

Article

The Influence of Smart Green Spaces on Environmental Awareness, Social Cohesion, and Life Satisfaction in High-Rise Residential Communities

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Abstract: Urbanization has driven the growth of high-rise residential areas, creating unique challenges for enhancing residents' well-being, especially in large metropolitan regions. This study investigated the impact of smart green spaces—green areas integrated with technology to optimize environmental benefits—on environmental awareness, social cohesion, and life satisfaction in these dense urban environments. Utilizing data collected from questionnaires and field interviews in seven representative high-rise residential areas in Guangzhou, China, the structural equation model (SEM) was employed to explore the complex effects of smart green spaces. The findings reveal positive correlations between the presence, accessibility, and technological features of smart green spaces, which contribute to heightened environmental awareness, strengthened social bonds among residents, and increased life satisfaction. These results emphasize the diverse benefits of urban green spaces enhanced by smart technologies, beyond their aesthetic and recreational roles. This study suggests that strategic planning and policy initiatives focused on the development and operation of smart green spaces can substantially improve urban residents' well-being by fostering environmental consciousness, promoting community interaction, and enhancing the overall quality of life in high-rise residential settings. These insights are crucial for urban planners, policymakers, and community stakeholders, providing a blueprint for leveraging smart green spaces in creating sustainable, resilient, and livable urban environments.

Keywords: environmental awareness; high-rise residential communities; pro-environmental behaviors; smart green spaces; social cohesion; structural equation modeling (SEM); sustainable urban planning; technological integration

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1. Introduction

The rapid urbanization in China over recent decades, coupled with the influx of population into urban centers, has led to the proliferation of high-rise residential clusters, fundamentally transforming the urban landscape (Table 1) [1,2]. These dense developments maximize land use efficiency and provide essential housing, but they have also significantly altered residents' interactions with their environment. Although China's construction standards mandate the inclusion of ecological benefits in real estate projects, green spaces are still a scarce resource, particularly in large metropolitan areas. The integration of smart green spaces—green areas augmented with advanced technologies such

as IoT sensors, automated irrigation systems, and data-driven environmental management—presents a promising solution to this challenge. These spaces are designed not only to satisfy ecological requirements but also to facilitate residents' life quality in certain areas [3]. The existing literature on social sustainability emphasizes the importance of promoting sustainable lifestyles, which are strongly associated with improved well-being. Smart green spaces, with their innovative features such as adaptive shading systems, real-time environmental monitoring, interactive digital interfaces, and responsive lighting, have the potential to significantly enhance both visual and thermal comfort [4–9]. Consequently, they could contribute to a higher quality of life in high-rise residential communities, fostering a more sustainable and environmentally conscious living experience [2,3,10].

Table 1. Urban population, density, and high-rise residential development in China: five-year interval statistics (2000–2020) [1].

Year	Urban Population (million)	High-Rise Residential Development Area (million sqm)	Urban Area (km ²)	Population Density (Persons/km ²)
2000	456.8	1.9	17,596	1.9
2005	562.1	2.3	19,384	2.3
2010	636.1	3.2	19,878	3.2
2015	749.2	4.5	21,406	4.5
2020	848.4	5.7	22,326	5.7

The field of environmental psychology seeks to elucidate the ways in which individuals interact with built environments. According to Santos, a core principle of environmental psychology is that individuals are naturally embedded in physical environments, where notable reciprocal effects occur between the person and their surroundings [11]. This hypothesis is a crucial component of residential environmental psychology and behavioral science, focusing on how the structural features of living spaces influence residents' preferences, decisions, and overall satisfaction [12]. In another study, Geneshka drew upon insights from environmental psychology to propose an integrated framework for promoting environmental consciousness [13–15]. This theoretical model suggests that the integration of green elements, particularly smart green spaces, can reduce the costs associated with pro-environmental behaviors, thereby enhancing their appeal and accessibility through the provision of various technologically-enhanced amenities. Nevertheless, empirical research in this field remains somewhat limited [16].

Despite the recognized benefits of traditional green spaces, the connection between smart green spaces and residents' environmental attitudes, social interactions, and life satisfaction within high-rise living settings remains insufficiently explored. Notably, existing research often emphasizes the physical attributes of green spaces or the general benefits of exposure to natural environments [17,18]. However, specific investigations into how smart green spaces impact the living experiences and environmental awareness of high-rise residents, especially from a sustainable and livable standpoint, have been limited [19].

In these contexts, the paper tentatively investigates the influence of smart green spaces on environmental awareness, social cohesion, and life satisfaction among residents of high-rise residential areas and explores how these technologically integrated green spaces can benefit residents by quantifying the psychological and physical satisfaction they bring. To achieve this goal, a comprehensive survey was conducted among residents living in high-rise buildings in selected neighborhoods. The study area is in Guangzhou, one of China's first-tier cities with a high concentration of population and high-rise buildings [20–22]. Four major aspects were investigated: environmental awareness, the smart green space environment in high-rise residential areas, social cohesion, and individual characteristics of the residents. The research incorporated variables into a questionnaire

to quantify data on perceptions of smart green spaces, attitudes toward the environment, social cohesion, and overall life satisfaction by asking respondents to assign values to those variables [2,3]. Structural equation modeling (SEM) and Pearson correlation analysis were employed to reveal the relationships between these variables. Before conducting the research, four hypotheses were formulated (Figure 1):

Hypothesis 1 (H1): Both environmental awareness and social cohesion among high-rise residents impact their life satisfaction.

Hypothesis 2 (H2): The smart green space environment in high-rise residential areas is associated with residents' levels of life satisfaction.

Hypothesis 3 (H3): The smart green space environment affects residents' life satisfaction through the mediating role of their social cohesion and environmental awareness.

Hypothesis 4 (H4): A correlation exists between the individual features of residents and their level of life satisfaction.

This research will make a substantial contribution to the existing scholarly literature. Firstly, it broadens the scope of previous studies by investigating the particular influence of smart green spaces on environmental awareness and life satisfaction among high-rise-building residents. Secondly, it emphasizes the necessity of considering the distinctive characteristics of built environments in metropolitan areas, such as a high concentration of population and limited access to nature, when designing and implementing smart public green spaces. Lastly, by understanding how smart green spaces improve urban residents' life quality, evidence-based strategies can be formulated for future development initiatives [23–25].

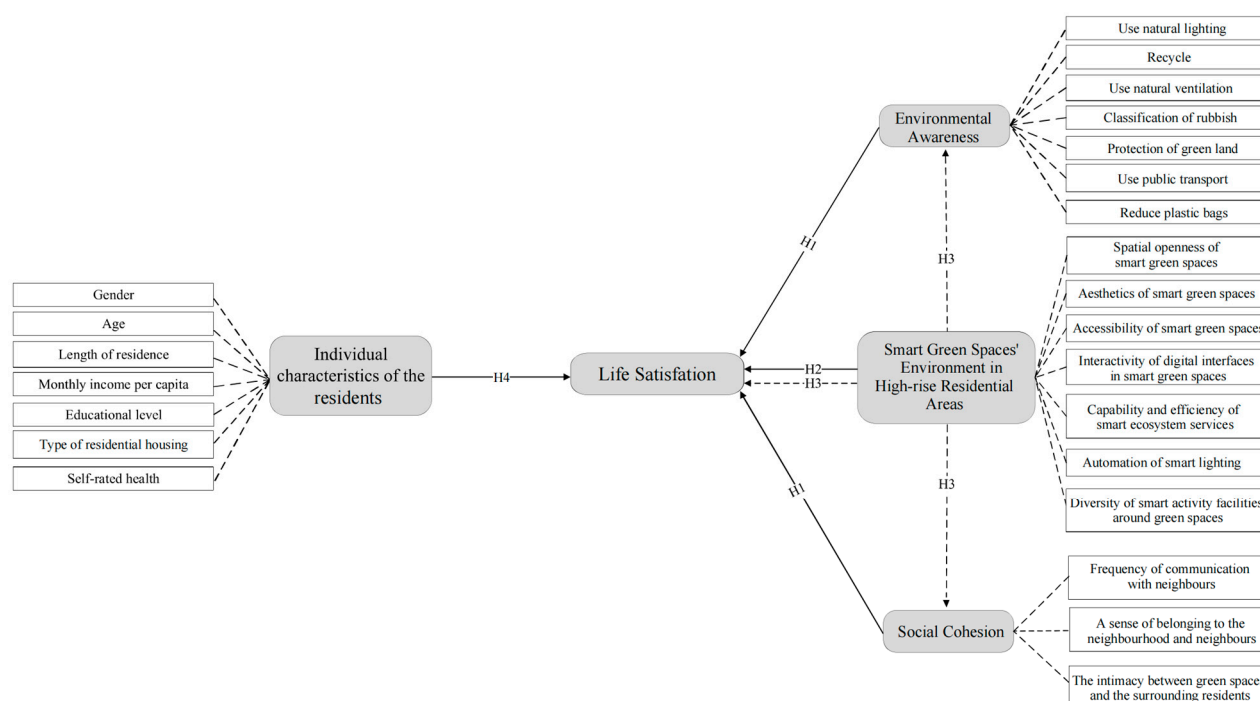


Figure 1. Hypotheses of the influence path on the life satisfaction of individuals in high-rise residential communities.

2. Related Literature

This section presents a literature review on social sustainability and environmental psychology, aiming to establish the connections between smart green space environments, environmental awareness, social cohesion, and life satisfaction among residents in high-rise residential buildings.

