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Study on Micro-updating Strategies for Age-Friendly Public Spaces in Small and Medium-Sized Cities' Old Communities

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ABSTRACT: Focusing on the scarcity of elderly care resources in small and medium-sized cities in Zhejiang Province, this study aims to efficiently, gradually, and precisely improve the age-friendliness of stock spaces in old communities. Based on the shortage of age-friendly spaces and the conflict between supply and demand, the study identifies four typical spatial features through on-site questionnaires and other surveys. Moreover, by focusing on the behavior of elderly residents and analyzing the content, patterns, and priority of their needs, the study identifies principles for extracting potential micro-public spaces, including proximity, disadvantaged spaces, and surplus spaces. Finally, the study proposes micro-updating strategies for age-friendly communities in small and medium-sized cities by improving the design guidelines, establishing industrial component standards, and exploring diversified collaborative mechanisms, which is demonstrated by a case design.

KEY WORDS: small and medium-sized cities; old communities; age-friendliness; micro-public spaces; micro-updating

1 Background

The aging of old communities has always been a hot social issue.With the proportion of elderly people in some old communities even exceeding 40% and there being a large number of elderly people living alone or in empty nests, the resulting agglomeration of such elderly people [1] urgently needs social attention and government support. At present, most of the more mature elderly care transformation systems and mechanisms are established in large cities or rural areas. Small and medium-sized cities have different characteristics and attributes from the former in terms of community physical form, living pattern, neighborhood relations, social supporting model, regional culture, and the status of the elderly population. Compared with large cities, small and medium-sized cities have more scarce elderly care supporting resources, weaker elderly care awareness, and a larger elderly population. Therefore, the current elderly care systems cannot be directly applied to small and medium-sized cities.

At the same time, the existing old community transformation modelis relatively coarse and cannot meet the humanistic needs of the elderly. In September 2022, the Department of Housing and Urban-Rural Development of

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Zhejiang Province issued the "Technical Guidelines for the Renovation of Old Urban Communities in Zhejiang Province (2022 Edition)." The content about renovation and renewal mainly focuses on the overall comprehensive improvement at the macro and meso levels of the community, such as public services, municipal supporting facilities, house building maintenance, and environmental improvement. However, there is still a certain gap with the quality of life demands of the elderly, so it is particularly important to seek a more "micro" level of renewal. At present, more and more scholars are exploring the significance of micro-renewal through continuous practice. For example, large cities such as Beijing, Shanghai and Guangzhou are the main typical practice places for micro-renewal [2-4]. Whether from the perspective of trial and error of construction models, inheritance of historical context, activation of community vitality, or optimization of social networks, a large number of micro-renewal pioneer explorations have been carried out.

In the context of limited resourcesregarding space, funds, supporting facilities, and talent reserves, the "micro" renewal of small and medium-sized cities for the elderly needs to consider its economic feasibility, universal applicability, and functional optimization, rather than the experimental and personalized design of large cities. This article mainly focuses on the public spaces in old communities in small and medium-sized cities (within the range of 5-10 minutes of living circles). Based on the recognition of limited community space, the author hopes to further focus on and refine the main behavioral activities of the elderly and explore the potential small and micro public spaces suitable for the elderly, so as to sort out the micro-renewal strategy of suitable spaces for the elderly through typological methods and means of architectural industrialization. By paying attention to small and micro public spaces and using micro-renewal methods, we can achieve a transition from relatively coarse comprehensive improvement to refined quality improvement, and effectively optimize the suitability of old communities for the elderly.

2 Spatial characteristics and limitations of old communities

The old communities in small and medium-sized cities focused on in this article are mainly residential areas from the 1980s to the 2000s. These communities have poor environmental quality and poor suitability for the elderly. According to incomplete statistics, most of the residential buildings in cities were built after the 1980s, especially during the period of welfare housing distribution (the proportion of residential communities built during the period of 1980-2000 accounted for more than 50% of the urban residential area [5]). The community space form during this period had historical limitations, and conventional renovation methods failed to effectively solve the problems brought about by the increasing aging of the community. The phenomenon of the extension of the daily life of the elderly has caused considerable conflicts with the existing community space.

2.1 Characteristics and types of old community space

The team visited and surveyed small and medium-sized cities in Shaoxing, Jinhua, Wenzhou, Huzhou and other places in Zhejiang Province, and selected a relatively typical old community as shown in Figure 1 below, showing the relationship between its satellite images, road network and residential units, reflecting a relatively high-density and compact geometric layout. Different types of residential units form the existing community public space under the constraints of the "fishbone" structure road system [6], showing the typical characteristics of "single line" layout. The spatial form of this type of "single line" residential unit is simple and small and fragmented. Combined with the invisible space field of residents' life extension, its physical space type can be divided into four categories: outdoor house-to-house space, house-side space, alley space and indoor residential traffic space (as shown in Figure 2). The specific spatial characteristics are as follows:

1) House-to-house space: a large space area between residential units in the long direction (mostly north-south direction), usually with functions such as green parks, traffic parking, and leisure space, with good openness and suitable for large-scale gatherings. Part of it is occupied by supporting warehouses.

2) House-side space: the edge space within 1-3M of the residential unit building. The space is compact, and due to the close connection with the first-floor function, the spatial independence is poor, and its domain and sense of belonging are relatively strong. It usually includes functions such as residen-

tial entrance, house-side green space, house-side street, and house-side trail. It is also the area where the phenomenon of life extension is most obvious.

3)Alley space: Alley space in the direction of the gable of the residential unit building, most of which are the main roads in the community, with a width of 4-12 meters, good accessibility, mainly including spaces for transportation, parking and other purposes.

4) Residential traffic space: Public vertical and horizontal traffic space in the unit building, mainly including stairs and walkway space, generally limited to the activities of the elderly in the unit.

