



Study on the Path and Strategy of Upgrading Renovation of Old Community Based on the Residents' Needs: A Case of Youdian Xincun Community, Wuhan

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Abstract. In a narrow sense, urban renewal means renovating old communities as a concrete measure to solve new urban problems. However, judging from the current renovation results, there are many practical problems, such as insufficient consideration of the users, a lack of interior renovation, and low utilisation of public space. Based on the needs of residents, this paper selects the Youdian Xincun community in Wuhan as a case and develops the research plan. According to the planning structure characteristics, renovation status, and existing community problems, it constructs the index system and analyses renovation projects and residents' attitudes. The path of upgrading renovation, "communication, construction, and improvement", and the strategy of upgrading renovation, "unimpeded communication channels", "focusing on the construction of the district's community", and "improving the living quality of welfare public housing" are put forward, providing a reference for advancing people's livelihood projects and the follow-up renovation of old communities.

Keywords: old community; residents' needs; upgrading renovation; path and strategy; case study.

1 Introduction

During the "14th Five-Year Plan" period, under the urban development concept of inventory improvement and organic renewal^[1], renovating old urban communities has become a crucial key for achieving high-quality urban development with a people-oriented approach. With the continuous and orderly progress of renovating old communities across the country, most cities have carried out a series of pilot projects, and several old communities have acquired a completely new outlook. In the current progress of renovating old communities, however, due to the defective mechanisms of multi-party

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cooperation and diversified governance, it does not pay attention to the primary users of old communities and consider the needs of residents, resulting in serious homogenisation of renovation. It is necessary to implement upgrading renovation because of the imperfect infrastructure, the low utilisation rate of public space, the poor linkage effect of the district, and the lack of corridor and interior renovation, to name but a few^[2] after the renovation of communities. Based on the above, the paper expounds on the importance of upgrading renovation and residents' needs, selects the sample community, makes the research plan, collects data, analyses the characteristics of the planning structure of the sample community and the existing problems, builds an index system, carries out field questionnaires and mathematical statistics, explores the path and strategy of upgrading renovation of the old community, and promotes the quality renewal of the community from a microscopic perspective.

2 The importance of upgrading renovation and resident's needs

2.1 From “arranging life around production” to the stage of upgrading renovation

Under the influence of “welfare-oriented housing distribution”, “thousand indicator indexes”, and “the Soviet Union model^[3]” in the period of planned economy, all working units built supporting staff dormitories by way of “building average, orientation average, and house type average” to meet the housing needs of workers in a specific historical period^[4]. This “unit compound” type of collective living form is arranged around the production unit^[5], emphasising closed management and having clear boundaries^[6]. With time, in order to maintain low-cost space, the transformation of “making use of every single space” and “old buildings' storey-adding” in the community has become increasingly common, resulting in the disorder of building height, density, construction standards, and population composition^[7]. For the community, the infrastructure is in disrepair, the interior and exterior of the building are seriously ageing, the guidance system is backward, and the surrounding supporting services are challenging to meet the residents' needs^[8]. Based on this, many old communities have been renovated in the type of “foundation, improvement, and promotion^[9]”, but there are still many blind zones in the renovation process, and the recognition of residents is not high. So, it is necessary to enter the upgrading stage of renovating old communities.

2.2 From the “government-leading action” to the residents' needs coordination mechanism

In recent years, the government-led renovation of old communities has mainly been carried out in the following two aspects: first, the building exterior renovation, that is, the housing facade of the communities has been repaired and repainted, and the entrance foyer, doors and windows, the outer hood of the air conditioner, and the kitchen ventilator cover have been uniformly replaced; second, the renovation of the community environment, that is, the construction of public activity space, fitness and ageing facilities, and divided parking spaces in the community. Nevertheless, the former

focuses too much on improving the appearance and image of the community, ignoring the interior space of the building; the latter is only limited to the internal environment of the community, ignoring the community linkage and resource sharing in the district, resulting in problems such as imperfect infrastructure, lack of corridor and interior renovation, low utilisation rate of public space, poor linkage effect of the district after the renovation, and low expectations and poor actual renovation effect^[10]. Although this kind of renovation perspective, in which the government and corresponding organisations are all-inclusive, has maximised the benefits of the overall renovation, it is affected by policy background systems, communication and coordination mechanisms, and conflicts and frictions between subjects, which make it difficult for users to participate in the renovation process truly. It is difficult for residents to convey their reasonable needs to the leading party of the local government^[11], and conflicts and disturbing renovation projects occur from time to time. The renovation perspective must shift from government-leading to a collaborative mechanism based on residents' needs^[12].

