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Current Situation and Sustainable Renewal Strategies of Public Space in Chinese Old Communities

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Abstract: Old community renovation is now gradually receiving attention in China's urban construction development, and how to make its public space sustainable has become a research topic. This paper conducts a study of the current situation of public space in old communities from the surface to the deep through field research methods. This paper has summarized four spatial characteristics of public space in old communities, including the increase of boundary space; spatial function is polarized between context-specific user groups and complex but sustainable symbiotic systems. Based on these findings, this paper proposes three sustainable renovation considerations and strategies, which include respecting the rationales of the original space, stimulating the cooperation of stakeholders, and recreating the daily life of residents.

Keywords: China's old communities; public space; renovation design; sustainable renewal



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1. Introduction

Recently, global habitat issues have been gaining attention, and experts and scholars from various countries have conducted a lot of research and practice in the field of habitat-related environment. Compared with the theoretical certainty of the previous research on habitat space, the “sustainable development of old urban communities” has gradually become a problematic concept full of uncertainty in the process of research by social science experts [1]. In 2019, the Chinese government proposed forming a territorial spatial pattern of intensive and efficient production space; moderate livable space; beautiful ecological space; and safe and harmonious, competitive and sustainable development by 2035 [2]. Since 2020, the government has put forward policies to support the renovation of old communities one after another [3]. In July of the same year, the General Office of the State Council put forward guiding opinions on the renovation of old urban communities, requiring the active expansion of effective investment to implement the renovation of old communities. These policies were proposed to achieve the sustainable development of urban space and community space, but before practice, the current situation of old communities needs to be studied thoroughly.

For an old living space, public space is one of the more important and problematic parts of old community renovation. Firstly, there is no clear and definite conclusion on the concept of public space in the academic community, but there are abundant theoretical resources in the research of sociology. From the perspective of the theory of relevant scholars, the use of the word “public” is constantly changing with the development of the times [4]. However, the common understanding of these views and theories is that public space is actually the materialization of public life and the stage to show public life [5]. Secondly, since the scope of public space and private space is clearly defined in the early stage of the construction of old communities in China, all community spaces except the private rooms of community residential buildings are public spaces and also guide and manage the behaviors in the spaces [6]. This paper uses this as a reference standard to

divide public space and private space. Through the current understanding of Chinese old community renewal projects, it has been found that some of the public spaces after transformation have not achieved satisfactory results. This situation cannot be judged to be favorable or unfavorable to the space. It is certain that the expectations of most community stakeholders have not been met, and various conflicts have arisen [7]. It was not expected by the designers and managers that the public space, which was originally full of popularity, would become cold after being transformed [8]. Therefore, this paper will focus on the public space of old communities in Chinese cities and propose strategies and considerations for sustainable renewal by analyzing the current situation and causes of public space in old communities.

2. Literature Review

Using Citespace software, this paper examined the literature on “urban communities” in the Web of Science database over the past decade, and found that from 2010 to 2020, new research hotspots have emerged on “mixed urban community development”, “urban greening”, “informal activities and networks”, “community spatial differentiation”, and “sustainable urban community development”. According to the analysis of these hotspots, it can be reflected that urbanization has brought about a series of problems such as the imbalance of community spatial development and the urgent need for sustainable community development, which makes urbanization research shift to socioeconomic perspectives and discuss the livability via both physical and socio-cultural dimensions, as well as public governance, etc. For example, the importance of community engagement and urban governance interventions in optimizing community wellbeing has been identified by assessing livability approaches in different parts of the world [9]. There is research on the construction of an index quantitative framework for the livability of Hong Kong [10] and that evaluates the urban environmental quality at the community level given the residential community as the basic unit of urban living areas [11]. That research opened new windows in enhancing livability and health status within communities, with the aim of promoting the sustainability of cities in the long run. By combining the cluster analysis of collaborating institutions and literature analysis, it can be concluded that “Chinese cities” and “Chinese communities” have gradually become important research objects in the field of urban community research between 2010 and 2020, and Chinese urban communities have emerged to feature “Spatial differentiation”, “informality”, and “sustainable development”. The complexities and problems of “spatial differentiation”, “informality”, and “sustainable development” have attracted the attention of experts in the field of urban communities, making Chinese urban communities a typical and special object of study. An analysis of co-authors and collaborating institutions shows that Chinese institutions and experts rank high globally in terms of their collaboration and influence in the field of urban community research. For example, C.Y. Jim and his department at the University of Hong Kong, China, and F. Wu and his team at University College London, UK, are actively involved in international collaborations and exchanges, paying close attention to the challenges posed by the transformation of Chinese cities and the sustainable development of urban communities.

In China, many scholars have explored the practice of community renewal in recent years. The Ju'er Hutong renovation, designed by L. Wu, used the idea of organic regeneration to create a new place suitable for modern living on the basis of retaining the traditional courtyard design and Beijing's hutong culture. Z. Yan used the organic renewal concept based on the characteristics of cultural community renewal ideas in Fu Hougang community renewal planning to explore the local cultural heritage and improve the daily lives of residents from functional improvement, traffic combing, landscape coordination, and other aspects of efforts to create a distinctive cultural community [12]. Y. Ye discussed the community regeneration path guided by local culture in the case study of the Xinhepu area in Dongshan, Guangzhou. They argued that there is an important endogenous logic between the “local culture” embedded in the community itself and the community's autonomous regeneration [13]. It follows that the current Chinese academic community has

reached a consensus on the importance of the sustainable development of culture and life in community regeneration, and the exploration of more effective renovation strategies has become a hot topic of research in China nowadays.

3. Theory and Methods

3.1. *Methods: Field Trip and Social Scenario Analysis*

This paper adopts a fieldwork research method, including non-participant observation, participant observation, site survey, and stakeholder interviews. The current situation of public spaces in Chinese old communities is the basis of this research. Combined with the authors' community visits and observations in several Chinese cities such as Beijing, Shanghai, and Jiangsu, the research on public spaces in old communities was conducted at multiple levels, including spatial form, social context, and environmental factors. The space was photographed and recorded to obtain first-hand drawings and images to provide rich empirical support for this study. Finally, the causes of the current situation of spaces with complexities were studied through interviews and observations.

