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Research Article:

The Effect of Green Spaces in Gated Communities on Residents' Social Actualization, Sulaymaniyah City as a Case Study

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Abstract

This study examines how the hierarchical structure of green spaces within gated communities influences residents' social actualization. The research focuses on Slemani Heights in Sulaymaniyah City and adopts a mixed-methods approach combining spatial audit, graphic analysis, and a structured questionnaire survey (n = 272). Green spaces are categorized into central and pocket types to evaluate their differentiated spatial and social roles. Urban design quality is assessed through a checklist based on established planning criteria. At the same time, residents' social actualization is operationalized as a multidimensional construct including social interaction, sense of belonging, trust, well-being, collective identity, and residential satisfaction. Statistical analysis, including ANOVA, is used to examine variations across spatial conditions. The findings indicate that pocket green spaces are more strongly associated with everyday social outcomes such as trust, belonging, and satisfaction due to their proximity and frequent use. In contrast, central green spaces contribute primarily to collective identity and shared experience, with effects dependent on accessibility and spatial integration. The study is limited by its reliance on self-reported data and a single case study, and the findings should therefore be interpreted as context-specific.

1. Introduction

Urban green spaces are widely recognized as essential components of the built environment, contributing to environmental quality, public health, and social life (Jacobs, 1961; Lynch, 1960; Gehl, 2011). Beyond their ecological and aesthetic roles, green spaces play a critical function in shaping social interaction, emotional well-being, and community cohesion (Chiesura, 2004). However, contemporary research increasingly demonstrates that the benefits of green spaces are not uniform, but depend on their spatial configuration, accessibility, and integration within the urban structure (Giles-Corti et al., 2016; Kabisch et al., 2017). Within this perspective, the concept of green-space hierarchy has gained growing importance in urban design and planning research, recognizing

that different types and scales of green spaces perform distinct social functions (Whyte, 1980; Carmona et al., 2010). Larger central green spaces often function as collective and symbolic nodes that support organized activities and shared identity, whereas smaller pocket green spaces operate at the neighborhood scale, facilitating routine interaction, informal encounters, and everyday social contact (Talen, 2010; Kuo et al., 1998). Recent empirical research further confirms that different types of green spaces contribute differently to social and psychological outcomes. Zhao et al. (2024), using a structural equation modeling approach, demonstrate that urban parks, neighborhood open spaces, and private gardens have distinct relationships with individuals' subjective well-

being, emphasizing the importance of spatial scale and typological diversity. Similarly, studies indicate that residents interact more frequently with proximate, everyday green spaces embedded within residential environments, as these spaces are integrated into daily routines and require minimal effort to access (Sugiyama et al., 2008; Francis et al., 2012; Peters et al., 2010). These findings suggest that the social performance of green spaces depends not only on their presence but on their type, scale, and spatial distribution within the residential system, reinforcing the importance of examining green-space hierarchy rather than treating green spaces as homogeneous entities. This issue becomes particularly critical in gated communities, where green spaces form an internalized and controlled spatial system rather than part of an open urban network. Due to restricted access, defined boundaries, and the internalization of amenities, residents' daily activities and social interactions are largely structured within the community itself (Blakely & Snyder, 1997; Low, 2003). Previous studies suggest that social outcomes in gated communities are influenced more by the configuration of internal spaces than by access control mechanisms (Atkinson & Blandy, 2005). In this context, shared green spaces act as primary arenas for outdoor activities, casual encounters, and community life, with their spatial quality and accessibility shaping patterns of familiarity, interaction, and social cohesion (Peters et al., 2010; Wu, 2010). Despite the growing body of research on green spaces and gated communities, a critical gap remains in understanding how different levels of green spaces within gated residential environments contribute differently to social outcomes. Most existing studies treat green spaces as homogeneous entities or focus on general accessibility, with limited attention to the comparative roles of central and pocket green spaces within a unified spatial system. Furthermore, the relationship between green-space hierarchy and higher-order social processes—such as residents' social actualization—remains underexplored. Drawing on the concept introduced by Corey Keyes, social actualization is understood in this study as the realization of social potential through interaction, belonging, trust, and shared experience within a specific socio-spatial

context. While the concept has been extensively theorized at a macro-social level, its spatial dimension—particularly within everyday residential environments—has received limited empirical attention (Manzo & Perkins, 2006). Accordingly, this study moves beyond conventional green space perception research by examining how different types of green spaces—central and pocket—are perceived, accessed, and socially utilized within a gated residential environment. By focusing on the hierarchical structure of green spaces in Slemani Heights, the study provides a more nuanced understanding of how spatial scale and distribution influence residents' social actualization.

2. Literature Review

The concept of green areas has long occupied a central position in urban planning and design discourse, where such spaces are understood as integral components of residential environments rather than supplementary amenities. Urban green areas are commonly defined as open spaces dominated by vegetation and intentionally integrated into the urban fabric to support recreational, environmental, and social functions (Carmona et al., 2010). These spaces include large public parks, neighborhood gardens, landscaped corridors, and smaller pocket green spaces embedded within residential developments. Beyond their ecological and climatic roles, scholars increasingly emphasize that green areas operate as social environments that facilitate interaction, promote psychological restoration, and support everyday social life (Kaplan & Kaplan, 1989; Chiesura, 2004). Within residential contexts, green areas function as transitional spaces between private and collective realms. Gehl (2011) argues that such semi-public environments play a decisive role in shaping patterns of optional and social activities, providing settings for lingering, observing, and low-pressure interaction. Empirical studies consistently show that proximity to green areas increases outdoor presence and casual encounters, strengthening social ties and reinforcing a sense of belonging (Sugiyama et al., 2008; Maas et al., 2009). More recent research further highlights that green spaces act as critical social infrastructures, supporting resilience, well-being, and everyday social interaction (Klinenberg, 2018; Giles-Corti et al., 2016). As urban green systems evolve,

increasing attention has been given to their classification according to scale and function. Green spaces are widely understood to form a hierarchical system ranging from city-level parks to neighborhood green spaces and small pocket greens embedded within residential blocks (Barton et al., 2010; Carmona et al., 2010). This hierarchy is not only spatial but also social, as different scales support different patterns of use, duration, and interaction. Large, central green areas often function as multifunctional destinations, while smaller spaces support frequent, routine use and localized social contact (Whyte, 1980; Talen, 2010). Recent empirical evidence reinforces the importance of this distinction. Zhao et al. 2024 urban green spaces well-being study demonstrates that different types of green spaces—including urban parks, neighborhood open spaces, and private gardens—have distinct relationships with subjective well-being, emphasizing the importance of spatial scale and typological diversity. These findings suggest that the distribution and diversity of green spaces within residential environments are critical determinants of their social performance. Research consistently indicates that differences in scale produce distinct social outcomes. Central green spaces are associated with collective activities, symbolic representation, and community identity (Lynch, 1960; Chiesura, 2004), whereas pocket green spaces—due to their proximity and familiarity—are more closely linked to everyday interaction, trust-building, and informal neighborly relationships (Kuo et al., 1998; Peters et al., 2010). Understanding this distinction is essential for evaluating residential environments in which multiple green-space types coexist. Gated communities represent a distinctive residential form in which the role of green areas becomes especially pronounced. Characterized by controlled access, defined boundaries, and internalized amenities, gated communities often reduce engagement with the surrounding public realm and concentrate social life within internal spaces (Blakely & Snyder, 1997; Low, 2003). In such contexts, internal green areas frequently substitute for public parks, becoming primary settings for outdoor activity, leisure, and social interaction (Low, 2003). Research suggests that the social performance of gated communities is

