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EVALUATING THE AGE-FRIENDLINESS OF PUBLIC SPACE IN CHINESE URBAN VILLAGES USING THE EFUSQ FRAMEWORK

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Abstract

This study presents a systematic evaluation of age-friendly public spaces in Chinese urban villages, focusing on an empirical investigation of Xin'er Village in Chengdu. Using the Elderly-Friendly Urban Space Questionnaire (EFUSQ), data were collected from a purposive random sample of 104 elderly residents. The results indicate that street spaces exhibit relatively higher age-friendliness (accessibility, $\beta = 0.054$, $p < 0.05$), whereas significant deficiencies persist in public activity areas and green spaces, largely due to inadequate planning and design. Key influencing factors such as barrier-free design ($\beta = 0.054$, $p < 0.05$), nighttime lighting ($\beta = 0.04$, $p < 0.05$), and spatial cleanliness ($\beta = 0.059$, $p < 0.05$) were identified, providing empirical evidence for targeted urban regeneration strategies. These findings underscore the urgent need for comprehensive improvements in the planning and upgrading of urban village environments to enhance safety, accessibility, comfort, and diversity, particularly for vulnerable elderly populations. The study's main contribution lies in establishing an evidence-based framework and validating the application of the EFUSQ within the unique context of Chinese urban villages, a typical informal urban setting. It offers both theoretical insights for environmental gerontology and concrete policy recommendations for improving elderly well-being through spatial interventions.

Keywords: Age-Friendly, Elderly, Evaluation, Public Space, Urban Village

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INTRODUCTION

China has the world's largest and fastest-growing aging population. Advances in medical technology and improved living standards have significantly increased life expectancy from 68 years in 1990 to 77.6 years in 2019 (Yang et al., 2023). However, this demographic shift has placed mounting pressure on the economy, healthcare system, and elderly care services. Establishing a sustainable support system for older adults is therefore essential not only to enhance their health and quality of life but also to ensure broader social stability. Within this context, addressing the physical decline, shifting social roles, and psychological adjustments associated with aging has become an urgent societal concern.

Existing studies highlight the importance of age-appropriate community environments in promoting the well-being of older adults (Sun, 2024). In response, China has introduced the concept of “adaptive space for the elderly”, which emphasises optimising living environments, enhancing social participation, and delivering adaptive services to meet the diverse needs of the ageing population (Sun, 2024; Wang et al., 2023). Simultaneously, policy efforts have promoted a care model based on home, neighbourhood, and institutional support (Krings et al., 2022; Wang et al., 2023), marking a shift from traditional family-based care towards community-centred approaches.

Nevertheless, most research to date has focused on urban centres or well-planned communities, with limited attention paid to transitional spaces such as urban villages. These villages, shaped by China's rapid urbanisation, straddle urban and rural characteristics. Due to historical and institutional factors, they often suffer from inadequate infrastructure, limited public services, and weak social support systems (Krings et al., 2022; Tian et al., 2021). Elderly residents in these areas frequently face deteriorating housing, scarce healthcare resources, and a lack of age-friendly amenities. Despite these challenges, urban villages remain under-explored in ageing-related research, constraining our understanding and impeding the formulation of effective, targeted policies.

This study addresses this gap by assessing the age-friendliness of public spaces in urban villages. Using the Elderly-Friendly Urban Space Questionnaire (EFUSQ), it investigates the perceptions of older residents regarding their community environments and identifies key factors influencing their adaptability. The findings aim to offer empirical evidence to guide the age-friendly transformation of urban villages and inform broader urban renewal and ageing policy in China, contributing to more inclusive social and supportive urban development.