2.1. *The Impact of Smart Green Spaces on Enhancing Life Satisfaction*

The dominant literature suggests that integrating technology with green elements within public spaces, such as diverse plant life and the quality of the outdoor environment, can significantly enhance health, productivity, and positive perceptions of the surrounding environment among individuals [17,19,26,27]. For instance, research has revealed that time spent in smart green spaces—where natural elements are augmented with technological features such as IoT-enabled environmental monitoring, automated irrigation, and smart lighting—can lower stress levels and facilitate psychological restoration. These spaces are related to reduced rates of chronic diseases and mental health disorders [18,27–30]. Furthermore, features such as safety, cleanliness, and the presence of smart ecosystem services have been positively associated with a sense of pleasure and overall well-being among residents [31–34]. The configuration of smart green spaces, including the density of surrounding buildings, the layout of public space, and land-use patterns, can also influence residents' physical and mental health [35–37].

However, the existing literature does not adequately explore the broader impacts of smart green spaces—including the abundance of surrounding smart recreational facilities, the engendered place attachment among individuals, or public memory—on overall life satisfaction [38–43]. Some researchers believe that these factors could be essential. Additionally, the majority of the surveys have been conducted in office buildings, rather than in residential communities [44,45]. The activities engaged in by individuals in residential and office buildings are distinct, resulting in disparate evaluations and priorities regarding land-use patterns and environmental features [46,47]. The elements of smart green spaces that greatly enhance the well-being of office workers do not necessarily align with those prioritized by residents in high-rise buildings [48–52]. Furthermore, the green evaluation standards differ between these two environments, leading to varying design priorities and considerations [53–57].

2.2. *Smart Green Spaces, Social Interactions, and Environmental Awareness*

Beyond the health benefits, smart green spaces provide opportunities for social interaction, creating platforms for residents to connect, build relationships, and develop a sense of belonging [58]. Research has indicated that smart green spaces, enhanced with technological features such as interactive displays and community-based environmental monitoring systems, can contribute to the formation of social networks, enhance trust among neighbors, and strengthen community resilience [59]. Additionally, studies have shown that these spaces can facilitate intergenerational interactions and foster a sense of shared identity among residents [60,61].

Furthermore, a small number of empirical studies in the field of environmental psychology have investigated the potential influence of smart green spaces on collective environmental action. These studies have explored the impact of technologically integrated and ecologically sustainable environments on the environmental awareness of their occupants [62]. The provision of opportunities for social interaction and shared experiences in these spaces can facilitate the discussion of environmental issues and the collaborative development of solutions among residents [63]. This heightened sense of ownership can result in increased participation in environmental initiatives, including community gardening, waste reduction, and energy conservation [64–66]. Several studies indicate that the presence of smart green or sustainable features in communities encourages residents

to engage in more environmentally friendly behaviors, including improved waste recycling practices, energy saving, and other behaviors that are beneficial to the environment. Specifically, exposure to these smart and nature-enhanced environments can facilitate a connection to the natural world, leading individuals to adopt more sustainable patterns of living [67,68]. Moreover, smart green spaces can function as outdoor classrooms, promoting knowledge of biodiversity and the importance of environmental conservation [25]. Studies have also shown that greenery, especially when combined with educational technology, can enhance individuals' connection to environmental concerns and activism [19]. The intersection of smart green spaces with other sustainable elements, such as transportation networks and economic development, is an area that has not been extensively explored, yet it holds potential for revealing the multifaceted contributions of these spaces to living quality [66]. Addressing these gaps could provide a more nuanced perspective on the value of smart green spaces and inform more effective design and policy strategies for urban environments.

2.3. *The Neighborhood Environment and Social Cohesion in High-Rise Residential Communities*

The social dynamics and communal well-being within high-rise residential communities are profoundly shaped by both the physical attributes and the perceived qualities of their surrounding neighborhood environment. Specifically, the characteristics of high-rise environments, including vertical density and a large resident population, can present challenges to fostering interpersonal interactions and community bonds, further compounded by the spatial configuration of tall buildings, which may not inherently facilitate unplanned social interactions [69,70]. The presence of public entertainment and ecological spaces within these settings has been recognized as a crucial factor, similar to findings in lower-density neighborhoods, in promoting opportunities for social engagement [71–73]. There is a positive correlation between environmental appeal, access to communal spaces, social interaction, and resident satisfaction in urban residential areas [63]. While high-rise residential environments present unique challenges to social cohesion due to their structural and spatial characteristics, strategic planning and design interventions that prioritize green spaces integrated with technologies and accessible communal areas have the potential to mitigate these challenges and foster a sense of community among residents [45]. Additionally, there is a dearth of research on the influence of cultural factors and community-specific norms on the use and perception of smart green spaces in high-rise communities, which could inform more culturally sensitive design strategies [74–77].

In conclusion, the existing literature offers insights into the theoretical connections among smart green spaces, environmental awareness, social interactions, and life satisfaction [78–82]. However, the literature is deficient in its examination and establishment of the specific mechanisms through which smart green spaces impact residents' well-being, social cohesion, and environmental awareness in high-rise residential communities, particularly regarding the provision of detailed empirical evidence (Table 2).

Table 2. Summary of the literature review.

Topic	Key Findings
Smart Green Spaces and Life Satisfaction	Enhances health and reduces stress, but broader impacts need further research
Smart Green Spaces and Social Interactions	Promotes social networks, intergenerational interactions, and community resilience
Smart Green Spaces and Environmental Awareness	Increases environmental action, sustainable behaviors, and conservation knowledge
High-Rise Communities and Social Cohesion	Challenges in social interaction; green spaces and communal areas can foster community

3. Statistics and Methodology

3.1. Case Study

This study focuses on residents of high-rise residential areas within Guangzhou. Data were collected using a combination of quantitative and qualitative methods. Field observations, structured interviews, and surveys were conducted among individuals residing in diverse high-rise residential communities across Guangzhou (Figure 2) [35,44]. Sample selection adhered to stringent criteria to ensure the rigor and applicability of findings:

- (1) **Geographical focus:** This study concentrated on primary urban districts known for high-density residential development, including Tianhe District, Yuexiu District, and Liwan District. These areas collectively accommodate a significant proportion of Guangzhou's population and exhibit varying degrees of urban development and community infrastructure, making them ideal places for examining the integration and effects of smart green spaces.
- (2) **Selection of communities:** High-rise residential complexes constructed between 2000 and 2020 were targeted, focusing on those with established smart green spaces and communal facilities. Emphasis was placed on communities with advanced environmental amenities, incorporating technological innovations such as IoT systems for environmental monitoring and automated maintenance, reflecting a spectrum of architectural layouts and smart environmental design approaches related to community engagement and well-being.
- (3) **Sampling criteria:** Communities exhibiting a minimum occupancy rate of 75% were selected for inclusion in this study, as this threshold is believed to show a realistic representation of typical living conditions and dynamics. Additionally, communities comprising a diverse demographic profile were chosen, reflecting the inclusion of residents from a broad range of social backgrounds and household structures.
- (4) **Characteristics of participants:** The research intentionally included participants representing a range of ages, socio-economic statuses, and household compositions, ensuring a comprehensive exploration of how smart green spaces impact residents' perceptions and experiences of environmental awareness, social cohesion, and overall life satisfaction.

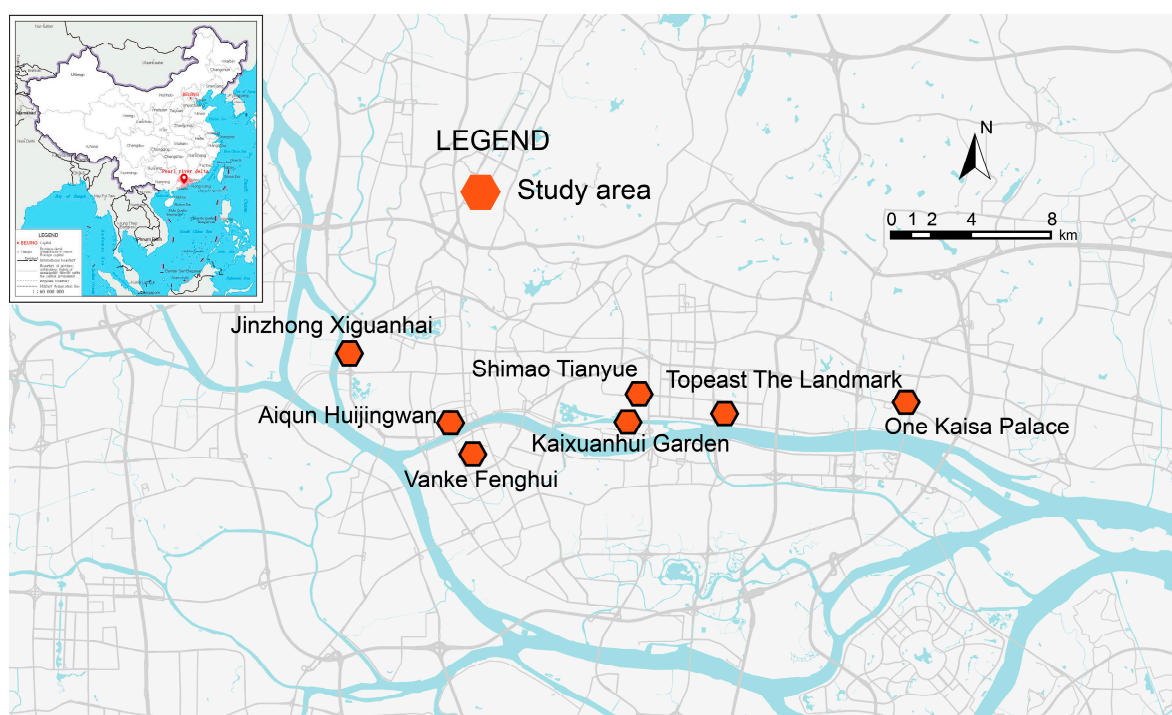


Figure 2. Illustration of the study area.