influenced more by the configuration and quality of internal spaces than by access control mechanisms alone (Atkinson & Blandy, 2005). Well-designed and accessible green areas encourage residents to spend time outdoors, encounter one another, and develop informal social ties (Wu, 2010). The effectiveness of these spaces is closely tied to spatial characteristics rather than mere provision. Scale influences activity type and duration: larger spaces tend to support diverse activities but are destination-oriented, whereas smaller spaces are used more frequently as part of daily routines (Chiesura, 2004; Gehl, 2011). Proximity is particularly critical, with studies indicating that green spaces within 300–500 meters walking distance are more likely to support regular use and social interaction (World Health Organization, 2017; Barton et al., 2010). Accessibility and connectivity further shape social outcomes. Carmona et al. (2010) emphasize that multiple access points, pedestrian continuity, and visual permeability increase both usage and social presence. Additionally, visibility and enclosure influence perceived safety, as highlighted by Jacobs' (1961) concept of "eyes on the street" and Newman's (1972) defensible space theory. These spatial qualities are particularly significant in gated communities, where internal green spaces serve diverse users across time. Green spaces operate within hierarchical systems, ranging from large central parks to smaller neighborhood and pocket spaces, each fulfilling distinct spatial and social roles (Whyte, 1980; Carmona et al., 2010). Central green spaces typically function as collective nodes, supporting organized activities, events, and shared identity (Chiesura, 2004). In contrast, smaller spaces such as pocket parks operate at the micro-scale, facilitating routine interaction, informal encounters, and everyday social contact (Talen, 2010; Kuo et al., 1998). Recent empirical evidence reinforces this distinction. Zhao et al.'s 2024 urban green spaces well-being study demonstrates that different types of green spaces—urban parks, neighborhood open spaces, and private gardens—have distinct relationships with subjective well-being, highlighting the importance of spatial scale and typological diversity. These findings suggest that the distribution and diversity of green spaces within residential environments are critical

determinants of their social performance. The concept of social actualization originates from the framework of social well-being developed by Corey Keyes, where it is defined as one of five dimensions reflecting individuals' beliefs about the potential, development, and trajectory of society (Keyes, 1998). In this formulation, social actualization operates at a macro-social and cognitive level, focusing on how individuals perceive society as evolving positively over time. However, this conceptualization does not directly address localized socio-spatial contexts such as residential environments, where social experience is shaped by everyday interaction and spatial conditions. To address this limitation, the present study adopts an interpretive adaptation of Keyes' concept, translating it from a macro-level perception of society to a micro-scale, place-based process. In this adapted form, social actualization is understood not as an abstract belief about societal development, but as a lived socio-spatial experience through which individuals realize their social potential within their immediate residential environment, and the theoretical Integration of residents' social actualization in this study is further conceptualized through the integration of motivational, relational, and spatial theories, providing a coherent explanation of how social potential is realized within residential environments. From a motivational perspective, Abraham Maslow explains that human development occurs through the progressive satisfaction of needs, where social belonging, esteem, and self-development depend on interaction and supportive environments (Maslow, 1954; Deci & Ryan, 2000). This positions social actualization as a developmental process rather than a static condition. From a relational perspective, Social Exchange Theory explains that social relationships emerge through repeated interaction, where trust, cooperation, and social bonds develop based on reciprocity and mutual benefit (Homans, 1958; Blau, 1964; Cook et al., 2013). This provides the mechanism through which social actualization is produced, linking spatial use to social outcomes. From a spatial perspective, the Capability Approach emphasizes that individuals' ability to achieve well-being depends on the opportunities provided by their environment (Sen, 1999; Nussbaum, 2011). In this sense, the built environment—particularly the accessibility and distribution of green spaces—plays a critical role in enabling or constraining social interaction and participation (Carmona, 2019). By integrating these perspectives, residents' social

actualization is understood as a socio-spatial process, where spatial conditions enable interaction, interaction fosters trust and belonging, and these processes collectively support the realization of social potential within the residential environment. As illustrated in Figure (1), residents' social actualization is conceptualized as a sequential socio-spatial process in which environmental conditions enable interaction, interaction fosters trust and belonging, and these processes collectively support the realization of social potential, based on all above social actualization is a dynamic process through which residents realize their social potential as shown in figure (2). Urban green spaces are widely recognized as essential components of sustainable urban environments, contributing to physical health, psychological well-being, and social interaction. Empirical studies demonstrate that access to green spaces is associated with reduced stress, improved mental health, and enhanced social cohesion (Maas et al., 2009; Sugiyama et al., 2008; Giles-Corti et al., 2016). Beyond environmental benefits, green spaces function as social environments that support interaction, encounter, and community engagement (Gehl, 2011; Francis et al., 2012). Recent research emphasizes that the social effectiveness of green spaces depends not only on their presence but on their accessibility, proximity, and spatial configuration. Spaces located within walking distance and integrated into daily routines are more frequently used and have a stronger influence on social interaction and well-being than larger, less accessible parks (Peters et al., 2010; Francis et al., 2012). Within gated communities, the distinction between central and pocket green spaces becomes particularly significant, as different spatial scales are associated with different patterns of use and social outcomes (Carmona et al., 2010; Talen, 2010). Central green spaces typically function as symbolic and collective environments, supporting shared activities, community events, and the formation of collective identity (Lynch, 1960; Chiesura, 2004). Due to their scale, visibility, and spatial prominence, these spaces act as primary social and recreational cores within gated communities, enabling both planned and spontaneous interactions (Blakely & Snyder, 1997; Low, 2003; Gehl, 2011). Previous studies indicate that large, centrally located green spaces support diverse forms of social engagement and contribute to broader social outcomes such as collective identity, sense of

belonging, and community cohesion (Chiesura, 2004; Francis et al., 2012). In particular, these spaces facilitate weak-tie interactions—casual encounters among a wide range of users—which play a critical role in strengthening community-wide social networks (Granovetter, 1973; Putnam, 2000). However, their effectiveness is strongly influenced by accessibility and spatial integration, as larger spaces are often destination-oriented and less frequently embedded in everyday routines (Gehl, 2011; Giles-Corti et al., 2016). In contrast, pocket green spaces represent small-scale green areas embedded within residential blocks, designed for frequent, informal, and proximity-based use (Whyte, 1980; Nordh et al., 2009). Due to their closeness to residential units, these spaces are more directly integrated into daily life, supporting routine activities such as brief encounters, children’s play, and casual interaction among neighbors (Peters et al., 2010). Empirical research demonstrates that proximity enhances repeated exposure and familiarity, which are essential mechanisms for trust development and social bonding (Kuo et al., 1998; Sullivan et al., 2004). From a socio-relational perspective, these repeated low-intensity interactions align with Social Exchange Theory, which emphasizes reciprocity, familiarity, and repeated contact as key conditions for the formation of social relationships (Homans, 1958; Blau, 1964). As such, pocket green spaces play a particularly important role in facilitating everyday social interaction, trust-building, and the development of localized social networks. Recent empirical research further reinforces the importance of distinguishing between different types of green spaces. Zhao et al. (2024) demonstrate that urban parks, neighborhood open spaces, and private gardens exhibit distinct relationships with subjective well-being, indicating that spatial scale and typological diversity significantly influence how green spaces are experienced and valued. Similarly, studies show that proximity and integration into daily movement patterns are key determinants of green space use and social engagement (Sugiyama et al., 2008; Francis et al., 2012). Taken together, these findings suggest that different types of green spaces contribute differently to social life. While central green spaces primarily support collective identity,

weak-tie interaction, and community-wide engagement, pocket green spaces play a more significant role in everyday social interaction, trust formation, and neighborhood-level social bonding (Chiesura, 2004; Peters et al., 2010). This distinction is particularly important in gated communities, where internal spatial configuration determines the structure of daily social experience, and where the distribution of green spaces directly influences opportunities for interaction, participation, and the development of social relationships (Atkinson & Blandy, 2005).

3. Research Problem, Aim, and Hypothesis

In the case of Sulaymaniyah City, the green urban spaces found in the city's gated communities are recognized as being essential to the urban residential design, although the social role of such green urban spaces is not always well understood, especially in relation to the role of the internal green urban space typologies in the social lives of the residents of the city's gated communities. In most of the city's gated communities, the focus of urban residential design is often centered on the central green spaces, while the pocket green spaces are often overlooked, despite their importance to the city's residents' urban residential activities. This study attempts to bridge the gap in our understanding of how these green spaces within the city's gated communities really affect the social actualization of their inhabitants. Its primary intent is to assess how these green spaces within gated communities affect the social actualization of their inhabitants, as perceived by the inhabitants. Slemani Heights will be used as a case study. This investigation will test the hypothesis that the pocket green areas influence residents' social actualization more than central green spaces inside gated communities. The hypothesis validity shown in table 7.

4. Research Methodology

4.1 Research Design

This study adopts a mixed-methods research design, integrating qualitative spatial analysis and quantitative survey methods to examine the relationship between green-space hierarchy and residents' social actualization within gated communities. This approach is appropriate because the research problem involves both objective spatial conditions and subjective social outcomes, requiring the combination of physical evaluation and residents' perception data. The study is structured along two complementary lines of inquiry:

- (1) spatial assessment of green spaces, and
- (2) measurement of residents' social responses.