In analyzing the causes of the current spatial situation, this paper makes use of the social scenario analysis method. The evolution of urban residential space is actually a social phenomenon, as is the public space of old communities in China. The research needs to simultaneously observe specific spatial practices in a specific spatial and temporal context as a "socio-historical event" and to describe the subject, object, process, and outcome of the socio-historical event through different case studies, as well as to explain the causes of the event [14]. Advocated by sociologist Liping Sun, "The sociology of facing practice emphasizes that we should face the social phenomena in the form of practice and take it as the research object."; "Regard social facts as dynamic and flowing rather than static". This research method pays particular attention to in-depth case studies and goes deep into the process of phenomena [15]. This "process-event" sociological research method, which is used to feedback the social and spatial impact of events, has a particularly important methodological significance for empirical research. It is helpful for the transformation analysis from static "space" to dynamic "events", thus making spatial research more specific and also providing inspiration for spatial practice [16]. For example, it interprets the social and institutional meanings of the use of public space based on a dialogical relationship with social actors in order to recognize their daily practices, conflicts and tensions, forms of intervention and social appropriation, their rationalities, and meanings of the common use of public space as a scene of the social and spatial integration of cities.

3.2. *Theory: Spatial Morphology and Spatial Sociology*

"Morphology" is derived from the Greek words "Morphe" and "Logos", meaning the logic of the composition of forms. The external geometry of things and the internal logic and meaning conveyed by external shapes are included in the meaning of the word [17]. Morphology, which began with the study of biology and was subsequently applied by other disciplines related to the study of space, has gradually become an important part of Western natural science and social thought, which contains two important ideas: (i) the idea that a complex whole is composed of simple elements, and therefore the adoption of a partial-to-whole analysis process can be a suitable way to reach the ultimate truth of things and (ii) the emphasis on the evolutionary process of objective things [18]. Reviewing the development history of urban morphology, the historical geography school and process typology school laid the foundation of urban morphology analysis. The French school supplemented typology through diversified discipline backgrounds. These three are generally referred to as typomorphology [19]. Urban morphology is jointly established by researchers from different language regions and disciplines on the basis of a series of consensuses. They agree that cities or towns can be "interpreted" and analyzed through the media of their physical form [19]. At the end of the 20th century, there appeared a school of spatial syntax characterized by quantitative analysis. With the promotion of the international seminar on urban form (ISUF), there is a trend of mutual integration among

various schools, and modern urban morphology has gradually emerged. By using the method of urban morphology to study the formation and change process of urban spatial structures, combined with the spatial characteristics of public facilities and residential areas, we can obtain a comprehensive analysis of the urban construction environment [20]. At the same time, modern urban morphology also includes urban functions, social relations, as well as the development of economy, culture, and technology. Shlomo Angel emphasized the role of the historical inheritance of the urban form in future urban development. He clarified the impact of land ownership on the new urban form of London through the reconstruction after the London Fire in 1666 [21]. In recent years, urban morphology has been gradually combined with urban ecological issues such as urban air quality [22], wind development [23], and core microclimates [24] to explore the relationship between urban spatial morphology and other elements. Urban morphology has also been considered as an adaptation strategy to improve outdoor thermal comfort in the urban residential community of city [25] and to reflect on the community development model generally established from the morphological level and break through its limitations so as to promote the transformation of community development model [26]. As the basic component of the city [27], the community is closely related to the living environment. The change of its spatial form is the external reflection of the behavior and daily life of urban residents [28]. The belief and creativity behind it are an integral part of urban sustainable development [29,30]. However, urban morphology still has an insufficient understanding and cognition of community space in different regions, especially in Chinese communities with particularity, mainly in the following aspects: First, the research perspective tends to be grand. The community is not a city. Both physical scale and spatial scope are closely related to the body of residents. Too grand of a research perspective will be divorced from the significance of the community form research. Second, there is a lack of community form description and analysis methods, especially at the three-dimensional level. Third, there is a lack of continuous attention to the dynamic evolution of the community spatial form. Therefore, this paper will use the theory of urban morphology and micro perspectives to make a specific descriptive analysis of the public space form of Chinese old communities and capture the continuous and dynamic evolution process of space.

It is important to note that if the material form and change process of space are interpreted only from the morphological perspective, the study will be only an aesthetic discourse, but the complex social production relationship hidden behind the space and the association of spatial elements cannot be analyzed in depth. Sociology believes that space is the condition for the establishment of social forms, and that the material space of different forms and connotations is constructed by social space, which in turn is constructed by individual interaction [31]. Spatial sociology is a theoretical discipline derived from sociology, as well as a research method, and the purpose of using them is to further explore the meaning behind spatial phenomena and to explore the various layers of structures and relationships between forms, connotations, and cultures [32]. Therefore, this paper will combine the perspectives of morphology and sociology to analyze the material aspects of public space in old Chinese communities while exploring the connection between the interpretation of spatial forms and social relations.

4. Results

4.1. Increase in Boundary Space

The most intuitive spatial change in the public space of old communities lies in the increase of boundary space. The crowded inner spaces and the weakening of space management have directly led to the spillover of furniture and living supplies, which occurred in most of the public spaces of older communities. There was a resulting increase of public space boundaries (Figure 1), which makes the old community public space unstable and complex. The transformation of the boundaries of these public spaces is intertwined with the daily life behaviors of individuals [33], superimposed on the life patterns of different individuals, and is also constantly changing and developing, with no

clear spatial boundaries but a vague transition zone. The increase in boundary space has led to the shrinking and retreat of the original public space, but from a behavioral level, the public space boundaries formed so far are more everydayness [34]. Field research shows that the boundaries of public spaces in communities are more prone to various kinds of interactive behaviors, and although they are not large-scale collective activities, they are diverse and changing. The construction of canopies and the placement of homes in public space do not only extend the private space outward, but also increase the original clear and simple spatial boundaries. The semi-private space in the daytime is transformed into a semi-public chatting place in the afternoon and a temporary parking space for non-motorized vehicles in the evening. The temporal dislocation of use prompts the combination of spatial functions of different public levels, and the constant friction and adaptation form a kind of boundary space spontaneously generated based on daily needs (Figure 2).

