

## THE MORPHOLOGICAL PATTERNS OF RESIDENTIAL NEIGHBORHOODS IN CHINA: A CASE STUDY OF DOWNTOWN SHANGHAI

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### ABSTRACT

*The built environment in China is undergoing a process from quantitative change to qualitative change. As one of the most inclusive cities in China, Shanghai has plenty of diverse residential neighborhoods, which makes it an ideal sample to study morphological patterns of residential neighborhoods in China. The paper made a morphological study of residential neighborhoods in downtown Shanghai from 1949 to 2019 by means of extracting the typical residential cases, analyzing the morphological forms and clarifying the requirement changes of the urban dwellers. Five morphological patterns of the neighborhoods were studied: scale, boundary, pathway, layout, and height. Results showed that the scale of the block where the neighborhoods were located gradually became larger. There were fewer and fewer entrances in the neighborhood. The morphology of the pathway, the building layout and the height were diversified. Keywords: morphological pattern, downtown Shanghai, residential neighborhood, high-density environment*

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### BACKGROUND

Since 1949, the development of Chinese neighborhoods has been affected by two development periods of the housing system and two social transformations. The first transformation was the socialist transformation that took place after the founding of the People's Republic of China, which transformed the town's own, rented market housing system into a public welfare housing system. During this period, China built a large number of workers' communities to solve the housing problems of workers. Shanghai's "Caoyang Village" was the first "workers' community" in China. Limited by relatively backward productivity, the quantity and quality of workers' communities did not fully meet the actual needs of people. The second transformation was the transformation of the housing system based on welfare housing under the planned economy into commercial housing under the market economy after the reform and opening-up. During this period, the construction of commercial housing with the goal of construction volume and market income developed rapidly. As China's per capita living area increases, the residential construction in China will enter its third transformation, and the urbanization model will change from increment development to inventory development (Zhenyu Li, et.al. 2016).

Shanghai is a typical representative of China's urbanization development. In the 40 years since the reform and opening up, the per capita living area of Shanghai has quadrupled (Yijia Dong, et.al. 2019). As the site of the first workers' community and the earliest high-rise residential building, Shanghai has various types of residential neighborhoods. It is a test field for residential construction of China and reflects the exploration of architects of different eras.

In the relevant research on Shanghai's residential neighborhoods, the evolution of urban space has been explored from a morphological perspective. For example, Qi Yu (2011) explored the

evolution of the urban residential space layout pattern in Shanghai under the influence of the space production model. His research was aimed at the layout of residential space under the overall perspective of urban planning. Existing research still lacks analysis of urban morphology at neighborhood scale. Yijia Dong (2019) conducted a morphological analysis of 365 excellent residential community design cases in Shanghai and summarized the morphological patterns of contemporary residential communities. This article selected the residential neighborhoods in downtown Shanghai as research objects, and analyzed the urban form evolution at the neighborhood scale.

## METHODOLOGY

Under the influence of two social transformations, the development of Shanghai's urban neighborhoods from 1949 to the present can be roughly divided into three periods: public housing period, market exploration period, and marketization period. Five typical neighborhood cases were selected in each period in downtown Shanghai. Five morphological patterns of the neighborhood cases were studied: scale, boundary, pathway, layout, and height.

