SOCIOLOGY | RESEARCH ARTICLE

Evaluating residents’ satisfaction before and after regeneration. The case of a high-density resettlement neighbourhood in Suzhou, China

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Abstract: The urban residential regeneration strongly supported by the 14th five-year plan of China should achieve social sustainability. Assessing residents’ satisfaction with the housing quality and living environment is essential for social sustainability and, therefore, should be considered in any transformation process. This study investigates which factors affect residents’ satisfaction significantly in

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PUBLIC INTEREST STATEMENT

Urban regeneration and social sustainability are worthy of investigation because they impact urban development. The research explores the factors that influence the residents’ satisfaction with the transformation of a typical resettlement neighborhood in Suzhou, China. It uses a structured questionnaire survey with SEM analysis. The results are surprising: they show how it is not the residential unit that impacts the assessment—once a decent dwelling is provided—but the urban environment. The regenerated area does not perform much better than the old one in the view of the residents, even if the old one and the new one are entirely different. The research contributes to understand how urban regeneration can obtain sustainable high-quality urbanization.
high-density resettlement neighbourhoods, focusing on housing conditions and the community environment. The selected case study is Nanhuan Village, a large resettlement neighbourhood in Suzhou built in the early “80s with medium-density multi-storey buildings and partly transformed with high-density high-rises in 2010. The study analyses residents’ satisfaction before and after the regeneration and adopts a mixed research method: in-depth interviews with community managers and designers, fieldwork, and a structured questionnaire survey with residents to determine the influencing factors of satisfaction analysed by a structural equation model. The study identifies 24 indicators and the results highlight what matters for the residents: “community environment”, “property management”, and “surrounding facilities” are the factors that most significantly impact the residents’ satisfaction, even though there are different opinions between the residents of the old part and the regenerated part. The results are surprising: it is not the residential unit that mostly impacts the assessment—once a decent dwelling is provided—but the urban environment. The results also reveal that the densification realized by the transformation is not perceived as a problem. The results of this study can contribute to the definition of the government’s urban regeneration policy.

Subjects: Urban Sociology - Urban Studies; Planning and Sustainability; Sustainability Assessment; Housing and Communities; Sustainable Development

Keywords: Sustainable regeneration; residents’ satisfaction; resettlement community; structural equation model; high density

1. Introduction: The new role of regeneration in Chinese urbanization

The 14th five-year plan of China (2020–2025) assigns a relevant role to urban regeneration (城市更新) in the process of sustainable and high-quality urbanization (Ji, 2015; The State Council, 2021b). Urban regeneration is officially promoted for the first time by the central government to use efficiently land resources, create a better living environment, improving the city image. The intentions of the 14th five-year plan urban regeneration include a range of actions: from demolition with reconstruction to partial renovation, to comprehensive renovation. These very recent guidelines align China with the directions for sustainable development that is the main goal of the UN-Habitat (Akbar & Edelenbos, 2021; Barton, 2000; Mensah, 2019; Tzoulas et al., 2007).

Beyond the basic improvements of the building stock, the idea of regeneration in China brings about two emerging topics: the increase of population density in urban areas and a new approach to social sustainability (Chen et al., 2022). In fact, intending to increase the urbanization rate, which is a key national priority, and under the pressure of constant urban immigration, the most competitive cities in China are increasing the existing Floor Area Ratio (FAR): on one side to make the investment in urban regeneration profitable, on the other side to use land more efficiently (Chhetri et al., 2013; LENG et al., 2010; Li et al., 2016; The State Council, 2021a). Different from the past, the social sustainability of each transformation is increasingly considered, because not only growth must be achieved, but sustainable growth according to the New Type of Urbanization launched in 2014 with fully consideration of residents’ needs and satisfaction (Chu, 2020; Guan et al., 2018; Pellegrini & Chen, 2020).

This paper addresses the topic of residents’ satisfaction with the regeneration and densification of their resettlement neighbourhoods built before 2000 in the city of Suzhou, Yangtze River Delta region, China.

The paper focuses on residents’ satisfaction and aims to answer three main research questions:
How has the regeneration impacted the residents’ satisfaction? What elements and changes in the open space and buildings of the neighbourhood have significantly impacted residents’ satisfaction?

What role has the densification played in the formation of the residents’ perception of the regenerated community?

These research questions connect space and satisfaction and aim to discover if the regeneration project, which has transformed the existing neighbourhood into a high-density one, has increased residents’ satisfaction or not. The paper assumes residents’ satisfaction as one element to measure the success of the regeneration and the social sustainability of the transformation process. The paper wants to contribute to the discussion about the ongoing Chinese transition process into high-quality residential communities and the general negative assessment of high-density levels in the built environment (Chunfang, 2012; Heping & Zhi, 2019).

The paper has 5 sections. First, it introduces the resettlement community and the related issues. The second section defines the conceptual framework for evaluating residents’ satisfaction in a high-dense resettlement community. The third illustrates the research site, research methods, and data collection. The fourth evaluates the residents’ satisfaction in the high-dense resettlement site according to the conceptual framework and through a Structural Equation Model (SEM). Finally, the most significant influencing factors to residents’ satisfaction are identified, and some conclusions are given about the relationship between residents’ satisfaction and the regeneration of the Nanhuanshi Community.