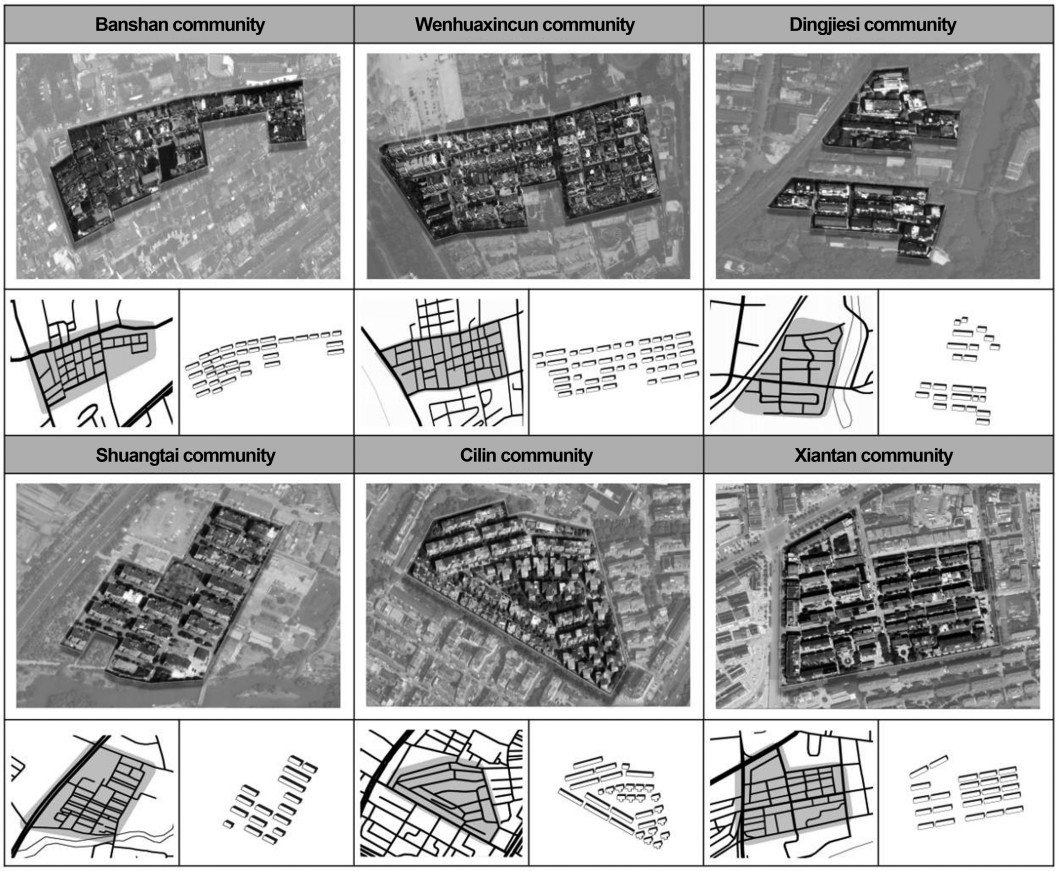


Figure 1 Texture relationship diagram of a typical old community (drawn by the authors)

2.2 Spatial limitations and problems of old communities

The above-mentioned 80-00 old communities are different from the current mainstream high-rise low-density residential planning. Their multi-story high-density layout makes the space resources for activities scarce. By comparing the utilization rate and development degree of space, it can be found that there are roughly two types of fragmented remaining spaces for residents' activities, such as house-to-house spaces, n. One is the functional space that already exists in the planning and cannot bear the residents' activities; the other is the functional space that is spontaneously "occupied" and carries a certain number of residents' self-organized activities. The former does not match the living habits of residents, and the latter's poor spatial arrangement will disrupt the overall unity of the community, further exacerbating the fragmentation and disorder of the already limited space. Faced with this type of old communities with limited construction resources, it is no longer possible to carry out large-scale integration or transformation, and it is very difficult to update for the elderly. At the same time, compared with larger cities, the old communities in these small and medium-sized cities have the following characteristics and problems:

1) The community boundaries are more blurred and open, the overall space is slightly looser than that of larger cities, and the mixed functions of the first floor are more obvious;

2) The parking problem is prominent, but the phenomenon of random occupation and random parking of

vehicles is relatively mild, and there is still room for improvement;

3) The outdoor greening rate is low, and the environmental quality and humanized space are relatively weak;

4) The phenomenon of residents' life extension is more serious, and the functional occupation of nurseries, livestock, drying and other functions is prominent (as shown in Figure 3);

5) There is a lack of barrier-free design, low continuity of access, and a weak sense of living circle.

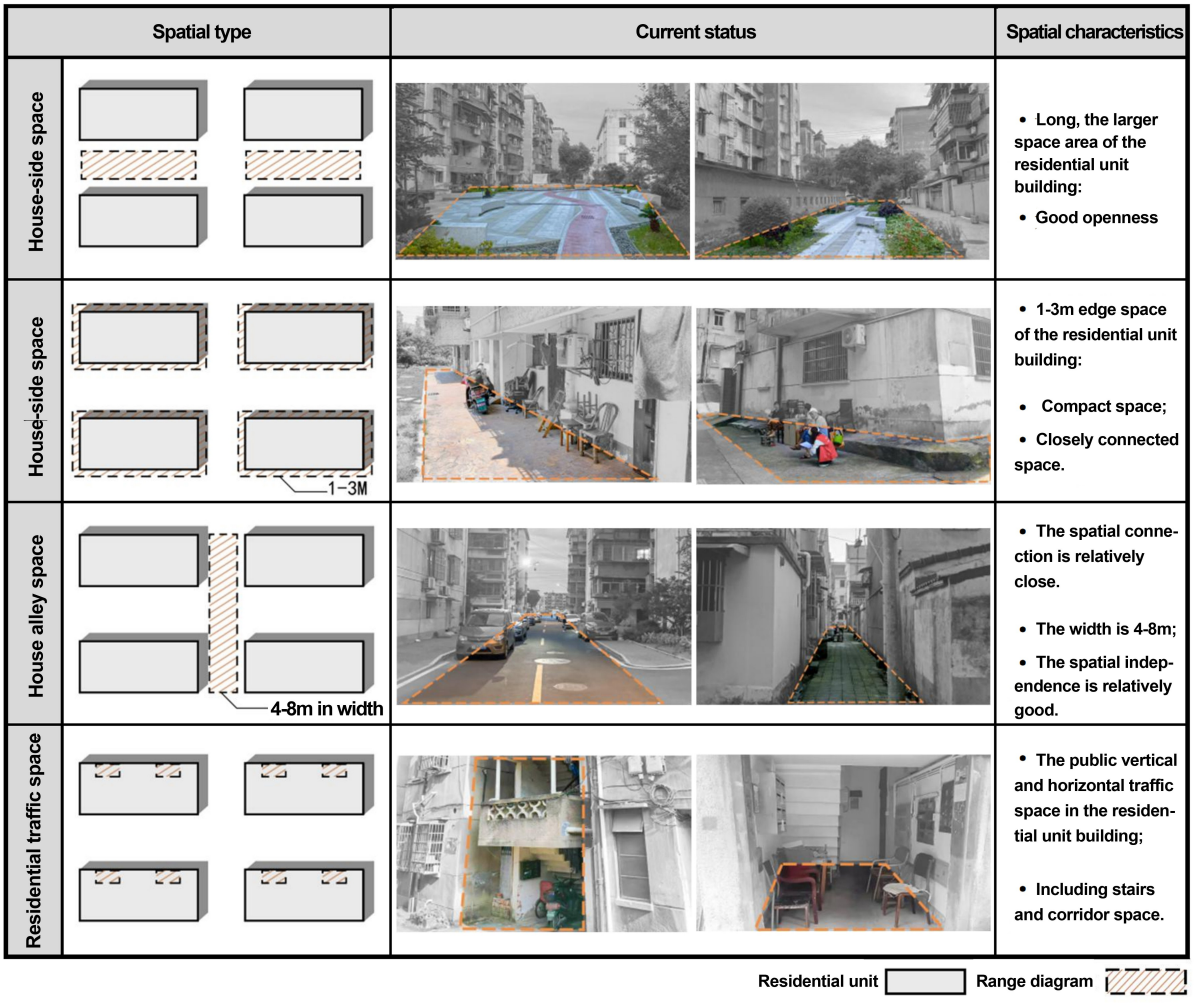


Figure 2 Types and characteristics of old community spaces (drawn by the authors)



Figure 3 Current situation of residents' life extension phenomenon (photographed by the authors)

3 The behavior and needs of the elderly in old communities

When entering the stage of senior citizenship, the functions of the body have declined to varying degrees. Due to the limitations of time and distance, the behavior and activities of the elderly show certain patterns, and their activity range gradually shrinks. The 5-10-minute community living circle (200-500 m) is the basic scale of old communities and the high-frequency range of elderly activities. Especially for the elderly over 70 years old, the proportion of needs within a 5-minute walk exceeds 50% [7]. How to condense the elderly's activities within this 5-10-minute living circle is the key.