3 The research plan formulation and implementation

3.1 The research plan design

For the case study of the renovation of the Youdian Xincun community, a combination of qualitative and quantitative research methods is mainly used, and the research path mainly includes two stages. First, through field research and historical text data, it conducts a classification analysis of the complex and diverse planning structure types of the community and identifies the existing problems of community renovation. Then, according to relevant standards, field investigations, and public opinion surveys, an index system for the upgrading renovation of old communities based on residents' needs was constructed. Through a questionnaire survey and statistical analysis, data such as demographic information, daily commuting patterns, expected renovation projects, spatial renovation types, and demand satisfaction of 230 permanent residents in the community were obtained. Finally, the qualitative and quantitative research results were integrated to form a comprehensive conclusion and put forward the path and strategy for upgrading renovation of old communities (Figure 1).

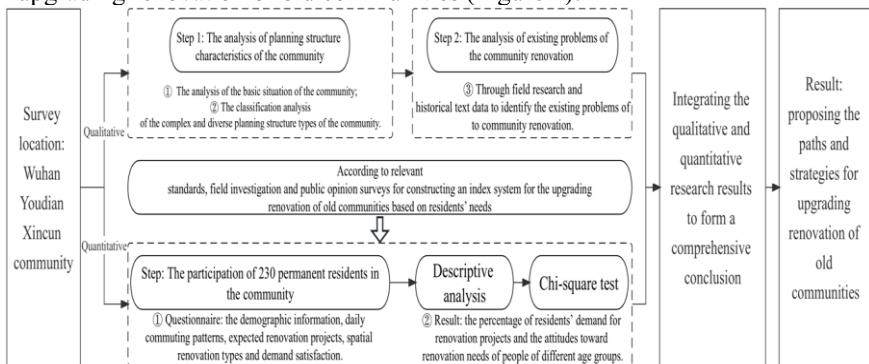


Fig. 1. The research plan design

3.2 Youdian Xincun community planning and renovation

3.2.1. Overview of the basic situation of the community.

The Youdian Xincun community (Figure 2) is a dormitory of China Telecom Wuhan Branch, also known as the dormitory of Youdian. It was founded in the 1950s and was built successively from the 1980s to the 1990s, with 31 houses and a permanent population of about 1856 people.

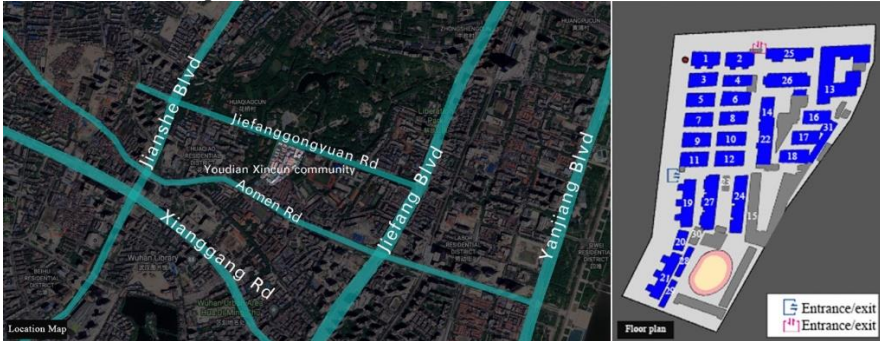




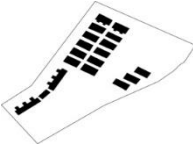
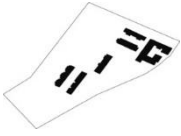
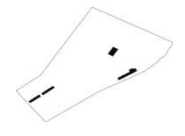
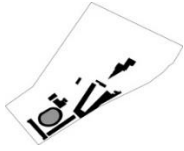