<i>Period</i>	<i>Neighborhood</i>	<i>Construction time</i>	<i>District</i>	<i>Site area/ha</i>	<i>Block area/ha</i>
<i>Public housing period (1949-1978)</i>	<i>Caoyang First Village</i>	<i>1951</i>	<i>Putuo District</i>	<i>7.2</i>	<i>2.6</i>
	<i>Hudong Village</i>	<i>1953</i>	<i>Pudong District</i>	<i>19.0</i>	<i>32.4</i>
	<i>Anshan Third Village</i>	<i>1954</i>	<i>Yangpu District</i>	<i>3.4</i>	<i>6.3</i>
	<i>Tianlin Village</i>	<i>1962</i>	<i>Xuhui District</i>	<i>9.1</i>	<i>26.0</i>
	<i>Xuhui Village</i>	<i>1976</i>	<i>Xuhui District</i>	<i>1.6</i>	<i>5.5</i>
<i>Market exploration period (1978-1998)</i>	<i>West Miyun Community</i>	<i>1980</i>	<i>Hongkou District</i>	<i>6.8</i>	<i>11.0</i>
	<i>Gubei Community</i>	<i>1986</i>	<i>Changning District</i>	<i>4.1</i>	<i>4.1</i>
	<i>Sanlinyuan</i>	<i>1995</i>	<i>Pudong District</i>	<i>12.2</i>	<i>15.1</i>
	<i>Mingducheng</i>	<i>1997</i>	<i>Minhang District</i>	<i>17.2</i>	<i>17.4</i>
	<i>Wanlicheng</i>	<i>1997</i>	<i>Putuo District</i>	<i>8.1</i>	<i>11.1</i>
<i>Marketization period (1998-2019)</i>	<i>Da'an Garden</i>	<i>2004</i>	<i>Putuo District</i>	<i>9.9</i>	<i>12.7</i>
	<i>Zhonghao Garden</i>	<i>2007</i>	<i>Putuo District</i>	<i>7.5</i>	<i>8.9</i>
	<i>Tianshan Garden</i>	<i>2009</i>	<i>Changning District</i>	<i>6.5</i>	<i>16.7</i>
	<i>Renheng Park</i>	<i>2015</i>	<i>Pudong District</i>	<i>6.7</i>	<i>10.6</i>
	<i>Wanyuancheng C Community</i>	<i>2018</i>	<i>Minhang District</i>	<i>12.9</i>	<i>12.9</i>

Figure 1. information of fifteen neighborhood cases in downtown Shanghai.

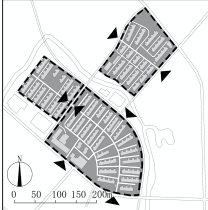
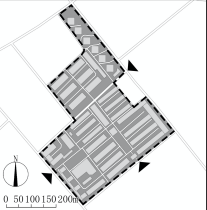
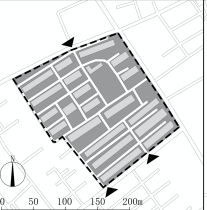
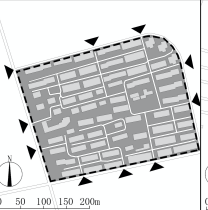
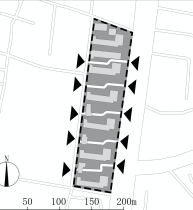
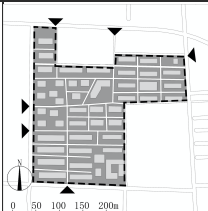
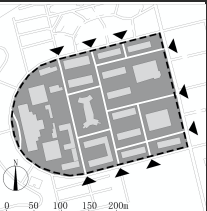
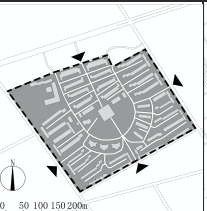
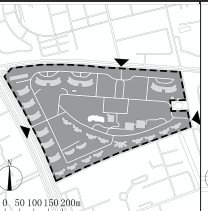
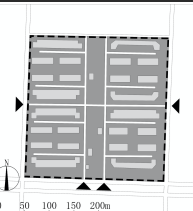
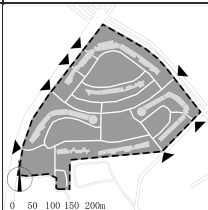
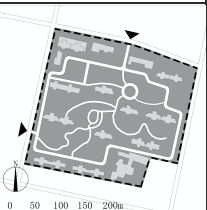