The elderly's behavior and activities can be divided into relatively dynamic and static. The dynamic behavior is mainly based on mobility such as traveling, including walking and running. The scope of such activities is relatively large, the differences are relatively random, the range is wide, and the spatial form is difficult to define. The relatively static residence behavior almost covers the important social and leisure activities of the elderly, and there are patterns to follow. Its spatial range is limited, and the scale is relatively fixed. Under the background of limited resources, it has certain limitations and guiding significance for further focusing on the scope of elderly-friendly renewal and screening the existing "micro" space. This article will focus on the resident behavior and needs of the elderly and analyze the demands of resident behavior on the function, scale, energy efficiency and other aspects of the elderly-friendly space through the three dimensions of behavior content, rules and demand order.

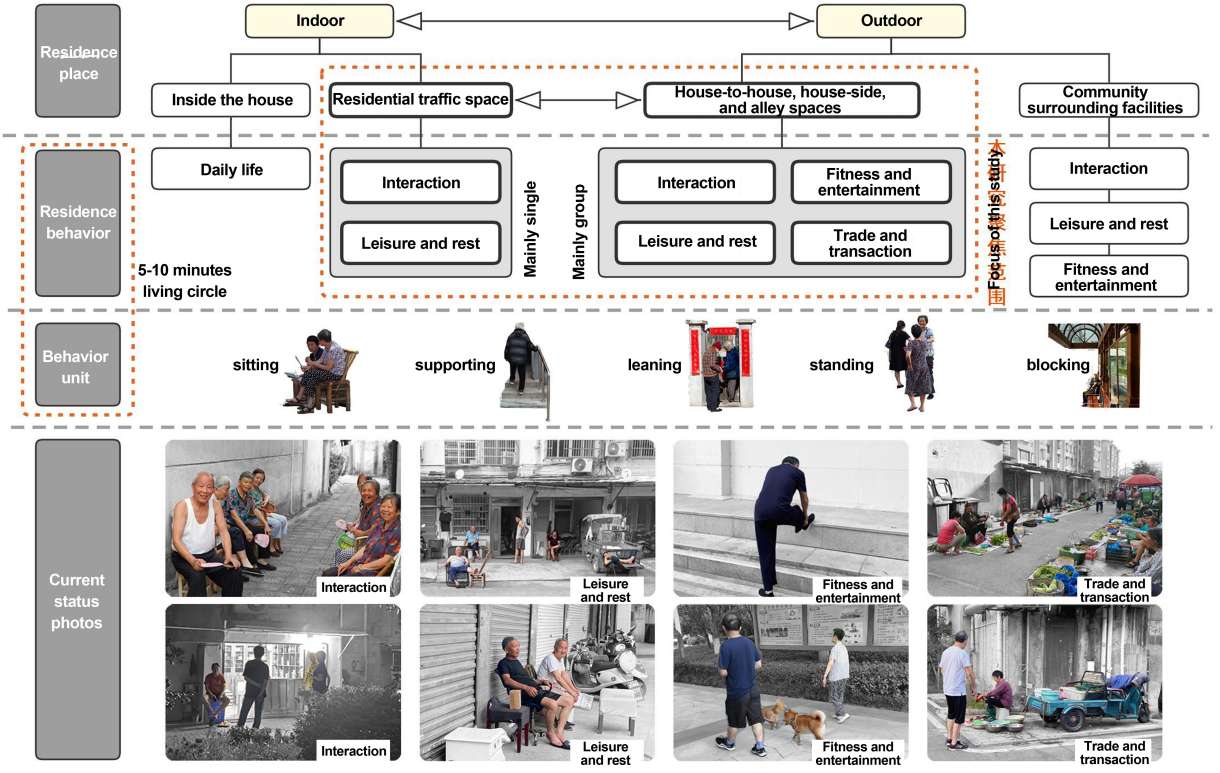


Figure 4 The behavior of the elderly in old communities (drawn and photographed by the authors)

3.1 Behavior content and unit elements

This article understands resident behavior as the life and social behavior of the elderly staying or moving in a limited area. According to the current situation survey and tracking, the resident behavior of the elderly can be divided into four categories (as shown in Figure 4): interactive communication, mainly chatting; leisure and rest, mainly sunbathing, enjoying the cool, resting, viewing, reading newspapers, gardening and other behaviors; fitness and entertainment, mainly sports, square dancing, chess and cards and other behaviors; trading, mainly informal market behaviors such as stalls. The above four types of people's behavior activities are inseparable from unit actions, such as standing to chat, sitting to read newspapers, etc. Once

these ordinary actions involve the elderly, they need more humane care, such as the need to shelter from the elements, and the need to rest and sit when tired. In summary, the author believes that to meet the needs of the elderly's stay, we must first consider the needs of the five major unit elements of the space: sitting, supporting, leaning, standing, and blocking.

3.2 Behavioral patterns and spatial utility

The behavior of the elderly has certainpatterns in terms of time, space use and group size. In terms of time, summer and winter outdoor activities are selected as typical representatives. The survey found that in summer, the principle of keeping cool and avoiding the heat is followed. Among the elderly interviewed, the two peak time periods for outdoor activities are 5-8 am and 16-19 pm. In winter, the principle of sunbathing is followed to keep warm. The time of outdoor activities is affected by the movement of the sun. The two peak time periods are 7-10 am and 14-17 pm. Among them, morning exercises, shopping and walking are the main activities in the morning, while rest, exercise and entertainment are the main activities in the evening. The willingness for outdoor activities in other time periods is affected by the suitability and accessibility of the space around the residential building units. In the above time periods, especially in the evening, the spontaneous stay behavior of the elderly is mostly in groups of 1 to 3 people (including 1 to 2 elderly people with 1 child), with 2 to 3 groups gathering together. The stay space is mostly maintained in an area of 2 to 6 people (as shown in Figure 5). However, due to the different preferences of the elderly, the space formed by this kind of life extension phenomenon is messy and unsystematic, and often only meets the use of local groups in a single time period. The needs of residents of other age groups in the community for staggered use are not considered, and the space utilization rate is low.

