sustainability factors is notable: it confirms that Osogbo park users conceptually distinguish digital/technological park-management tools from ecological and resource-management practices, even though both are commonly grouped under "smart" or "sustainable" park management in the international literature [7]. This distinction is preserved in the GREENSCAPES synthesis. .Table 8 shows that mean expectations across all five components are high and closely clustered (4.569–4.592), with Water Management and Environmental Monitoring rated marginally highest (mean = 4.592) and Smart Management rated marginally lowest (mean = 4.569). As reported, this domain was also the only one of the four to show a statistically significant difference in expectations across the three park typologies ($F = 6.02$, $p = .003$), rising from the Osun-Osogbo Sacred Grove (4.547) to Nelson Mandela Freedom Park (4.586) to Bristol Family Fun Park (4.617). This gradient plausibly reflects differences in each park's current ecological baseline and governance model: the Sacred Grove is a UNESCO World Heritage forest site already perceived as ecologically intact, potentially depressing users' incremental expectations for further ecological intervention, whereas Bristol Family Fun Park is a more built, commercially-operated site where the perceived need for additional environmental measures may be correspondingly higher. This finding is discussed further in relation to guideline implementation

Table 8: Average and Standard Deviation - Park Users' Expectations Regarding Environmental Sustainability

Group of Observed Variables	Number of Questions	Average[1]	S.D.	Cronbach's α
Ecological Scape	5	4.582	0.363	0.762
Resource & Waste Stewardship	5	4.577	0.353	0.741
Water Management & Environmental Monitoring	5	4.592	0.336	0.690
Energy Efficiency & Environmental Awareness	4	4.590	0.370	0.697
Smart Management	2	4.569	0.421	0.504

3.5 The GREENSCAPES Guideline

The analysis of park users' expectations provides valuable insights into potential areas for improvement and development of recreational parks in Osogbo. Well-designed spaces include safe, clean, and sustainable

spaces that provide park users with opportunities to engage in physical activities. Parks should also serve as tools to promote social and ecological awareness and pride within the community.

As a result of analysing 55 park-user expectation questions from 368 survey participants using EFA, a set of guidelines was developed: the GREENSCAPES Guideline for the design and management of recreational parks in Osogbo. GREENSCAPES seeks to establish park settings that fulfil the needs of city dwellers through responsive design, provisioning of services, participatory governance, and management of ecological sustainability. It is framed within eleven themes ("principles") synthesised from the thirteen empirical factors identified, summarised in Table 9 and Figure 1. Each principle is coupled with a description, deployment suggestions, its constituent survey items, and its mean-score justification.

Translating thirteen empirically-derived factors into eleven GREENSCAPES principles required two explicit synthesis decisions, both made on conceptual-content grounds and reported transparently here. First, the single-item Equipment factor was folded into Recreation Zones, since equipment provision is a facet of activity-space quality (combined: A1, A2, A3, A5, A7, A8, A11, A13, A14; 9 items). Second, four of the five environmental sustainability factors were consolidated into two principles matching their dominant conceptual content: the water-management/green-corridor factor maps onto Green Infrastructure (matching its Table 9 description of bioswales, rain gardens, and green corridors), while the resource-and-waste-stewardship and energy-efficiency factors together map onto Environmental Stewardship (matching its description of composting, waste-sorting, and resource efficiency). The governance-level Sustainability factor (C3, C12) was likewise folded into Environmental Stewardship, reflecting that governance commitment and operational practice are complementary expressions of the same underlying principle. The remaining constructs - Ecological Scape (Factor 1) and Smart Management (Factor 5) - map directly onto their corresponding GREENSCAPES principles without modification. Table 10 reports, for full transparency, exactly which survey items and originating EFA factors feed into each of the eleven principles.

Table 9: Summary of the GREENSCAPES Guideline with Definitions, Implementation Strategies, and Supporting Survey Data