3.2. Surveys

The data collection for this study involved a structured approach combining questionnaires and field interviews conducted within selected high-rise residential communities. In May 2024, a number of researchers and graduate students from the University of Hong Kong and South China Agriculture University formed interview teams distributed across seven strategically chosen communities. The sample selection employed random sampling techniques, focusing on residents who were actively engaged with smart green spaces. Participation was voluntary, and individuals who declined cited various reasons, including time constraints and personal commitments unrelated to this study's focus.

In total, 450 questionnaires were distributed, and 392 responses were received. After meticulous scrutiny for completeness and accuracy, 375 valid responses formed the basis of the analysis. The survey aimed to investigate several key aspects related to the influence of smart green spaces:

- (1) Demographic and behavioral profiling: A thorough examination of the demographic profiles and behavioral patterns of residents was conducted to gain insights into the utilization of smart green spaces and their impact on community well-being.
- (2) Environmental assessment: The classification of smart green spaces into distinct categories—such as recreational facilities, aesthetic features, and ecological diversity with integrated technological features—allowed for their perceptual and functional significance in fostering environmental awareness and social cohesion to be evaluated.
- (3) Quality-of-life metrics: The assessment of residents' perceptions incorporated an examination of how smart green spaces contribute to overall life satisfaction. This was achieved through the measurement of psychological comfort, social interaction facilitation, and environmental stewardship, which were enhanced by greenery and smart technologies.

The questionnaire was designed with the objective of obtaining detailed responses that would facilitate a thorough investigation of the influence of smart green spaces on environmental awareness, social cohesion, and life satisfaction in high-rise residential settings.

3.3. Structural Equation Models (SEM)

Building upon the existing literature on the relationships between urban environments and well-being in high-rise residential contexts, this study explores the complex interplay of internal and external factors influencing the well-being of residents. Internal factors include demographic characteristics such as age, gender, educational attainment, and income level. External factors involve the physical attributes of the high-rise residential environment, including the perception of safety, features of the smart green spaces, and the availability of recreational facilities. These elements collectively shape the subjective cognitive states of residents, thereby impacting life satisfaction.

Directly assessing latent constructs such as well-being and social cohesion in urban environmental research presents challenges, necessitating the use of observable indicators as proxies. Structural equation modeling (SEM) emerges as a qualified statistical method for such inquiries, enabling simultaneous examination of latent constructs and their observable manifestations. This study advances theoretical frameworks by investigating how objective features of high-rise residential environments, particularly smart green spaces, interact with subjective perceptions to influence overall well-being. The SEM framework developed here integrates multivariate latent constructs related to smart green spaces and resident characteristics. Guided by established hypotheses, an empirically validated indicator system, and rigorous statistical analyses using software such as AMOS 24, the SEM model is constructed following methodological guidelines outlined by notable researchers.

Confirmatory factor analysis (CFA) was utilized to assess the standardized loadings of all latent constructs, ensuring measurement reliability and construct validity. Composite reliability (CR) was employed to evaluate internal consistency, with average variance extracted (AVE) gauged to assess convergent validity. The model demonstrates an acceptable fit with factor loadings ranging from 0.45 to 0.95, with all latent constructs meeting the requisite criteria for reliability and validity. This affirms the capacity of the SEM framework to elucidate the dynamics of life satisfaction in high-rise residential environments influenced by smart green spaces.

4. Results

This study began with Pearson correlation tests to assess multicollinearity and verify preliminary relationships. Figure 3 visually represents the correlation analysis among several variables pertinent to individual characteristics and the smart green spaces' environment indices, such as gender, age, monthly income, type of residential housing, spatial openness, interactivity of digital interfaces, sense of belonging, and life satisfaction. Notably, prior research, including the study by Longato [83], suggests a lack of significant relationship between certain variables related to social cohesion and well-being among residents, which led to their exclusion from further analysis.

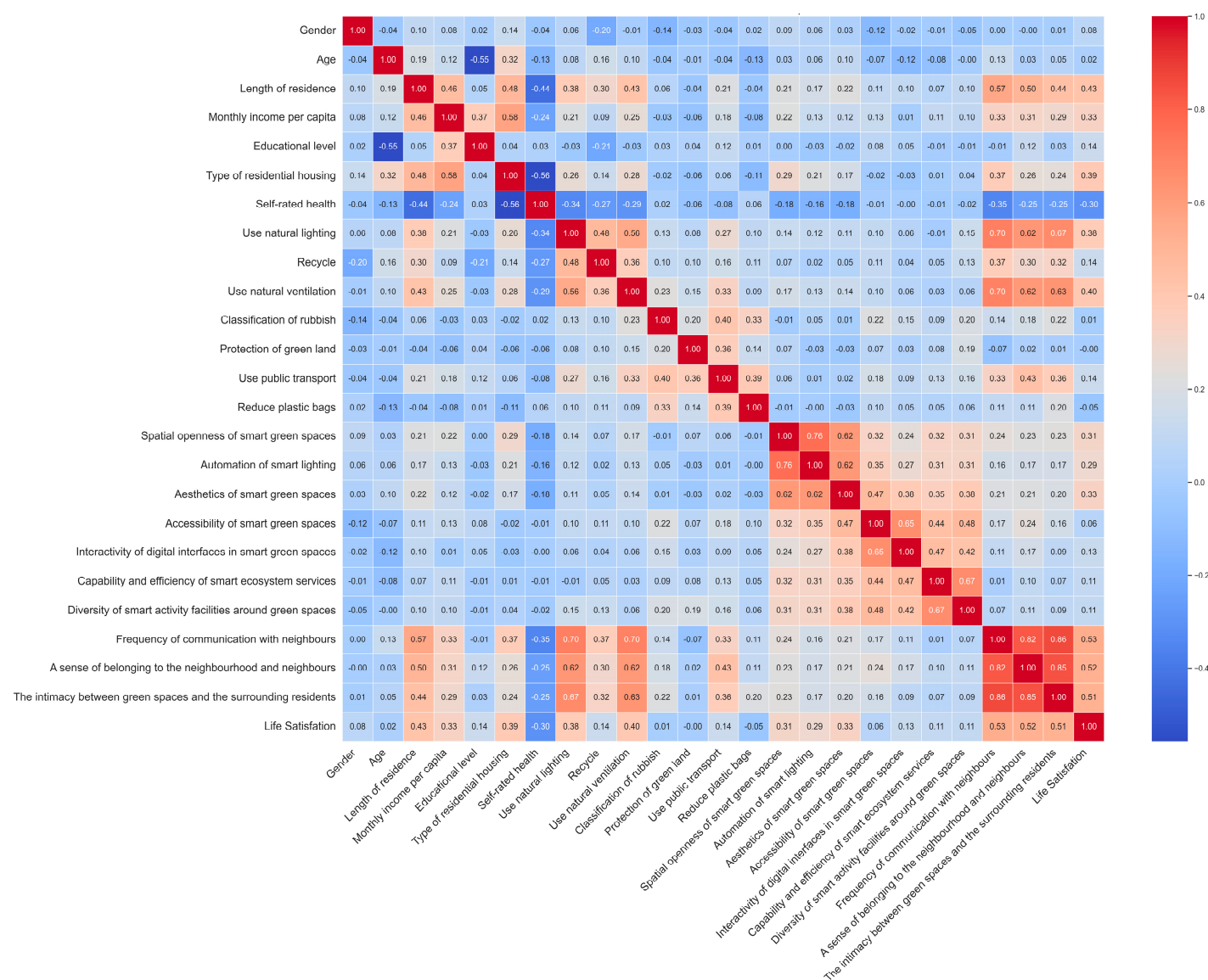


Figure 3. Pearson correlation tests.

The heatmap reveals several significant correlations. For example, the type of residential housing exhibits a mildly positive correlation with recycling behavior (0.14) and a strong positive correlation with life satisfaction (0.39), suggesting that individuals might be more content with their lives and more inclined to promote environmental protection due to better housing accommodation or accumulated wealth. Furthermore, the spatial openness of smart green spaces shows a moderate correlation with a sense of belonging (0.23), indicating that open spaces integrated with advanced digital ecosystems and smart green infrastructure can still foster a sense of community and attachment in high-density urban environments.

Building on the preliminary findings from the Pearson correlation analysis, structural equation modeling (SEM) was employed to delve deeper into the relationships between variables. SEM is particularly suitable for larger samples and multiple dependent variables, as it enables the examination of complex interrelationships and mediation effects among variables, providing a nuanced understanding of the underlying mechanisms. This analytical approach was deemed especially appropriate for this study, given its comprehensive scope and the necessity to elucidate the intricate dynamics between smart green spaces and life satisfaction [49].