4.2 Case Study Selection

The case study selected for this research is Slemani Heights, a gated residential development in Sulaymaniyah City. The case was chosen due to its clearly defined internal spatial structure, the presence of both central and pocket green spaces, and its relevance as a representative example of contemporary gated communities in the region. Previous research has identified Slemani Heights as a high-quality gated community based on its spatial organization and level of service provision (Demir & Mukhlis, 2017). This classification provides a strong empirical basis for its selection, as it represents a well-developed residential environment in which the relationship between urban design quality and social outcomes can be effectively examined. Accordingly, Slemani Heights offers an appropriate and relevant context for investigating how green-space hierarchy influences residents' social actualization within a controlled and structured residential setting, as shown in Figure (3).

4.3 Spatial Analysis and Checklist Evaluation

The first part of the study involved an evaluation of the physical quality of green spaces using a structured checklist derived from urban design and green-space quality literature (Carmona et al., 2010; Gehl, 2011). The checklist includes criteria related to accessibility, connectivity, spatial configuration, usability, and environmental quality. Two types of green spaces were assessed:

- Central green spaces
- Pocket green spaces

In addition, graphic spatial analysis was conducted using site plans to identify the distribution, size, and accessibility of green spaces. Observations were systematically recorded and coded based on predefined criteria, see Tables 1, 4, and 5.

4.4 Design Audit and Architectural Evaluation

The audit was conducted through systematic field observation and spatial analysis by the researcher. Site visits were carried out to assess each indicator based on direct observation, supported by site plans and photographic documentation. The Scoring and Rating System. Each sub-indicator was evaluated using a three-level rating scale:

- **Below expectation** → The feature is absent, poorly designed, or does not meet minimum functional standards
- **Meets expectation** → The feature is present and adequately supports its intended function
- **Exceeds expectation** → The feature demonstrates high-quality design, strong usability, and contributes positively to user experience

The thresholds for these categories were established based on:

- Urban design principles (Gehl, 2011)
- Public space quality frameworks (Carmona et al., 2010)
- Functional performance criteria (e.g., accessibility, usability, safety)

And as the audit was conducted by a single evaluator, specific measures were taken to reduce subjectivity:

- Use of a structured checklist with predefined criteria
- Consistent application of evaluation standards across all observations
- Cross-verification using site plans and photographic evidence

While inter-rater reliability could not be calculated, the use of standardized criteria ensures a reasonable level of consistency and transparency in the evaluation process.

4.5 Questionnaire Design and Data Collection

The second part of the study involved an online questionnaire survey administered using Google Forms. The questionnaire was designed based on established constructs of social actualization and related social outcomes identified in the literature.

The questionnaire included items measuring:

- Social interaction
- Trust
- Sense of belonging
- Social identity
- Well-being
- Residential satisfaction

Responses were recorded using a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree). A total of 272 responses were collected. After data cleaning, incomplete responses and cases with missing values were excluded, resulting in varying valid sample sizes across different analyses (e.g., 264, 223, 222). These variations are due to item non-response and listwise deletion applied during statistical analysis.

4.6 Validity and Reliability

To ensure the quality of the measurement instruments, the questionnaire was reviewed for content validity based on existing literature. Internal consistency was assessed using Cronbach's alpha, and exploratory analysis was conducted to confirm the coherence of the constructs, as shown in Table 6.

4.7 Data Analysis

Data analysis was conducted using SPSS. The study employed:

- **Descriptive statistics** → to summarize responses
- **Correlation analysis** → to examine relationships between variables
- **Regression analysis** → to test the influence of green spaces

- ANOVA → to compare differences between central and pocket green spaces
- Mediation analysis → to examine the role of residential satisfaction

These methods were selected to test the conceptual model linking green-space hierarchy (independent variable), residential satisfaction (mediator), and residents' social actualization (dependent variable).

5. Conceptual Framework

Building upon the theoretical foundations discussed in the literature review, this study develops a conceptual model that explains the relationship between urban green spaces and residents' social actualization within gated communities.

In this model, green spaces are conceptualized as the primary spatial independent variable (X), represented through the hierarchical structure of central and pocket green spaces. These spaces differ in scale, accessibility, and spatial integration, which influence how residents use and experience them in everyday life. The model assumes that the influence of green spaces on social outcomes is not direct, but occurs through socio-spatial processes. Specifically, the accessibility, distribution, and spatial qualities of green spaces shape opportunities for interaction, participation, and repeated encounters among residents. These processes form the underlying mechanisms through which social relationships are developed. Residential satisfaction is introduced as a mediating variable (M), reflecting residents' evaluation of their living environment and its ability to meet their social and spatial needs. Satisfaction represents the intermediate stage through which spatial conditions are translated into social outcomes. The dependent variable (Y) is residents' social actualization, which is operationalized through social outcome dimensions including social interaction, trust, sense of belonging, social identity, and well-being. These dimensions are treated as outcomes of socio-spatial interaction rather than independent constructs. Accordingly, the conceptual relationship tested in this study follows a structured pathway:

Green-space (X) → Residential satisfaction (M) → Residents' social actualization (Y) This relationship is understood as an indirect process in which spatial configuration influences social outcomes through patterns of use, interaction, and everyday experience, and this framework allows the study to move beyond descriptive analysis and examine the structural relationship between spatial design and social outcomes within gated residential environments.

5.1 Checklist-Based Quality Evaluation of Central Green Spaces

The quality of central green spaces was assessed through a structured checklist following existing urban design performance criteria related to public spaces (Carmona et al., 2010; Project for Public

Spaces, 2016). The checklist focuses on spatial qualities that have been found to have empirical relationships with social interaction and well-being outcomes. The assessment process is represented in Table 2: Central Green Spaces Quality Evaluation Checklist. The table includes an assessment of the following qualities:

- Accessibility & Connectivity: ease of movement and inclusiveness, identified as a significant predictor of use frequency (Barton et al., 2010; WHO, 2017).
- Safety & Security: including lighting, visibility, and security through natural surveillance that has a direct relationship with levels of social interaction (Jacobs, 1961; Newman, 1972).
- Amenities & Facilities: seating, shading, and play areas that encourage more time to be spent in the space, and more opportunities for social interaction to take place (Whyte, 1980; Gehl, 2011).
- Maintenance & Environmental Quality: cleanliness and freshness of the environment, which has a direct impact on the level of satisfaction that users experience (Nassauer, 1995; Carmona, 2019).

Each of these factors was analyzed using a standardized framework, which enables a side-by-side comparison of all case study site results. In addition to the checklist, a graphic analysis was also used to analyze spatial arrangement, visual permeability, and activity zones. This technique follows the spatial performance analysis techniques, which have been found to have a direct impact on spatial qualities (Marcus & Francis, 1998; Groat & Wang, 2013).

5.2 Checklist-Based Quality Evaluation of Pocket Green Spaces

The process of assessing pocket green spaces utilizes a parallel checklist to ensure consistency in the process while recognizing the distinct functions of these methods. The criteria for evaluating these green spaces are as follows, as shown in Table 3: Pocket Green Spaces Quality Evaluation Checklist:

- Proximity and distribution, particularly the importance of 'walking distance' and the layout of spaces, may influence their use more than we think (WHO, 2017; Barton et al., 2010).
- The importance of micro-amenity spaces such as 'benches,' 'shade,' and 'surface quality' for short-term use and socializing (Gehl, 2011; Nordh & Østby, 2013).
- The importance of 'visibility' and 'enclosure' for the perception of safety and 'watchfulness' (Jacobs, 1961; Newman, 1972).
- The relationship between 'maintenance' and 'usability' and 'care' and 'ownership' (Nassauer, 1995; Low, 2013).

Like the green spaces, the results obtained from the checklist will be supplemented by a graphical analysis of form, access routes, and activity nodes. This is similar to public space evaluation methods for urban neighborhoods (Marcus & Francis, 1998; Carmona et al., 2010).

6. Research Findings

6.1 Measurement Model and Validity

A Confirmatory Factor Analysis (CFA) model was employed to examine the measurement structure of residents' perceptions of green spaces and socio-spatial experiences in Sulaimani Heights. The observed variables were grouped into three latent constructs based on the theoretical framework and the expert-based architectural evaluation adopted in this study:

- Central Green (CGreen)
- Pocket Green (PGreen)
- Social Accessibility and Perceptual Legibility (SocAc)

The model demonstrated acceptable overall fit indices ($\chi^2/df = 2.271$, CFI = 0.91, AGFI = 0.85, RMSEA = 0.076). Although these values indicate an acceptable level of model fit, the results should be interpreted cautiously, particularly as the AGFI and RMSEA values fall within moderate rather than ideal ranges.