2. Literature review

2.1. Old resettlement communities: A critical part of Chinese cities

The resettlement communities (安置社区) are neighbourhoods where people who had their house demolished—farmers or inhabitants of old urban centres or dilapidated areas—are relocated according to specific policies (Qian, 2019; The State Council, 2011; Zhao & Zou, 2017; Zhou & Xiong, 2019), which are meant to provide sufficient construction land for urbanization, improve land-use efficiency, offer the residents both an improvement of their houses and compensation (Linlin, 2015). The resettlement was usually financed by local governments and given a low budget: planning was as rapid as possible, the design largely standardized, the construction planned to last not more than 30 years; given these premises decaying installations, outdated space utilization, ineffective open space distribution, inadequate supporting public facilities, and infrastructure breakdowns are frequent (Qian & Decai, 2006).

The obsolescence of the structures, the poor maintenance, and the missing facilities combined with the enrichment of Chinese society make the resettlement communities built before 2000 a critical part of Chinese cities. Under these conditions, the regeneration of resettlement communities should start from an overall re-thinking of the living environment, including residential units, Floor Area Ratio (FAR), dimensions, distribution, allowed uses of the open spaces, and supporting facilities.

In China, the old resettlement communities are one of the main targets of regeneration for several reasons related to the quantity and the quality of the stock:

(1) They amount to a significant proportion of the existing housing stock; in fact, nearly 100 million households experienced housing demolition and relocation from 1995 to 2014 (Xie & Hu, 2014);

(2) Today, several resettlement communities offer a low-quality built environment and few public services and therefore need the upgrading of both the indoor features and the outdoor public spaces, basic living infrastructures, and supporting facilities (Chen et al., 2021; Li et al., 2018; Muchadenyika & Waiswa, 2018; Posthumus et al., 2014; Zhang et al., 2021).
According to the 14th five-year plan and the related guidelines, the regeneration must target especially the communities built before 2000 and produce a living environment better suited to the newly achieved wealth of a large part of the Chinese population, that is to say the middle class which the central government wants to increase (The State Council, 2021b). The improvement is consistent with the goal of the "moderately prosperous society" (小康社会) promoted for the whole country by the central government since 1978 and declared achieved by President Xi in July 2021 (Xi, 2021).

2.2. Quality of living environment, social sustainability and residents' satisfaction

Social sustainability is one of the pillars of sustainable development, because it satisfies basic human needs, improves life, and ensures social justice (McKenzie 2004; Bramley & Power, 2009; Dempsey et al., 2011; Pareja-Eastaway, 2012). The quality of the living environment is essential in determining the quality of life because it impacts the fulfilment of needs, everyday life, and social justice. Improving the quality of life (QoL) is a key component in enhancing social sustainability at the community level (McKenzie, 2004; Karuppnan & Sivam, 2011). QoL implies subjective life satisfaction (Aaronson, 1988; Diener, 2009; Diener & Ryan, 2009; Felce & Perry, 1995). The measurement of QoL is based on residents' satisfaction, with the investigation of subjective feelings, then promoting comprehensive consideration of living well-being and social balance, and ensuring social justice (Mohit & Abdul, 2014).

At the neighbourhood level, a socially sustainable community can be defined as a place where people want to live and work now and in the future (Sundelin, 2019), because:

1. it is a long-term viable setting for human interaction, communication, and culture development (Yiftachel & Hedgcock, 1993);
2. it meets the diverse needs of current and future residents, is environmentally sensitive and contributes to a high quality of life (Pareja-Eastaway, 2012);
3. it is safe, inclusive, well-planned, well-constructed, and managed, and provides equal opportunities and good services to all (Gay, 2006).

According to numerous scholars, residential evaluation, or “satisfaction” with the neighbourhood where one lives, is an important indicator to measure the quality of the living environment. Analysing residents’ evaluation has been identified as a primary method to check the achievements of planners and basic government rules (Amérgio & Aragones, 1997; Dekker et al., 2011; Galster & Hesser, 1981; Hongfeng, 2004; Huang et al., 2020; Phillips et al., 2004; Speare, 1974).

Since the 13th national five-year plan (2015–2019), social sustainability is officially recognized in China along with ecological sustainability as a significant factor in achieving high-quality urbanization and people-oriented development (Guo & Guo, 2008; Jin Zhengyi, 2009; The State Council, 2016). The achievement of a “harmonious society” (和谐社会) in the fast-developing Chinese cities is connected to residents’ satisfaction, and the factors affecting residents’ satisfaction are receiving unprecedented attention in China (Chen et al., 2000; Geng, 1999; Z. Li & Wu, 2013; Ma et al., 2019). Moreover, even though there is no specific regulation about people’s participation in planning and design activities, the Chinese government regeneration policy states the importance of residents’ participation in regeneration projects (Deng Jiangyun & Wang, 2015; Yanlu, 2004) to understand their needs and priorities and deal with the conflicts which often raise between residents and local governments for the transformation decision-making (State Environmental Protection Administration(SEPA), 2007; Xiangyang, 2005).