The SEM results emphasize the significant influence of smart green spaces on life satisfaction, mediated through social cohesion, technological interactivity, and environmental awareness (Table 3). Social cohesion emerges as the most potent predictor of life satisfaction, with a standardized coefficient of 0.561, emphasizing the critical role of community bonds, enhanced by smart green spaces, in promoting residents' well-being. Environmental awareness also shows a positive impact, with a coefficient of 0.263, indicating that it serves as a mild mediator between smart green spaces and life satisfaction, reinforcing the importance of eco-consciousness in urban environments. Moreover, the direct impact of smart green spaces on life satisfaction, as indicated by a coefficient of 0.282, is further enhanced by their positive effect on social cohesion, technological interactivity, and environmental awareness. The findings lend substantial support to the hypothesis that smart green spaces not only confer direct benefits to residents but also promote community engagement and facilitate environmental consciousness, both of which contribute to higher life satisfaction. These insights are of vital importance for the development of cohesive and technologically integrated communities and the advancement of sustainable urban planning [74,84].

Table 3. Standardized regression coefficients of the impact of the smart green spaces' environment on life satisfaction.

X	→	Y	Z (CR Value)	p	Standardized Regression Coefficient
Individual Characteristics	→	Life Satisfaction	6.454	$p \leq 0.01$	0.392
Social Cohesion	→	Life Satisfaction	10.261	$p \leq 0.01$	0.561
Environmental Awareness	→	Life Satisfaction	4.141	$p \leq 0.01$	0.263
Green Spaces' Environment	→	Social Cohesion	3.466	$p \leq 0.01$	0.223
Green Spaces' Environment	→	Environmental Awareness	2.367	$p \leq 0.05$	0.154
Green Spaces' Environment	→	Life Satisfaction	4.449	$p \leq 0.01$	0.282

The findings in Figure 4 reveal that intimacy with smart green spaces and the interactivity of digital interfaces exhibit the strongest positive correlations with environmental

awareness. This suggests that residents who perceive the green spaces as visually appealing and technologically engaging are more likely to develop a heightened sense of environmental consciousness. The presence of aesthetically pleasing landscapes, coupled with interactive features such as real-time environmental data displays and user-friendly digital platforms, appears to foster a deeper connection between residents and their surroundings [85]. This connection might contribute to a greater awareness of environmental issues and a stronger inclination towards sustainable practices. In addition to aesthetics and interactivity, the use of natural lighting and the frequency of communication with neighbors show moderate positive correlations with environmental awareness. These findings suggest that the design of smart green spaces, which incorporates natural elements such as sunlight and promotes social interactions, can also play a significant role in enhancing residents' environmental awareness [71]. While these factors are not as influential as aesthetics and interactivity, they nonetheless contribute to an environment that encourages sustainable living. Interestingly, demographic variables such as gender, age, and educational level do not exhibit strong correlations with environmental awareness.

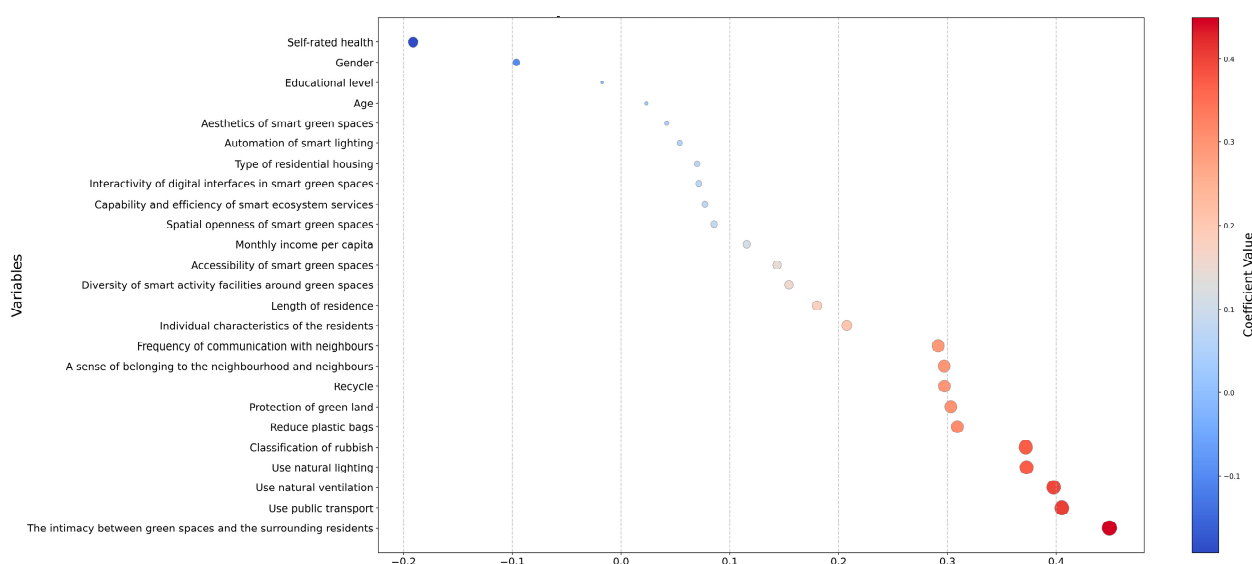


Figure 4. The impact of independent variables on environmental awareness.

Figure 5 focuses on the factors that influence the overall perception of smart green spaces' environment. The analysis reveals that the capability and efficiency of smart ecosystem services along with the accessibility of these green spaces are the most influential variables. These findings highlight the importance of functionality and ease of access in creating a positive environmental experience. Residents are more likely to benefit from and appreciate green spaces that are not only easily accessible but also equipped with efficient and effective ecosystem services, such as automated irrigation systems, adaptive lighting, and real-time environmental monitoring. Automation of smart lighting and the type of residential housing show moderate correlations with the environment of smart green spaces. These results suggest that while technological integration is crucial, the type of housing—whether it be high-rise apartments or more traditional residential buildings—also plays a role in shaping residents' perceptions of their environment [86]. The combination of advanced technology and appropriate housing types contributes to a more cohesive and functional green space environment.

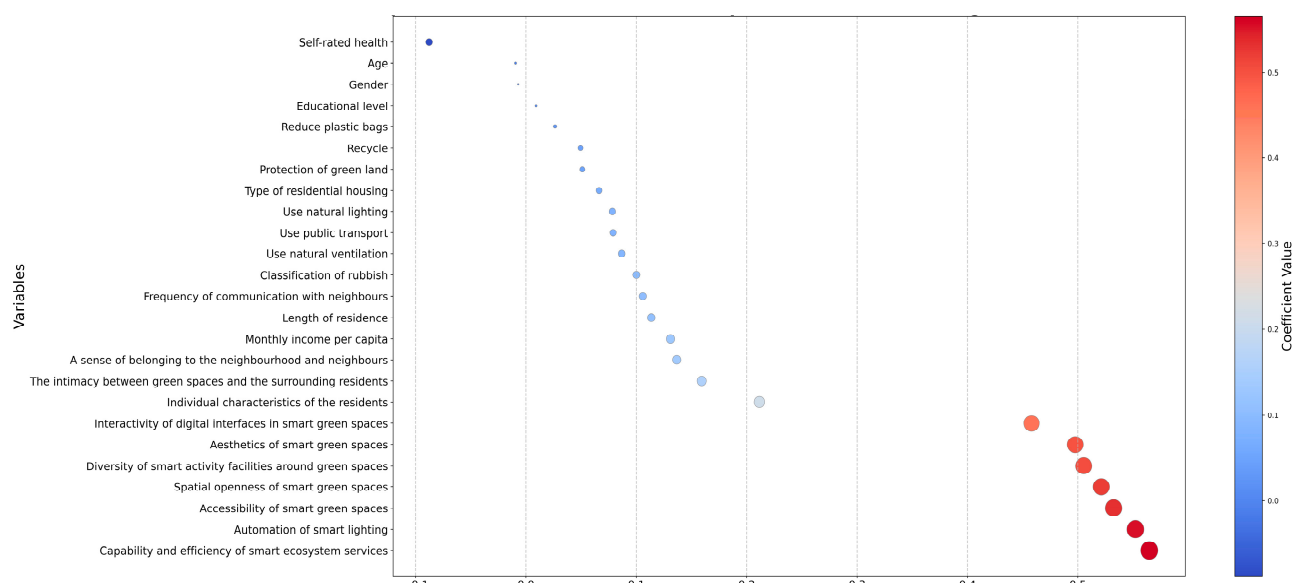


Figure 5. The impact of independent variables on smart green spaces' environment.

5. Discussion

The diversity of smart activity facilities and the spatial openness of smart green spaces emerge as the variables mildly correlated with social cohesion, as illustrated by Figure 6. These findings underscore the importance of providing a variety of recreational opportunities and maintaining open, accessible spaces to foster community bonds. In environments where residents have access to diverse activities and open areas, there is a greater likelihood of increased social interactions, leading to stronger community ties and a sense of belonging [87]. Residents who feel digitally integrated into their community are more likely to engage in both virtual and physical social activities, creating a supportive and inclusive environment [88]. And it is noteworthy that the individual features “the use of natural lighting” and “intimacy with smart green spaces” are also critical factors that positively impact social cohesion. Similarly, frequency of communication with neighbors emerges as an important predictor of social interactions. This result exhibits the importance of technology-enhanced social interaction in fostering a sense of belonging and community. Regular interactions through smart spaces' environment can lead to the development of robust social networks, which are essential for emotional support and mental health. On the other hand, the classification of rubbish and the use of public transportation exhibit weaker correlations with social cohesion. While these factors are valued for their environmental benefits, their direct impact on fostering social connections within the community appears to be less pronounced [89].