3.3 Demand order and principle characteristics

The needs of the elderly mainly show a strong demand for a sense of security, belonging, neighborhood, privacy, and comfort. Among them, a sense of security is the foundation and guarantee; belonging, neighborhood, and privacy are the embodiment of social and individual elements and occur in different functional places; comfort is the pursuit of a higher quality of life. Based on the above demand logic, the team briefly conducted interviews and created questionnaires from the three aspects of safety, functionality, and comfort. A total of 136 questionnaires were collected, of which 127 were valid. It is generally believed that the elderly attach importance to the three aspects of demand in the order of safety $\geqslant$ functionality > comfort. As shown in Table 1, in terms of safety, most of the elderly are mainly concerned about the travel hazards of mixed people and vehicles and anti-slip roads. At the same time, looking back at the long-term epidemic prevention and control measures, the elderly have a stronger demand for communication and activities; in terms of functionality, in addition to the demand for some indoor functional places, the elderly are more concerned about the perfection of facilities that affect their own activities such as exercise and leisure places, as well as the potential for adding parking facilities such as elderly mobility. In terms of comfort, most elderly people pay more attention to the overall macro experience or are more concerned about the quality within their own activity areas. The diversification of nearby spaces can enhance the elderly's sense of belonging. In the process of micro-renewal for the elderly, considering economic and conservation issues, meeting the basic barrier-free safety and access to multiple functions are the fundamental need of the elderly, while the pursuit of comfort can effectively increase the elderly's living satisfaction in terms of belonging to the field.

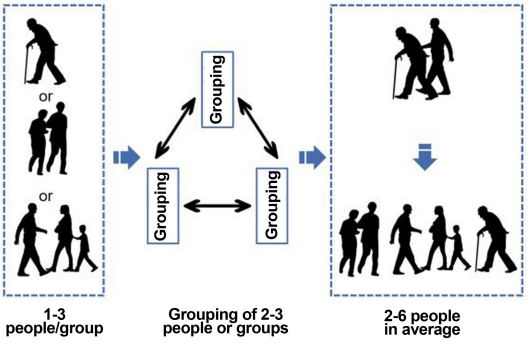
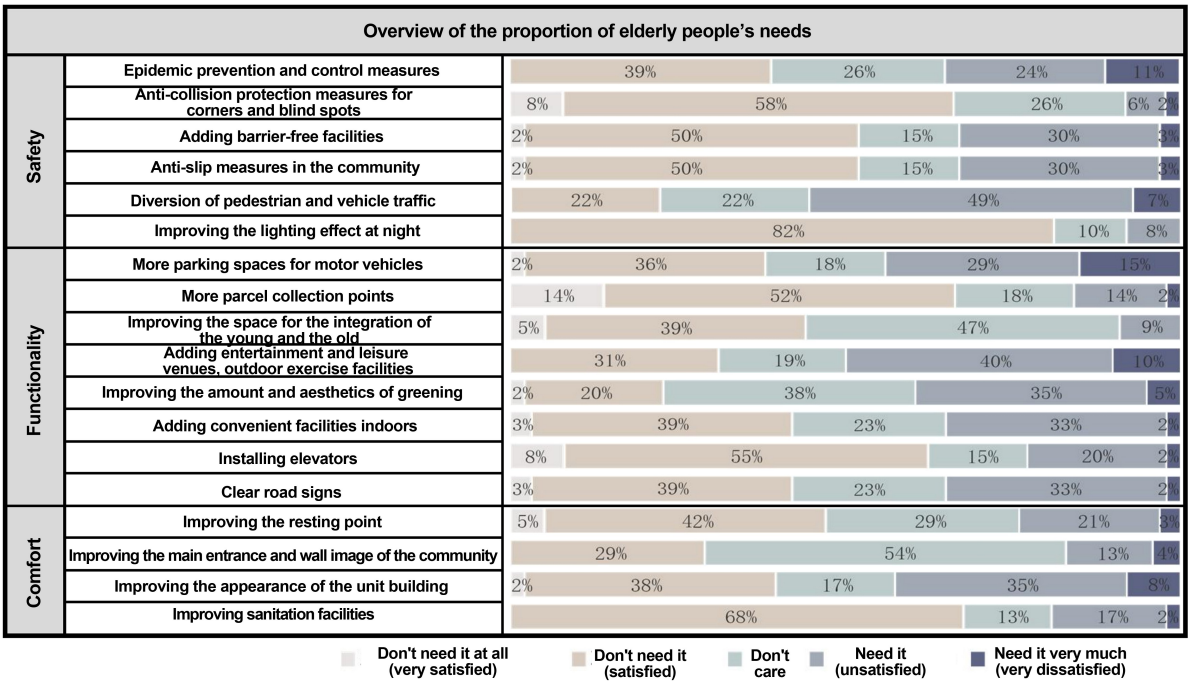


Figure 5 Typical scale analysis of the elderly's resident behavior

Table 1 Overview of the proportion of elderly people's needs (created by the authors)



4 Analysis of the types of potential elderly-friendly micro-spaces

The mismatch between the fragmented and limited space of old communities in small and medium-sized cities and the current behavior of the elderly has led to a chaotic phenomenon in the hierarchical order of community space. The author hopes to redefine, sort out, refine and integrate the concepts and type characteristics of potential elderly-friendly micro-public spaces by matching the above physical space with behavioral needs, so as to clarify and effectively limit the scope of elderly-friendly micro-renewal.

4.1 Scope of micro-public spaces suitable for the elderly

"Micro-public spaces" can be understood as small open places artificially created in the city to provide services for human interaction and other social activities [8]. For example, starting with the renovation design represented by parking micro-parks, attempts to create new behavioral patterns through small furniture and non-enclosed public spaces (Atelier Bow-Wow 2002), or using basic elements such as "tree-bench-grass" to form the smallest scale open space type model (Rebal Design Co. 2005). Although existing typical studies provide references for further understanding of micro-public spaces in this paper, their spatial scale is more focused on urban functions and interfaces, and their goals are mostly to explore context and awaken regional vitality. The micro-public spaces in this paper mainly focus on the community level and are based on the perspective of age-friendliness, so the definition of their spatial scope needs to be re-examined.

This paper understands potential micro-public spaces suitable for the elderly as existing micro-public activity spaces within the 5-10-minute living circle of community residential units (200-500m), which are convenient for the elderly to travel, perceive and stay. Such potential elderly-friendly spaces are scattered between houses, beside houses, lanes and traffic spaces of residential buildings. They have no clear boundaries and specific spatial forms, but their basic space units need to meet the small-scale activity functions of 1 to 8 people, and the scale is mostly between 4 and 30 square meters. At the same time, based on the resident behavior characteristics of the elderly and their needs for safety, function and comfort, the above-mentioned potential elderly-friendly small and micro public space units can eventually meet the five behavioral-needs of the elderly, namely, sitting, supporting, leaning, standing, and blocking, through micro-renewal, meet the elderly's demands for aging-friendly living from a micro scale, and further efficiently improve the quality of life of the elderly in old communities.