In China, specific studies to measure residents’ satisfaction started relatively late if the global context is considered and a variety of approaches coexists in current research. Some studies used quantitative and statistical analysis methods to define the influencing factors; others used qualitative comparison and descriptive analysis (Wang, 2016; Yuan et al., 2018). According to existing studies, the residents’ satisfaction with large-scale resettlement communities can be analysed using a comprehensive and multi-level indicator system that considers objective and subjective factors:
(1) objective factors include the characteristics of the residential unit, the surrounding environment, and infrastructure (Awotona, 1990; Huang & Du, 2015; Lee et al., 2008; Mccrea et al., 2005; Mohit & Azim, 2012; Ozo, 1990; Riazi & Emami, 2018; Salle, 2008; Speare, 1974);

(2) subjective factors include personal and family characteristics, income level, house ownership, relocation, and compensation for relocation (Galster, 1987; Huang et al., 2020; Malpass, 2005; Mohit et al., 2010; Speare, 1974; Tan et al., 2019a).

When selecting the evaluation indicators, we selected a broad range of indicators in order to represent all the aspects that are closely related to people’s behavior and life, such as property, pedestrian, greening, cultural symbols, etc., and achieve as complete a description as possible. The factors can be grouped into 3 main categories:

(1) housing conditions, such as building quality, building area, building age, building orientation, lighting, and ventilation (Amole, 2009; Garrod & Willis, 1992; Hongfeng, 2004; Niu & Zhao, 2018; Paris & Kangari, 2005);

(2) individual attributes, such as age, education, family structure, economic level, house ownership (Galster & Hesser, 1981; Mohit et al., 2010; Yi & Jianping, 2014);

(3) context, such as community management, supporting infrastructure, transportation convenience, surrounding environmental conditions, neighbour’s relationships (Baum et al., 2010; Lv, 2004; Phillips et al., 2004; X. Wang et al., 2014; Yi & Jianping, 2014).

3. Research method

3.1. The case study

Several studies in China have focused on the impact of various spatial characteristics of some communities on residents’ satisfaction (Ding, 2010; Gao, 2013; S. M. Li & Song, 2009; D. Wang et al., 2019; Yunxia et al., 2016; Zeng & Zeng, 2013; Zou et al., 2014), but very few studies analysed the residents’ satisfaction before and after the transformation of their living environment (Lee, 2021; P. Wang et al., 2021). This comparative study is possible in the case of Nanhuan Village (南环村), in Suzhou, Yangtze River Delta area, where one part of the community was transformed in morphology, building types, and density, and one part remained as originally designed in the ‘70s (Fig. 1 and 2). Nanhuan Village, in fact, was built between the late ‘70s and the early ‘80s to relocate over 6000 inhabitants from Suzhou old town which was being demolished (first relocation in the first stage of city modernization). The resettlement community was designed “as usual” in this kind of operation: a compact sequence of about 150 almost identical 4–6 floors residential buildings oriented east-west with no open space beyond the ones strictly needed between adjacent buildings. In 2010 approximately 80% of the community was demolished for its dangerous obsolescence and low living standards—such as foundation subsidence, house tilt, balcony collapse, road damage, and inadequate supporting facilities—and replaced by a completely different urban morphology and building types (second relocation for regeneration in a mature phase of urbanization); the construction of 21 high-rises of 22 to 32 floors increased the Floor Area Ratio (FAR) from 1.5 to 2.6.

Figure 1. Aerial view of the two parts of Nanhuan village: on the left what remains of the original resettlement village, on the right the area transformed by high-rises.
In May 2010 the demolition of 118 buildings on a total built area of 325,000 square meters began; in June 2011 the agreement for resettlement and compensation of 4,778 households was settled; in June 2013 the New Village was completed and 97% of the original residents moved back. The New Village required an investment of more than 2.3 billion yuan to build 559,800 square meters for 5,137 households, 2 schools, and one community centre, commercial spaces in one mall, and multi-functional commercial streets (Hua et al., 2012). Now approximately 15,000 residents live in the Nanhuan whole community.

The Nanhuan case preceded the current national guidelines for regeneration by 10 years and attracted attention for its innovative proposal:

(1) it is the first regeneration of an existing resettlement neighbourhood planned, financed, and realized by the local government in Suzhou; the project was included in the government’s
annual list of crucial tasks and it was meant to be exemplary for communities in similar conditions;

(2) it included densification and residents’ relocation in situ;

(3) it combined high-rises with small compact blocks and mixed uses, an unusual solution where mono-functional superblocks are the most frequent condition.

As the transformation involved only one part of the neighbourhood, Nanhuan Village allows a direct comparison of the residents’ satisfaction with the original solution and with the high-density one, the New Village.

3.2. Research steps
The research on NanHuan residents’ satisfaction adopted a comprehensive and multi-level indicator system which includes objective and subjective factors to

(1) identify and analyse the factors and indicators which affect residents’ satisfaction;

(2) compare the resident’s satisfaction with the old part of Nanhuan Village and with the new part to understand the changes due to the regeneration.

The steps of the investigation were:

(1) field research, data collection, analysis of residents’ satisfaction: interviews with experts and stakeholders involved in the realization of the old and New Village; field observation and survey with questionnaires distributed to the residents of both parts; evaluation of residents’ satisfaction levels;

(2) analysis of the influencing factors and results: identification of the factors and indicators which influence resident’s satisfaction applying an exploratory factor analysis (EFA) and a structural equation model (SEM). In considering both objective and subjective factors the analysis has not applied a single-equation model because the influence of objective factors may be underestimated (Yuan et al., 2019).