Fig. 2. The location map and floor plan of the Youdian Xincun community

3.2.2. The Planning structure characteristics of community.

The planning structure of the Youdian Xincun community is complex and diverse, with a dense and irregular overall layout and narrow street space, which can be divided into four types (Table 1): The first type is solidarity households, which have a long construction time and a similar building size, orientation, and house type. In addition, most of the buildings have been storey-added, resulting in average shape and poor identification. The second type is enclosed unit buildings, which are similar in size and shape and face the same direction, but the number of floors is different. The green space between the buildings is in strips, and the utilisation rate is low. The third type is a single-family bungalow with irregular land use, inconsistent building scale and orientation, usually with a courtyard, narrow lanes, and limited land resources. The fourth type is functional spaces, which belong to factories, schools, and bicycles and electro-mobile sheds. The buildings are spread out around a particular space, with large green spaces and public activity spaces, and the overall layout is regular.

Table 1. The planning structure characteristics of the Youdian Xincun community.

Planning structure	Solidarity household	Enclosed unit building	Single-family bungalow	Functional space
Floor plan				
Texture map				
Building function	Mixed commercial and residential	Residence	Mixed commercial and residential	Industry and commerce, education, convenience
Architectural features	With similar building size, orientation, and house type	With similar building size shape and facing the same direction but different numbers of floors	With irregular land use, inconsistent building scale and orientation	The buildings spread out around a particular space
Building materials	The two-story brick and wood structure, or covered with brick and concrete structure	Reinforced concrete	Brick and concrete combined iron shed	Reinforced concrete
Space form	Similar shape and poor identification	The green space between the buildings is in strips, and the utilisation rate is low	Narrow lanes and limited land resources	With large green spaces and public activity spaces
Year of construction	From the 1950s to 2000	From the 1990s to 2000	Unknown	From 1970s to present
Build quality	Average, poor some	Good	Poor	Good most, poor some
Quantity proportion	58%	19%	12.9%	10.1%

3.2.3. The existing problems of the community renovation.

After visiting and investigating and according to the renovation process of the Youdian Xincun community (Table 2), there are still the following three problems:

(1) The renovation focuses on “exterior” rather than “interior”: Under the opportunity of urban facade renovation, the improvement of old communities, and the management of property companies, a series of comprehensive repairs have been carried out on the house facades distributed along the arterial and secondary roads and branches of the city in the community, but the house facades relative to the internal are ignored. The travel roads have been paved with floor tiles, covered with asphalt, and have divided parking spaces. However, there are still insufficient parking spaces for motor vehicles, and some of them overlap with road greening.

(2) The utilisation rate of public space is low after the renovation: the leisure square, rebuilt after the demolition of many historical illegal buildings in the community, has a low frequency of use for leisure and fitness by residents of the community; the air-conditioned room built for summer has a limited coverage of residents; a cultural corridor built to beautify the safe passageway has a poor space function. In addition, there are also problems such as incomplete supporting facilities and the low brightness of the night-time luminous environment in public spaces.

(3) The construction of intelligent communities does not combine the actual needs of residents: through the implementation of WIFI (public areas), monitoring systems, community access control, license plate recognition systems, intelligent express cabinets, et cetera, it mainly achieves the intelligent management of the community. Moreover, the non-motor vehicle parking sheds are ageing and backwards, lacking intelligent charging piles. Residents use power strips for charging by themselves, which poses fire risks. The level of intelligent service in the community needs to be further improved.

Table 2. The renovation process of the Youdian Xincun community.

Community Name	District	Affiliated unit	Renovation time	Renovation projects
Youdian Xincun	Jiang'an	China Telecom Wuhan Branch	After the 1990s	Housing system reform
			After 2010	Three supplies and one industry ¹ , road covered with asphalt
			After 2015	Improvement of old communities, property management companies settled in, and facade renovation of military games
			After 2020	Comprehensive law enforcement: banning merchants operating in violation of regulations Infrastructure: comprehensive renovation of house facades, roads, and pipe networks

¹ “Three supplies and one industry” refers to the enterprise’s water supply, power supply, heating and property management.