4.2 Extraction and analysis of potential elderly-friendly micro-spaces

Potentialelderly-friendly micro-public spaces can be extracted following the three principles: the principle of spatial proximity, that is, the vicinity of the elderly's homes, including the floors, entrances, and residential units, can bring more security, territory, and sense of belonging to the elderly; the principle of integration of disadvantaged spaces, that is, the ambiguous, mobile, and temporary marginal spaces used by disadvantaged groups [9], which are relatively independent and can form their own areas, are often more typical, and the two types of planned existing spaces and spontaneous "invasion" spaces are reorganized in a coordinated manner; the principle of spatial surplus exclusion, excluding spaces with clear public functions and potential private areas (including spaces within a certain range such as in front of doors and windows). Based on the above principles, the four types of old community spaces are further typified to explore potential elderly-friendly micro-public spaces at a micro scale. For each type of community space, three potential subtypes are summarized (Fi-gure 6):

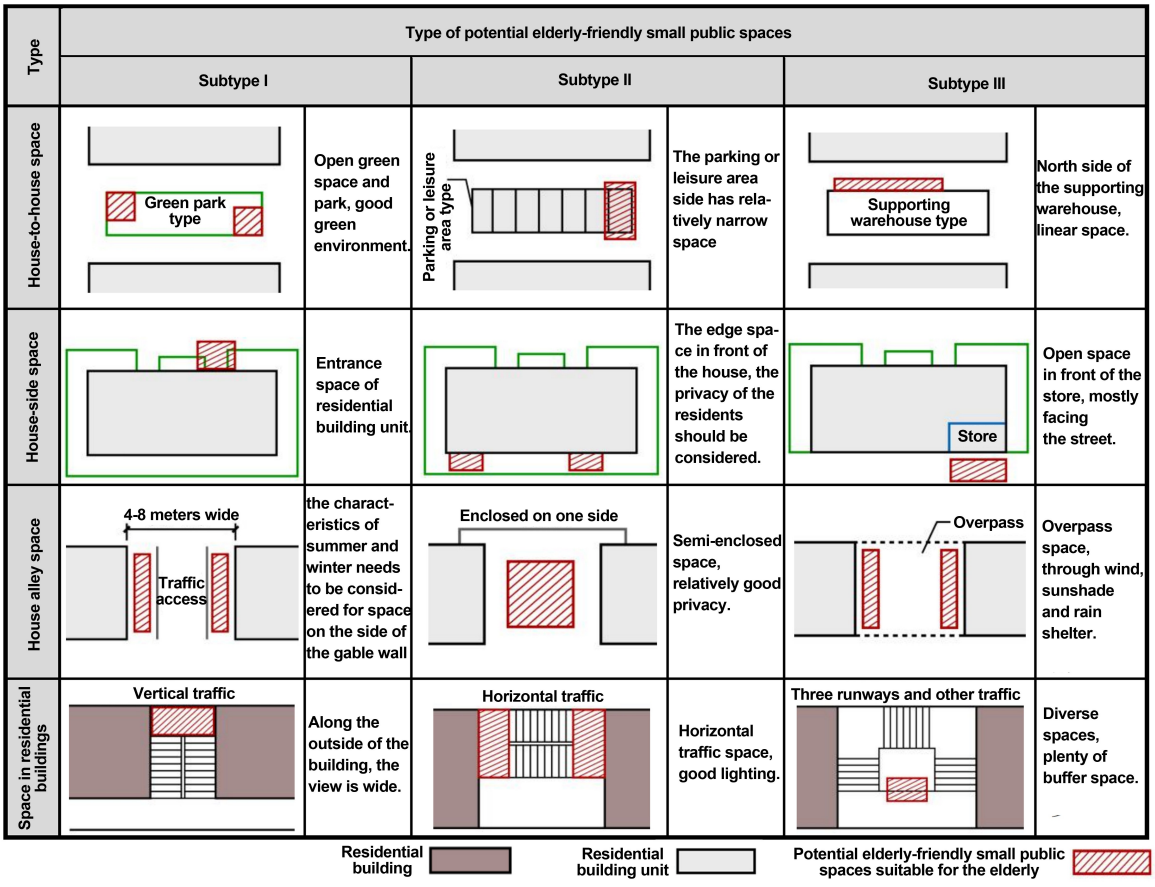


Figure 6 Schematic diagram of potential types of elderly-friendly micro-public spaces in old communities (drawn by the authors)

1) House-to-house spaces: typical examples are green parks, parking or leisure spaces, and supporting warehouses. Among them, the first two types of potential elderly-friendly micro-spaces should be partially updated in combination with the actual behavioral needs of the elderly, such as accessibility and privacy. The space restrictions are relatively few and can meet the needs of large-scale aggregation. The supporting warehouse type can be combined with the linear space on one side (avoiding the warehouse entrance side and obtaining the consent of its users) for aging-friendly transformation.

2) House-side spaces: including three typical micro-spaces: the entrance space of the residential unit, the edge space in front of the house, and the open space in front of the store. Among them, there is a certain flow of people at the entrance and in front of the store, which is also a high-

frequency area for the elderly to stay, which can meet their information exchange needs, especially the space in front of the store. Considering the characteristics of the business hours and lighting effects of small supermarkets and shops, its spontaneous aggregation effect at night is more prominent. The potential utilization of spaces in front of the house needs to consider the privacy within the outdoor windows of the first-floor residents.

3) Alley spaces: divided into gable side space, semi-enclosed space and over-street building space. Among them, the gable side space is the most typical, and the community road it faces is particularly suitable for the elderly to "go to the market," but the needs and possibilities of summer cool-off and winter sunbathing and wind protection must also be considered.

4) Residential traffic spaces: divided into vertical traffic, horizontal traffic and other traffic types. The rest platform is the most promising for elderly-friendly uses, as it has less impact on the entrance door of the corridor and is relatively independent and can be combined with the elderly's needs for rest and sightseeing.

5 Elderly-friendly micro-renewal strategies for old communities

Combining the characteristics of four types of public spaces in old communities, and through in-depth research on the elderly's resident behavior, this paper provides certain guidance and reference for the screening of potential elderly-friendly micro-spaces from the aspects of spatial scope, scale, and conditional restrictions. Just as this article explores the economic feasibility, universality, and functional optimization of elderly-friendly renewal in small and medium-sized cities, the elderly-friendly micro-renewal of old communities, based on the five principles of elderly people sitting, supporting, leaning, standing, and blocking, transforms potential micro-spaces into elderly-friendly "micro base stations" one by one, and at the same time satisfies the functions of "micro base stations" in functional complexity, staggered time and peak, information sharing, and easy repair and construction, and ultimately improves the communication and integration of community neighborhood culture. The following sections will outline the elderly-friendly micro-renewal strategies suitable for small and medium-sized cities from three dimensions: guidelines for elderly-friendly micro-renewal (design and strategy), industrial component standards (production and technology), and construction coordination mechanisms (management and implementation), and provide a schematic design of micro-renewal plans.