4. Data analysis and results

4.1. Field research and questionnaire
A preliminary field investigation was carried out and people with different expertise and involvement in the community were interviewed to gain an in-depth understanding of the current situation, its background, and what influencing factors of satisfaction are identified by them (Shenjing & Xiaoing, 2014; D. Wang et al., 2019); they are the management of the community, the head of the planning and design institute who designed the Master Plan of the New Village, 3 members of the neighbourhood committee, 10 residents.

The questionnaire adapts the indicators most frequently listed in the relevant literature to the information collected in the preliminary investigation:

(1) Personal identity, Lee et al. concluded that individual identity including gender, education, income, and race influence residents’ satisfaction obviously. Parkes et al. believed that low-income, poor jobs, and tenants have a negative impact on residents’ satisfaction (Cao, 2016; Ellis et al., 2006; Lee et al., 2008; Parkes et al., 2002);

(2) Living space, McCrea et al. sorted out that the size of the house, the degree of regional pollution, the age, and the status of the traffic peers are all the factors affecting the overall residents’ satisfaction. Mohit and Azim believed that the size and housing conditions and the
pedestrian passage were the main variables of the residents' satisfaction (Cao & Zhang, 2016; Lee et al., 2008; Mccrea et al., 2005; Mohit & Azim, 2012);

(3) Services, and facilities, Yi et al. regarded facilities, transportation, and property as indicators of residents’ satisfaction. Phillips and others believed that the elderly facilities and security are relatively significant. Wang and others believed that parking, service facilities, and entrance and exit traffic have a great impact on Residents’ satisfaction (Baum et al., 2010; Phillips et al., 2004; X. Wang et al., 2014; Yi & Jianping, 2014);

(4) Social network, Mohit et al. believed that community residents’ relations and rest space have a great impact on residents’ satisfaction, and shopping preferences also have an important impact (Malpass, 2005; Mohit & Azim, 2012; Mohit et al., 2010).

Then we integrated the existing literature to form the index system with 23 indicators in Table 1.

The questionnaire was mainly sampled according to the proportion of the community population (1/50), and questionnaires sample collection as conducted by means of convenience sampling. Convenience sampling means a non-probabilistic sampling method of randomly selecting respondents at a specific time and within a specific community area. A total of 308 questionnaires were conducted face to face in the public spaces of both the old and new part of the Village on weekdays between 8–10 am and 5–7 pm in summer 2021; 295 questionnaires were completed with an effective rate of 95.8% (Figure Figure 2). Team members inquired the residents randomly in the Nanhuan New Village public areas and asked whether they were willing to do a questionnaire survey. After obtaining their consent, the process of questionnaire collection was started. Team members explained the goal of the questionnaire and the available choices to the participants to ensure they answered accurately. The team obtained the approval of the survey activity from the neighbourhood managing committee and with their support also some residential units were visited (Zou et al., 2018, 2014).

4.2. Analysis of the level of residents’ satisfaction

The research analysed and classified in a range of values 1–5 the answers in the questionnaires to define the main characteristics of the residents in NanHuan and to evaluate the residents’ satisfaction (Table 2, 3, and 4). The main findings are as follows.

As the collection of information obtained by the questionnaires (Table 2) highlights, on average the old and the new part have similar inhabitants in age, income, occupation. 66.4% of the residents has an education level lower than high school, while in Suzhou it is 60.6% and in the Jiangsu province is 73% in 2020. This data means the neighbourhood is mostly occupied by a low-skill labour force. (Table 2)

Both parts of the village remained attractive over the years because the original residents were largely substituted (Table 2): while 98% of the residents who had their house demolished returned to the Nanhuan New Village in 2014, today only 40% lived in Nanhuan before relocation. The neighbourhood attracts immigrants: more than 30% are not Suzhou citizens (the hukou status, 口 状态); the New Village accommodates 10% more immigrants than the old part. The presence of this floating population, very likely low-skilled workers, means that the rent prices in the neighbourhood are affordable.

The neighbourhood accommodates also middle-class residents: in fact the most represented group, 25%, declared the highest income—10,000 to 15,000 RMB a month, much higher than the average income declared in Suzhou, 5900 RMB, and in the Jiangsu province, 4400 RMB in 2020 (Table 2).

As the select results of questionnaires showed in Table 3, the indicators do not show radical differences between the old and new part of the Nanhuan community; the most relevant are: the
number of immigrants is 8.5% higher in the new part; the number of unemployed or retired are 5.6% higher in the old part; the apartments are larger in the new part; the old part is inhabited by families with only two components 9% times more than the new one; residents feel much safer in the old part; residents of the new part are more satisfied with the green landscape.

From the questionnaire analysis result,, it can be said that most residents share the same opinion: 46.2% of the residents declares to be satisfied, score 3, 44.5% declares to be satisfied, score 4 (Table 4&Figure 3).