LITERATURE REVIEW

Urban Village

The Chinese term for urban villages is *Cheng-Zhong-Cun*, meaning "village in the city." This term reflects the distinctive spatial and socio-economic features that characterise these areas (Wang, 2013). Unlike the lifestyle neighbourhoods typical of American suburbs, China's urban villages emerged as unintended consequences of rapid urban expansion (Wang, 2021). During the urbanisation process, agricultural land was frequently expropriated for development, while rural settlements were often preserved to reduce relocation costs and avoid prolonged compensation negotiations with local villagers (Xie et al., 2021). Urban villages represent a unique neighbourhood from within China's urbanisation process, marked by spatial characteristics that differ significantly from conventional urban neighbourhoods. Elderly residents in these areas also tend to have distinct socioeconomic and demographic profiles (Kochan, 2015). The formation and evolution of urban villages are closely tied to the complexities of urban development, including land scarcity, rural-to-urban migration, and planning constraints. Initially established as rural hamlets, these areas have been gradually integrated into the expanding urban fabric, giving rise to the modern urban village — a hybrid of urban and rural elements. This transformation reflects demographic shifts as well as socio-economic and spatial reconfigurations associated with rapid urbanisation. Urban villages are typically informal settlements characterised by substandard housing, inadequate infrastructure, and the absence of formal urban planning. They are often situated on the urban fringe or embedded within city boundaries (Peng et al., 2023; Al, 2019). This phenomenon has blurred the traditional urban-rural divide, creating a transitional spatial and social category that houses large populations of migrant workers.

The development of urban villages in China generally follows three stages: expansion, densification, and intensification, each driven by urban sprawl and the pursuit of employment opportunities (Hao, 2013). A key concern regarding these spaces is their limited age-friendliness, particularly poor spatial accessibility and environmental quality, which affect the elderly disproportionately.

Table 1: Comparison of rural villages, urban villages, and urban neighbourhoods

	Rural village	Urban village	Urban neighbourhood
Existing landowner	Collectively owned	Collectively owned	State owned
Industry	Agriculture	Rental	Secondary, tertiary
Economic organisation	Collective economy	Collective economy	Corporate
Society administration	Village committee	Village committee	Neighbourhood committee
Public costs	Collective economy	Collective economy	Government funds

Source: (Shen & Sun, 2023; Willits et al., 2019; Cottam, 2023).

Furthermore, public facilities in urban villages are often poorly adapted to meet the needs of elderly individuals, with limited opportunities for social engagement and support for mental well-being. These challenges are compounded by intersecting pressures of urbanisation, population ageing, and insufficient provision of community space. Infrastructure deficits, environmental degradation, and underdeveloped social services exacerbate the vulnerabilities of elderly residents (Samsurijan et al., 2017; Wang, 2021). In response, the Chinese government has initiated a series of urban village transformation programmes. These efforts focus on upgrading dilapidated housing, improving infrastructure and sanitation, and reclaiming land for more effective spatial planning, all aimed at enhancing living conditions and promoting integrated urban development (Wang, 2021).

Elderly Friendly Environment

The conceptual foundation for age-friendly environments was established by the World Health Organization's (WHO) 2007 Age-Friendly Cities framework, which outlines core domains for supporting active ageing. This global initiative has spurred research worldwide, with studies in countries like Malaysia reinforcing the universal importance of factors such as safe walkability, accessible amenities, and social inclusion for older adults (Khalid et al., 2020; Rashid et al., 2021). This global body of work, however, predominantly focuses on formal urban settings. A recent bibliometric review by Zhao et al. (2023) corroborates this, highlighting a distinct knowledge gap regarding informal settlements like urban villages. This gap is particularly critical given the unique spatial, social, and policy challenges these areas present, and it is within this global yet under-explored niche that our study positions itself.

In China's urban villages, the translation of WHO principles and internationally recognized needs into practice faces substantial barriers. Inadequate physical infrastructure directly contradicts the emphasis on accessible outdoor spaces and buildings prevalent in the literature. Uneven walkways, limited green spaces, and insufficient seating inhibit mobility and social interaction among the elderly (Wang et al., 2023), while the lack of community support services exacerbates loneliness and mental health concerns (Sun, 2024), undermining the social participation domain central to the age-friendly canon. The frequent oversight of older adults' needs during urban village transformation (Zhao et al., 2023) further widens the gap between global policy intentions and local lived reality.

This misalignment creates an urgent need for context-specific assessment tools. Studying age-friendliness in urban villages is therefore critical not only for addressing immediate livability concerns but also for testing and adapting global age-friendly frameworks in underrepresented contexts. Such

research can inform renovations through scientifically grounded assessment of elderly needs and satisfaction (Li et al., 2022), ultimately contributing to more equitable urban development that leaves no older resident behind.