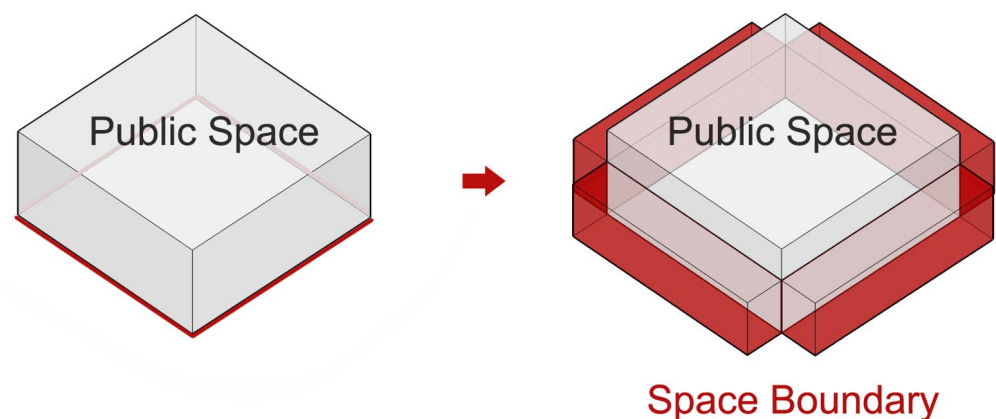


Figure 1. Increase in spatial boundary.



Figure 2. Behavior and interaction at the boundaries of public space.

There are differences in the morphology of public space boundaries in old communities, which can be divided into three forms: open, semi-enclosed, and completely enclosed.

Open spatial boundaries generally appear generally in different types of public spaces, and these spatial morphologies' forms, which cannot be described with a standard and well-defined shape of the body mass, are open and irregular. For example, in Beijing's Jingmian community, an open spatial boundary is formed outside the community convenience market, which is a frequent place for community residents to meet and interact with each other. In order to further increase the flow of people and interaction, the supermarket staff used simple construction materials, tables, and chairs to build a space for chatting, drinking tea, and playing cards together in the open space next to the supermarket. Because of the constant occurrence of communication behaviors and activities, it prompted more residents to take out old furniture at home and occupy the borders of this supermarket space, eventually creating a morphologically irregular, but still publicly open, complete zone (Figure 3a).



Figure 3. Expanded public space boundaries in older communities: (a) Jingmian Community in Beijing; (b) Lihua Community in Changzhou; (c) Baiwanzhuang Community in Beijing; and (d) Jiefangqiao Community in Zhenjiang.

The semi-enclosed boundary is generally located between the private space and the public space, the spatial form presents a semi-enclosed state with a certain degree of spatial enclosure and a clearer spatial scope. Semi-enclosed spatial boundaries are more private; for example, in Changzhou's Lihua community, the residents of the first floor use the community public space close to their homes to grow vegetables, dry clothes, and chat with their neighbors. They use living objects and furniture to enclose the space, forming a kind of semi-private space (Figure 3b). Some of the semi-enclosed space boundaries are located for doing commercial activities; for example, in Beijing's Baiwanzhuang community, the ground floor residents use waste materials to transform their own yards into fruit stalls and extend the fruits and awnings to the public streets of the community, forming a semi-enclosed space for fruit selling (Figure 3c). The above about semi-enclosed public space boundary can be understood as a situation where public space is occupied.

The completely enclosed public space boundary is an extreme presentation of semi-enclosed public space, which is divided by walls of different materials to form a closed and complete spatial form. For example, in the Jiefangqiao community of Zhenjiang, some

residents of the first floor enclose the public space on the side of the residential building with various simple materials to form their private space (Figure 3d). Compared with the semi-enclosed public space boundary, the fully enclosed space has a clear and complete spatial form, and it is also more aggressive to the public space. It should be noted that this kind of space occupation is illegal, and it is an expansion of private space for residents and more satisfaction of private behavior. However, for the community public space, they destroy the community greening and site and damage the public interests of the community, which pose a threat to the sustainable development of the old community public space.

In general, the boundaries of public space formed spontaneously in old communities are soft and flexible, which gives the old community more public activities and life convenience. Some of them are closed and rigid, which damages the public interests of the old community. However, these reflect a “bottom-up” space design. This spontaneous transformation and the driving factors behind it may become the entry point for the sustainable transformation of public space in old communities.

4.2. Diversity and Singularity of Public Space Functions

There are rich forms of public space in Chinese old communities, but as old living spaces that are different from the high-end communities of cities, the transformation of the form is bound to be affected by the transformation of spatial functions, which hides the transformation of the right to use and ownership of space [35]. The right of use and ownership of public space cannot be known from superficial field observations. Therefore, by studying the functions of public spaces in old communities, we can further understand the reasons for the evolution of spatial forms. Current field research in old Chinese communities reveals a polarization between multiple and single public space functions. The diversification of the functions of the public space in the old community refers to the use of various functions in a certain range of space. There are basic functions in these spaces, but in the process of continuous use by community residents, there are various uses different from the original space functions. The single function of public space refers to the combination and unification of behavior and use modes in the process of using the space, which is difficult to accommodate the occurrence of multiple public behaviors.

The diversified functional spaces are mainly concentrated in the commercial spaces of old communities. The boundaries of these spaces have exaggerated forms and are unstable. For example, in the Quyang community in Shanghai, the bicycle garage on the first floor of the original residential building was transformed into a fruit store, convenience store, and beauty establishment (Figure 4a). This is due to the fact that after the rapid development of China’s economy, the number of bicycles in the community gradually decreased and some spaces in the garage became vacant. At the same time, the lack of living commercial spaces in the community and the lack of management fees led the manager to divide the garage space and sublet it out, making it into multiple commercial public spaces. In the above example, the space not only has diversified functions but also makes the old garage space sustainable to use.