5.1 Improving the menu-style design guidelines

Through the integration and refinement of four types of potential elderly-friendly micro-spaces, the design guidelines for the spaces are summarized as follows from the perspectives of space applicability, personnel activity scale, and corresponding strategies (as shown in Figure 7):

1) house-to-house spaces: Type 1-1 is suitable for relatively complete micro-plots. It can be attached to different positions between houses while ensuring that sunlight is met as much as possible. The functional settings must meet the needs of the elderly and children, and reserve interactive space for them, taking into account both communication and care [10]. In addition to meeting the needs of safe travel, the handrail space also provides a certain amount of simple exercise and stretching functions for the elderly; Type 1-2 is mainly aimed at the space on the north side of the warehouse. On the premise of giving way to some private spaces such as warehouse windows, foldable seats and handrails are simply arranged to meet the needs of the elderly to stay without affecting the operation of the original space.

2) house-side spaces: Type 2-1 is suitable for entertainment activities of the elderly living downstairs in this residential unit. At the entrance of the residential unit, it can be combined with functional settings such as announcements and parcel storage; Type 2-2 generally faces the main community roads or branch roads, but the elderly-friendly micro-renewal of its space needs to balance the normal drainage function of the store.

3) Alley spaces: Type 3-1 is the same as Type 2-1. Whether the seats are foldable depends on the original space scale. This type of space is mostly north-south oriented. In winter, the baffle needs to be set according to the direction of the monsoon. At the same time, since the public nature of the space is relatively pronounced, it can also be appropriately considered to reserve simple fitness

stretching, non-periodic market activities and information-related functions; Type 3-2 is a semi-enclosed space. If needs such as community parking and greening are satisfied, activity functions such as chess and cards can be set.

4) Traffic spaces in residential buildings: The micro-renewal principles of types 4-1 and 4-2 are similar. The former is mainly for the staircase semi-platform space, while the latter is for the floor space. In addition to setting up a certain number of foldable seats, the elderly's safety must be considered when using the free surface on the outside of the building for leaning. At the same time, sliding rail handrails can be added according to the needs of residents. The above space is mainly for communities without elevators.

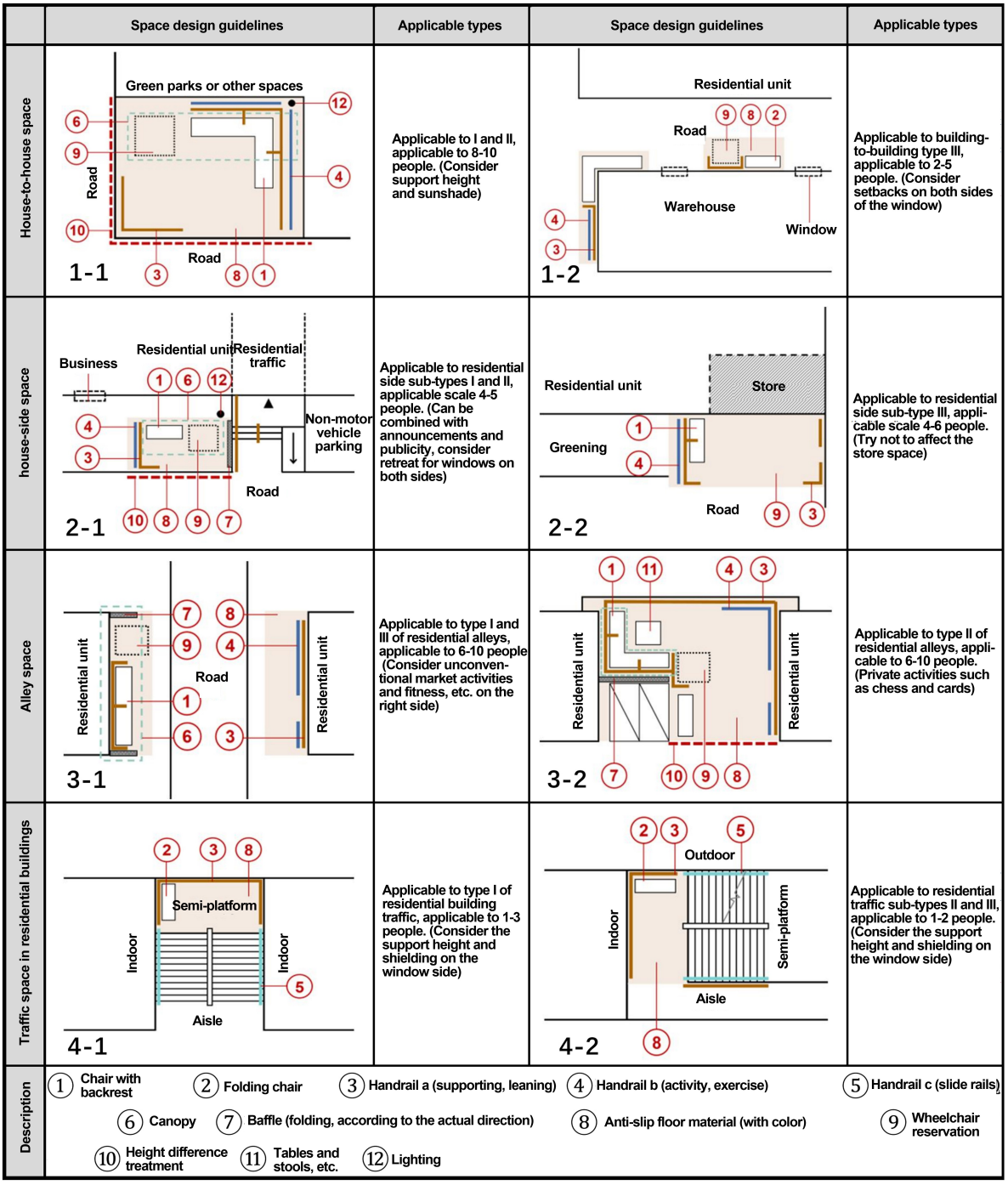


Figure 7 Design guidelines for elderly-friendly micro-renewal of old communities (drawn by the authors)

5.2 Establishing industrial standardsfor components

Under the national strategic background of "dual carbon" and new "building industrialization," the upgrading and transformation of building construction technology is imperative. Under the requirements of building assembly, standardization, and componentization, it can bring economic value, construction value, and later operation and maintenance value to construction projects, and can coordinate and optimize their entire life cycle. The focus of this article is relatively specific, and considering factors such as easy production, easy processing, easy transformation, easy disassembly, lightweight, low-carbon and green, the design analysis of elderly-friendly components based on wood is selected as the main material. As shown in Figure 8, taking the design guideline 1-1 of the residential space as an example, the two approaches of standardized modulus and componentized parts are explained and attempted.