RESEARCH METHODOLOGY

Research Approach

This study adopts a quantitative research methodology with a cross-sectional design to investigate older adults' perceptions of the age-friendliness of public spaces in urban villages and the factors influencing these perceptions. Data were collected using structured questionnaires, and statistical analysis was employed to examine the relationships between key variables. A cross-sectional design is particularly suited for capturing the experiences and needs of older adults at a specific point in time, providing timely insights for policy and urban planning. The strength of the quantitative approach lies in its objectivity and capacity for systematic analysis, enabling the identification of patterns and challenges faced by the elderly, thereby enhancing the reliability and validity of the findings.

Data Collection

Data collection was conducted in three stages: instrument preparation, participant recruitment, and fieldwork. The primary measurement tool was the Elderly Friendly Urban Spaces Questionnaire (EFUSQ) (Lak et al., 2019), which has been validated in international studies on age-friendly cities. The EFUSQ assesses seven key dimensions: safety, convenience, comfort, accessibility, aesthetics, sense of belonging, and social interaction.

To tailor the EFUSQ to the cognitive and cultural context of older adults in urban villages, several modifications were made: language was simplified, using colloquial expressions and avoiding technical jargon; locally contextual examples were added, such as replacing abstract questions on accessibility with items like, "Is it convenient to take a break in a small square in the village?"; a 5-point Likert scale (1 = very inconvenient to 5 = very convenient) was adopted to improve ease of response and reduce cognitive burden.

During participant recruitment, a purposive random sampling strategy was employed. Eligibility criteria included individuals aged 60 years or above who had lived in the urban village for an extended period, regularly used public spaces, and possessed basic communication skills. From this screened pool, a random sample was drawn. This approach ensures the sample reflects typical usage patterns and needs among elderly urban village residents, avoiding biases that purely random sampling might introduce, such as overrepresenting healthy and active individuals. While this limits the generalizability of the findings, the study's objective is exploratory, prioritizing depth over breadth. The final sample size was N=104, sufficient to support basic statistical analyses.

Fieldwork was conducted in four rounds (6th, 10th, 15th, and 23rd March 2024) using a face-to-face interview format. Researchers assisted participants in completing the questionnaire. For respondents with visual or literacy challenges, questions were read aloud and clarified as needed to ensure responses accurately reflected personal experiences. Each interview took approximately 15-20 minutes, and all responses were anonymised.

Data analysis

This study adopts a systematic and structured approach to analysing the questionnaire data. The analysis begins with an examination of the respondents' demographic characteristics, including age, marital status, education level, and length of residence in the urban village. This provides essential context for a better understanding of the sample composition. Next, the reliability of the survey instrument is assessed using Cronbach's alpha coefficient, while validity is evaluated through the Kaiser-Meyer-Olkin (KMO) measure and Bartlett's sphericity test. These tests determine the suitability of the data for further statistical analysis and ensure the robustness of the instrument used. Upon establishing the reliability and validity of the instrument, multiple linear regression analysis is conducted to identify the factors influencing the age-friendliness of public spaces for older adults. To assess the integrity of the regression model, multicollinearity diagnostics, including variance inflation factor (VIF) tests, are performed. These steps ensure the internal consistency, rigour, and reliability of the findings.

Study Area

This study focuses on Xin'er Village, situated in the Jinniu District of Chengdu, China. With a population of approximately 10,430, about 22.76% of whom are elderly, Xin'er Village represents a typical urban village currently in the early stages of redevelopment. Like many rapidly urbanizing Chinese cities, Chengdu faces significant challenges in upgrading such informal settlements. The area is characterized by narrow, congested streets, poorly maintained sidewalks, various safety hazards, and unsanitary alleyways, all of which collectively diminish residents' quality of life. Public spaces are limited and often fail to meet the demands of daily activities, a shortcoming that disproportionately affects older residents. Despite these physical constraints, many elderly individuals maintain active engagement in community life, underscoring the critical need for age-sensitive urban design. This research evaluates the age-friendliness of three principal public space typologies within Xin'er Village: streets, alleys, and communal gathering spaces. These typologies reflect the common spatial configuration found in Chinese urban villages and provide a foundational basis for assessing the suitability of public spaces for an ageing population.