Figure 4. Diversification of public space functions in old communities: (a) Quyang Community in Shanghai and (b) Daoxiang Community in Wuxi.

The phenomenon of stall extensions on the street appeared in Wuxi's Daoxiang community (Figure 4b), which was originally the aisle at the boundary of the vegetable market; some stall owners chose to set up their own stalls on both sides of the aisle because they could not afford to pay the rent for the stalls in the vegetable market. These stalls have a variety of service functions: sewing clothes, acquiring old appliances, and dispensing keys. The survey revealed that there is a good negotiation between the stall owners, managers, and residents. The stall owners set up their stalls between 6.30 am and 5.30 pm after negotiation, and the residents were very supportive of their approach. These spaces met the diverse living needs of community residents, giving the originally single-function aisle space a rich public function and making the community road sustainable and vibrant.

There has also been a shift to a singularity of the function of public space in Chinese old communities. One representative example is that motor vehicles occupy a large amount of community public open space, making the function of public open space monolithic. With the development of Chinese society and the improvement of residents' economic level, the travel mode of residents in old communities has changed from bicycle-based to motor vehicle-based. In some old communities, in order to give more space for motor vehicles, the original lawns and gardens had been transformed into parking spaces, destroying the original community greenery (Figure 5). Most of the old communities did not consider the driving and parking of private vehicles in the initial planning and design, so the originally small public spaces in the old communities became more crowded due to the parking of motor vehicles. The function of these spaces was also directly transformed into a single parking function. At present, most of the public spaces occupied by motor vehicles in old communities are in a single negative state; although the spatial form has stability, it is difficult to stimulate the vitality of public space.



Figure 5. The singularity of the function of public space in old communities: (a) Beiyangfang Community in Beijing and (b) Fanguanang Community in Shanghai.

4.3. Particularity of User Identity

The first batch of residents in many of China's old communities were born between the 1930s and 1950s and are now elderly. These elderly people who have lived in the community for a long time have a special historical background and social status. Through interviews and literature collection, it is found that most of the elderly residents in the old community entered the "Danwei" in the 1960s-70s, which is the general name of the socialist workplace in China and a series of systems it includes [6]. As soon as they entered the "Danwei", they were given the social identity of "worker", a strong sense of honor, and a harmonious neighborhood atmosphere. These old communities are the collective living spaces that they highly agree with [36] (Figure 6). Regardless of social communication or geographic space, the basic background of the community in China at that time was represented by the "Conjugates" composed of acquaintances with the same function, geography, and emotion [37]. However, by the end of 1990s, social changes such as the reform of state-owned enterprises and the commercialization of housing had impacted the residential status in the community. At present, the residents remaining in the

old communities are “laid-off workers” [38]. They gradually moved from the social center to the social edge. Until 2000, due to the development of cities and the flow of resources, the old community began to show a migration trend [39], and many external populations began to appear in the old community. As a result, the old communities further became a more marginal space in cities. However, it is worth noting that through on-the-spot investigation and observation, users of the public space in the old community are still the aboriginal elderly, the use of public space by the external population is less, the elderly residents have more opinions on the environment and services of the existing public space, and this also produces a lot of spontaneous transformation behavior. The space formed by the spontaneous transformation behavior continuously affects the use of public space, and the use behavior further strengthens or consolidates the psychology and motivation of the users. For example, most of the elderly residents in the old community will choose to use the public space at the entrance on the first floor of residential building. They will choose to place some worn-out or abandoned seats or even add some supporting furniture. In these public spaces, the elderly will chat, drink tea, sun, and so on, but there will also be potential regulatory behavior. (Figure 7) Because the elderly residents in the old community are usually employees who have worked in the same “Danwei” and department, and they have both neighborhood and colleague relationships, they have similar backgrounds and experiences [6]. There will be great vigilance for the emergence of other individuals or groups, especially a certain number of foreign tenants in the old community. This does not only improve the security of the old community, but also strengthens the enthusiasm of the elderly for the common use of public space, which has become a sustainable state of space operation.



Figure 6. Collectivized communities of China in the 1950s.



Figure 7. Spontaneously generated regulatory behavior in the public space of old communities.

Public space does not seem to have much to do with foreign tenants in the Chinese old community. This is due to the obvious homogeneity of the original users of public space in the old community, which makes it difficult for tenants to integrate. At the same time, foreign tenants usually work around the old community during the day. They usually only go home at night and pass through the public space of old community. They are not allowed to use the public space too much. As a result, the public space in the old community is mostly for the elderly to get engaged in public activities.

By communicating with other elderly people, they have a strong nostalgia for the collectivist living mode under the early “Danwei” system. The glorious years were unforgettable and proud for them. Making use of public space in some old communities to create collective activities is not only a need to be accompanied psychologically [40], but also their nostalgia for the work and life under the “Danwei” system in the past. Therefore, the main user of public space in the Chinese old community is the elderly residents.

4.4. Complex and Sustainable Symbiotic Systems

The current status of public space in Chinese old communities reflects the differential relationships between living mode, user groups, living needs, and urban development in China, which is manifested in a system different from the original planning will and the modern urban governance mode. Modern residential communities in China have a clear division of spatial functions, but the Chinese old community public space has undergone a long period of development, forming a series of complex and sustainable operation modes. There are runs-in and negotiation among community residents, community managers and users. These “informal” spatial transformations we see in the Chinese old community today are precisely due to the complex formation system behind the space. They cannot be expressed with simple and clear spatial graphics and require in-depth social investigation to understand [41]. However, it is undeniable that these systems have become the internal driving force for the sustainable development of public space in the Chinese old community.