Beyond this overall appreciation, which can be influenced by the Chinese cultural milieu, the results show that the different design of the two parts has an impact on the level of residential satisfaction: the New Village scores slightly better. The indicators which are most relevant to assess the result of the transformation of the old neighbourhood into the new one score well, that is to say the ones which urged the process of transformation such as building quality, green space, supporting facility, public transport. The assessment of the regeneration is positive, as shown for example, by the average values of the primary indicators “living space,” “community convenience,” and “social network” are higher than the medium score in both parts (Table 5). Within the scope of this research, which compares the condition before and after the regeneration of the neighbourhood, it is particularly relevant that “residence change” and “living condition” have no significant impact on the overall satisfaction, because it means that the residents’ assessment is not impacted by the radical change in their living environment due to the demolition and rebuilding of New Nanhuan.
The results show how the old residential environment is still valued (as an example because it is safer and better connected to public transport), and the regeneration has improved the facilities for both parts not only the new part.

Residents of both parts gave the lowest satisfaction scores to neighbour’s interaction, shopping facilities, and parking. The complaint about parking is justified because the design underestimated the ratio of parking lot per household: only 0.25, while in 2020 there was 0.82 car in every household in Suzhou on average; in fact, the regulation today requires 0.8 parking lot per unit.

It has to be noted that the “building quality”, which includes the management of the compound, is more appreciated by the residents of the old part simply because they have no elevators and are not impacted by their management. Similarly, the green landscape is assessed much better by the residents of the new part because the old part has almost no green areas.

4.3. Analysis of the factors which influence satisfaction with NanHuan neighbourhood

4.3.1. Identification of factors
The influencing factors of satisfaction were examined through a structural equation model (SEM), which has proven powerful and consistent by several pieces of research on similar topics related to the built environment (Niu & Zhao, 2018; Tan et al., 2019b; Yuan et al., 2018; Yuancheng &

| Statistical variables | Category              | Count | %     |
|-----------------------|-----------------------|-------|-------|
| Age                   | 20–45 years old       | 130   | 43.20%|
|                       | 46–59 years old       | 61    | 20.30%|
|                       | Over 60               | 110   | 36.50%|
| Gender                | Male                  | 173   | 57.50%|
|                       | Female                | 128   | 42.50%|
| Household registration (Hukou 户口状态) | Suzhou | 204   | 67.80%|
|                       | Out of town           | 97    | 32.20%|
| Occupation            | Unemployed            | 147   | 48.80%|
|                       | Private enterprise    | 81    | 26.90%|
|                       | State-owned enterprise| 73    | 24.20%|
| Current residence     | Old district          | 78    | 25.90%|
|                       | New District          | 217   | 72.10%|
| Residence before relocation | Nanhuan | 127   | 42.20%|
|                       | Suzhou                | 102   | 33.90%|
|                       | Other city            | 72    | 23.90%|
| Income                | No income             | 4     | 1.30% |
|                       | Below 5000 yuan       | 38    | 12.60%|
|                       | Between 5000 and 7000 yuan | 52   | 17.30%|
|                       | Between 7000 and 10,000 yuan | 60 | 19.90%|
|                       | Between 10,000 and 15,000 yuan | 76 | 25.20%|
|                       | Between 15,000 and 20,000 yuan | 53 | 17.60%|
|                       | More than 20,000 yuan | 18    | 6.00% |
| Satisfactory indicators | Secondary indicators | Old | Category | % | New | Category | % | Overall | Category | % |
|------------------------|----------------------|-----|----------|---|-----|----------|---|---------|----------|---|
| Personal identity      | Age                  | 20-45 | 44.9%    |   | 20-45 | 43.3%    |   | 20-45   | 43.2%    |   |
|                        | Household registration | Suzhou | 61.5%    |   | Suzhou | 70.0%    |   | Suzhou  | 67.8%    |   |
|                        | Occupation           | Unemployed or retired | 52.6% |   | Unemployed or retired | 47.0% |   | unemployed | 48.8% |   |
|                        | Residence before relocation | Nanhuan | 39.7% |   | Nanhuan | 42.2% |   | Nanhuan | 41.2% |   |
| Living space           | Number of rooms      | two bedrooms | 70.5% |   | two bedrooms | 57.6% |   | two bedrooms | 60.5% |   |
|                        | Dwelling area (the more frequent one) | 66-80m² | 33.3% |   | 81-100m² | 34.1% |   | 66-80m² | 33.2% |   |
|                        | People/each unit     | 2 people | 48.7% |   | 2 people | 39.6% |   | 2 people | 42.2% |   |
|                        | Building quality perception | Good structure and functioning | 46.2% |   | Good structure and functioning | 43.8% |   | Good structure and functioning | 44.5% |   |
|                        | Air quality perception | Score 4 | 44.9% |   | Score 4 | 37.3% |   | Score 4 | 39.2% |   |
|                        | Property management  | Score 3 | 46.2% |   | Score 4 | 38.2% |   | Score 3 | 38.9% |   |
|                        | Pedestrian safety    | Score 3 | 52.6% |   | Score 3 | 41.5% |   | Score 3 | 43.9% |   |