Figure1: Satellite Image of Xiner Village
Source: Baidu map (2025)

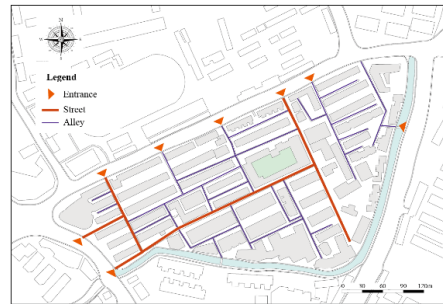


Figure 2: Distribution of streets and alleys
Source: Author's own work (2024)

ANALYSIS AND FINDINGS

Socio-Demographic Profile of the Respondents

This study surveyed 104 elderly residents of Xiner Village in Chengdu. Detailed respondent characteristics are presented in Table 2. The average age of participants was 72.1 years, with 60.6% reporting being married. Educational attainment was generally low, with only 4.8% having completed high school or higher education. Most respondents (94.2%) were retirees, highlighting a key demographic trait of the sample. In terms of financial capacity, only 7.7% reported a monthly expenditure below \$500. Regarding residential location, 36.5% of the participants lived within Xiner Village itself, while a further 20.2% resided in nearby areas, indicating a strong connection to the locality.

Table 2: Respondents Profile

Total Respondent:	104	
	Frequency	Percentage (%)
<i>Age</i>		
65-74	70	67.30%
75-84	30	28.80%
85 or above	4	3.80%
<i>Marital status</i>		
Single	3	2.90%
Widow	38	36.50%
Married	63	60.60%
<i>Education</i>		
Lower than primary school	16	15.4%
Primary school-high school	83	79.8%
Higher than high school	5	4.8%
<i>Monthly expenses (CNY)</i>		
Lower than 500	8	7.7%
500-1000	73	70.2%
Above 1000	23	22.1%
<i>Occupation</i>		

Total Respondent:		104
Employed	1	1%
Housewife	5	4.80%
Retired	98	94.20%
<i>Length of residence</i>		
In one year	6	5.8%
1-5 years	17	16.3%
Above 5 years	81	77.9%
<i>Place of residence</i>		
Inside Urban Village	38	36.5%
Close to Urban village	21	20.2%
Outside Urban Village	45	43.3%
<i>Reason for residence</i>		
Low prices and convenient living	55	52.9%
With parents	19	18.3%
With children	30	28.8%

Source: author's work

Affordability and convenience were the primary reasons cited for residing in the area, accounting for 59.2% of responses. A small proportion of participants (5.8%) had lived in the area for less than one year, indicating a relatively stable residential population. Notably, six individuals were excluded from the analysis due to difficulties in comprehending the survey questions, which may have introduced minor limitations to the data's accuracy. The findings suggest that perceptions of age-friendliness among older residents were influenced by a range of socio-demographic factors, including age, educational background, occupation, marital status, place of residence, and monthly expenditure.

Reliability and Validity Test

The reliability of the survey data was assessed using Cronbach's alpha coefficient, which measures internal consistency. All alpha values for the respective dimensions exceeded 0.5, indicating an acceptable level of reliability. Furthermore, the α coefficient remained above 0.6 even when the individual items were removed, confirming the robustness of the evaluation index system and its suitability for further analyses.

To assess the suitability of the data for factor analysis, the Kaiser-Meyer-Olkin (KMO) measure and Bartlett's Test of Sphericity were employed. The KMO value was 0.737, surpassing the minimum threshold of 0.7, while Bartlett's test yielded a statistically significant result ($\chi^2 = 2228.883$, $df = 820$, $p < 0.001$). These outcomes indicate strong inter-item correlations and affirm the structural validity of the questionnaire, thereby supporting its use in subsequent statistical procedures.

Table 3: KMO and Bartlett-based validity test.