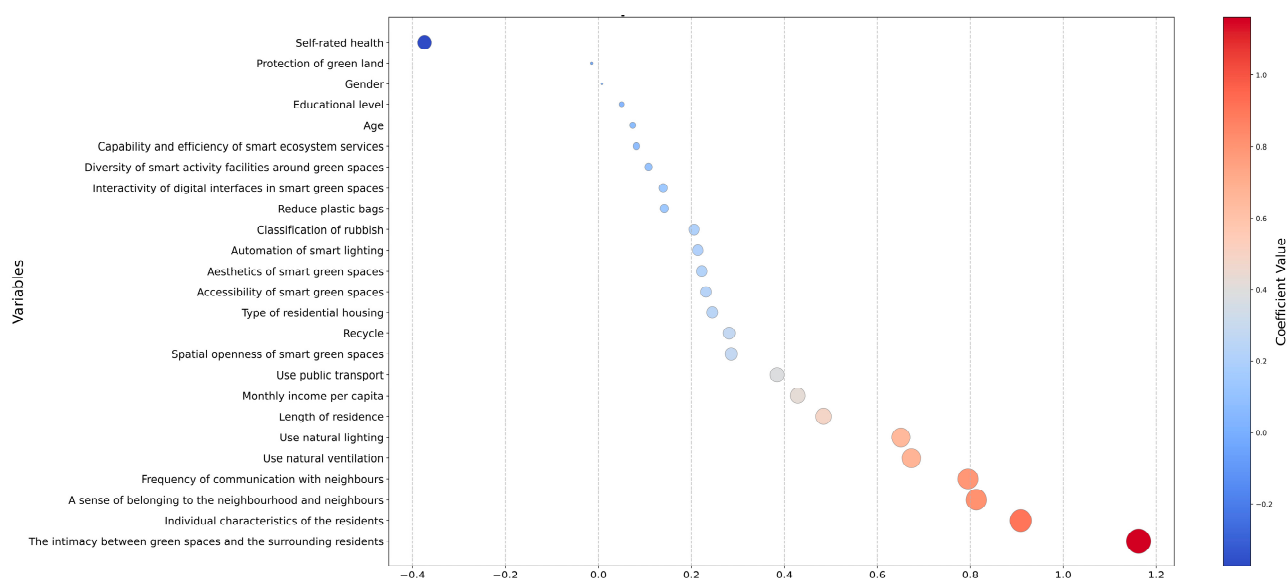


Figure 6. The impact of independent variables on social cohesion.

According to the data presented in Figure 7, the findings reveal that the integration of smart green spaces and social cohesion factors within high-rise residential communities significantly enhances life satisfaction, with substantial positive coefficients. This suggests that the more intimate the interaction between residents and smart green spaces, the higher the level of life satisfaction they experience. This relationship can be attributed to the multifaceted benefits that smart green spaces offer, such as the provision of digitally enabled recreational opportunities, dynamic aesthetic features, and the fostering of a digitally interconnected community environment. Several environmentally conscious behaviors, such as minimizing plastic bag usage, utilizing public transportation, and participating in recycling programs, have been observed to exert a positive, albeit modest, influence on life satisfaction, with a coefficient of around 0.1. This finding suggests that smart green spaces, which actively promote and facilitate these behaviors through digital nudges and information dissemination, can foster a sense of personal responsibility and community pride, ultimately enhancing overall well-being. However, the influence of specific variables, such as the utilization of smart natural ventilation and automated lighting systems, appears to be inconsequential, with a coefficient of approximately 0. This may be due to the fact that these smart features do not directly impact the daily lives of residents in a significant way or may be overshadowed by other more prominent factors within the community environment.

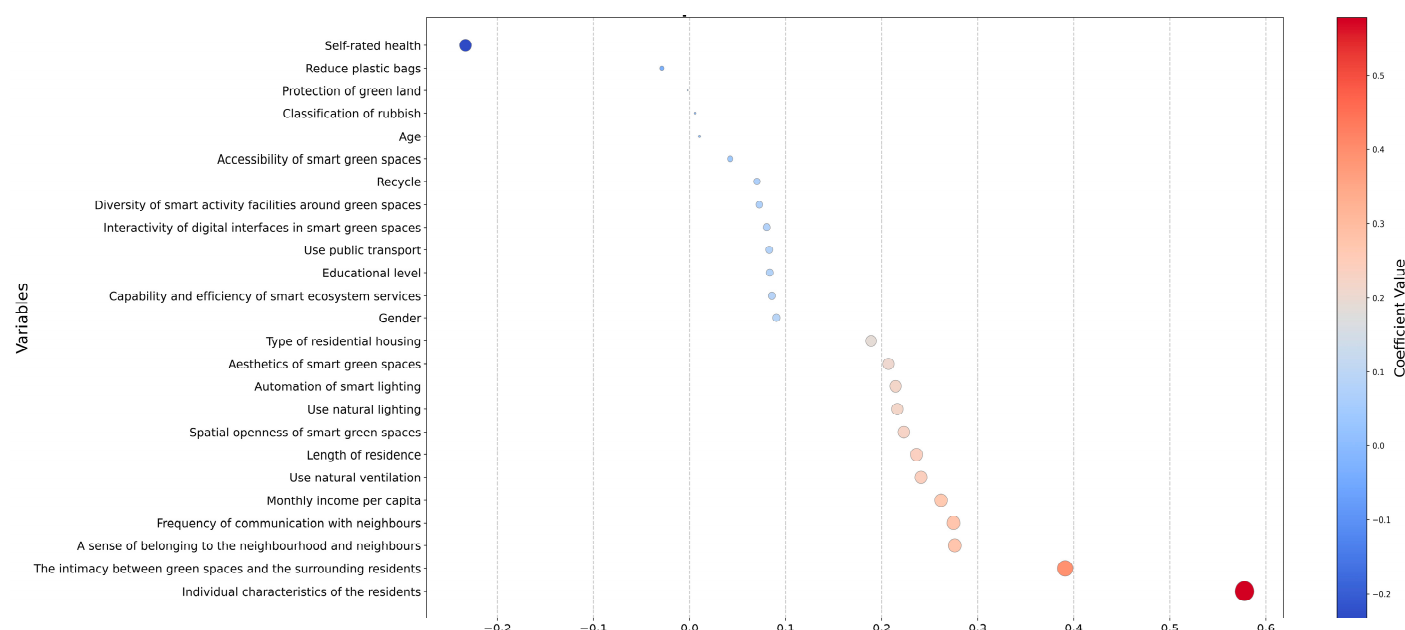


Figure 7. The impact of independent variables on life satisfaction.

A number of recurrent features emerge from a holistic review of the impact variables data presented (Figures 4–7). Aesthetic appeal and technological integration demonstrate a consistently strong positive correlation with environmental awareness, the quality of the smart green spaces' environment, social cohesion, and life satisfaction. These findings emphasize the pivotal role that design and technology play in shaping the overall experience of residents in high-rise residential communities. Furthermore, the accessibility and functionality of smart green spaces are also common factors that influence both the environment of the spaces and the social dynamics within the community. In contrast, demographic variables such as age, gender, and educational level do not demonstrate robust correlations, indicating that the influence of smart green spaces is relatively universal across diverse demographic groups. However, there is a phenomenon where individuals with low self-rated health report higher life satisfaction and social cohesion, probably due to the fact that some of them tend to maintain a positive outlook and derive meaning and satisfaction from their surrounding environment. The integration of smart green spaces, which enhance intimacy with green areas and strengthen the sense of belonging to communities, may play a key role in this process [88–90].

6. Conclusions

By examining both objective and subjective perceptions, this study uncovers how certain attributes of smart green space environments—such as perceptual accessibility, technological diversity, and enhanced safety features—interact with social cohesion and pro-environmental behavioral patterns. The principal conclusions may be summarized as follows (Figure 8):

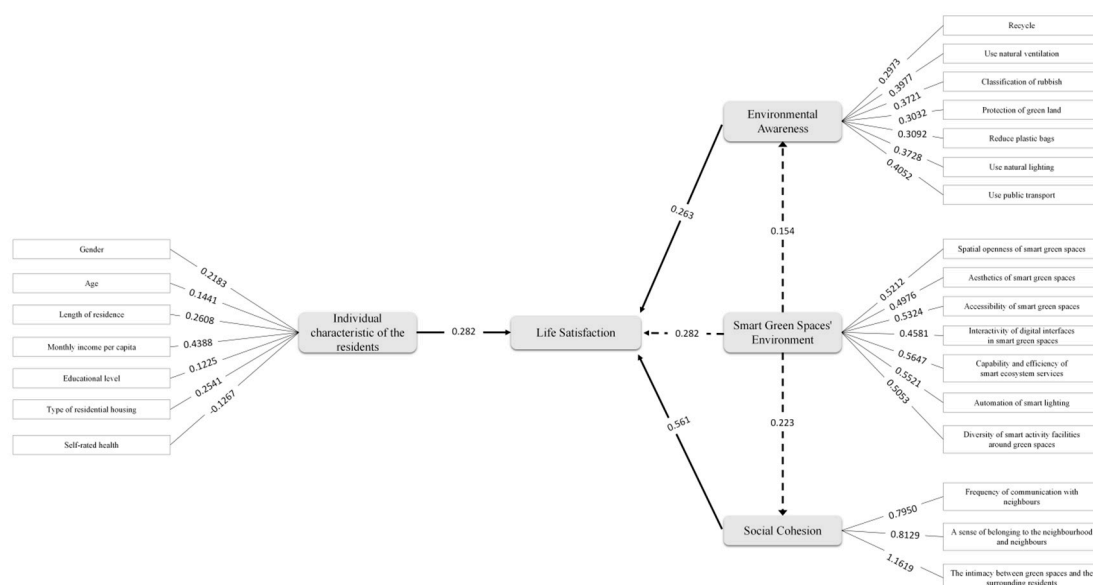


Figure 8. The influence path of different variables under SEM framework.