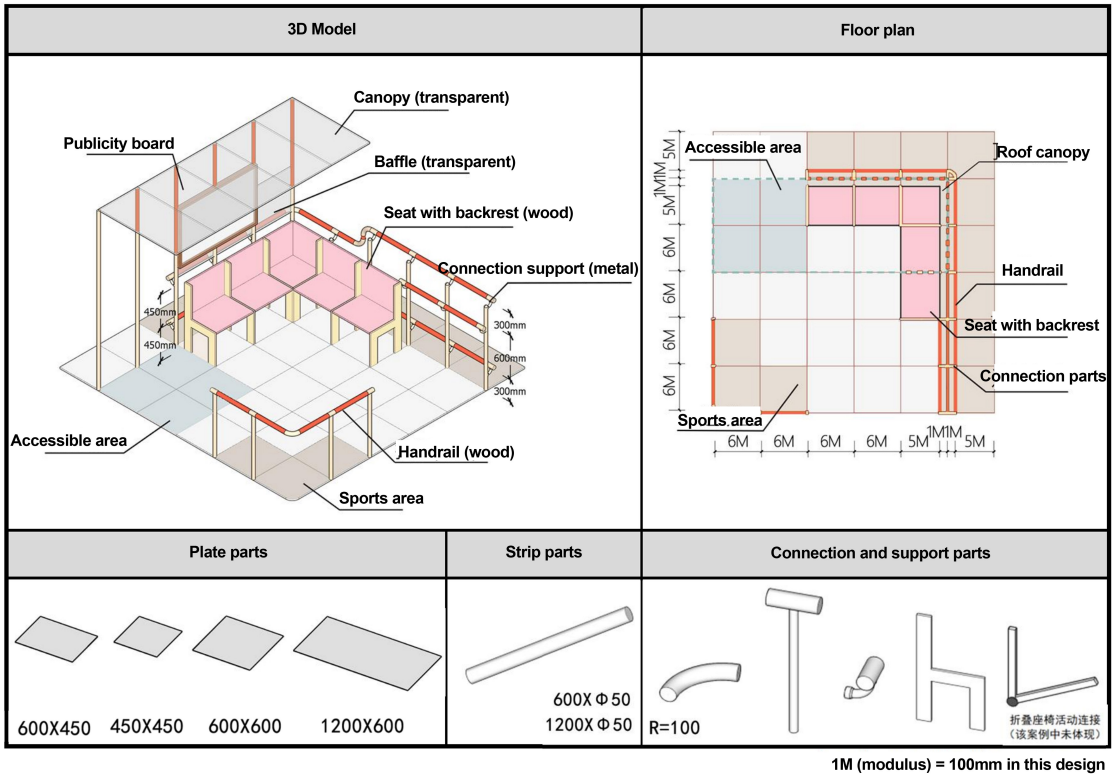


Figure 8 Illustration of elderly-friendly micro-update components and standards (drawn by the authors)

1) Standardized modulus: Modulus is the basis of standardized construction, but the coordination of modulus between different interfaces, levels, components and subcomponents is particularly important [11]. If necessary, a multi-layer modulus grid should be established to consider its standard system from the perspectives of design, production, construction, and operation and maintenance.This study takes 100mm as the basic modulus 1M (Figure 8, top). Starting from the spatial activity scale of the elderly, among the three dimensions, the plane dimension should be extended by 6M, and the vertical dimension should be extended 3/2M and 3M, thus forming a corresponding modulus grid, and all components are limited and controlled in this grid system.

2) Componentparts: Based on the above modulus grid, various functional components are decomposed and classified into three categories: plate components, strip components and connection support components (Figure 8, bottom). While meeting the modulus, its size needs to consider the spatial error and adjustability of the connection and splicing. The plate and strip components are mainly made of wood (the anti-corrosion durability of wood outdoors should be considered), and the plate also contains some transparent materials (lightweight and durable materials such as PC board), and the connection support components are mainly made of metal materials. Of course,

these components also need to consider the reservation and implantation of various interfaces such as information networks and electronic power supplies to meet the needs of information dissemination and sharing.

5.3 Exploring diversified coordination mechanisms

Compared with the practical exploration and research on the participation of multiple subjects in some large cities, most of the traditional community renovation activities in small and medium-sized cities are currently carried out by government funds for single mandatory operations [12]. Coarse development is prone to lead to an imbalance between interests and needs, and the flexibility of the renovation process is relatively low. The following shortcomings are reflected mainly from the four subjects of government managers, professional designers, developers and builders, and community users: passive control conditions, coarse design and production, maximization of construction profits, and low user participation. There is insufficient linkage and coordination between the subjects, and the top-down construction projects cannot meet the needs of the elderly. Micro-renewal, especially elderly-friendly, is a continuous task. Under such a wide range, large volume, scattered, trivial and high humanization requirements, it is necessary to coordinate the participation of multiple subjects, carry out design empowerment, integrate new technologies such as big data and the Internet to establish a new platform [13], enhance community stickiness [14], and explore a bottom-up project screening, evaluation and construction system under the background of limited capital investment, which are the key to ensure its sustainable construction and promotion.

At the same time, we should further seek social investment models other than government funds. Of course, compared with comprehensive renovation projects, the purpose of elderly-friendly micro-renewal is to implement the last small step of humanization.As such, the project has limited impact on land appreciation and space appreciation, innovative advertising is necessary. For example, through the concept of "sharing" [15], we can integrate cultural, media and other forms of information network propaganda with "micro base stations," which are both elderly-friendly micro-spaces and information dissemination stations. While enhancing user interaction, it also increases the potential value of social intervention.

5.4 Schematic diagram of elderly-friendly micro-renewal plan

Combined with the above three-dimensional elderly-friendly micro-renewal strategy, we still take the design guideline 1-1 of the house-to-house space as an example to illustrate the micro-renewal design. The before and after comparison is shown in Figure 9. The functions are improved from three aspects: free activity, cultural identity building, and information sharing:

1) Free activity: forming a complex elderly-friendly community space. Modularization allows facilities such as seats and handrails to be combined according to the needs and preferences of the elderly themselves, realizing the needs of different scenes. At the same time, it provides a resting place to create a warm community environment.

2) Cultural identity building: forming diversified humanistic connotations, inheriting and carrying forward the party building leadership and traditional culture, etc., spreading through the electronic bulletin board in the form of video clips, arousing the sense of identity and belonging of the elderly, and creating a fresh humanistic environment.

3) Information sharing: forming a variety of business formats through digital empowerment, adapting to the technological era through digital empowerment, expanding the functionof the display to be used for commercial advertising, weather forecast broadcasting, healthy diet push and other business formats.

The updated house-to-house space provides a rich activity venue for the elderly. According to the travel and gathering patterns of the elderly and focusing on the two high-frequency activity periods of early morning and evening, a summary of the outdoor residence behavior of the elderly is made (as shown in Figure 10). In the early morning, the crowd is mainly composed of the elderly alone, who often engage in quiet leisure and simple exercise; in the evening, young people and children will join the crowd, which then leads to a comprehensive activity for multiple groups.