Environmental remediation: demolishing illegal structures, clearing up blind zones, removing debris in corridors, and gardening

Intelligent community: installing access control system, monitoring system, micro fire booth, divided parking spaces

3.3 Field questionnaire survey analysis

3.3.1. Index system construction.

According to the “Measurement Standards for Renovation of Old Urban Community¹” and the “List of Standards for Renovation of Old Urban Community in Wuhan²”, combined with the overall idea and model of Wuhan City’s urban renewal, and based on field research and public opinion surveys, “diverse demand”, “convenience demand”, “quality demand” are taken as the first-level indicators; a total of 11 second-level indicators, including “infrastructure, public space, sports and entertainment, public roads, parking facilities, intelligent services, public visual, building repair, landscaping, corridors and interior space”, were divided into 35 third-level indicators to construct an index system for upgrading renovation old community based on residents’ needs (Table 3).

Table 3. Index system for upgrading renovation of old community based on residents’ needs.

Primary index	Secondary index	Third index
	Infrastructure	Water supply facility; Drainage network pipe; Power supply facility; Gas pipeline
Diverse demand	Public space	Daycare room for old adults; Daycare room for school-age children; Express delivery site; Health service centre; Public restaurants
	Sports and entertainment	Old adults activity room/air-conditioned room; Sports and entertainment square (including fitness equipment)
Convenience demand	Public road	Internal and external communication channel, pedestrian walkway, and accessible facility; Repaving the floor tiles; Fire exits; Drainage facility
	Parking facility	Intelligent parking system; Designating parking spaces; Three-dimensional parking lot; Smart parking shed

¹ General Office of Ministry of Housing and Urban-Rural Development, General Office of National Development and Reform Commission, General Office of Finance. (2021) Measurement Standards for Renovation of Old Urban Community. <https://www.gov.cn/zhengce/zhengceku/2021-12/31/5665762/files/214253a4458148bf8af738b925001852.doc>.

² General Office of Wuhan Municipal People’s Government. (2020) List of Standards for Renovation of Old Urban Community in Wuhan. https://www.wuhan.gov.cn/zwgk/xxgk/gjyh/zzqgh/202003/t20200316_970812.shtml

	Intelligent service	Smart charging station; Smart express delivery cabinet; Intelligent market vice
Quality demand	Public visual	Public lighting; Signage guidance system
	Building repair	Elevator installation; Facade repair; Roof finishing and repair
	Landscaping	Greening and beautification; Air conditioning hood, kitchen smoke exhaust hood; Wall beautification
Daily living demand	Corridor space	Public kitchen/toilet; Stairs and entrances/exits
	Interior space	Shower equipment; Interlayer and ladder; Baffle

3.2.2. Questionnaire data analysis.

After extracting 10% of the community population, 230 questionnaires were randomly distributed, and 225 valid questionnaires were recovered. Through statistics and descriptive and chi-square test analysis of the questionnaire results, the percentage of questionnaire subjects' demand for renovation projects and the attitudes towards renovation needs of people of different age groups were obtained.

(1) Descriptive analysis.

Among the overall questionnaire subjects, more than 65% of residents believe that the division of parking spaces is unreasonable. More than 64% of residents believe that solidarity households need to increase interior bathroom space, which is accompanied by other problems such as dim corridors and outdated public kitchens and bathrooms; 60% of residents are dissatisfied with the water supply and drainage facilities and require the installation of elevators; public space renovation projects have a lower demand percentage in these statistics, accounting for 28% to 45%; signage guidance systems and solidarity households interior interlayers renovation projects account for the ratio of around 30%, while most other types of renovation projects remain around 50% (Figure 3).