Kaiser-Meyer-Olkin metrics		0.737
Bartlett spherical test	approximate chi-square	2228.883
	df	820
	Sig.	0.000

Source: Author's work

Factors Influencing User Perception

The study identified significant differences in elderly residents' evaluation of the adaptability of urban village environments, which were shaped by various socio-demographic factors, including age, occupational background, marital status, length of residency, educational attainment, and monthly expenditure. These differences were particularly evident across several dimensions of public use. Notably, perceptions of the suitability of different types of public space exhibited a clear hierarchy. Street spaces received the highest ratings, attributed to their well-developed commercial amenities such as farmers' markets and retail shops, and the presence of organically formed social interaction venues. The spatial ambience dimension was ranked second, benefiting from the stable social networks formed by long-term residency (77.9% of respondents had lived in the area for more than five years). In contrast, formal public activity spaces and green areas received the lowest evaluations, reflecting deficiencies in landscape design and dedicated recreational infrastructure within urban villages. A summary of key influencing factors and their corresponding survey findings is presented in Table 4 below:

Table 4: Analysis of results in different factors

Factor	Key Findings	Data
Age	Seniors aged 85 and above prioritised infrastructure utility and accessibility, while younger seniors (65-74) focused more on environmental comfort and recreational attributes. This reflects a shift from leisure to protection with increasing age.	Street space rating of 40.500 (85+); Green space score of 24.586 (65-74); 75-84 age group displayed transitional preferences.
Marital status	Single seniors exhibited high spatial autonomy and environmental sensitivity. The married group demonstrated the most stable assessments, while the widowed showed the greatest variability.	Street space score for single group was 41.000; Married group rating range 35-37; Standard deviation (widowed) of 4.2
Education	A positive correlation was observed between educational level and spatial evaluation. Highly educated individuals were more critical, whereas those with lower educational levels showed greater inclusivity.	Average score: Primary school group 37.688; High school group 29.600; University group presented the highest expectations.

Factor	Key Findings	Data
Monthly expenses (CNY)	Income level influenced expectations: low-income respondents prioritised basic functionality; higher-income groups desired multifunctional spaces; middle-income groups offered the most representative evaluations.	<\$500 group street rating is 40.000; >\$1000 group green space score 24.217; 70% of sample earned \$500-\$1000 monthly.
Occupation	Retirees gave consistently positive and stable evaluations; working seniors faced time constraints; housewives prioritised spaces for children's activities. Occupational differences influenced patterns of space usage.	Retiree average rating was 36.367; Working group scores were 15-20% lower; Child-related concerns prominent among housewives.
Length of residence	A typical 'adaptation curve' was observed: residents of 1–5-year provided the most favourable evaluations; long-term residents identified more deficiencies; newcomers experienced a 'honeymoon effect'.	Peak ratings among 1–5-year residents; 5-8% decline among the 5+ year group; Notable variability among those with <1 year residency.
Place of residence	Residents in core village areas rated their environment more favourably due to more frequent space use. Peripheral residents were more reliant on public amenities, reflecting spatial and functional disparities.	Climate rating of 29.156 (core village); Peripheral group scored 10-12% lower; transitional area residents had intermediate ratings.
Reason for residence	Family structure significantly shaped perceptions. Those living in multi-generational households gave the highest ratings. Elderly individuals living alone or as empty nesters displayed heightened reliance on public space.	Co-resident group average of 39.033; Living alone group scored 8-10% lower; Empty nesters reported pronounced social needs.
Activity characteristic	Daily activity types influenced spatial priorities. Socially active seniors emphasised ambience, while function-oriented seniors prioritised convenience. Activity radius also impacted spatial evaluations.	+12% for social atmosphere; +15% for functional convenience; Mixed activity types yielded the most balanced ratings.

Source: Author's work

Regression model analysis

This study investigates the factors influencing elderly residents' perceptions of the age-friendliness of public spaces in urban villages. A multiple linear regression model was developed to analyze the survey data. In this model, the various dimensions of public space friendliness served as dependent variables (Y), while individual survey items were used as independent variables (X). Prior to regression analysis, multicollinearity diagnostics were conducted using the Variance Inflation Factor (VIF) and tolerance statistics. The results indicated that all tolerance values were well above the common threshold of 0.1 (ranging from 0.743 to 4.351), and all VIF values were substantially below the conservative cutoff of 5 (ranging from 0.230 to 1.346). These results confirm the absence of

multicollinearity among the predictor variables, thereby ensuring the reliability and interpretability of the regression outcomes. The regression models for all four dimensions demonstrated statistical significance ($p < 0.001$) and exhibited acceptable explanatory power, with R^2 values ranging from 0.637 to 0.724, indicating that the independent variables explain 63.7% to 72.4% of the variance in the age-friendliness evaluations.