Element	Description	Implementation in Recreational Parks	Constituent Survey Items	Mean Score	Cronbach's α
G - Green Infrastructure	Integrate nature-based water and landscape design into all park zones	Bioswales, rain gardens, green corridors, nature-based stormwater management	D3, D4, D10, D14, D20 (n=5)	4.592	0.690
R - Recreation Zones	Provide diverse spaces for active and passive leisure, including equipment	Multi-use courts, jogging tracks, fitness stations, picnic areas, play equipment	A1, A2, A3, A5, A7, A8, A11, A13, A14 (n=9)	4.528	0.795
E - Engagement & Community	Foster social inclusion through consultation and participatory governance	Stakeholder consultation, participatory management, resident programming input	C1, C2, C7 (n=3)	4.514	0.664
E - Environmental Stewardship	Maintain ecological integrity and resource efficiency	Composting, waste-sorting, water-efficient landscaping, energy-efficient lighting	D5, D6, D7, D8, D11, D12, D15, D16, D21, C3, C12 (n=11)	4.582	0.613
N - Navigation & Accessibility	Ensure ease of movement for all user groups	Wayfinding signage, ramps, tactile paths, accessible routes and entrances	C6, C9, C10, C11 (n=4)	4.464	0.681
S - Safety & Security	Maintain safe environments through design and management	CCTV, adequate lighting, emergency call points, visible staff	A4, A6, A9, A10, A12 (n=5)	4.548	0.735
C - Cleanliness & Hygiene	Uphold high sanitation and maintenance standards	Regular maintenance schedules, prompt repair of damaged facilities	B3, B6 (n=2)	4.543	0.390
A - Amenities	Provide	Seating, drinking water,	B1, B2, B4, B5, B7, B8	4.490	0.769

& Facilities	supporting services that enhance park visit quality	shade, toilets, retail kiosks, event spaces	(n=6)		
P - Participation & Programming	Organise structured activities promoting physical and social well-being	Community events, cultural activities, youth and community-group programming	C4, C5, C8 (n=3)	4.532	0.639
E - Ecological Scape	Design the landscape to be aesthetically and ecologically functional	Native planting, tree canopy and shade, biodiversity-supporting planting	D1, D2, D9, D13, D19 (n=5)	4.582	0.762
S - Smart Management	Leverage digital tools to improve operational efficiency	Digital park-management systems, digital maintenance-feedback channels	D17, D18 (n=2)	4.569	0.504

The term GREENSCAPES is interpreted as follows: "green" stands for the ecological and environmental centre of the design, and "scapes" stands for the management of landscape and the design of park space; combined, the term denotes the integration of environmental and design management with the well-being of the community of park users.