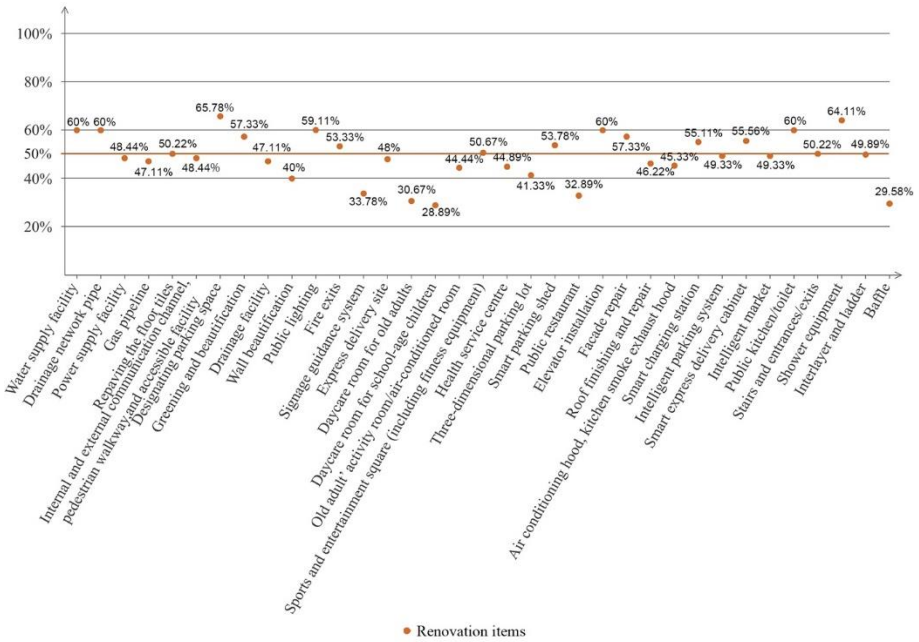


Fig. 3. Scatter chart of renovation project demand percentage

(2) Chi-square test.

First, the residents’ attitude towards the renovation of diverse needs was determined from the two aspects of frequency and percentage (Table 4), and then the age and renovation attitude were extracted from the questionnaire for reclassification. By comparing these two categorial variables, the correlation between people of different ages and the renovation of convenience, quality, and daily living needs was analysed (Table 5, 6, 7).

Table 4. Residents’ diverse needs for renovation degree

Item	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Frequency	13	4	35	39	134
Percentage	5.8	1.8	15.6	17.3	59.6

Table 5. Correlation between different age groups and convenience demand renovation

Ages (years old)	Total (n)	Renovation attitude			Fisher’s exact rate	
		Disagree [n(%)]	Neutral [n(%)]	Agree [n(%)]	Fisher’s statistics	P
<18	4	1 (25.0) ab	0 (0.0)	3 (75.0)		
18-60	191	6 (3.1) b	14 (7.3)	171 (89.5)	13.472	0.00
>60	30	6 (20.0) a	1 (3.3)	23 (76.7)		6

Table 6. Correlation between different age groups and quality demand transformation

Ages (years old)	Total (n)	Renovation attitude			Fisher's exact rate	
		Disagree [n(%)]	Neutral [n(%)]	Agree [n(%)]	Fisher's statistics	P
<18	4	1 (25.0) a	0 (0.0)	3 (75.0)		
18-60	191	4 (2.1) b	19 (9.9)	168 (88.0)	16.837	0.001
>60	30	6 (20.0) a	1 (3.3)	23 (76.7)		

Table 7. Correlation between different age groups and living needs renovation

Ages (years old)	Total (n)	Renovation attitude			Fisher's exact rate	
		Disagree [n(%)]	Neutral [n(%)]	Agree [n(%)]	Fisher's statistics	P
<18	4	1 (25.0) ab	0 (0.0)	3 (75.0)		
18-60	191	10 (5.2) b	24 (12.6)	157 (82.2)	9.246	0.038
>60	30	6 (20.0) a	2 (6.7)	22 (73.3)		

In the overall questionnaire, 173 residents agreed or strongly agreed to the renovation of the old community with diverse needs, accounting for 76.9% of the total number, which was in line with the residents' supportive attitude towards the renovation of infrastructure, public space, sports, and entertainment in the semi-structured interview. By examining the correlation between different age groups and renovation demand, elderly residents do not recognise convenient renovation such as public roads, parking facilities, and intelligent services. Young and middle-aged residents have a high degree of recognition for quality and living needs renovation such as public visual, building repair, landscaping, corridor, and interior space.