(Continued)
| Satisfaction indicators | Secondary indicators | Old | | | % | New | | | % | Overall | | | % |
|-------------------------|----------------------|-----|---|---|---|---|---|---|---|---|
| Community convenience (CCD) | Parking need / ownership of car | Household with no car | 38.5% | Too few ground parking | 26.7% | Household with no car | 27.6% |
| Supporting facility convenience | Score 4 | 52.6% | Score 4 | 53.9% | Score 4 | 53.5% |
| Aging care service | Score 2 | 35.9% | Score 2 | 37.8% | Score 2 | 37.5% |
| Education facilities | No children at the local schools | 64.1% | No children at the local schools | 67.3% | No children at the local schools | 66.4% |
| Public transport convenience | Score 4 | 65.4% | Score 4 | 61.8% | Score 4 | 63.1% |
| Entrance to the compound's convenience | Score 4 | 33.3% | Score 4 | 40.6% | Score 4 | 38.5% |
| Improvement after regeneration (the largest group) | Apartment quality | 23.1% | public space | 31.3% | public space | 27.9% |
| Social network | Green space landscape | Score 2 | 69.2% | Score 4 | 74.2% | Score 4 | 56.1% |
| Neighbour interaction | say hello | 29.5% | say hello | 30.4% | say hello | 31.2% |
| Shopping preference | Offline shopping | 65.4% | Offline shopping | 63.6% | Offline shopping | 63.8% |
| Satisfaction | Residents' satisfaction degree (the largest group) | Score 3 | 46.2% | Score 4 | 48.8% | Score 4 | 46.2% |
### Table 3. Results of space-related indicators

| Category                           | New Count | Old Count | Percentage |
|------------------------------------|-----------|-----------|------------|
| Parking need/ownership of car       | 51        | 30        | 83%        |
| Insufficient ground parking        | 58        | 22        | 81%        |
| Insufficient underground parking   | 43        | 9         | 81%        |
| Expensive parking fees             | 23        | 7         | 7%         |
| Others                             | 42        | 10        | 18%        |
| Improvement after demolition       | 71        | 33        | 35.3%      |
| Apartment quality                  | 68        | 15        | 27.9%      |
| Community public space             | 5         | 1         | 2%         |
| Supporting facilities              | 56        | 15        | 24.6%      |
| Others                             | 17        | 14        | 10.3%      |
| Green space landscape              | 1         | 0         | 0.70%      |
| 5 score                            | 169       | 5         | 2.76%      |
| 4 score                            | 73        | 11        | 15.1%      |
| 3 score                            | 59        | 9         | 15.1%      |
| 2 score                            | 25        | 3         | 12.3%      |
| 1 score                            | 2         | 0         | 0%         |

Chen et al., Cogent Social Sciences (2022), 8: 2144137
https://doi.org/10.1080/23311886.2022.2144137
Madong, 2010; Zhang, 2015; Zou et al., 2018). SEM is a statistical technique for evaluating the causal relationship between single indicators, their overall role, and latent variables which cannot be observed directly.

The Kaiser Meyer Olkin and Bartlett tests indicated that the data and information collected were suitable for the factor analysis, so an exploratory factor analysis (EFA) was first applied (Table 6). EFA groups the original factors into some influencing factors with strong explanatory ability. Applying the statistical method of maximum variance orthogonal rotation, the influencing factors resulted: “Individual attributes”, “Self-conditioned cognition”, “Community environment”, “Greening level”, “living before New Nanhuan Village”, “Living condition”, “Living life”, “Residents’ interaction” and “Supporting facility supply”; Table 6 lists the influencing factors and what variables they refer to.

4.3.2. Modelling
Starting from the influencing factors condensed by the exploratory factor analysis in Table 6, and the hypothesized relationships among the variables, IBM® SPSS® Amos 27, structural equation modelling program, was used to construct the SEM; the statistical method of maximum likelihood estimation was applied to calculate the value of the variables in the model. Among them, “included variables” is the observation variable, and “factor name” is the latent variable, the two are independent variables with the corresponding relationships in the model. “Residents’ satisfaction” is the dependent variable. Link the collected model data to the modified model, and correspond each variable to the frame line in the path diagram, then select “name unobserved variables” to name the latent variables and residuals, and finally select “analysis properties” to set the output options, including “optimization history”, “standardized estimates”, “modification indicators”, “indirect, direct & total effects” “Factor score weights”, “variances of estimates”, “tests for normality and outliers”, and finally “calculate estimates” to get the analysis results.

The first model was composed of nine latent (unobserved) variables and 22 explicit ones, including 21 exogenous variables and one endogenous variable. The first model required corrections because coefficients can only be estimated in the just-identified or over-identified model and if most of the observed and latent variables are at the confidence level, while in the estimate results, some paths relationship and regression coefficients did not meet the requirements—the standardized coefficient smaller than 0.1—and were not significant, as an example the path “Residents” satisfaction ← Individual attributes’ (Table 7).

The model was modified using the correction index provided by Amos: the samples data of the 22 variables were substituted removing relationship paths that proved not significant and adding influence paths that improved the correlation between model fitness and error variables (Figure Figure 4).