Within the CGreen construct, variables related to emotional comfort, experiential quality, and the lake area showed relatively strong factor loadings, suggesting that the central green space functions as an important experiential and symbolic element within the gated community. Within the PGreen construct, variables associated with maintenance quality, care, and satisfaction demonstrated coherent loadings, indicating the importance of smaller green spaces in shaping residents' everyday residential experience.

For the SocAc construct, observed variables related to walkability, legibility, environmental quality, and amenity recognition showed consistent loadings, suggesting that these dimensions collectively contribute to residents' socio-spatial perception of the environment. However, given the conceptual proximity between spatial perception and social experience, the CFA results are interpreted as supportive rather than conclusive evidence of construct validity. Overall, the CFA findings suggest that the proposed measurement structure provides an acceptable representation of the relationships among the observed variables and supports the methodological framework adopted in this study (Table 6:1).

6.2 Structural Model

Following the CFA phase, a Structural Equation Model (SEM) was estimated to examine the relationship between central green spaces, pocket green spaces, and residents' social actualization in Sulaimani Heights.

In this study, social actualization is interpreted as a socio-spatial outcome reflected through dimensions of interaction, trust, belonging, social identity, and environmental satisfaction. Spatial-perceptual variables such as walkability, legibility, and amenity accessibility were treated as environmental predictors rather than as components of the dependent construct in order to reduce conceptual overlap.

The structural model identified statistically significant positive relationships between both types of green spaces and residents' social actualization (Table 6.2). The path coefficient between Central Green Area and Social Actualization was statistically significant ($\beta = 0.40$, SE = 0.233, CR = 2.04, $p = 0.041$), indicating that improvements in the quality, accessibility, and experiential characteristics of the lake area are associated with higher levels of social actualization among residents.

Similarly, the relationship between Pocket Green Spaces and Social Actualization was positive and statistically significant, with a relatively stronger coefficient ($\beta = 0.55$, SE = 0.191, CR = 2.651, $p = 0.008$). This suggests that smaller green spaces located near residential areas may have a stronger association with everyday socio-spatial experiences. These findings generally align with the ANOVA results, which indicate that pocket green spaces are associated more strongly with trust, environmental awareness, and residential satisfaction, whereas the central green space demonstrates stronger symbolic and collective characteristics.

However, the SEM findings, as shown in figure (4) should be interpreted as exploratory rather than strictly confirmatory, given the moderate fit indices and the conceptual complexity of socio-spatial constructs.

6.3 The ANOVA results for pocket green areas

The ANOVA analysis for pocket green spaces indicates selective differences in residents' social perceptions and satisfaction according to the quality classification of pocket green areas (Table 9). The classifications of "meets expectation" and "exceeds expectation" are based on the structured design audit criteria presented in the methodology section. For SC16 ("I often notice familiar residents when using green spaces near my neighborhood"), no statistically significant difference was found between green spaces classified as meeting expectations ($M = 3.70$, $SD = 1.136$) and those exceeding expectations ($M = 3.87$, $SD = 1.037$), $p = 0.242$. This suggests that improvements in pocket green-space quality alone may not substantially increase casual social recognition among residents. In contrast, SC25 ("I pay attention to the condition and cleanliness of green spaces near my neighborhood") demonstrated a statistically significant difference ($p = 0.042$). Residents in areas with higher-quality pocket green

spaces reported greater levels of environmental awareness and attention to green-space condition ($M = 4.03$, $SD = 1.086$) compared to those in areas classified as meeting expectations ($M = 3.80$, $SD = 1.136$). A stronger effect was observed for SC37 (“Most residents can be trusted to look after the small green spaces near their homes”), where the difference between groups was statistically significant ($p = 0.005$). Residents in areas with higher-quality pocket green spaces reported higher levels of trust and perceived collective responsibility ($M = 4.02$, $SD = 1.078$) compared to residents in areas meeting expectations ($M = 3.58$, $SD = 1.082$). For SC45 (“After a long day, I prefer to walk through or along the green spaces near my home”), no statistically significant difference was identified ($p = 0.432$), although slightly higher mean scores were observed among residents in areas with higher-quality green spaces. Interestingly, SC55 (“The way people use green areas near their houses reflects shared community values”) showed a statistically significant difference ($p = 0.049$), though in the opposite direction than initially expected. Residents in areas classified as meeting expectations reported slightly higher agreement levels than those in areas exceeding expectations. This may indicate that moderate-scale and familiar spaces encourage more collectively regulated patterns of use. Finally, SC65 (“The quality of the small green spaces near my home has a positive impact on my satisfaction with living here”) revealed a statistically significant difference ($p = 0.045$), with residents in areas exceeding expectations reporting higher residential satisfaction. Overall, the findings suggest that pocket green spaces function less as destinations for intensive socialization and more as everyday socio-spatial environments that support environmental awareness, trust formation, and residential satisfaction, see figure (5).

6.4 The ANOVA results for the Central green space (Lake area)

The ANOVA results for the central green space (lake area) indicate that accessibility, visibility, and spatial integration influence residents’ perceptions and experiences of the central green environment (Table 8). It should be noted that zone-based differences in this study should be interpreted cautiously, as the zones also reflect differences in housing typology and density. Zone 2 consists primarily of apartment buildings, while Zones 1 and 3 consist mainly of lower-density housing areas. Therefore, observed differences may reflect both spatial accessibility and broader residential characteristics. For SC15 (“Shared spaces in the lake area encourage me to stop and spend time with others”), statistically significant differences were identified between zones ($p = 0.043$). Zone 3 reported the highest agreement levels, followed by Zone 2, while Zone 1 reported the lowest mean

values. This suggests that spatial proximity and visual exposure may influence the degree to which residents integrate the lake area into everyday social experience. A similar pattern was observed for SC24 (“The lake area feels like an important part of what makes this community feel like home”), where differences between zones were statistically significant ($p = 0.021$). Although Zone 2 is located at a greater overall distance from parts of the central green area, its direct pedestrian connections and visual accessibility to the lake appear to strengthen residents’ experiential relationship with the space. For SC36 (“I feel comfortable spending time in the lake area even when it is crowded”), the result approached statistical significance ($p = 0.050$). Residents in Zones 2 and 3 reported slightly higher comfort levels compared to Zone 1. However, given the borderline significance level, this result should be interpreted cautiously. No statistically significant differences were identified for SC44 (“The lake area provides a calming experience when walking or jogging”), SC54 (“While using the lake area, I feel a sense of togetherness with other residents”), or SC64 (“The lake area increases my satisfaction with living in this community”). These findings suggest that while accessibility and visibility influence the integration of central green spaces into residents’ daily experience, the broader experiential benefits of the lake area—such as calmness, togetherness, and residential satisfaction—are generally shared across the gated community once the space is used, see Figure (6)

7. Discussion

The findings of this study offer strong empirical support for the notion that green spaces can affect social life in gated communities through scale-dependent and accessibility-mediated means, not simply through their presence. The integration of expert architectural evaluation and residents’ perceptions and causal modeling has shown that social actualization is a product of the interaction among spatial configuration, proximity, and usability of green spaces. The findings on the central green space suggest that large green spaces used collectively can primarily serve symbolic functions, and social benefits can vary significantly depending on their physical and visual accessibility. Even though the lake area in Sulaimani Heights is architecturally prominent and has strong restorative benefits for its environment, the extent to which residents are willing to socialize and emotionally actualize this space depends on their zones of residence. This is consistent with previous studies on the use of public green spaces and how distance and physical effort significantly mediate the use of public green spaces even when their quality is rated high (Peters et al., 2010; Giles-Corti et al., 2005). The diminished relationship between social self-actualization and attachment, and the housing