- (1) The intimacy between residents and smart green spaces shows a strong positive correlation with life satisfaction. The proximity to and engagement with smart green spaces not only improve the aesthetic appeal of the environment through interactive and adaptive design features but also serve as catalysts for social interactions and community cohesion. Specifically, the integration of smart technologies, such as sensor-activated lighting, automated maintenance systems, and diverse digital interfaces, within high-rise residential areas enhances residents' daily experiences and promotes a sense of place attachment, reinforcing their satisfaction with urban living.
- (2) The significant influence of environmental awareness and social cohesion on life satisfaction in high-rise residential areas is self-evident. The heightened environmental awareness among residents, fostered by some smart systems that provide real-time data on environmental quality and energy use, instills a sense of responsibility towards sustainable living practices and environmental conservation, further reinforcing their satisfaction with the ecological integrity of their residential environment. Moreover, strong social cohesion within communities, enhanced by smart platforms for social networking and community participation, cultivates a sense of belonging and trust among residents, which is crucial for buffering against stressors and enhancing overall psychological well-being. Residents who feel socially connected through these smart features tend to engage in collective neighborhood activities that improve their living environment, thereby contributing to higher levels of life satisfaction.
- (3) Smart green spaces enhance life satisfaction by fostering social cohesion as a mediating path. These technologically integrated environments serve as central hubs for communal gatherings, fostering regular social interactions and promoting neighborhood cohesion. Residents who frequently engage in activities within these spaces, supported by smart scheduling systems and interactive event-planning tools, cultivate shared experiences and develop strong social bonds, which collectively contribute to the formation of a supportive community network. This accumulated social capital, bolstered by smart technologies, enhances residents' sense of belonging and collective efficacy, thereby positively influencing their overall life satisfaction.
- (4) The hypothesis that individual characteristics influence residents' life satisfaction has been validated. Individual factors, including age, socioeconomic status, and personal preferences, have been demonstrated to influence perceptions of living suitability

and residential satisfaction. For example, residents with higher incomes may demonstrate a preference for smart green spaces that offer exclusive digital amenities or luxury smart features, which contribute to their sense of prestige and satisfaction.

In summary, this study emphasizes the crucial role of smart green spaces within high-rise residential communities. It not only enhances the aesthetic and functional appeal of the residential community but also incorporates advanced sustainability initiatives, such as smart ecosystem services and automated recreational facilities, that foster environmental consciousness and a sense of community attachment through digitally supported behaviors in high-rise areas. Urban planners are supposed to prioritize the seamless integration of smart green spaces into the fabric of high-rise residential areas, ensuring that these spaces are not only visually appealing but also functionally beneficial through technological innovations that enhance user experience and environmental values. The deployment of smart technologies that tailor the environment to individual needs can facilitate the creation of inclusive urban environments. These technologies may include adaptive lighting, automated mobility assistance, and personalized digital interfaces. Furthermore, the necessity of engaging residents in the design and planning process is corroborated, thereby ensuring that their needs and preferences inform the urban landscape. The incorporation of feedback through the utilization of participatory design tools enables urban planners to create more effective and sustainable urban spaces that reflect the collective vision of the community, thereby fostering a heightened sense of ownership and satisfaction.

One of the most notable limitations of this study is its reliance on cross-sectional data, which provides a static snapshot rather than a dynamic view of how smart green spaces influence life satisfaction over time. It would be beneficial for future research to track residents' perceptions and experiences over time, with a specific focus on how the evolving technological capabilities of smart green spaces impact social cohesion, environmental awareness, and, ultimately, long-term life satisfaction and well-being. This approach is of great consequence for the formulation of sustainable urban planning and policy-making decisions, which are aimed at optimizing the health values of smart green spaces within rapidly changing and developing metropolitan areas.

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References

1. Statista. Urbanization. In *Statista-The Statistics Portal*; Statista: New York, NY, USA, 2024. Available online: <https://www.statista.com/topics/9350/urbanization/> (accessed on 3 July 2024).

2. Asri, A.K.; Lee, H.-Y.; Pan, W.-C.; Tsai, H.-J.; Chang, H.-T.; Lung, S.-C.C.; Su, H.-J.; Yu, C.-P.; Ji, J.S.; Wu, C.-D.; et al. Is green space exposure beneficial in a developing country? *Landsc. Urban Plan.* **2021**, *215*, 104226. <https://doi.org/10.1016/j.landurbplan.2021.104226>.
3. Zhu, C.; Zheng, S.; Yang, S.; Dong, J.; Ma, M.; Zhang, S.; Liu, S.; Liu, X.; Yao, Y.; Han, B. Towards a Green Equal City: Measuring and matching the supply-demand of green exposure in urban center. *J. Environ. Manag.* **2024**, *365*, 121510. <https://doi.org/10.1016/j.jenvman.2024.121510>.
4. Jabbar, M.; Nasar-U-Minallah, M.; Yusoff, M.M. Measuring and modeling the association between human psychological well-being and urban green spaces of Lahore, Pakistan. *J. Environ. Stud. Sci.* **2024**, *1*–12. <https://doi.org/10.1007/s13412-024-00895-4>.
5. Ha, J.; Kim, H.J.; With, K.A. With. Urban green space alone is not enough: A landscape analysis linking the spatial distribution of urban green space to mental health in the city of Chicago. *Landsc. Urban Plan.* **2022**, *218*, 104309. <https://doi.org/10.1016/j.landurbplan.2021.104309>.
6. Jiao, H.; Li, C.; Yu, Y.; Peng, Z. Urban Public Green Space Equity against the Context of High-Speed Urbanization in Wuhan, Central China. *Sustainability* **2020**, *12*, 9394. <https://doi.org/10.3390/su12229394>.
7. Jimenez, M.P.; DeVille, N.V.; Elliott, E.G.; Schiff, J.E.; Wilt, G.E.; Hart, J.E.; James, P. Associations between Nature Exposure and Health: A Review of the Evidence. *Int. J. Environ. Res. Public Health* **2021**, *18*, 4790. <https://doi.org/10.3390/ijerph18094790>.
8. Kim, H.; Shoji, Y.; Tsuge, T.; Aikoh, T.; Kuriyama, K. Understanding services from ecosystem and facilities provided by urban green spaces: A use of partial profile choice experiment. *For. Policy Econ.* **2020**, *111*, 102086. <https://doi.org/10.1016/j.forpol.2019.102086>.
9. Kuddus, A.; Tynan, E.; McBryde, E. Urbanization: A problem for the rich and the poor? *Public Health Rev.* **2020**, *41*, 1. <https://doi.org/10.1186/s40985-019-0116-0>.
10. Vegaraju, A.; Amiri, S. Urban green and blue spaces and general and mental health among older adults in Washington state: Analysis of BRFSS data between 2011–2019. *Health Place* **2024**, *85*, 103148. <https://doi.org/10.1016/j.healthplace.2023.103148>.
11. Santos, J.P.C.; Honório, N.A.; Barcellos, C.; Nobre, A.A. A Perspective on Inhabited Urban Space: Land Use and Occupation, Heat Islands, and Precarious Urbanization as Determinants of Territorial Receptivity to Dengue in the City of Rio De Janeiro. *Int. J. Environ. Res. Public Health* **2020**, *17*, 6537. <https://doi.org/10.3390/ijerph17186537>.
12. Chang, D.; Gao, D.; Wang, X.; Men, X.; Zhang, P.; Zhang, Z. Influence mechanisms of the National Pollution Source Census on public participation and environmental consciousness in China. *J. Clean. Prod.* **2022**, *363*, 132397. <https://doi.org/10.1016/j.jclepro.2022.132397>.
13. Yoo, E.-H.; Roberts, J.E.; Eum, Y.; Li, X.; Konty, K. Exposure to urban green space may both promote and harm mental health in socially vulnerable neighborhoods: A neighborhood-scale analysis in New York City. *Environ. Res.* **2022**, *204*, 112292. <https://doi.org/10.1016/j.envres.2021.112292>.
14. Beute, F.; Marselle, M.R.; Olszewska-Guizzo, A.; Andreucci, M.B.; Lammel, A.; Davies, Z.G.; Glanville, J.; Keune, H.; O'Brien, L.; Remmen, R.; et al. How do different types and characteristics of green space impact mental health? A scoping review. *People Nat.* **2023**, *5*, 1839–1876. <https://doi.org/10.1002/pan3.10529G>.
15. Fan, J.; Peng, L.; Chen, T.; Cong, G. The role of social impact on consumer attitudes toward green and healthy home appliances during the COVID-19 pandemic. *Environ. Dev. Sustain.* **2023**. <https://doi.org/10.1007/s10668-023-03802-z>.
16. Wang, P.; Han, L.; Mei, R. An Impact Asymmetry Analysis of Small Urban Green Space Attributes to Enhance Visitor Satisfaction. *Int. J. Environ. Res. Public Health* **2022**, *19*, 2922. <https://doi.org/10.3390/ijerph19052922>.
17. Longato, D.; Cortinovis, C.; Balzan, M.; Geneletti, D. A method to prioritize and allocate nature-based solutions in urban areas based on ecosystem service demand. *Landsc. Urban Plan.* **2023**, *235*, 104743. <https://doi.org/10.1016/j.landurbplan.2023.104743>.
18. Macháč, J.; Brabec, J.; Arnberger, A. Exploring public preferences and preference heterogeneity for green and blue infrastructure in urban green spaces. *Urban For. Urban Green.* **2022**, *75*, 127695. <https://doi.org/10.1016/j.ufug.2022.127695>.
19. Love, J.; Selker, R.; Marsman, M.; Jamil, T.; Dropmann, D.; Verhagen, J.; Ly, A.; Gronau, Q.F.; Smíra, M.; Epskamp, S.; et al. JASP: Graphical statistical software for common statistical designs. *J. Stat. Softw.* **2019**, *88*, 1–17. <https://doi.org/10.18637/jss.v088.i02>.
20. Leach, M.; Reyers, B.; Bai, X.; Brondizio, E.S.; Cook, C.; Díaz, S.; Espindola, G.; Scobie, M.; Stafford-Smith, M.; Subramanian, S.M. Equity and sustainability in the anthropocene: A social–ecological systems perspective on their intertwined futures. *Glob. Sustain.* **2018**, *1*, e13. <https://doi.org/10.1017/sus.2018.12>.
21. Lenzholzer, S.; Duchhart, I.; Koh, J. Research through designing in landscape architecture. *Landsc. Urban Plan.* **2013**, *113*, 120–127. <https://doi.org/10.1016/j.landurbplan.2013.02.003>.
22. Li, J.; Han, Y.; Li, Q.; Tang, D. Optimizing Public Space in High-Rise Residences: A Whole Life Cycle Perspective with Kruskal Algorithm—A Case Study of a Shanghai High-Rise Residential Project. *Buildings* **2024**, *14*, 1769. <https://doi.org/10.3390/buildings14061769>.
23. Geneshka, M.; Coventry, P.; Cruz, J.; Gilbody, S. Relationship between Green and Blue Spaces with Mental and Physical Health: A Systematic Review of Longitudinal Observational Studies. *Int. J. Environ. Res. Public Health* **2021**, *18*, 9010. <https://doi.org/10.3390/ijerph18179010>.
24. Larondelle, N.; Lauf, S. Balancing demand and supply of multiple urban ecosystem services on different spatial scales. *Ecosyst. Serv.* **2016**, *22*, 18–31. <https://doi.org/10.1016/j.ecoser.2016.09.008>.
25. Lavrakas, P. *Encyclopedia of Survey Research Methods*; Sage Publications, Inc.: Thousand Oaks, CA, USA, 2008. <https://doi.org/10.4135/9781412963947>.