Each observation variable’s C.R. and P values were within a reasonable confidence range. Some test indexes were applied to assess the model performance after the correction, such as Comparative Fit Index, Root Mean Square Error of Approximation, Relative Chi Square, and a good fitting degree was found (Table 8).

| Table 4. (a) Residents' satisfaction degree from the questionnaire output |
|-----------------------------------------------|------|--------|
| Category               | Count | Percentage |
| Satisfaction           |      |          |
| 1 score                | 3    | 1%       |
| 2 score                | 20   | 6.6%     |
| 3 score                | 134  | 44.5%    |
| 4 score                | 139  | 46.2%    |
| 5 score                | 5    | 1.7%     |
| Primary indicators      | Secondary indicators         | Mean value for secondary Indicators (1–5) | Standard deviation |
|------------------------|-------------------------------|-------------------------------------------|--------------------|
|                        |                               | Total | Old | New | Total | Old | New |
| Living space           | Number of rooms               | 2.38  | 2.21| 2.44| 0.719 | 0.543 | 0.756 |
|                        | Dwelling area                 | 2.32  | 2.24| 2.33| 0.968 | 0.983 | 0.952 |
|                        | People/each unit              | 2.63  | 2.54| 2.65| 1.062 | 0.935 | 1.104 |
|                        | Building quality              | 3.29  | 3.31| 3.28| 0.788 | 0.827 | 0.781 |
|                        | Air quality                   | 3.20  | 3.27| 3.18| 1.145 | 1.170 | 1.143 |
|                        | Property management           | 3.11  | 3.04| 3.12| 0.831 | 0.813 | 0.841 |
|                        | Pedestrian safety             | 2.96  | 2.97| 2.96| 0.981 | 0.911 | 1.001 |
| Community convenience degree (CCD) | Parking convenience          | 1.68  | 1.38| 1.79| 1.526 | 1.589 | 1.488 |
|                        | Supporting facility convenience | 3.62  | 3.53| 3.66| 0.954 | 0.990 | 0.950 |
|                        | Aging care service            | 1.59  | 1.71| 1.54| 0.964 | 0.982 | 0.962 |
|                        | Education                     | 1.66  | 1.64| 1.67| 0.473 | 0.483 | 0.470 |
|                        | Public transport convenience  | 3.81  | 3.88| 3.78| 0.866 | 0.837 | 0.879 |
|                        | Entrance convenience          | 3.46  | 3.38| 3.49| 1.053 | 1.154 | 0.996 |
|                        | Improvement after regeneration | 2.36  | 2.32| 2.36| 1.578 | 1.827 | 1.488 |
| Social network         | Green space landscape         | 3.36  | 2.32| 3.73| 0.807 | 0.634 | 0.476 |
|                        | Neighbour interaction         | 1.57  | 1.51| 1.61| 1.157 | 1.170 | 1.162 |
|                        | Shopping preference (online)  | 1.62  | 1.64| 1.62| 0.512 | 0.509 | 0.514 |
4.3.3. SEM analysis results

As shown in the SEM result of Table 7, some indicators resulted to have little co-relation to the residents’ satisfaction, i.e. P < 0.001, they are “Individual attribute” (3 indicators), “Supporting facility” (1 indicator), “Greening level” (2 indicators), “Residence change” (3 indicators), “Residence life” (2 indicators), and “Living Condition” (2 indicators); the reasons of this little significance and the consequent not consideration of the indicators are as follows:

- Individual attributes “Residence Change” and “Residence Life”: even if the community was partially transformed the living conditions of the residents groups in the community are perceived as very similar. We found that the residents in Nanhuan New Village and the residents in the Old Community enjoy similar housing conditions and living characteristics; in addition, we found as well that nearly 60% of the residents in the current community are households that lived in situ before transformation;

- Indicators “Supporting facility,” “Greening level,” and “Living Condition”: the primary supporting facilities and the greening available to the residents of Nanhuan are in the new part of the community, result of the partial transformation; this way the existing service level in the whole community shows a very small difference. The same considerations can be made to the Living Conditions indicators.

The SEM analysis shows that “community environment”, “self-conditioned cognition”, and “neighbour interaction” are the most relevant influencing factors of residents’ satisfaction with the whole Nanhuan community. In both parts of the neighbourhood, “Community environment” and “self-condition cognition” have a strong correlation with residents’ satisfaction (Figure 5), while “neighbour interaction” has little.

Residents pay attention to some factors specifically related to space, such as number of rooms and dwelling area. Still, the results show that property management is the main influencing factor in absolute terms. This finding can be surprising, but it expresses the great importance of the elements which directly impact everyday life, such as the efficiency and the functioning of the buildings and the compounds. For the renewed part of the community, it can be concluded that the relocation is interpreted as an opportunity (Kearns & Mason, 2013) and the most considered issues in answering the questionnaire are the ones related to the everyday life in the community environment, once the resettlement problems are settled, such as the compensation for what lost, the unit dimension and the housing conditions.

In addition, in the significant relationship, we also found some negative correlation factors, such as “Occupation← Individual attribute,” “People/each unit← Residence life,” and “Income← Self-conditioned cognition.” Negative correlation means the more stable work “occupation”, the greater the negative impact on the “Individual Attribute.” The more people living in each unit, the greater the negative impact on “Residence life.” The higher the “Income”, the greater the negative impact on “Self-conditioned cognition”.