locations further away from the lake, can be seen to relate to the concept of "distance decay" in the use of shared space, a phenomenon which has long been supported by research into urban space. However, the sense of shared experience of the calming atmosphere and social collectivity of the central green space is seen to transcend the location of the resident. This is consistent with environmental psychology research, which has found that the experience of the quality of a natural setting can provide universal benefits in terms of stress relief and renewal, provided the environment is of high quality (Ulrich et al., 1991; Hartig et al., 2014). The results therefore clearly indicate that the central green space is of high intrinsic quality, although the ability to invigorate is more related to accessibility, visibility, and topography than to the inherent quality of the space. In contrast, the pocket green areas near the residential units emerge as being particularly influential in the social actualization of the residents. The stronger structural effect of the pocket green areas is also in line with the previous findings that small, accessible, and visible green areas play a critical role in the development of social actualization (Kuo, Sullivan, Coley, & Brunson, 1998; Kazmierczak, 2013), as the experience of the pocket green areas is part of the routine experience, as opposed to the large central green areas that are often destinations rather than part of the routine experience. Moreover, ANOVA analysis revealed that the quality of the pocket green space indeed had a significant pull on the perception of collective care and satisfaction, even if not on the frequency of walking and/or the frequency of spontaneous social conversations. This is consistent with research indicating that green space on the neighborhood scale actually contributes to the development of social care and cohesion rather than driving and/or walking (Francis et al., 2012; Sullivan, Kuo, & DePooter, 2004). Most interestingly, the moderately designed pocket greenspace was found to have a stronger pull on the perception of collective values rather than the most elaborately designed ones, reminiscent of Jacobs' (1961) assertion that familiarity, repetition, and watchfulness are the keys to the maintenance of social order and harmony. The structural model demonstrates the connections between the variables, indicating that both central and pocket green spaces have a significant pull-on social actualization, but the latter has a stronger pull. This is in line with the present urban theories, which emphasize that the sustainability of the social does not depend upon the grand and monumental, but upon the quotidian and the micro-scale (Gehl, 2011). While central green space is important for collective identity and symbolic space, pocket green space is more of a micro-social catalyst that influences social outcomes through proximity, visibility, and repetition. These

results are also in line with Lynch's (1960) theories of legibility and mental mapping, as well as more recent empirical research confirming the benefits to residents of environments that are navigable, visually legible, and socially legible in terms of feelings of security, community, and actualization (Ewing & Handy, 2009; Brown, Perkins, & Brown, 2003). The socially actualized construct is the validated measure of this experience, integrating walkability, legibility, amenity recognition, and outdoor usability within the socio-spatial experience. The study contributes to the existing literature by providing empirical evidence that the hierarchy of green spaces within gated communities is important. The central green spaces and the pocket green spaces are not substitutes for each other; rather, they are mediated through distinct processes. This contributes to the existing research on urban green spaces, which typically treats the provision of green spaces as homogeneous (Maas et al., 2006; Wolch, Byrne, & Newell, 2014). From the perspective of the existing literature, the study challenges the assumption that gated communities are detrimental to social actualization. Instead, the study shows that the provision of green spaces within the urban environment can be used to actively promote social actualization. The study contributes to the existing methodological approach to the study of urban spaces by providing empirical validation of the expert architectural criteria against the experiences and outcomes.

8. Conclusions

- This study examined the relationship between green-space hierarchy and residents' social actualization within the gated community of Sulaimani Heights in Sulaymaniyah City. The findings suggest that green urban spaces influence residents' socio-spatial experiences not simply through their presence, but through their accessibility, proximity, visibility, and integration into everyday residential life.
- The study indicates that central and pocket green spaces perform different but complementary socio-spatial roles within the gated community. Central green spaces primarily support collective identity, restorative experience, and broader community-oriented social engagement. However, the extent to which residents socially integrate these spaces into daily life appears to be influenced by factors such as physical distance, topography, pedestrian accessibility, and visual connectivity.
- In contrast, pocket green spaces located near residential units demonstrated stronger associations with routine social interaction, trust formation, collective care, environmental awareness, and residential satisfaction. Rather than functioning as major destinations for movement or gathering, these smaller spaces appear to support everyday

socio-spatial interaction through repeated exposure, familiarity, and proximity-based use.

- In contrast, pocket green spaces located near residential units demonstrated stronger associations with routine social interaction, trust formation, collective care, environmental awareness, and residential satisfaction. Rather than functioning as major destinations for movement or gathering, these smaller spaces appear to support everyday socio-spatial interaction through repeated exposure, familiarity, and proximity-based use.
- At the same time, these findings should be interpreted within the specific context of the Sulaimani Heights case study. The observed differences between zones may also be influenced by housing typology, density, visibility, and residential morphology, in addition to green-space configuration. Therefore, the results are interpreted as socio-spatial associations rather than universal causal relationships applicable to all gated communities.
- From a practical perspective, the findings suggest that the social effectiveness of green spaces depends not only on their size or visual quality, but also on their integration into residents' everyday movement patterns. Improving pedestrian accessibility, minimizing steep ramps, strengthening visual connections, and ensuring the distribution of small usable green spaces near residential units may enhance the social role of green spaces within gated communities.
- The study also highlights that maintenance and cleanliness influence residents' perception and usability of green spaces, although the social vitality of these spaces depends more strongly on their responsiveness to everyday social practices and opportunities for interaction.
- Several limitations should be acknowledged. The study focuses on a single gated-community case study and relies partly on self-reported questionnaire data. In addition, the analysis did not fully control for housing type, demographic variation, or socioeconomic differences between zones. Future research could strengthen these findings through comparative studies across multiple gated communities, the use of advanced spatial metrics such as visibility and network analysis, and multivariable models capable of controlling for residential and demographic differences.

9. Recommendations

- Greater planning and design attention should be given to pocket green spaces near residential units by ensuring adequate distribution, accessibility, visibility, and usability through seating, shading, and activity-supporting elements.

- Central green spaces should be strengthened through improved pedestrian accessibility, clearer visual connections, and reduced physical barriers such as steep slopes or indirect routes to support their collective and integrative social functions.
- Green-space planning within gated communities should consider the complementary relationship between central and pocket green spaces rather than prioritizing only large landmark spaces.
- Future gated-community developments should integrate socio-spatial considerations, including walkability, visibility, and proximity-based interaction, as part of green-space planning and residential design strategies.

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تأثير المساحات الخضراء الحضرية في المجتمعات السكنية المغلقة على التحقق الاجتماعي للسكان: مدينة السلیمانیة كدراسة حالة

المستخلص

يبحث هذا البحث في كيفية تأثير البنية الهرمية للمساحات الخضراء داخل المجتمعات السكنية المغلقة على التحقق الاجتماعي للسكان. وتركز الدراسة على مشروع “سليمانى هايتس” في مدينة السلیمانیة، مع اعتماد منهجية بحثية تجمع بين التدقيق المكاني، والتحليل الجغرافي، والاستبيان المنظم للسكان (n = 272) وقد جرى تصنيف المساحات الخضراء إلى مساحات مركزية ومساحات جيبية بهدف تقييم أدوارها المكانية والاجتماعية المتميزة. كما تم تقييم جودة التصميم الحضري من خلال قائمة تدقيق تستند إلى معايير تخطيطية معتمدة. وفي الوقت نفسه، جرى تعريف التحقق الاجتماعي للسكان بوصفه مفهوماً متعدد الأبعاد يشمل التفاعل الاجتماعي، والشعور بالانتماء، والثقة، والرفاهية، والهوية الجمعية، والرضا السكني. واستخدمت الدراسة التحليل الإحصائي، بما في ذلك تحليل التباين (ANOVA)، لفحص الاختلافات المرتبطة بالظروف المكانية المختلفة. وتشير النتائج إلى أن المساحات الخضراء الجيبية ترتبط بصورة أقوى بالمرجات الاجتماعية اليومية، مثل الثقة والانتماء والرضا، نتيجة قربها وسهولة استخدامها المتكرر. في المقابل، تسهم المساحات الخضراء المركزية بصورة أساسية في تعزيز الهوية الجمعية والتجربة المشتركة، مع ارتباط تأثيرها بدرجة سهولة الوصول والتكامل المكاني. وتتمثل حدود الدراسة في اعتمادها جزئياً على البيانات الذاتية المصرح بها من قبل السكان، بالإضافة إلى اقتصرها على دراسة حالة واحدة، لذلك ينبغي تفسير النتائج ضمن سياقها المكاني والاجتماعي المحدد.