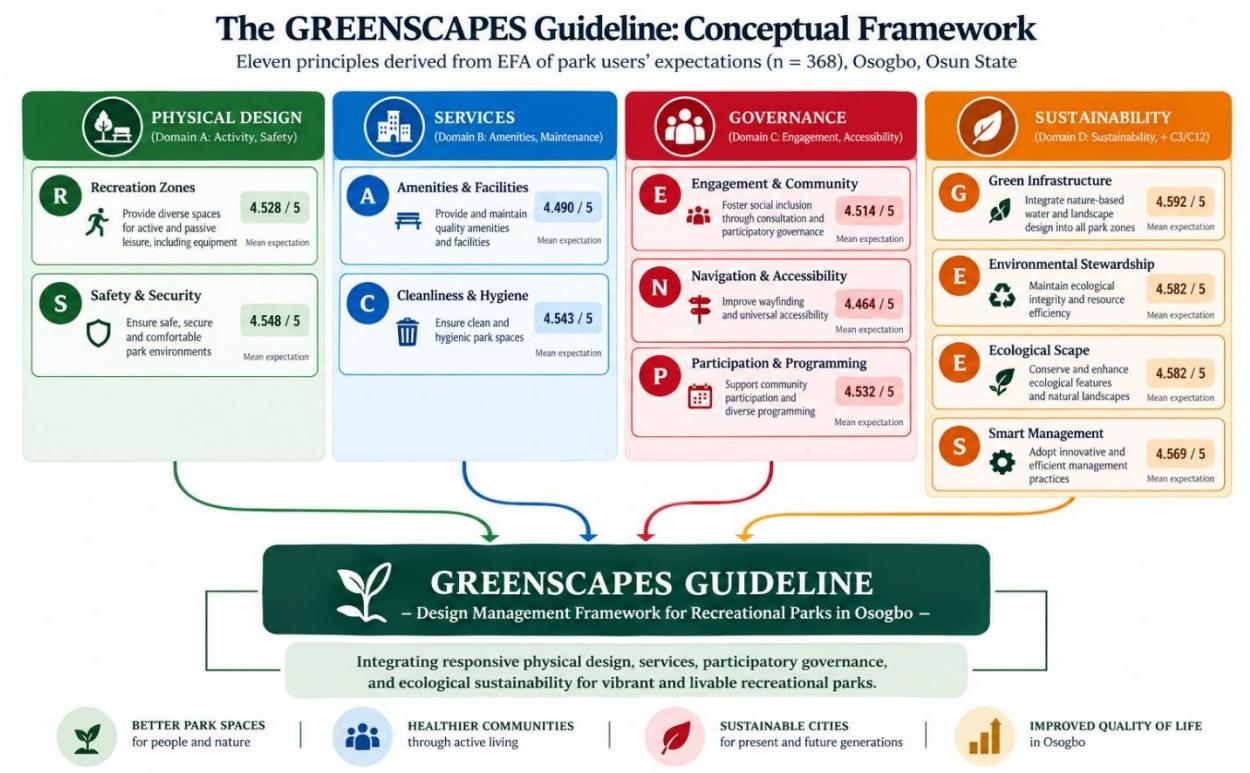


Figure 1: Illustrates how the eleven GREENSCAPES principles cluster under the Physical Design, Services, Governance, and Ecological/cross-cutting dimensions, with mean expectation scores computed directly from the 368-respondent dataset.

(1) Physical: Allocating Appropriate Spaces and Facilities for Park Activities

The study of recreational park design shows the importance of allocating recreation zones, safety infrastructure, and, as detailed, dedicated ecological space. The results reveal that park users of Osogbo want different spaces for active and passive recreation: active recreation items (fitness and exercise spaces, jogging and walking spaces, multi-purpose recreation areas) and passive recreation items (spaces for passive recreation and relaxation, family-oriented recreational spaces) both loaded on the same Recreation Zones factor, together with equipment adequacy and children's play provision. As per Xu et al. [7], among park users of different backgrounds, the order of importance of design elements is dominated by cleanliness and

maintenance - an observation of the relationship between the physical aspect of the space and its users, consistent with the strong expectation scores this study finds for Cleanliness & Hygiene (mean = 4.543) and Ecological Scape (mean = 4.582).

The study also emphasises the importance of maintaining park infrastructure and equipment for the user experience: Equipment (A2) was the single highest-scoring item-level construct in the physical design domain (mean = 4.595), and safety-related items - adequate lighting, visible security personnel, emergency facilities - clustered into a well-defined Safety & Security factor ($\alpha = 0.735$, mean = 4.548). Tran and Giles-Corti [6] confirmed, via systematic review, that well-designed, safe, and physically maintained park spaces are among the greatest determinants of park usage and physical activity within parks, consistent with the uniformly high expectation scores recorded here.

(2) Services: Providing Adequate Facilities and Maintenance for Park Users

The results indicate that park users in Osogbo have high demands for the provision of amenities and facilities and for the management of cleanliness and hygiene, indicating that parks need to operate as full-service environments supporting all user activities from active recreation to social relaxation. Respondents expected adequate recreational amenities, such as toilet facilities, drinking water, shade structures, seating, and food-and-beverage kiosks (mean = 4.490).

Maintenance was rated marginally higher than amenities provision, with an expectation score of 4.543, consistent with Au-Yong et al. [5], who found maintenance to be one of the two most important factors, alongside core amenities, explaining satisfaction with park services. In Osogbo, parks should implement regular cleaning and repair schedules, provide adequate waste collection points, and maintain teams that respond promptly to reported service failures - whose local feasibility is discussed further in subsection (5) below.

(3) Governance: Engaging the Community and Ensuring Inclusive Management

The results show that recreational park users value Community Engagement, Accessibility, and Participation in relation to park governance, demonstrating that management frameworks should be participatory, inclusive, and forward-looking. Engagement of the community through consultation on park development and stakeholder participation in management and programming shows a high expectation average of 4.514, in agreement with findings from recent African park research linking community engagement and accessibility to overall well-being outcomes [10], [16], and with Olatunji et al. [18], that participatory governance promotes social capital and community cohesion. A related but conceptually distinct construct, Participation & Programming community events, cultural activities, and youth/community-group involvement - recorded the highest mean expectation among the three community-facing governance principles (mean = 4.532), underscoring that Osogbo residents want not only to be consulted, but to actively take part in structured park activities.

Navigation & Accessibility - physically and socially inclusive access for all residents regardless of age, economic status, or mobility, including accessible pathways, ramps, tactile wayfinding aids, and signage - recorded the lowest mean score among the eleven GREENSCAPES principles (mean = 4.464), though still high in absolute terms. This is discussed further in relation to Nigeria's broader accessibility infrastructure deficits.