4 The Path and Strategy of Upgrading Renovation of the Youdian Xincun Community

4.1 Community upgrading renovation path

Based on those qualitative and quantitative research results, the upgrading renovation path of Youdian Xincun Community can be divided into three steps: communication, construction, and improvement (Figure 4). Among them, the communication step is to form unimpeded communication channels for residents' demands and responses to develop the essential work and generate the logic before the renovation implementation; the construction step is to focus on the construction of the community of the district, strengthen the linkage effect of the district, and create a complete residential area; the improvement is to improve the living quality of welfare public housing, implement interior renovation simultaneously, and improve residents' satisfaction.

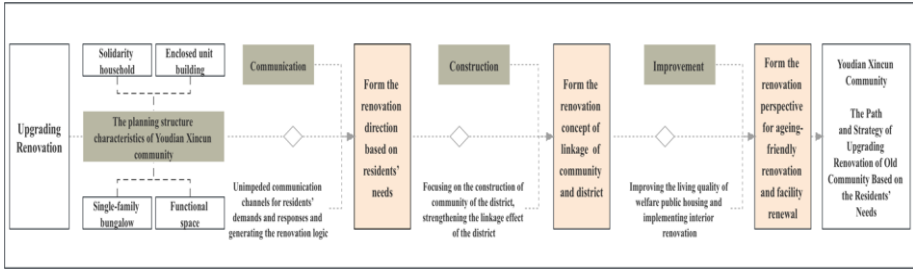


Fig. 4. Path for upgrading renovation of old community based on residents' needs

4.2 Community upgrading renovation strategy

4.2.1. Unimpeded communication channels for residents' demands and responses and generating the renovation logic.

Due to the complex population composition and the severe ageing structure, the community mainly consists of migrant tenants, retired employees, and many others, and has a high plot ratio with limited available space. The renovation project is not only related to the immediate interests of the owners and tenants but also involves communication and coordination among many departments, such as subdistricts, residents' committees, and business units^[13]. Although residents have a strong willingness to renovate, due to the imperfect coordination mechanism for upward communication, there are significant differences in the effectiveness of community renovation, resulting in an embarrassing situation in which residents and the renovation leaders find it challenging to reach a consensus. Therefore, establishing an unimpeded communication channel for residents' demands and responses is a prerequisite for implementing community renovation.

The grass-roots management units of subdistricts, residents' committees, and property management companies should form a communication mechanism for consultation, governance, and construction with the community residents to encourage residents to use their rights and provide suggestions for the renovation. In addition, for the situation in which the infrastructure is difficult to repair, it is necessary to carry out a comprehensive survey of the infrastructure of the community under a sound upward and downward communication mechanism. For communities with uncertainty, it is necessary to invite a third-party institution to conduct a corresponding survey and collect feedback from residents promptly. Renovation items such as water, electricity, and gas, which are the most basic demands of residents' needs, should be a high priority to ensure the essential life of residents. As for road surface, fire protection, and corridor space, such as ageing handrails, damaged stairs, significant height differences between entrances and exits, and no elevators, it should start from the overall universal and ageing-friendly renovation thinking^[14] to repave the road with floor tiles, widen fire passageways, repair handrails and damage, slope entrances and exits, and install elevators (Figure 5).