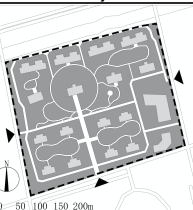
Public housing period (1949-1978)					
Neighborhood	Caoyang First Village	Hudong Village	Anshan Third Village	Tianlin Village	Xuhui Village
Diagram					
Number of entrances	7	3	3	10	10
Pathway	grid	grid	grid	grid	grid
Building layout	row layout	row layout	row layout	row layout	row layout
Market exploration period (1978-1998)					
Neighborhood	West Miyun Community	Gubei Community	Sanlinyuan	Mingducheng	Wanlicheng
Diagram					
Number of entrances	6	9	4	3	4
Pathway	grid	grid	inner ring	inner ring	grid
Building layout	row layout	point-block layout	mixed layout	point-block layout	row layout
Marketization period (1998-2019)					
Neighborhood	Da'an Garden	Zhonghao Garden	Tianshan Garden	Renheng Park	Wanyuancheng C Community
Diagram					
Number of entrances	7	2	3	2	3
Pathway	inner ring	inner ring	inner ring, grid	irregular curve	outer ring
Building layout	semi-enclosed layout	row layout	row layout	point-block layout	clustered layout

Figure 2. Boundaries of fifteen neighborhood cases in Downtown Shanghai.

The 15 neighborhoods were selected from "City · Residential · City—Comparison of Residential Building Development between Berlin and Shanghai" (Zhenyu Li, 2004), and the award-winning works of Shanghai Excellent Residential Design in 2018.

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## FINDINGS

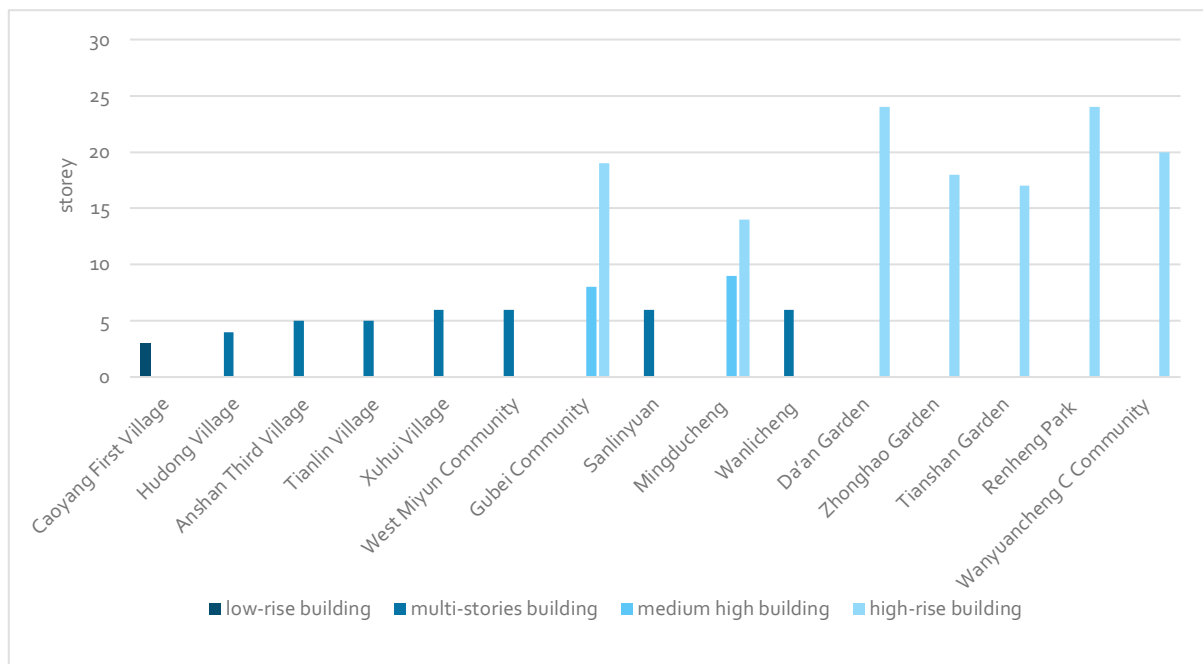
Since the founding of the People's Republic of China, the construction of urban neighborhoods in China has achieved glorious achievements. In the 30 years after the 1980s, the constructed area of new urban residential buildings was about 10 billion square meters and the per capita residential constructed area of some large cities increased by five to six times (Zhenyu Li, 2011). Shanghai was a typical example during that time.