(4) Sustainability: Integrating Ecological Design, Stewardship, and Smart Management

Reflecting the depth of the dedicated 21-item environmental sustainability domain , the GREENSCAPES Guideline resolves this domain into three distinct principles. Green Infrastructure (mean = 4.592, the highest-scoring principle in the guideline) reflects users' expectations for nature-based water and landscape management - rainwater managed through nature-based measures, reduced stormwater runoff, and green corridors connecting ecological areas - which loaded together as a coherent factor (Factor 3) distinct from vegetation and biodiversity provision. Ecological Scape (mean = 4.582) captures that vegetation, biodiversity, and canopy-cover dimension directly (Factor 1): native planting, tree canopy and shade, biodiversity-supporting planting, and protection of soil and landscape resources. Environmental Stewardship (mean = 4.582, based on the largest single item pool of any principle, 11 items) consolidates resource efficiency, waste management, energy efficiency, and governance-level environmental commitment into a single broad stewardship principle.

Smart Management (mean = 4.569) is the narrowest and most technologically specific of the eleven principles, comprising only the two items that empirically and cleanly separated from the other environmental-sustainability factors: digital systems supporting park management, and digital channels for maintenance feedback. Its comparatively low reliability ($\alpha = 0.504$) reflects its two-item composition rather than weak underlying loadings (both items loaded above 0.80), and is addressed as a limitation.

(5) Adapting International Best Practice to the Osogbo Context

While the GREENSCAPES principles draw on design criteria validated internationally - for example, the emphasis on cleanliness echoing Xu et al.'s [7] finding that this was the single most important design criterion across a broader international sample - this study cautions against directly importing international best-practice benchmarks without local adaptation. International design standards are frequently calibrated to

municipal budgets, workforce capacity, and regulatory enforcement mechanisms that are not currently available to park managers in Osogbo. The Maintenance principle's high mean expectation (4.543) alongside its below-threshold reliability illustrates this tension directly: users clearly and strongly want prompt repair and regular upkeep, but the instrument's current two-item measurement of this construct does not yet capture the full range of what "adequate maintenance" means operationally in a resource-constrained Nigerian municipal context. We recommend that park managers treat aggressive service-level targets (e.g., very short repair-response windows) as aspirational, to be phased in - for example, beginning with the highest-footfall zones of each park rather than as immediately mandatory standards, with future implementation research empirically testing achievable response times given current municipal and private-operator capacity.

Similarly, Smart Management solutions such as sensor-based maintenance monitoring and digital feedback systems (Table 10) presuppose a level of digital and electrical infrastructure not uniformly available across Osogbo's parks. That this construct emerged as the most narrowly and cleanly defined factor in the entire sustainability domain separate even from energy-efficiency items suggests Osogbo park users already conceptually distinguish "digital/smart" tools from broader environmental practice, and that these two aspects of park management can reasonably be implemented on separate timelines: environmental stewardship and ecological-scape measures can proceed without waiting for digital infrastructure investment.

Finally, the significant park-typology difference found for environmental sustainability expectations ($F = 6.02$, $p = .003$) has a direct implication for implementation: rather than applying uniform ecological targets across all three park typologies, park managers should calibrate ecological intervention intensity to each site's baseline lighter-touch conservation-oriented management at heritage/ecological sites such as the Sacred Grove, and more intensive green-infrastructure retrofitting at built, commercially-operated sites such as Bristol Family Fun Park. Several GREENSCAPES principles also carry potential for tension in implementation: Safety & Security measures such as CCTV and increased artificial lighting can conflict with Ecological Scape and Environmental Stewardship objectives, since dense vegetation supports biodiversity and shade but can reduce natural surveillance, while extensive night lighting can disrupt nocturnal wildlife. Similarly, expanding Participation & Programming to meet the strong user demand identified increases footfall and physical wear, which can conflict with conservation objectives, particularly at the Osun-Osogbo Sacred Grove, where cultural-heritage conservation values add a further layer of constraint. We recommend that park managers address these tensions through spatial zonation - designating specific zones for high-activity programming versus low-disturbance ecological conservation within the same park an approach broadly consistent with zonation strategies used in comparable dual-purpose green-space management contexts elsewhere [11].