From the picture of Gudang community in Hangzhou (Figure 8a), we can see that there is a simple guard room next to the wall of the secondary entrance of the community. The guard room is next to the residential building, and behind the guard room is a bicycle garage. Interestingly, the roof of the guard room and the garage is an aerial platform composed of parasols, clothes racks, pot plants, bamboo poles, and other living items. The access to the platform is an iron staircase extending from a residential window on the second floor. From the outside of the community, the platform is covered by curtains and plants and is not easy to be found (Figure 8b). Through our visit to the resident of the second floor and consultation with the management of the community neighborhood committee, we came to understand the story behind this magical space and present the process of space formation in a dynamic model (Figure 9). At first, in order to meet the parking needs of residents, Hangzhou Gudang community managers built a bicycle garage at the community border. In the latter stage, a guard room was added to facilitate the custody of bicycles. However, due to the lack of management funds in the community, no supervisory security was found, and the guard room was left empty. However, due to the lack of a terrace, the second floor residents transformed the roof space of the security room and garage to form a terrace where they could dry clothes, breed flowers and plants, rest, and connect their own terrace with the terrace using a simple iron ladder. Interviews revealed that neighbors and managers agreed to the renovation of the second floor residents because the manager was also responsible for garage supervision and did not require community wages.

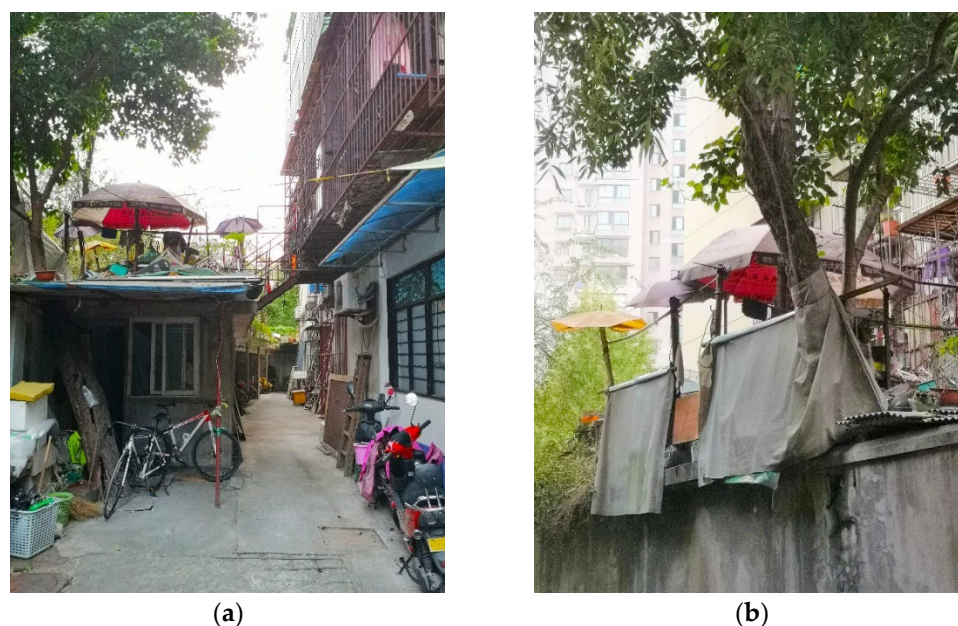


Figure 8. The evolution of public space in Hangzhou's Gudang community: (a) entrance guard, roof platform, and ladder in Gudang community and (b) observation of the space platform from the outside of the fence of the community.

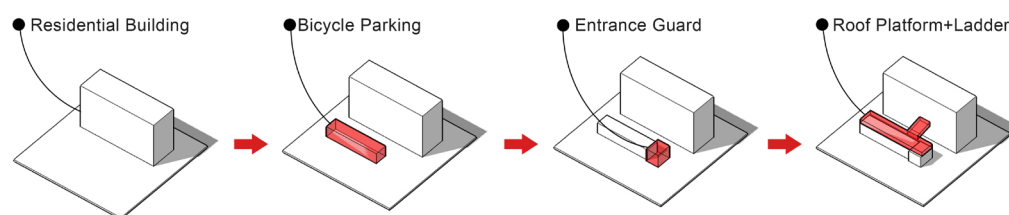


Figure 9. Symbiosis of public space in Hangzhou's Gudang community.

The same is true of the Caixiang community in Suzhou (Figure 10a). According to the picture, there are many small businesses along the community road. The shops of these businesses are relatively simple, without a professional store design, and there are even many pieces of daily furniture and objects in front of the door. On the upper floor of the commercial space on the ground floor, there is a roof platform surrounded by stainless steel fences, where domestic plants, simple tables and chairs, laundry racks, and other living items are placed. Next to the platform is a door on the balcony of the second floor resident. Through our visits with the owner of the store, the residents of the second floor, and the managers of the community, and combined with historical materials (Figure 10b), we have derived the process of the formation of this space, as well as the story behind it (Figure 11). The first floor of the original residential building is the normal living space. After experiencing the influence of housing commercialization in the late 1990s, some residents on the first floor began to rent and sell their own living space, thus gradually forming the bottom floor of the commercial space [42]. By 2000 or so, due to the development of the commercial economy, most of the residential space on the first floor has been transformed into commercial space, occupying roads and expanding, forming a commercial street in the community, and the types of space functions were rich and could meet the basic living needs of residents. Afterwards, the second floor residents built the “Aerial Garden” on the roof platform formed by the first floor expansion, giving a sense of hierarchy to the road space. Because of the practicality of underlying businesses and the beauty of air gardens, residents and managers in the old community have not dismantled them, thus forming today's spatial symbiosis.



Figure 10. The evolution of public space in Suzhou's Caixiang community: (a) current situation of Caixiang community and (b) Caixiang community in 1980s.