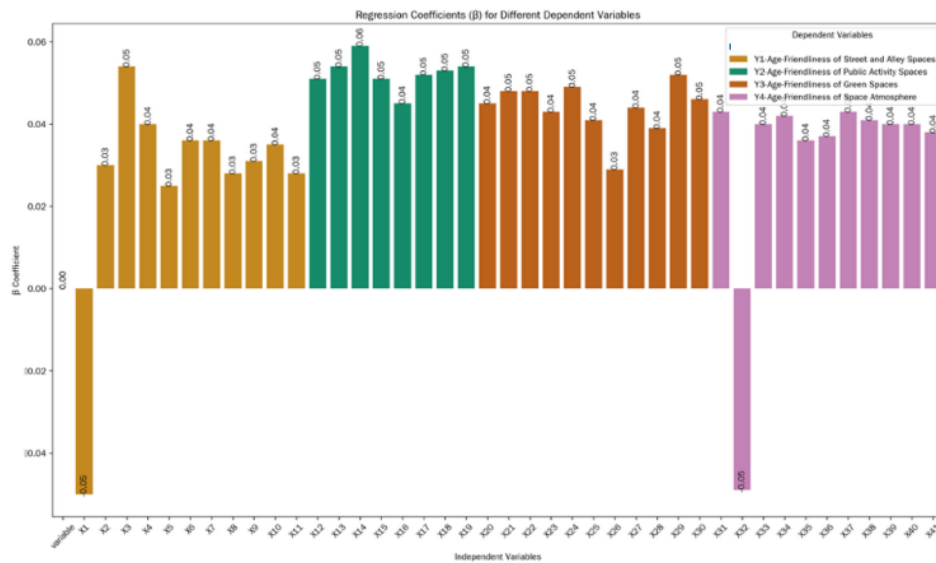


Figure 3: Results of multiple covariance tests for the independent variables and regression analyses

Street and Alleyway Space (Y1)

Regression analysis indicates that the age-friendliness of street and alleyway spaces is most significantly influenced by barrier-free design (X3, $\beta = 0.054$) and nighttime lighting (X4, $\beta = 0.04$). The model for street and alley spaces (Y1) yielded an R^2 of 0.692, explaining 69.2% of the variance. Key improvements to enhance accessibility include minimising differences in floor levels, increasing the availability of rest areas, and improving lighting conditions after dark. Additionally, pavement smoothness (X1, $\beta = -0.05$) and the presence of guide signs (X6, $\beta = 0.036$) were found to significantly affect older adults' experience in these spaces. These findings underscore the need for urban village street renewal initiatives to prioritise fundamental safety measures while enhancing pedestrian comfort.

Public activity space suitability for the elderly (Y2)

For public activity spaces, the most influential factors are cleanliness (X14, $\beta = 0.059$) and privacy-oriented design (X19, $\beta = 0.054$). The regression model for public activity spaces (Y2) achieved an R^2 of 0.724, indicating strong explanatory power. Elderly participants showed a preference for clearly demarcated, well-maintained areas and expressed support for gender-segregated facilities. The results also highlight the importance of seating comfort (X17, $\beta = 0.052$) and adequate shading (X21). These insights suggest that facility managers should focus not merely on the quantity of amenities but also on maintenance quality and user-centred design to better address the specific needs of older users.

Green space suitability for the elderly (Y3)

The perceived suitability of green spaces is largely determined by functional diversity (X29, $\beta = 0.052$) and spatial zoning (X32, $\beta = -0.049$). The model for green spaces (Y3) produced an R^2 of 0.637, accounting for 63.7% of the variance. Elderly respondents expected green spaces to offer both opportunities for social interaction and leisurely enjoyment. However, noise disturbance from children's play areas significantly diminished satisfaction levels. Effective zoning — separating quiet zones from active zones and managing usage by age group — emerged as a key recommendation. Furthermore, the selection of vegetation types (X24, $\beta = 0.049$) and the design of walking paths (X30, $\beta = 0.046$, $p < 0.01$) were also important considerations for fostering a more enjoyable and accessible outdoor environment.