الكلمات المفتاحية:

المساحات الخضراء – التحقق الاجتماعي – المجتمعات المسورة – إدراك السكان

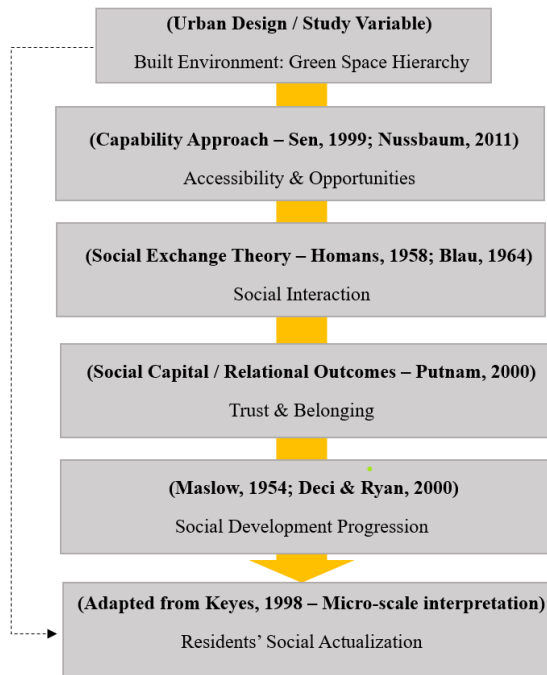


Figure 1: Integrated socio-spatial model of residents' social actualization showing theoretical layers from spatial conditions to social outcomes. Source (Researcher) based on Keyes (1998), Maslow (1954), Sen (1999), Homans (1958), and Putnam (2000)

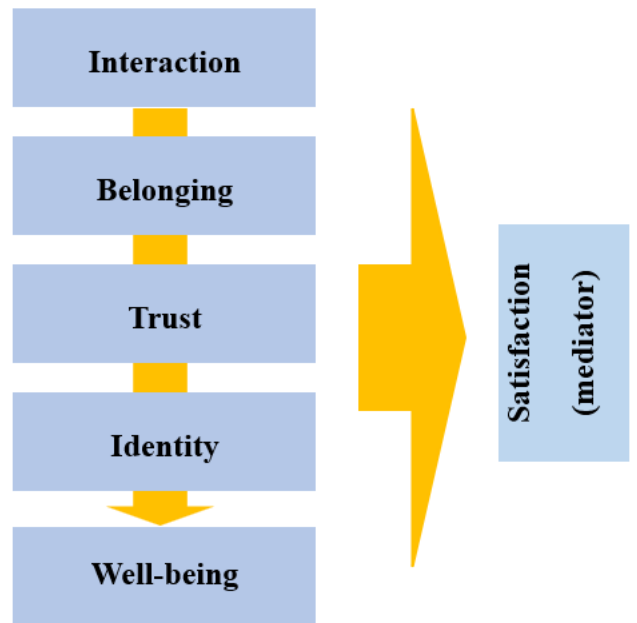


Figure 2: Process of residents' social actualization across social dimensions. Source (Researcher)



Figure 3: Slemani Heights site plan with zoning

Table 1: Graphic analysis for the case study and spatial design feature (Researcher)

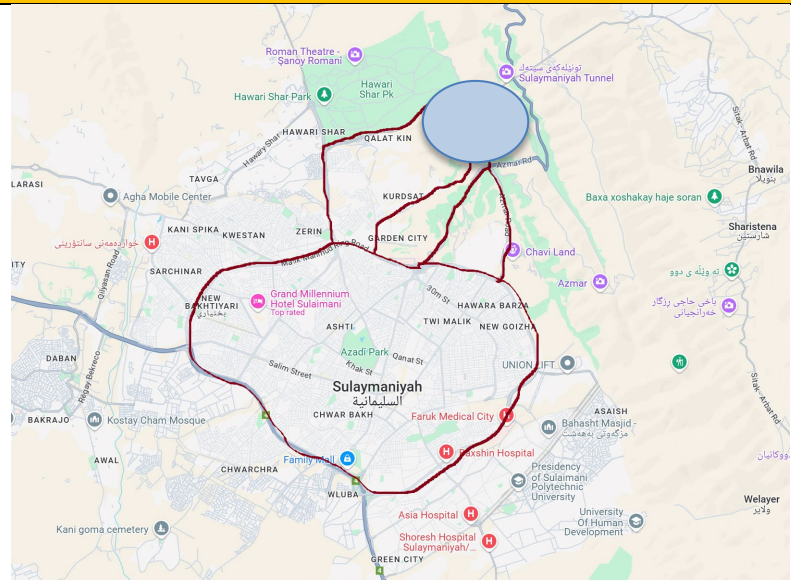

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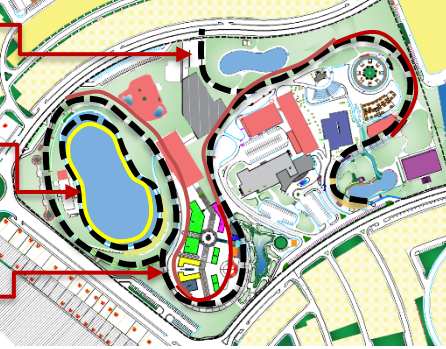

Table 2: Evaluation form for identifying the main/secondary of Central green spaces (Researcher)

Aspects of Central green spaces	Main Indicators	Sub indicators	Rating Likert		
			Below Expectation	Meet Expectation	Exceed Expectation
Accessibility and connectivity	1. Scale & Capacity	1. Total green area size			●
		2. Green area per capita		●	
	2. Accessibility	Walking distance from residential zones		●	
	3. Movement Amenities	1. Continuous walking		●	
		2. jogging loops		●	
		3. Ramps and slopes			●
Amenities and Facilities	4. Social gathering amenities	1. seating	●		
		2. picnic areas		●	
	5. Recreational amenities	Outdoor sports areas			●
	6. Family amenities	playgrounds			●
	7. Event amenities	1. Amphitheater		●	
		2. lake promenade			●
	Safety and Security	8. Safety amenities	1. Lighting functionality		
2. “Eye on street.”					●
Maintenance	9. Maintenance	Upkeep & Cleanliness			●
	10. Vegetation Quality	Vegetation density			●

Table 3: Evaluation form for identifying the main/secondary of Pocket green spaces (Researcher)





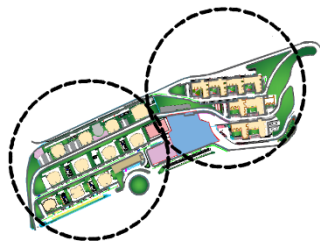

Aspects of pocket green spaces	Main Indicators	Sub indicators	Rating Likert								
			Zone 1			Zone 2			Zone 3		
			Below Expectation	Meet Expectation	Exceed Expectation	Below Expectation	Meet Expectation	Exceed Expectation	Below Expectation	Meet Expectation	Exceed Expectation
Proximity and Distribution,	1. Scale & Capacity	Total green area size		●			●			●	
		Green area per capita		●		●			●		
	2. Presence	Frequency of pocket spaces			●		●			●	
	3. Proximity	Distance from homes			●			●			●
Visibility and Enclosure	4. Visual Quality	Dense greenery & aesthetics			●		●			●	
Micro-scale Amenities	5. Rest Amenities	Benches		●			●			●	
	6. Kids' amenities	Play grounds		●			●			●	
	7. Safety Amenities	Lighting functionality			●			●			●
“Eye on street”				●			●			●	
Maintenance and Usability	8. Maintenance	Cleanliness & care			●			●			●

Table 4: Graphic analysis of Slameni Heights’s Central Green space (Lake area)

Category	Indicators	Sub-indicators of the Central green space (Lake area) of the Slameni Heights case study	Graphics analysis
Accessibility and connectivity	1. Scale & Capacity	<p>The central green area has a total size of 198,053 m² and serves the resident population of the community. According to international green space standards, this provision exceeds the required level, indicating more than adequate capacity for community-scale social and recreational use.</p> <p>The green area per capita is 19.33 m² per person, based on the total central green area and the resident population. According to international standards for urban green space provision, this value meets the recommended requirement, indicating a high level of green space availability per resident.</p>	
	Accessibility	<p>The walking distance from Zone 1 to the central green space falls within the acceptable range (30–600 m) and represents a medium level of proximity compared to the other zones.</p> <p>Zone 2, although it is still within an acceptable walking distance to the central green space, exhibits the greatest walking distance to the central green space among all zones</p> <p>Zone 3 is the closest to the central green space, and this means the residents of the zone will have the greatest ease of access. This will increase the opportunities for social connectivity.</p>	
	Movement	<p>All walking paths within the central green space are continuous and free of dead ends, providing clear connections between entrances and internal amenities.</p> <p>The central green space includes a continuous jogging loop surrounding the lake with a total length of 570 meters, indicating adequate provision for routine exercise.</p> <div data-bbox="347 1592 927 1697"> <p>Pathe's slope grades</p> <ul style="list-style-type: none"> 01% 05% 08% </div>	
	Social gathering	<p>There are two types of seating areas within the central green space: single benches and group table settings, but not many of these are available compared to the space, and they are concentrated more towards the water feature areas.</p>	