26. Wu, L.; Kim, S.K. Exploring the equality of accessing urban green spaces: A comparative study of 341 Chinese cities. *Ecol. Indic.* **2021**, *121*, 107080. <https://doi.org/10.1016/j.ecolind.2020.107080>.
27. Ta, N.; Li, H.; Zhu, Q.; Wu, J. Contributions of the quantity and quality of neighborhood green space to residential satisfaction in suburban Shanghai. *Urban For. Urban Green.* **2021**, *64*, 127293. <https://doi.org/10.1016/j.ufug.2021.127293>.
28. Lyshol, H.; Johansen, R. The association of access to green space with low mental distress and general health in older adults: A cross-sectional study. *BMC Geriatr.* **2024**, *24*, 329. <https://doi.org/10.1186/s12877-024-04738-3>.
29. Cardinali, M.; Beenackers, M.A.; Fleury-Bahi, G.; Bodénan, P.; Petrova, M.T.; van Timmeren, A.; Pottgiesser, U. Examining green space characteristics for social cohesion and mental health outcomes: A sensitivity analysis in four European cities. *Urban For. Urban Green.* **2024**, *93*, 128230. <https://doi.org/10.1016/j.ufug.2024.128230>.
30. Masterson, V.A.; Stedman, R.C.; Enqvist, J.; Tengö, M.; Giusti, M.; Wahl, D.; Svedin, U. The contribution of sense of place to social-ecological systems research: A review and research agenda. *Ecol. Soc.* **2017**, *22*, art49. <https://doi.org/10.5751/ES-08872-220149>.
31. Yang, M.; Dijst, M.; Faber, J.; Helbich, M. Using structural equation modeling to examine pathways between perceived residential green space and mental health among internal migrants in China. *Environ. Res.* **2020**, *183*, 109121. <https://doi.org/10.1016/j.envres.2020.109121>.
32. Nahlik, A.M.; Kentula, M.E.; Fennessy, M.S.; Landers, D.H. Where is the consensus? A proposed foundation for moving ecosystem service concepts into practice. *Ecol. Econ.* **2012**, *77*, 27–35. <https://doi.org/10.1016/j.ecolecon.2012.01.001>.
33. Naumann, S.; Burgos Cuevas, N.; Davies, C.; Bradley, S.; Mahmoud, I.; Arlati, A. *Harnessing the Power of Collaboration for Nature-Based Solutions: New Ideas and Insights for Local Decision-Makers*; Publications Office of the European Union: Brussels, Belgium, 2023. <https://doi.org/10.2777/954370>.
34. Venhoeven, L.; Bolderdijk, J.; Steg, L. Explaining the paradox: How pro-environmental behavior can both thwart and foster well-being. *Sustainability* **2013**, *5*, 1372–1386.
35. Shi, F.; Chen, Y.; Yue, W.; Wang, Y. High-Rise Residential District Morphology Optimization for Enhancing the Green Space Cooling Effect. *Buildings* **2024**, *14*, 183. <https://doi.org/10.3390/buildings14010183>.
36. Varma, C.S.; Palaniappan, S. Comparison of green building rating schemes used in North America, Europe and Asia. *Habitat Int.* **2019**, *89*, 101989.
37. Thompson, C.W. Activity, exercise and the planning and design of outdoor spaces. *J. Environ. Psychol.* **2013**, *34*, 79–96. <https://doi.org/10.1016/j.jenvp.2013.01.003>.
38. Wu, D.W.; DiGiacomo, A.; Kingstone, A. A sustainable building promotes pro-environmental behavior: An observational study on food disposal. *PLoS ONE* **2013**, *8*, e53856.
39. Wu, D.W.L.; DiGiacomo, A.; Lenkic, P.J.; Wong, V.K.; Kingstone, A. Being in a “green” building elicits “greener” recycling, but not necessarily “better” recycling. *PLoS ONE* **2016**, *11*, e0145737.
40. Xiao, J.; Li, H. Sustainable consumption and life satisfaction. *Soc. Indic. Res.* **2011**, *104*, 323–329.
41. Liu, Y.; Kwan, M.-P.; Wong, M.S.; Yu, C. Current methods for evaluating people’s exposure to green space: A scoping review. *Soc. Sci. Med.* **2023**, *338*, 116303. <https://doi.org/10.1016/j.socscimed.2023.116303>.
42. Jia, Y.; Chen, Z.; Lu, X.; Sheng, S.; Huang, J.; Wang, Y. The degradation and marginal effects of green space under the stress of urban sprawl in the metropolitan area. *Urban For. Urban Green.* **2024**, *95*, 128318.
43. Cornwell, E.Y.; Cagney, K.A. Assessment of neighborhood context in a nationally representative study. *J. Gerontol. Ser. B* **2014**, *69*, S51–S63. <https://doi.org/10.1093/geronb/gbu052>.
44. Vilcins, D.; Sly, P.D.; Scarth, P.; Mavoa, S. Green space in health research: An overview of common indicators of greenness. *Rev. Environ. Health* **2024**, *39*, 221–231. <https://doi.org/10.1515/reveh-2022-0083>.
45. Walls, M.; Gerarden, T.; Palmer, K.; Bak, X.F. Is energy efficiency capitalized into home prices? Evidence from three US cities. *J. Environ. Econ. Manag.* **2017**, *82*, 104–124.
46. Wang, Y.; Shaw, D. The complexity of high-density neighbourhood development in China: Intensification, deregulation and social sustainability challenges. *Sustain. Cities Soc.* **2018**, *43*, 578–586. <https://doi.org/10.1016/j.scs.2018.08.024>.
47. Wang, Y.; Mauree, D.; Sun, Q.; Lin, H.; Scartezzini, J.; Wennersten, R. A review of approaches to low-carbon transition of high-rise residential buildings in China. *Renew. Sustain. Energy Rev.* **2020**, *131*, 109990. <https://doi.org/10.1016/j.rser.2020.109990>.
48. Wei, W.; Ramalho, O.; Mandin, C. Indoor air quality requirements in green building certifications. *Build. Environ.* **2015**, *92*, 10–19.
49. Wells, C.S. Confirmatory factor analysis. In *Assessing Measurement Invariance for Applied Research, Educational and Psychological Testing in a Global Context*; Cambridge University Press: Cambridge, UK, 2021; pp. 245–294. <https://doi.org/10.1017/9781108750561.006>.
50. Weston, R.; Gore, P.A., Jr. A brief guide to structural equation modeling. *Couns. Psychol.* **2006**, *34*, 719–751.
51. White, E.V.; Gatersleben, B. Greenery on residential buildings: Does it affect preferences and perceptions of beauty? *J. Environ. Psychol.* **2011**, *31*, 89–98.
52. Wohlwill, J.F. The physical environment: A problem for a psychology of stimulation. *J. Soc. Issues* **1966**, *22*, 29–38.
53. Norton, B.; Costanza, R.; Bishop, R.C. The evolution of preferences: Why ‘sovereign’ preferences may not lead to sustainable policies and what to do about it. *Ecol. Econ.* **1998**, *24*, 193–211. [https://doi.org/10.1016/S0921-8009\(97\)00143-2](https://doi.org/10.1016/S0921-8009(97)00143-2).