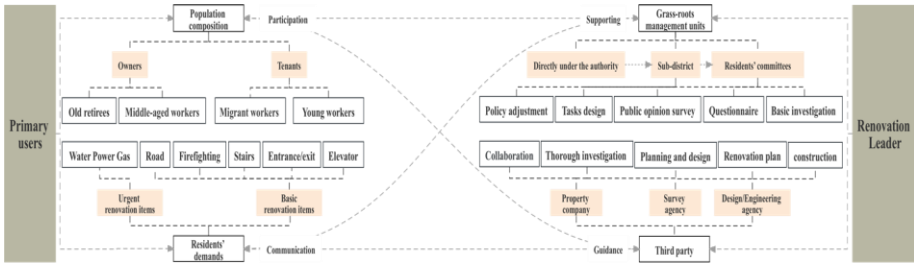


Fig. 5. The strategy of unimpeded communication channels for residents’ demands and responses

4.2.2. focusing on the construction of the district’s community, strengthening the linkage effect of the district.

Since the community was built relatively early, some convenience facilities are disrepair. A series of renovations have been carried out, including comprehensive law enforcement, improvement of infrastructure and environment, and property standard management. However, the field surveys and interviews have revealed that residents are not satisfied with public spaces such as business stalls, leisure squares and the cultural gallery after being vacated and rebuilt due to the main reason that the loss of “the hustle and bustle” of the community and the low usage rate of the square and the weak educational and publicity effect. As for convenient travel facilities such as vehicle parking spaces, non-motor vehicle parking sheds, and charging piles, there are problems such as insufficient parking spaces, ageing, and backward and hidden hazards, resulting in random parking and usage. Therefore, focusing on the construction of the district’s community and improving functional supporting facilities are the material guarantees for the renovation of the community.

The renovation should be led by the renovation perspective of the linkage effect of the district, and the renovation concept of “one community, one plan” should be gradually abandoned. On the one hand, the community should be used as a unit to meet the functional supporting facilities of the district. Parking lots should be built and equipped with charging piles and smart parking sheds for non-motor vehicles, and community medical centres should be constructed to promote the overall effect of the renovation of old communities from an urban system perspective. On the other hand, it is necessary to revitalise existing resources, make full use of idle resources in the area, promote full coverage of shopping, medical, education, transportation, and other resources, and help to create a 15-minute community living circle^[15]. Simultaneously, the progress of renovation should also pay attention to the co-construction and sharing of parking resources, greening, public spaces, fitness, and entertainment, to name a few, between communities to promote the construction of a complete residential area (Figure 6).

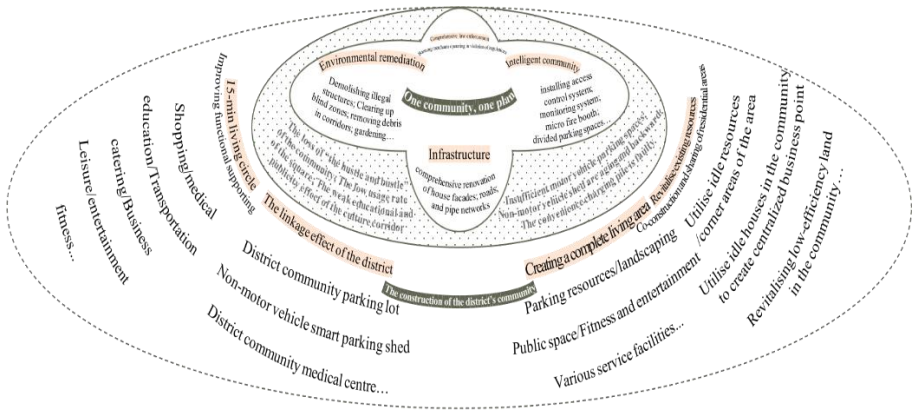


Fig. 6. The strategy of focusing on the construction of the district's community

4.2.3. Improving the living quality of welfare public housing and implementing interior renovation.

Because the community has the nature of welfare public housing, which is mainly composed of solidarity households and self-built bungalows, the living conditions of these houses are poor. Since some native residents moved out, this community has become a gathering place for vulnerable older adults and urban disadvantaged groups. Taking the solidarity households as an example, they account for 58% of the whole community. Except for the renovation of the entrance foyer, the renovation effect of the corridor space, such as stairs, handrails, entrances and exits, and public lighting, is poor. The interior public kitchen/toilet, bathroom, interlayers, ladders, and baffles have not yet been included in the renovation scope, and the living environment of the residents of the solidarity households is less than satisfactory. Therefore, improving the living quality of welfare public housing and implementing interior renovation are the critical elements of community renovation.