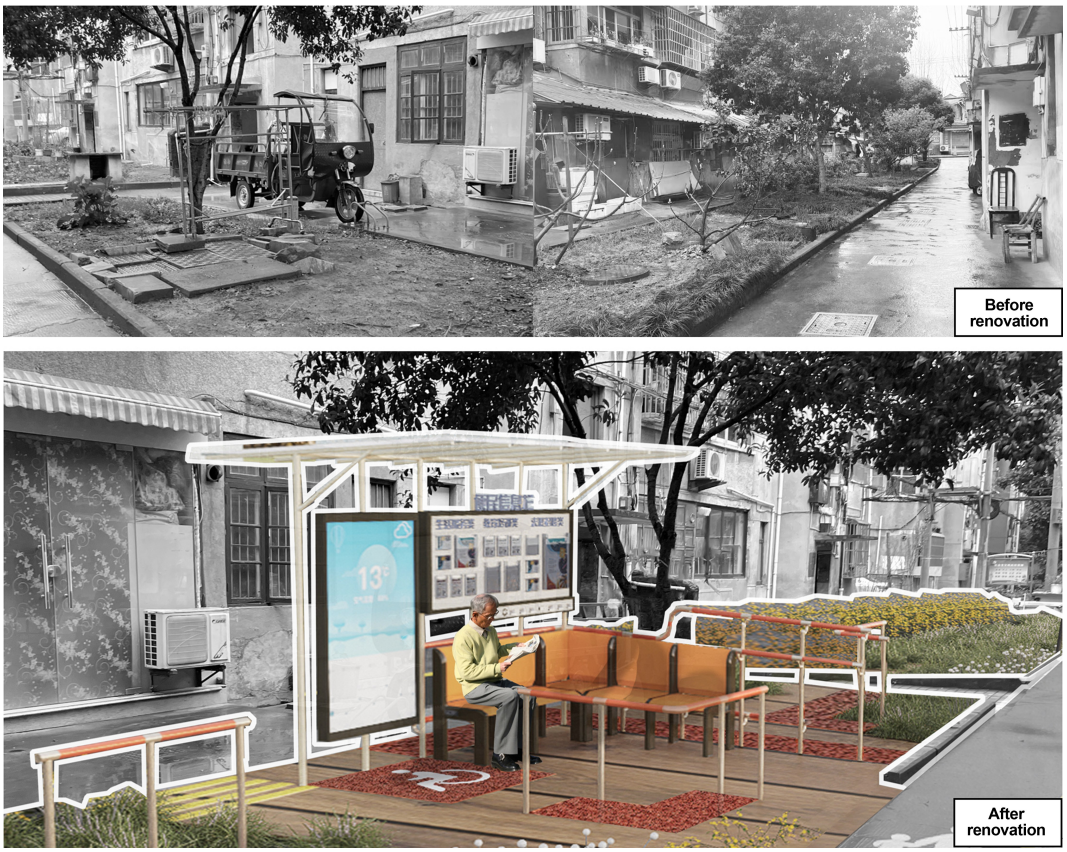


Figure 9 Comparison of renovation plans for house-to-house spaces (drawn by the authors)

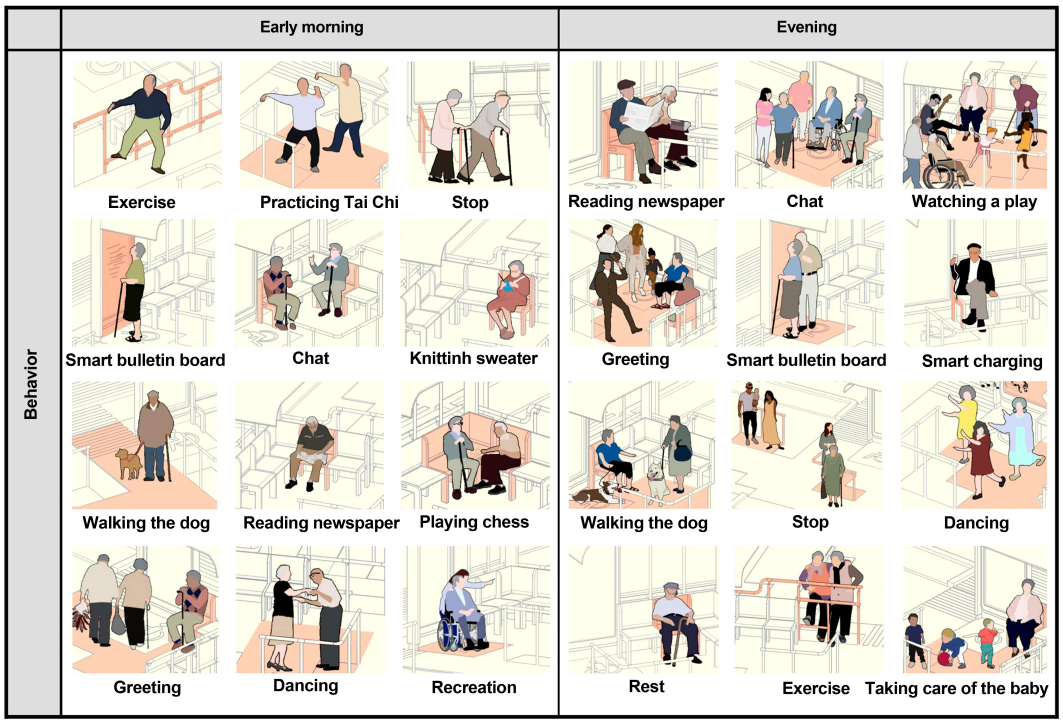


Figure 10 Summary of outdoor activities for the elderly (drawn by the authors)

Conclusion

Compared to the Matthew effect and resource allocation advantages enjoyed by big cities, as well as the distinctive rural regions, small and medium-sized cities between the two are often on the edge of being relatively neglected. Faced with increasing urbanization, large-scale demolition and construction is no longer the theme song of urban development. A series of sustainable development concepts such as "organic renewal," "micro-renewal" and "micro-circulation" have attracted public attention. Micro-renewal in big cities is more unique and leading, but micro-renewal in small and medium-sized cities needs to pay more attention to universality and feasibility. This article hopes to explore the strategy of elderly-friendly micro-renewal, and on the premise of continuously improving the quality of the living environment for the elderly in small and medium-sized urban communities, try to explore how to tackle the problem of elderly-friendliness in an efficient, gradual, precise and economical manner in the stock space of old communities in small and medium-sized cities, where elderly care resources are scarce, and provide a reference for the practice of universal elderly-friendly micro-renewal construction in old communities.

Figure and table sources

Figures 1, 2, 4, 5, 6, 7, 8, 9, 10:drawn by the authors.

Figure 3:taken by the authors.

Table 1: made by the author.

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