		<p>The space includes designated picnic areas equipped with shaded seating, tables, lighting, and waste bins to support comfortable and clean use throughout the day and evening</p> <p>The space has small kiosks for daily use, such as cafes and resting areas for the users.</p>	
	Recreational	<p>The space offers outdoor sports amenities, including a small golf practice area, a horse-riding facility, and outdoor fitness equipment such as stretching machines.</p>	
	Family	<p>The central green space features family-oriented amenities, including open and indoor playgrounds, a school drop-off area, a car-crushing zone, and a dancing fountain, all complemented by seating and parking for parents.</p>	
	Event	<p>The amphitheater (2,400 m²) provides adequate space for large community events and is well integrated within the central green space.</p> <p>The central green space contains two main water features—a lake (17,000 m²) and a dancing fountain—that function as visual and social focal points.</p>	
Safety and Security	Safety	<p>The area is supported by a coordinated lighting system with appropriately scaled light poles of 4 meters height for seating areas, pavement, and kiosk lighting for visibility, and targeted greenery lighting for aesthetic clarity.</p>	
		<p>All the areas are visible from the surrounding houses and apartments, which supports the “eye on street” theory.</p>	
Maintenance	Maintenance	<p>The maintenance condition of the area is highly effective, with trash bins provided at regular intervals of approximately 60 meters, supporting cleanliness and user convenience.</p>	
	Vegetation	<p>The central green space has high vegetation density that provides adequate shading and visual quality, meeting established standards for comfort and environmental appeal.</p>	

Table 5: Graphic analysis of Slameni Heights’s Pocket green spaces across the different zones

Category	Indicators	Graphics analysis		
		Zone 1	Zone 2	Zone 3
Proximity and Distribution,	Scale & Capacity	 <p>In Zone One, green pockets total 32,540 m² (15.2 m² per person), meeting the WHO minimum of 9 m² per person, and their wide range of sizes—from very small parcels to large pockets over 5,000–8,000 m²—supports both visual greenery and neighborhood-level social and recreational use.</p>	 <p>In Zone Two, green pockets total 23,397 m² (5.1 m² per person), below the WHO minimum, and their small-to-medium sizes mean they mainly serve visual purposes with limited support for social and recreational use.</p>	 <p>In Zone Three, green pockets total 25,890 m² (7.4 m² per person), below the WHO minimum, and their small-to-medium sizes mean they mainly provide visual greenery with limited capacity to support regular social and recreational use.</p>
	Presence	<p>Zone One contains 23 pocket green spaces for 2,135 residents, ensuring a strong presence of greenery and frequent access within short walking distances, which supports social and recreational use and exceeds the standard.</p>	<p>Zone Two contains 28 pocket green spaces for 4,588 residents, giving moderate presence and access to greenery; however, a higher population reduces per capita accessibility, so the provision only meets the standard for social and recreational use.</p>	<p>Zone Three contains 42 pocket green spaces for 3,520 residents, ensuring a strong presence and frequent walking-distance access to greenery, which supports outdoor activity and informal social interaction and exceeds the standard for accessibility.</p>
	Proximity	   <p>Across all three zones, pocket green spaces are within a 400-meter walking distance for all residents, ensuring equitable access. The design of Zone One, Zone Two, and Zone Three spaces offers a tapestry of choice, encouraging people to use them frequently, interact with one another, and enjoy the outdoors. This way, people’s well-being is given a boost as all have an equal opportunity to access the shared spaces.</p>		

Visibility and Enclosure	Visual Quality				
		<p>Zone One’s pocket green spaces use layered trees and shrubs, creating dense greenery with high visual quality.</p>	<p>Zone Two’s pocket green spaces rely mainly on short shrubs, resulting in simple planting and moderate visual quality.</p>	<p>Zone Three’s pocket green spaces use layered trees and shrubs, creating dense greenery with high visual quality.</p>	
Micro-scale Amenities	Kids’ amenities				
		<p>Zone One has only one playground serving the entire zone, which indicates that provision exists but remains below the standard.</p>	<p>Each apartment cluster is provided with its own playground, meaning playground provision not only meets the standard but exceeds it.</p>	<p>There is only one playground in the zone, and it is fenced and restricted to kindergarten use, making it effectively unusable for residents; therefore, playground provision is below standard.</p>	
	Safety Amenities	Rest Amenities	<p>Seating is limited to two main pocket green spaces, so rest amenities only partially support comfort and usability and meet the standard at a minimal level.</p>	<p>In Zone Two, each pocket green space has at least one seating area, so seating provision meets the minimum standard.</p>	<p>In Zone Three, no benches are provided, so seating provision is below standard and does not support usability or social interaction.</p>
					
		<p>All pocket green spaces are adequately lit for night use and are directly overlooked by surrounding houses and apartments, eliminating blind spots and enhancing natural surveillance in line with the “eyes on the street” principle.</p>			
Maintenance and Usability	Maintenance	<p>Maintenance of the pocket green spaces is very strong across all three zones, with well-kept greenery and trash bins provided in every pocket area, indicating a high level of care that exceeds standard maintenance expectations.</p>			

Table 6: Validity and Reliability of the Proposed Measurement Model (Researcher)

Items	Dimension	Estimate	X2/DF	AGFI	CFI	RMSEA
SC15 Central Green	C Green	0.503	2.271	0.85	0.91	0.076
SC24 Central Green		0.572				
SC36 Central Green		0.575				
SC44 Central Green		0.506				
SC54 Central Green		0.575				
SC64 Central Green		0.537				
SC16 Pocket Green	P Green	0.593				
SC25 Pocket Green		0.636				
SC37 Pocket Green		0.612				
SC45 Pocket Green		0.537				
SC55 Pocket Green		0.54				
SC65 Pocket Green		0.668				
SC11 Walkability	Soc Ac	0.596				
SC23 Legibility		0.612				
SC41 Mental Mapping		0.603				
SC51 Amenities		0.587				
SC53 Mental Mapping		0.586				
SC61 Amenities Outdoor		0.667				
SC62 Maintenance		0.626				

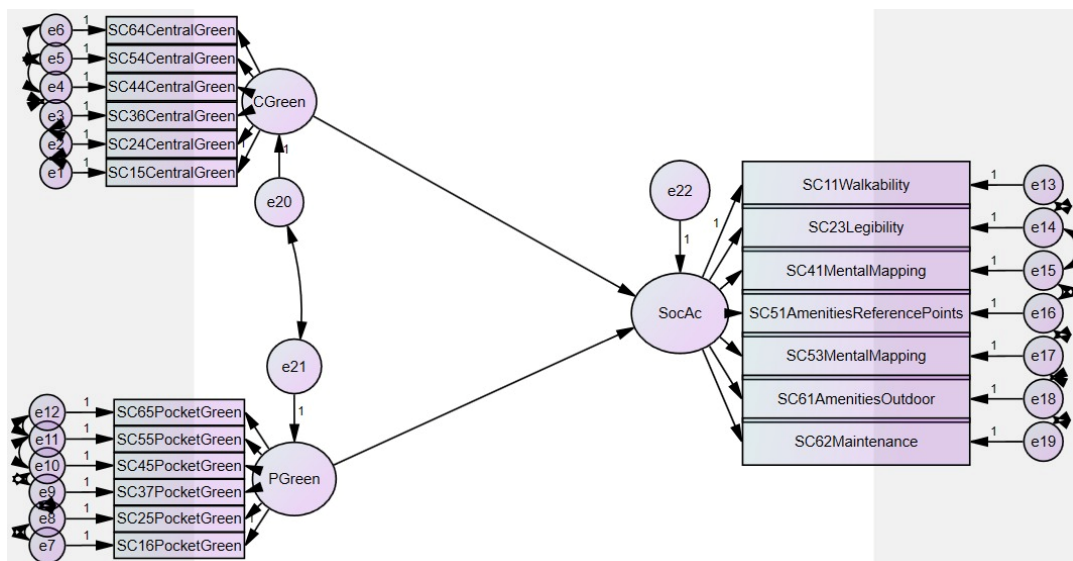


Figure 4: Structural model demonstrates statistically significant and theoretically meaningful relationships between both types of green spaces and Social Actualization (researcher)