54. O.Nyumba, T.; Wilson, K.; Derrick, C.J.; Mukherjee, N. The Use of Focus Group Discussion Methodology: Insights from Two Decades of Application in Conservation. In *Methods in Ecology and Evolution*; Geneletti, D., Ed.; British Ecological Society: London, UK, 2018; Volume 9, pp. 20–32. <https://doi.org/10.1111/2041-210X.12860>.
55. Oral, H.V.; Carvalho, P.; Gajewska, M.; Ursino, N.; Masi, F.; van Hullebusch, E.D.; Kazak, J.K.; Exposito, A.; Cipolletta, G.; Andersen, T.R.; et al. A review of nature-based solutions for urban water management in European circular cities: A critical assessment based on case studies and literature. *Blue-Green Syst.* **2020**, *2*, 112–136. <https://doi.org/10.2166/bgs.2020.932>.
56. Rao, Y.; Zhong, Y.; He, Q.; Dai, J. Assessing the Equity of Accessibility to Urban Green Space: A Study of 254 Cities in China. *Int. J. Environ. Res. Public Health* **2022**, *19*, 4855. <https://doi.org/10.3390/ijerph19084855>.
57. Reyes-Riveros, R.; Altamirano, A.; De La Barrera, F.; Rozas-Vásquez, D.; Vieli, L.; Meli, P. Linking public urban green spaces and human well-being: A systematic review. *Urban For. Urban Green.* **2021**, *61*, 127105. <https://doi.org/10.1016/j.ufug.2021.127105>.
58. Yu, C.W.F.; Kim, J.T. Building pathology, investigation of sick buildings—VOC emissions. *Indoor Built Environ.* **2010**, *19*, 30–39.
59. Yuan, K.-S.; Wu, T.-J. Environmental stressors and well-being on middle-aged and elderly people: The mediating role of outdoor leisure behavior and place attachment. *Environ. Sci. Pollut. Res.* **2021**, 1–10. <https://doi.org/10.1007/s11356-021-13244-7>.
60. Yang, Y.; Zhou, D.; Wang, Y.; Meng, X.; Gu, Z.; Xu, D.; Han, X. Planning method of centralized greening in high-rise residential blocks based on improvement of thermal comfort in summer. *Sustain. Cities Soc.* **2022**, *80*, 103802. <https://doi.org/10.1016/j.scs.2022.103802>.
61. Zhang, D. *From Green Buildings Towards Urban Sustainability: Lessons From the Singapore Green Building System*; Working Paper; NUS Department of Real Estate: Singapore, 2020.
62. Zhang, D.; Tu, Y. *Real Estate Developers and the Mandatory Green Building Control Regulations: Evidence from Singapore*; Working Paper; NUS Department of Real Estate: Singapore, 2020.
63. Zhang, L.; Wu, L. Effects of environmental quality perception on depression: Subjective social class as a mediator. *International J. Environ. Res. Public Health* **2021**, *18*, 6130. <https://doi.org/10.3390/ijerph18116130>.
64. Yu, S.; Liu, Y.; Cui, C.; Xia, B. Influence of outdoor living environment on elders' quality of life in old residential communities. *Sustainability* **2019**, *11*, 6638. <https://doi.org/10.3390/su11236638>.
65. Yue, Y.; Yang, D.; Xu, D. How built environment affects the mental health of urban older adults: Contrasting perspective based on observation and perception. *China City Plan. Rev.* **2022**, 31.
66. Zhang, Y.; Altan, H. A comparison of the occupant comfort in a conventional high-rise office block and a contemporary environmentally-concerned building. *Build. Environ.* **2011**, *46*, 535–545.
67. Liu, M.; Timmermans, E.J.; Zou, D.; Grobbee, D.E.; Zhou, S.; Vaartjes, I. Impact of green space exposure on blood pressure in Guangzhou, China: Mediation by air pollution, mental health, physical activity, and weight status. *Environ. Pollut.* **2024**, *356*, 124251. <https://doi.org/10.1016/j.envpol.2024.124251>.
68. Elsaddek, M.; Liu, B.; Xie, J. Window view and relaxation: Viewing green space from a high-rise estate improves urban dwellers' wellbeing. *Urban For. Urban Green.* **2020**, *55*, 126846. <https://doi.org/10.1016/j.ufug.2020.126846>.
69. Zhang, Z.; Zhang, J. Perceived residential environment of neighborhood and subjective well-being among the elderly in China: A mediating role of sense of community. *J. Environ. Psychol.* **2017**, *51*, 82–94. <https://doi.org/10.1016/j.jenvp.2017.03.004>.
70. Zhu, Y. Toward community engagement: Can the built environment help? Grassroots participation and communal space in Chinese urban communities. *Habitat Int.* **2015**, *46*, 44–53. <https://doi.org/10.1016/j.habitatint.2014.10.013>.
71. Liu, Z.; Chen, X.; Cui, H.; Ma, Y.; Gao, N.; Li, X.; Meng, X.; Lin, H.; Abudou, H.; Guo, L.; et al. Green space exposure on depression and anxiety outcomes: A meta-analysis. *Environ. Res.* **2023**, *231*, 116303. <https://doi.org/10.1016/j.envres.2023.116303>.
72. Zuo, J.; Zhao, Z.Y. Green building research—current status and future agenda: A review. *Renew. Sustain. Energy Rev.* **2014**, *30*, 271–281.
73. Lin, J.; Ye, Z.; Yang, H. Thoughts on the underused urban land redevelopment in the era of inventory planning. *China Land Sci.* **2019**, *33*, 1–8.
74. Lin, L.; Li, Y.; Deng, Y.; Wang, J. Spatial-temporal differentiation, influencing factors and over-standard control of residential floor area ratio in Guangzhou City. *Areal Res. Dev.* **2023**, *42*, 55–61.
75. Yu, Y.; Jia, G. The breakthrough point of redevelopment and utilization of low-efficiency urban land. *Urban Dev. Stud.* **2021**, *10*, 74–75.
76. Lu, S.; Qin, Q. The theory research of urban habitability. *J. Beijing City Univ.* **2012**, *1*, 13–16.
77. Xiao, R.; Huang, W.; Li, Q.; Zhang, Y.; Xie, H.; Deng, H.; Jia, Z. Optimization and change analysis of the ecological relevant hydrological indicators in the lower research of the Fu River on PCA-RF. *Resour. Environ. Yangtze Basin* **2024**, *33*, 1563–1575.
78. Tsiotas, D.; Makridis, E.; Polyzos, S. Measuring the effect of COVID-19 on the functionality of urban public spaces: The case of Thessaloniki, Greece. *Theor. Empir. Res. Urban Manag.* **2023**, *18*, 5–23.
79. Wang, H.D.; Ye, J.; Tarin, M.W.K.; Liu, Y.Y.; Zheng, Y.S. Tourists' Safety Perception Clues in the Urban Forest Environment: Visual Quality, Facility Completeness, Accessibility—A Case Study of Urban Forests in Fuzhou, China. *Int. J. Environ. Res. Public Health* **2022**, *19*, 1293.
80. Mak, B.K.L.; Jim, C.Y. Contributions of human and environmental factors to concerns of personal safety and crime in urban parks. *Secur. J.* **2021**, *35*, 263–293.
81. Carothers, P.; Vaske, J.J.; Donnelly, M.P. Social Values versus Interpersonal Conflict among Hikers and Mountain Bikers. *Leis. Sci.* **2001**, *23*, 47–61.

82. Bachinger, M.; Hafner, M.; Harprecht, P. Cultural and space-based factors influencing recreational conflicts in forests. The example of cyclists and other forest visitors in Freiburg (Germany). *Eur. J. Cult. Manag. Policy* **2024**, *13*, 12494.
83. Lin, C.; Wu, L. Green and Blue Space Availability and Self-Rated Health among Seniors in China: Evidence from a National Survey. *Int. J. Environ. Res. Public Health* **2021**, *18*, 545. <https://doi.org/10.3390/ijerph18020545>.
84. Yang, L. Analysis on the Causes and Countermeasures of Inefficient Land Use: Taking the Western Region as an Example. *Land China* **2017**, *380*, 37–39.
85. Guo, B.; Zhang, L.; Li, Y. Research on the path of residents' willingness to upgrade by installing elevators in old residential quarters based on safety precautions. *Saf. Sci.* **2019**, *118*, 389–396.
86. Müller, D.; Leitão, P.J.; Sikor, T. Comparing the determinants of cropland abandonment in Albania and Romania using boosted regression trees. *Agric. Syst.* **2013**, *117*, 66–77.
87. Heikoop, T.H. Assessing soil sealing and ecosystem services of urban front yards using Google Street View: A case study in Bloemhof district Rotterdam, the Netherlands. *IOP Conf. Ser. Earth Environ. Sci.* **2022**, *955*, 012019.
88. Lee, J.; Kim, D.H. Urban Forest Visit Motivation Scale: Development and Validation. *Sustainability* **2023**, *15*, 408.
89. Van Herzele, A.; Collins, K.; Tyrväinen, L. Involving People in Urban Forestry—A Discussion of Participatory Practices Throughout Europe. In *Urban Forests and Trees: A Reference Book*; Springer: Berlin/Heidelberg, Germany, 2005; pp. 207–228.
90. Luo, S.; Patuano, A. Multiple ecosystem services of informal green spaces: A literature review. *Urban For. Urban Green.* **2023**, *81*, 127849.

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