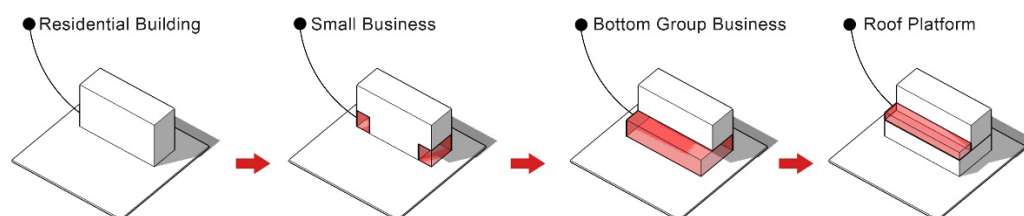


Figure 11. Symbiosis of public space in Suzhou's Caixiang community.

Through case analyses, it could be found that due to the change of property rights, the public space in an old community is different from the modern community's public space in clearly dividing the private field and the public field. These spaces observed by us are actually irregular space transformations, and they are generated spontaneously by residents. Generally speaking, urban informality is caused by the absence of official planning and some formal power control mechanism. The urban environment is spontaneous and incidental to a certain extent, with continuous bottom-up construction or re-construction activities. To a certain extent, it means the official failure to meet the needs of low-level citizens. On the other hand, informality is rooted in the rational economic behavior of ordinary people, i.e., obtaining what is needed at the lowest cost without caring about its legitimacy. Informality is the survival strategy and creative correspondence stimulated in the face of urban crisis. It is an effective force to dispel the oppression and control of people by bureaucratic cities and resist the daily life of colonization. Therefore, informality should be understood as a new urban culture, which is also a lifestyle, development model, and urban organization logic. There are positive aspects of space brought by informality in the old communities in China, which have promoted the continuous rational use of public space. The space has been continuously transformed by residents, and the rigid planning and standards have been constantly broken through. If the value of informality is ignored during community renewal, renovation will fall into an awkwardness, as mentioned above, and the public space of the old community will not be able to achieve sustainable development. Residents in the old community, after consultation with developers and managers, form special informal activities in the boundaries of public space, and then these behaviors influence users and managers, resulting in new impacts and further transforming the public space so as to form a symbiotic system of public space in the old community. Although forming a formidable challenge to contemporary urban space management, the complex symbiotic system in Chinese old communities makes space sustainable for development and reuse.

5. Discussion

Based on the results of the study, we propose the following strategies for the sustainable renewal of public spaces in old communities.

5.1. *Respecting the Rationality and Participation of the Existing Space*

Through the analysis of the material statuses, spatial functions, user groups, and formation system of public space in Chinese old communities, it was revealed that the old community does not lead to negative spatial behavior and activities because of the deterioration of the physical environment. There is still enthusiasm behind the seemingly dilapidated and disordered public space, which is mainly reflected in the spontaneous generation of a variety of space types and behaviors as well as a reasonable sustainable system in the space. The residents of the old community spontaneously transformed the public space, which is not only the direct expression of the will and ideas of the residents but also implies the participation of the community public space [43]. Although the public space spontaneously transformed by the residents of the old community is informal, such a spontaneous transformation is full of possibilities. For example, the physical space is improved without changing residents' active daily behaviors and activities. Illegal transformations in public spaces become legal spaces after design, making use of the generational logic behind to make the old community update more participatory. It can give us a lot of inspiration. There is an effective way of sustainable development of space, and even a new way to optimize urban space [44]. Of course, optimizing urban space will depend on the purpose and mission of city development, so it cannot easily be changed in local contexts, but it needs to be aligned with national or provincial policies in the long run, especially when dealing with the idea and principle of sustainable development.

At present, most community renewals and transformations tend to highlight the absolute publicity of public space, which makes the use of public space lose the balance between "freedom and control" [45], resulting in the unsustainability of community public space. However, through the field investigation and analysis of China's old communities, it can be found that at present, public spaces have formed a rich hierarchy, and the space contains a fuzzy transition space that is not in the absolute "public-private" relationship but tends to be balanced and sustainable. Such boundaries have more possibilities for the use of community space, for example the supplement of functions of private space, the increase of the possibility of neighborhood interaction, the improvement of public space utilization, etc. These are positive behaviors and forms produced by the long-term running of the process of community residents and public space [46]. Therefore, in the renewal progress of old communities, we should deeply understand and decipher these public space cases that can inspire sustainable renewal rather than rush to give specific and clear standard answers. The parking in the old community mentioned above makes the public space compact and single and cannot produce complex and diverse spatial behaviors and activities. In the renewal progress of community public space, we should respect the rationality of the current situation and consider the potential function and value of motor vehicle parking from the perspective of space. Motor vehicles have become one of the travel choices of community residents, and we cannot block them outside the community. American urban planner Jeff Speck is an urban planner and architectural designer. He advocates a more walkable city internationally through writing, speech, and architectural works. He mentioned that through the setting of the parking position of motor vehicles and combined with the overall planning and layout of the street, the parked motor vehicles are used as the "safety protection wall" between the sidewalk and the driving lane of motor vehicles (Figure 12a). In fact, similar parking methods can be found in the Chinese old community (Figure 12b) and play a positive role in road safety. In addition, the greening, wall painting, seats, etc., spontaneously formed along the street in some old communities can be combined with the parking mode of a "safety protection wall" (Figure 12c) (Figure 12d). Meanwhile, designers can mark the sidewalk, carriageway, and parking area through graphic design so as to promote the formation of the artistic

atmosphere of the whole community on the basis of solving the problem of community parking and walking safety. Therefore, respecting the rationality and use of the original space in the community and continuing and stimulating the participation of residents is the basis and premise of the renewal of the public space in the old communities. On this basis, the negative aspects of the original space will be transformed into positive aspects, especially when the current situation of the space is reasonable [47].