Spatial Atmosphere Age-Friendliness (Y4)

The age-friendliness of the spatial atmosphere is primarily shaped by architectural aesthetics (X37, $\beta = 0.043$) and air quality (X38, $\beta = 0.041$). The regression model for spatial atmosphere (Y4) resulted in an R^2 of 0.658, explaining 65.8% of the variance. Participants favoured building facades that reflected local cultural elements and well-ventilated environments. Conversely, high-rise buildings were associated with a sense of oppression (X36) and negatively influenced perceptions. Incorporating community memory (e.g., traditional motifs) and establishing social interaction nodes were also found to enhance residents' sense of belonging. Renovation efforts should aim to balance new developments with the preservation of existing landscapes and soften rigid environments through the integration of public art and cultural expression.

DISCUSSION

The findings of this study on the elderly-adaptability of public spaces in urban villages offer valuable policy implications. Older residents of Xiner Village rated the street space most favourably, attributing their positive evaluations to the

multifunctional nature of these spaces, which organically integrate commercial, social, and leisure functions. This spontaneously formed, mixed-use spatial pattern effectively operates as a neighbourhood life hub and serves as a meaningful reference for the age-friendly transformation of similar urban villages environments. In contrast, public activity spaces and green spaces received lower evaluations in terms of elderly-adaptability, pointing to deficiencies in their design and planning. Based on the regression analysis, the study proposes the following interventions: first, prioritise improvements to accessibility infrastructure and night-time lighting in street environments; second, enhance the functional configuration of existing public activity areas through targeted ‘micro-renewal’; and third, establish a collaborative public space maintenance mechanism involving government agencies, community organisations, and residents. These findings present a useful comparative perspective alongside the study by Tao et al., (2021) on five age-friendly neighbourhoods in Singapore. In terms of spatial accessibility, both Singapore's formalised ‘barrier-free walking network’ and the informally developed pedestrian system in urban villages effectively promote daily mobility among older adults. This affirms the importance of a continuous, safe, and accessible walking environment as a fundamental component of age-friendly urban design. Moreover, regarding the social support dimension, both contexts demonstrated how spatial design facilitates social connections. In Singapore, intergenerational communication spaces are intentionally incorporated into the neighbourhood plan, whereas in urban villages, similar outcomes emerge through organically formed commercial and social nodes. These findings collectively underscore the pivotal role of the social function of public space in promoting the well-being of older people.

Nevertheless, the study also highlights culturally rooted differences in implementation. Singapore's approach to creating age-friendly environments is largely government-led and characterised by standardised retrofitting of infrastructure. In contrast, urban villages tend to evolve through resident-led, adaptive spatial practices. This divergence suggests that while elderly-adaptability should adhere to universal principles such as safety, accessibility, and social connectivity, it must also respond sensitively to local spatial characteristics and socio-cultural contexts.

CONCLUSION

This study provides a systematic evaluation of age-friendly public spaces in the informal setting of Chinese urban villages, revealing that street spaces exhibit higher age-friendliness while significant deficiencies exist in public activity and green areas. Key influencing factors such as barrier-free design, nighttime lighting, and spatial cleanliness were empirically identified. The primary theoretical contribution of this research lies in the successful adaptation and

validation of the EFUSQ framework within an informal urban context, thereby extending its applicability beyond formally planned environments and offering a replicable methodological tool for studying age-friendliness in similar informal settlements globally.

To enhance age-friendliness, urban village upgrades must integrate physical improvements with tailored social support, addressing the diverse needs of elderly residents. Although limited by its cross-sectional design and single-case focus, this study establishes a crucial evidence-based foundation for future urban renewal policies and provides a validated framework for creating inclusive, supportive environments for ageing populations in rapidly urbanizing contexts.

ACKNOWLEDGEMENT

The study was conducted in strict adherence to academic ethical standards. Research permission was duly obtained, and all participants provided informed consent prior to data collection. To ensure confidentiality, all data were anonymised and securely stored on a password-protected server, accessible only to authorised members of the research team. The study received no external funding and was free from any conflicts of interest. All data were used solely for academic purposes.

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