For this type of “special house”, the key factors that need to be considered including its early construction, complex population composition, and many older adults. More attention should be paid to the ageing-friendly renovation of corridors and interiors and the updating of facilities, which is a concentrated reflection of the necessity of the renovation. In addition, due to the average construction, regular space and collective living are significant features of this type of housing. Except for the conventional corridor space renovation, interior public toilets should have at least one ageing-friendly flush toilet to meet older adults’ stand-up and sit-down toilet behaviour. As for public kitchens, environmental remediation measures should be taken, such as clearing up blind zones and debris and regulating the location of each household stove; for public lighting, induction lighting equipment should be used to save energy consumption and increase lighting brightness; for houses without bathroom space, integrated shower rooms can be installed to meet indoor bathing needs; and for families with multiple people, the safety of interior interlayers, ladders, and baffles should be guaranteed and corresponding renovation measures should be taken(Figure 7).

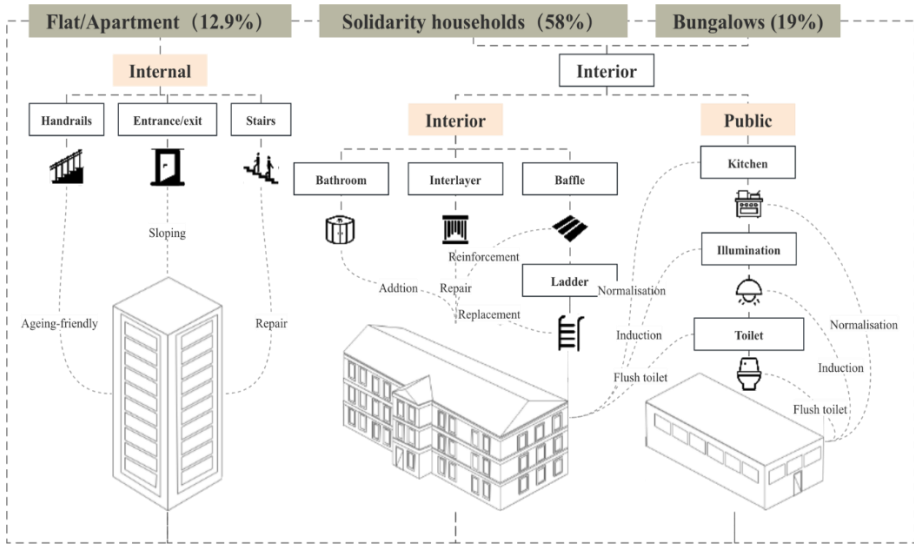


Fig. 7. The strategy of improving the living quality of welfare public housing

5 Conclusion

As a product of the era of the unit system, old communities used to play a vital role in balancing the relationship between employment and housing. However, with the continuous development of the social economy, these communities are in sharp contrast to the commercial property management residential areas dominated by modern real estate enterprises, with the noticeable internal and external development gap, and gradually become the “corners”, “lost spaces,” and “invisible injuries” of the city and urban development. After the “foundation, improvement, and promotion” renovation, how to realise the renewal of the quality of the old communities in China has become a pivotal issue in the next stage of the renovation, and it is imperative to move towards high-level upgrading renovation. In the past, residents’ reasonable needs were challenging to implement in the actual renovation process; the closed renovation perspective was not conducive to the linkage effect of the district; and the renovation content was complex to cover the internal and interior of the building, resulting in the dilemma of low expectations and a poor actual renovation effect. To sum up, this paper attempts to propose the path and strategy for the upgrading renovation of old communities through “communication, construction, improvement”, and “unimpeded communication channels”, “focusing on the construction of the district’s community” and “improving the living quality of welfare public housing”, to provide specific theoretical references and empirical support for the renovation of the old community to achieve the renovation with resident participation, complete residential areas, and quality renewal.

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