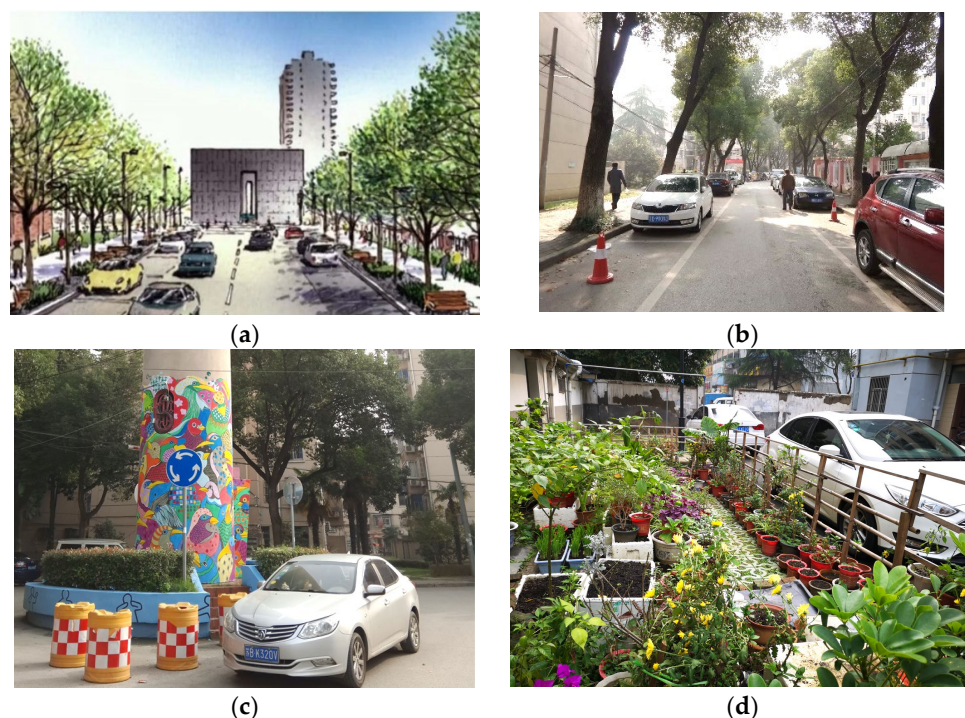


Figure 12. Rationalization of motor vehicle parking methods: (a) Jeff Speck's Oklahoma City street improvement design; (b) the main road of Shuixiu community; (c) the Graffiti in Shuixiu community; and (d) the spontaneous planting in Shuixiu community.

5.2. Stimulating Cooperation among Space Stakeholders

There is a complex symbiotic system behind the spontaneous transformation space in the public space of the old community. When space is continuously self-renewing, the network system composed of stakeholders must be in a more integrated and symbiotic state [48]. Through field research and analysis, the current situation of public space in Chinese old communities is a fragment in the process of continuous change and reconstruction. The whole process is determined by the symbiotic system in public space. A mature and stable symbiotic system does not only need to build a bridge between stakeholders through institutions and frameworks but also needs a long time for formation. It is the key to the sustainable development and renewal of urban space [49]. As we all know, designers and managers are not long-term users of the old community, and they are not clear about the behavior law of public space and the factors of space evolution. However, the elderly groups in Chinese old communities have the background of the "collectivism" era, and their long-term use of public space must have a certain particularity. It can be a direct and effective method for space users to participate in the renewal process of the old community. A designer's neglect of symbiosis systems will lead to the final transformation space not being well combined with the original system and even destroying the original symbiosis state, which is an easy way to stimulate more contradictions and problems, and, finally, cannot result in a sustainable renewal scheme [50]. The renewal of public space in an old community will inevitably lead to coordination among the wishes of residents, the ideas of designers, the experience and principles of managers, and national policies. Designers should not only master professional skills and ideas but also play a neutral role, have the

consciousness of reflection and criticism, and promote the communication and cooperation of other stakeholders [51].

At present, the sustainable development of public space in Chinese old communities is subject to multiple constraints and consultations among stakeholders, which is more inclined to the way of self-organization management and development. When there are conflicts and contradictions among stakeholders, the development of public space is bound to stagnate or regress. Therefore, the process of the sustainable renewal of public space in old communities requires a “top-down” and “bottom-up” design system (Table 1). In this open and adaptable system, it is necessary to allow the participation of various space stakeholders and provide a variety of communication methods [52]. For example, the renovation of the central square of the Wuxi Shuixiu community adopted a top-down and bottom-up design system (Figure 13). Under the guidance of the Urban Planning Bureau, the designers, residents, and community managers have carried out various activities to promote the design cooperation so that the design results can be recognized by everyone, the residents can be satisfied, and the community public space can be sustainable development. If designers are separated from the system, the problems that can be solved by themselves are limited. Therefore, designers need to actively provide an open and systematic space renewal process and should provide a communication platform for stakeholders. Designers should understand the needs of the group as much as possible, promote or stimulate the cooperation among stakeholders, and integrate people-friendly design factors so as to put forward the renewal design scheme of material space, making it possible for the public space in old communities to continue to instigate social activities in the future [53] (Figure 14).

Table 1. Differences and cases between top-down and bottom-up.





	Top-Down	Bottom-Up
Definition	Transfer impacts from higher levels to lower levels in the system	Transfer impacts from lower levels to higher levels in the system
Old Communities of China	 <p>Ways used by Chinese old communities in design and construction</p>	 <p>When residents move in, they start to spontaneously transform the old community over time</p>
Design Case		 <p>Quinta Monroy housing Architect: Alejandro Aravena</p> <p>This kind of “half room” design has been introduced into various poverty-stricken areas in the third world and has made significant contributions to the housing problems in poverty-stricken areas through top-down and bottom-up design ideas.</p>



Figure 13. Sustainable renewal of public space in Wuxi's Shuixiu community.