4. CONCLUSION

Although useful, this study has several limitations, several of which are now grounded in direct empirical evidence from the analysis rather than being purely anticipated concerns. First, the study considers only park users in the Osogbo metropolitan zone; results may not generalise to users of parks in other Nigerian cities or other cultural contexts. Second, data were collected through a cross-sectional, self-reported survey design that captures park users' expectations at a single point in time; the findings therefore reflect a snapshot rather than how expectations may shift with seasonal use patterns, park investment, or broader urban change, and cannot establish causal relationships between park attributes and outcomes such as usage or well-being. Third, self-report data carries potential response bias and social-desirability effects. Fourth, several factors identified through EFA showed internal-consistency reliabilities below the conventional $\alpha = 0.70$ threshold despite strong individual item loadings: Maintenance (B3, B6; $\alpha = 0.390$), the governance-level Sustainability factor (C3, C12; $\alpha = 0.562$), and the Smart Management factor (D17, D18; $\alpha = 0.504$) in particular should be interpreted with caution as psychometric constructs, and their item pools should be expanded in future revisions of the instrument. Fifth, the environmental sustainability domain produced five empirical factors rather than the three hypothesised at instrument design; while these were transparently synthesised into three GREENSCAPES principles on conceptual grounds, an independent-sample Confirmatory Factor Analysis is needed to establish whether this synthesised structure, rather than the fuller five-factor structure, is the more defensible representation of the underlying construct space. Sixth, the instrument's content validity rests on a triangulated development process (VMT mapping, literature review, and field consultation) rather than on a separately documented, pre-registered pilot study, which is recommended for future revisions of the instrument. Finally, direct observation techniques, post-occupancy evaluations, and interviews with park management were not used in this phase of the research, and may have offered additional depth and a richer understanding of the dimensions of recreational park management.

The GREENSCAPES Guideline offers a way to create and manage recreational parks in Osogbo, Osun State, that balances the physical, social, ecological, and governance needs of urban residents. Its physical design principles Green Infrastructure, Recreation Zones, Ecological Scape, Safety and Security, and Amenities and Facilities suggest the creation of safe, well-maintained, and activity-stimulating environments responsive to the community's recreational needs. Its service-provision principles of Cleanliness and Hygiene and Smart

Management suggest that parks should be well-managed, high-quality public resources. Its governance principles of Engagement and Community, Environmental Stewardship, Navigation and Accessibility, and Participation and Programming suggest the use of inclusive, participatory, and environmentally responsible management systems. Across all eleven principles, mean expectation scores ranged narrowly from (Navigation & Accessibility) to (Green Infrastructure) on the 0–5 scale evidence that Osogbo park users hold uniformly high expectations across every dimension of park design and management assessed, rather than prioritising any single dimension strongly over the others.

This research offers three main contributions. At the conceptual level, the GREENSCAPES Guideline extends EFA-based park-framework development previously applied predominantly in Malaysian, Chinese, and other non-African to a Nigerian secondary-city setting, contributing an empirically-grounded, locally-adapted design and management framework, built from a 55-item, four-domain instrument with confirmed sampling adequacy and factor structure in every domain, to the still-limited literature on urban green infrastructure in sub-Saharan African secondary cities. At the practical level, it provides park managers, urban planners, private investors, and public authorities in Osogbo with an evidence-based design and management template, including explicit guidance on which principles require typology-sensitive implementation. At the advocacy level, the findings can support park users and community organisations in articulating design and maintenance expectations to local authorities, grounded in systematically collected evidence rather than anecdote.

Future research should prioritise empirical validation of the GREENSCAPES Guideline itself, which this study did not test in an implementation setting. Three specific validation pathways are recommended. First, Confirmatory Factor Analysis (CFA) of the eleven-principle structure using an independent sample of park users - ideally including users from parks outside the three sampled here - to assess whether the synthesised eleven-principle structure, or the fuller thirteen-factor empirical structure identified provides a better-fitting representation of the underlying construct space, and to re-examine the reliability of the Maintenance, governance-level Sustainability, and Smart Management factors with an expanded item pool. Second, a structured expert/stakeholder validation exercise (e.g., a Delphi process or structured workshop with park managers, urban planners, and community representatives) to assess the practical implementability of each principle's specific recommendations. Third, a pilot implementation study in one Osogbo park, applying a subset of GREENSCAPES recommendations and evaluating changes in user satisfaction, usage rates, and maintenance outcomes over a defined period, to test the guideline's real-world effectiveness before wider roll-out across Osogbo and comparable Nigerian secondary cities. Given the significant park-typology difference found for environmental sustainability expectations, this pilot work should explicitly compare implementation outcomes across heritage/ecological, civic, and commercial park typologies rather than assuming uniform effects.

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