As shown in Figure 1, the area of most neighborhoods cases is less than 10 hectares, but the block area has gradually increased since 1949. During the period of public housing, the construction of residential areas in China was at a large overall development scale. For example, Caoyang Village included 10 neighborhoods such as Caoyang First Village, Caoyang Second Village and so on. In the market exploration period and marketization period, the area of blocks where the neighborhood cases were located increased. The block area was about 10 to 15 hectares.

In China, most neighborhoods are under control of sunshine regulations. The layout of residential buildings in these neighborhood cases is mostly north-south orientation, so the boundary of the neighborhood often shows a continuous interface on the side of the east-west road, while the interface of the north-south road is broken. As people's requirement of privacy and living quality increased, most neighborhoods are gated and get fewer entrances.

Since 1949, pathways in the neighborhoods have become more irregular with an organic and pedestrian-friendly design. During the public housing period, the pathways in most neighborhoods were grid-shaped (Figure 2). During the marketization exploration period, the pathways in neighborhoods had various forms, including grid form, ring form and so on. During the marketization period, the pathways leading to the housing unit were usually organized by a ring road. The form of pathways in this period was relatively complex combining various forms. There were also irregularly curved pathways in neighborhoods such as Renheng Park.

As can be seen from figure 2, the distance between buildings has become longer. In the public housing period, China's economy still developed slowly, and it was urgent to solve the problem of lack of urban housing resources. During this period, the speed and amount of housing construction were the first priority, and the form and quality of living space were not fully paid attention to. For the purpose of rapid construction, as well as learning urban construction experience from the Soviet Union, the layout of the workers' community adopted a row layout (Figure 2). The "Urban Planning Quota Index Regulations" issued in 1980 clearly stipulated the distance between residential buildings. In 2002, the "Urban Residential Area Planning and Design Code" further supplemented the regulations about winter solstice sunshine hours and sunshine spacing on the basis of the 1994 version. After the reform and opening up, commercial housing has developed rapidly. Under the constraints of the regulations, the row layout has been further applied and has become a commonly used model in urban neighborhood design (Guangxu Cui, 2013). In the period of market exploration and marketization, some neighborhoods adopted semi-enclosed layouts, such as Da'an Garden. In some cases, point-type high-rise residential buildings were arranged in a random and decentralized pattern, and there were fewer and fewer connections between building units.



**Figure 3. Building height in the 15 neighborhood cases in Downtown Shanghai.**

Over the past 70 years, the height of residential buildings in Shanghai's central urban area has changed significantly (Figure 3). The buildings in the period of public housing were mainly low-rise (1-3F) and multi-stories (4-6F). During the marketization exploration period and the marketization period, there were mainly high-rise buildings in the neighborhoods. In some high-end neighborhoods during the marketization period, the height of residential buildings was diversified, including low-rise buildings, multi-stories buildings, high-rise buildings and so on.

## CONCLUSIONS

In terms of scale, the area of the neighborhoods in downtown Shanghai has gradually increased in the 15 cases, but all around 10 hectares. As for the boundary, the east-west boundary of the neighborhoods during the public housing period was continuous, while the north-south boundary was broken. From the perspective of pathway, the pathways of residential neighborhoods in the period of public housing were grid form. During the period of market exploration and marketization, the form of pathways was more abundant and organic than that in the public housing period. The pathways in this period had various forms such as grid form, ring form and organic curves. In terms of building layout, most neighborhoods in public housing period had a row-type building layout. In the other two periods, the building layout tended to be diversified. The enclosed and semi-enclosed layout also emerged. However, the row-type layout was still the most popular form of building layout. There were mainly only multi-stories buildings in the neighborhoods during public housing period. Nowadays, high-rise buildings are the most popular ones in newly built neighborhoods. More neighborhoods have high-rise buildings and multi-stories buildings in the same time.

With the rapid development of the economy, the urban design and management in China has a refined trend. The quality of living space has become a new pursuit of people. The needs of residents are becoming more and more diversified, and neighborhoods vary in morphology. In future, the morphology of neighborhoods in Shanghai will be further diversified and sustainable.

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## ACKNOWLEDGMENTS

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