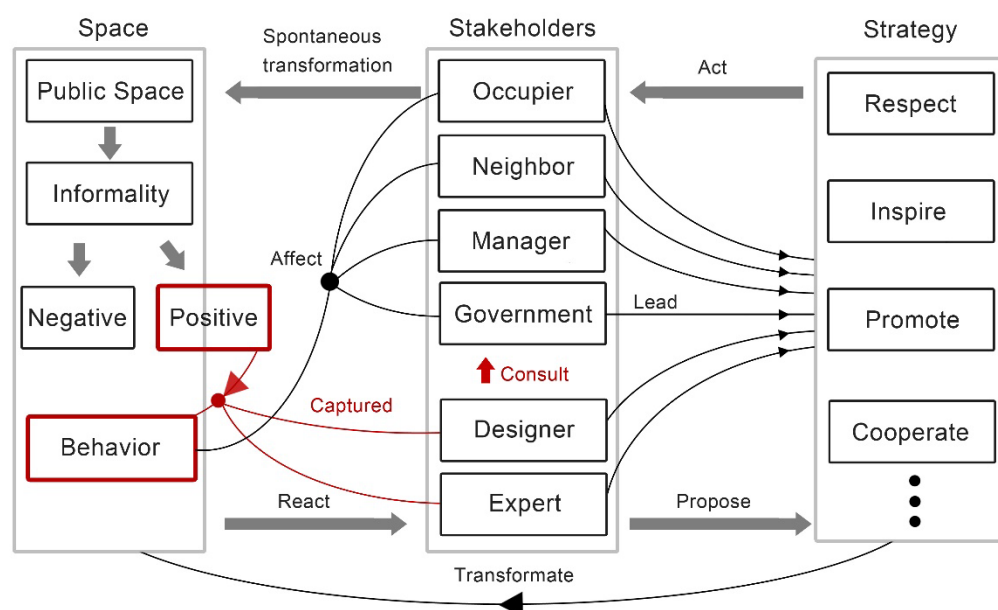


Figure 14. Sustainable design strategy generation system.

5.3. Reproducing and Enhancing Everyday Places

The original narrow and compact private space of Chinese old communities has prompted a large number of daily behaviors to take place in the public space. The current situation of the public space of these old communities is the materialized performance formed by the close interaction between body and space [54]. It also reflects that residents have a strong sense of autonomy in public space. The abundance of behaviors and activities in public space not only reflects the independent consciousness of users but also reflects the phased state of individuals after run-ins with space for a long time. As the public space of the old community currently contains the vitality of the daily life of residents, the transformation of the space should not place too much emphasis on material changes and should focus more on the stories behind the space and the guidance of social relations at the border. Social relations are not hidden in static text and classification but can only be found in dynamic daily life practice [55]. As described by B. Tschumi, the architectural space cannot be separated from its social significance, form creation, and events occurring in it [56].

Therefore, this paper believes that in addition to the above ideas, the renewal of public space in Chinese old community also needs to more consciously connect the operation system of space with the daily life of residents. In other words, the renewal process of public space in the old community needs to be guided to understand the daily space. In the process of renewal, the mode of public participation in old communities in China can be achieved through various activities such as theme activity days, street stage performances,

expert forums, and charity sales so as to return to the daily needs of community residents. In this process, space is not a static and pure object, but a medium with various visible and invisible daily behaviors and lifestyles. Designers should target the reproduction and enhancement of the residents' daily lives as a goal for renovation and the escalation of physical space as a means, rather than decoration or renewal floating, on the surface of the space. After fully understanding the social relationships and operating systems of the public spaces of the old community, designers can use diverse spatial forms to update the public spaces, reserve opportunities for the autonomous use and renovation of the spaces, stimulate new participatory opportunities in daily life, and allow the public spaces of the old community to operate in continuous and active manners.

6. Conclusions

This paper summarizes the following four space characteristics through the analysis of material status, space function, user groups, and formation system of public space in the Chinese old community: the increase of public space boundary; diversity and singularity of public space functions; particularity of user identity; and complex but sustainable symbiotic system.

The change of the boundary form of the public space in the old community is intuitive. Whether it is an open or closed space form, it is a phenomenon that the public space is occupied, but the spatial behavior and interaction caused by it are positive and enlightening. After a long period of development, the morphological changes in the public space of Chinese old community reflect the diverse living needs of residents. The continuous increase of community commercial activities promotes the more diversified functions of the public space. The long-term consultation among stakeholders leads to the flexibility of the public space in the old community. The parking of motor vehicles leads to the occupation of a large number of public spaces, which makes the function of some public spaces single and negative. The main users of public space in old communities are the elderly, who have the common memory of China's "collectivism" era and have a special understanding and feeling for public space and activities. After a long time of run-ins, the stakeholders in the community have formed a variety of ways to use public space. They will promote new spatial behavior and new spatial forms. Through repeated superposition and strengthening, a complex but sustainable symbiotic system is formed.

Based on the spatial characteristics, this paper puts forward the following three sustainable renewal design strategies: respecting the rationality and participation of the existing space; stimulating stakeholder cooperation; and reproducing and enhancing everyday places.

From the whole view, the current state of public space in Chinese old communities is the direct expression of occupants' will, the spaces having participation, and designers in the process of transforming the space should excavate as many positive factors as possible in the original public space, respecting the rationality possessed in the original space and enabling the behaviors of the active participation of residents to be sustainable. Due to the complex symbiotic system in the public space of the old community, designers should not rely on simple renewal or the reconstruction of space but require an open and adaptive system, which can promote communication with and stimulate stakeholders, and cooperate to improve the symbiotic system. No matter what space treatment method the designer uses in the renewal of the old community, the ultimate goal should always serve the daily life of the residents, reserving the autonomous use of spatial places and opportunities for development, creating more places that can carry daily life, and returning the renovated public space to the residents. The design strategy and the idea of sustainable renewal are involved in the renovation of the public space in Chinese old communities, which is not only conducive to the rationalization and improvement of the public space in old communities but also provides a reference for urban renewal and transformation in China and may also become a balance point of "top-down" and "bottom-up" design in urban space. As a spatial pattern of people's cohabitation, the inner relationship and structure

of communities are always under the pressure of different people's needs. Therefore, there is some commonality in the infrastructure. However, there must be differences between communities in different areas, which are related to culture, city, population identity, and so on. At the same time, the community itself is a complex system and will be transformed by the stimulation of the external environment. Therefore, we believe that the conclusion is applicable for the renewal of the old communities in China, but it is referential for communities in other countries and needs to be applied in conjunction with the environment and conditions of specific communities.

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