Table 7: Hypothesis testing validation of the measurement model (researcher)

Dependent	Independent	Estimate	S.E.	C.R.	P	Result
Social Actualization	Central Green Area	0.40	0.233	2.04	0.041	Accepted
Social Actualization	Pocket Green Area	0.55	0.191	2.651	0.008	Accepted

Table 8: Mean, SD, and the P value of residents' actualization on the Central green spaces (Lake area) according to the residents' different zones in the case study (researcher)

Central Green spaces		N	Mean	STD	P Values
SC15CentralGreen	Zone 1	66	3.59	1.109	0.043
	Zone 2	107	3.77	1.087	
	Zone 3	91	3.93	1.041	
	Total	264	3.78	1.081	
SC24CentralGreen	Zone 1	49	3.65	1.147	0.021
	Zone 2	99	4.16	0.900	
	Zone 3	75	3.92	1.171	
	Total	223	3.97	1.067	
SC36CentralGreen	Zone 1	66	3.45	1.166	0.05
	Zone 2	107	3.89	1.168	
	Zone 3	91	3.81	1.144	
	Total	264	3.75	1.168	
SC44CentralGreen	Zone 1	66	3.64	1.132	0.218
	Zone 2	107	3.93	1.084	
	Zone 3	91	3.74	1.237	
	Total	264	3.79	1.153	
SC54CentralGreen	Zone 1	66	3.82	1.080	0.703
	Zone 2	107	3.94	1.054	
	Zone 3	91	3.84	1.186	
	Total	264	3.88	1.105	
SC64CentralGreen	Zone 1	49	4.06	1.088	0.629
	Zone 2	99	3.93	1.100	
	Zone 3	75	3.87	1.119	
	Total	223	3.94	1.101	

Table 9: Mean, SD, and the P value of residents' actualization on the pocket green spaces (researcher)

Pocket Green spaces		N	Mean	Std. Deviation	P Value
SC16PocketGreen/Social interaction	Meets Expectation	66	3.70	1.136	0.242
	Exceed Expectation	198	3.87	1.037	
	Total	264	3.83	1.063	
SC25PocketGreen/Sense of belonging	Meets Expectation	49	3.80	1.136	0.042
	Exceed Expectation	173	4.03	1.086	
	Total	222	3.98	1.099	
SC37PocketGreen/ Sense of trust	Meets Expectation	66	3.58	1.082	0.005
	Exceed Expectation	198	4.02	1.078	
	Total	264	3.91	1.094	
SC45PocketGreen/Wellbeing	Meets Expectation	66	3.74	0.943	0.432
	Exceed Expectation	198	3.99	1.130	
	Total	264	3.86	1.085	
SC55PocketGreen/Collective identity	Meets Expectation	66	3.92	1.057	0.049
	Exceed Expectation	198	3.75	1.084	
	Total	264	3.79	1.078	
SC65PocketGreen/Satisfaction	Meets Expectation	49	3.39	0.812	0.045
	Exceed Expectation	174	3.63	0.731	
	Total	223	3.58	0.754	

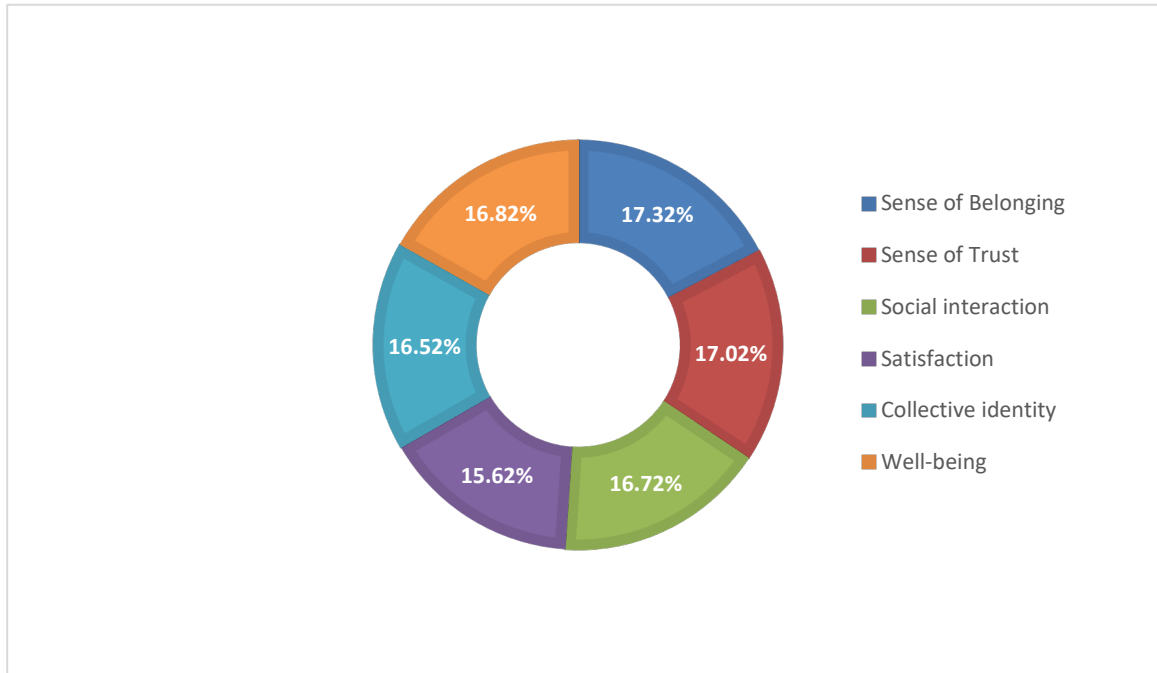


Figure 5: Pocket Green spaces -Social actualization dimensions (Researcher)

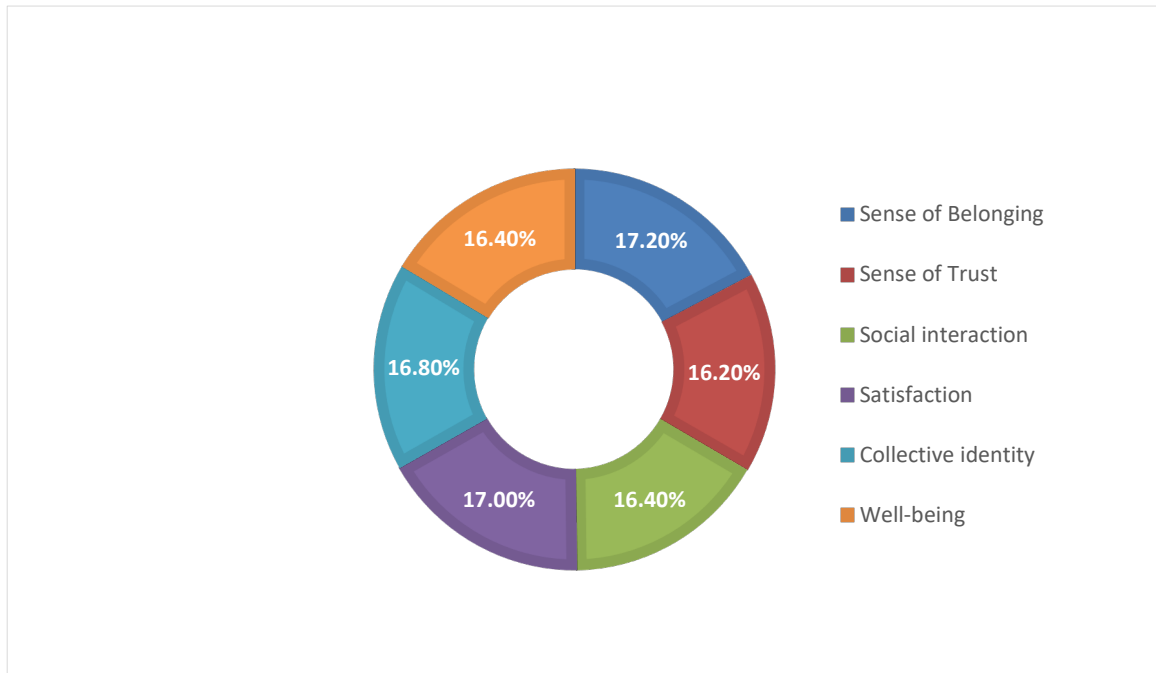


Figure 6: Central Green spaces -Social actualization dimensions (Researcher)