The findings obtained in Nanhuan are very similar to the ones found in literature about research on residents satisfaction. Unstable occupation, more people living in the residential unit, the reduced personal living space will decrease the residents' satisfaction (Mohit & Azim, 2012; Parkes et al., 2002). Higher-income people have usually higher demand for living conditions so their satisfaction with the community is low (Chan & Lee, 2008), but they have also the economic resources to get what they need or desire outside the community, so what impacts the most their satisfaction is the quality of the residential units.
5. Discussion and conclusion

5.1. Discussion

The residents’ satisfaction evaluation in Nanhuan shows that the large majority of the residents are either almost satisfied or satisfied with their living conditions, both the ones who live in the part of the community which was not regenerated and the ones who live in the new part. This finding is surprising and allows two different conclusions: one side the impact of the regeneration which radically changed the characters of the community is modest, and densification is not having a negative impact on people satisfaction, on the contrary it seems irrelevant. On the other side we can say that the regeneration has a very positive impact because it makes available public facilities and everyday shopping opportunities, which before the regeneration were either not existing of limited. We can conclude that what matters in this community of low-middle income families is not the residential unit they inhabit, but the urban environment and its public facilities it offers. In fact the factors “community environment” and “surrounding facilities” are the ones with the highest satisfaction level. On the contrary, “building quality” and “property management” are relatively unsatisfactory, indicating that especially the New Village should pay more attention to community management.

Given these findings, this study concludes that neither the urban form nor the building type, no matter their age and dimension, once the basic conditions are fulfilled, are the main factor of the residents’ satisfaction of Nanhuan, but the public facilities and the way the community is managed. This result is especially striking, because of the radical difference between the built environment of the old and the new part of the neighbourhood, and because the main reason for this radical transformation was a living condition that was assessed as not satisfactory by the promoters of the initiative.

The differences between the parts, both in the general assessment and in the single factors which influence the satisfaction, do not indicate different orientations of residents’ satisfaction, which allows concluding that both urban forms of Nanhuan—the traditional resettlement and the high-rises neighbourhood—are perceived as good enough. Densification is not an issue if it does not produce the perception of overcrowding and it does not in the case studied. This homogeneity of assessment allows concluding that the spatial differences do not significantly impact the assessment, and the two parts, which host populations with similar characteristics, still perceive themselves as one community, even though they occupy completely different urban forms. This can indicate that the regeneration

| Table 6. Exploratory factor analysis of influencing factors |
|------------------------------------------------------------|
| Factor name                                               | Included variables (factor loading)                                      |
| Individual attributes                                      | age (0.853), occupation (−0.781), shopping preference (0.698)          |
| Community environment                                      | property management (0.762), building quality (0.674), entrance convenience (0.557), air quality (0.517) |
| Greening level                                             | green space landscape (0.916), residence Hukou (0.909)                  |
| Living condition                                           | number of rooms (0.794), dwelling area (0.787)                          |
| Residence life                                             | education (−0.853), people/each unit (0.762)                           |
| Self-conditioned cognition                                 | income (0.852), pedestrian safety (−0.640), gender (−0.463)            |
| Residence change                                           | improvement after regeneration (0.747), residence Hukou (0.616), residence before moving (0.567) |
| Supporting facility                                        | Supporting facility convenience (0.732)                                |
| Neighbour interaction                                      | Neighbour interaction (0.732)                                           |
| Path Relation                                      | Estimate | S.E.  | C.R.   | P    | Estimate (S) |
|--------------------------------------------------|----------|-------|--------|------|--------------|
| Age ← Individual attribute                       | 1        |       |        |      |              |
| Occupation ← Individual attribute                 | -0.419   | 0.089 | -4.69  | ***  | -0.542       |
| Shopping preference ← Individual attribute        | 0.311    | 0.038 | 8.121  | ***  | 0.547        |
| Property management ← Community environment       | 1        |       |        |      | 0.517        |
| Building quality ← Community environment          | 0.596    | 0.068 | 8.793  | ***  | 0.54         |
| Entrance convenience ← Community environment      | 0.422    | 0.091 | 4.625  | ***  | 0.286        |
| Air quality ← Community environment               | 0.545    | 0.099 | 5.496  | ***  | 0.338        |
| Green space landscape ← Greening level            | 1        |       |        |      | 1.117        |
| Current residence ← Greening level                | 0.335    | 0.113 | 2.975  | 0.003| 0.635        |
| Dwelling area ← Living condition                  | 1        |       |        |      |              |
| Housing type ← Living condition                   | 0.678    | 0.089 | 7.659  | ***  | 0.71         |
| Education ← Residence life                        | 1        |       |        |      | 0.569        |
| People/each unit ← Residence life                 | -4.034   | 0.787 | -5.126 | ***  | -0.983       |
| Pedestrian safety ← Self-conditioned cognition    | 1        |       |        |      | 0.515        |
| Income ← Self-conditioned cognition               | -1.849   | 0.507 | -3.646 | ***  | -0.628       |
| Gender ← Self-conditioned cognition               | 0.303    | 0.069 | 4.426  | ***  | 0.308        |
| Improvement after regeneration ← Residence change | 1        |       |        |      | 0.141        |
| Household register ← Residence change             | 1.719    | 0.721 | 2.385  | 0.017| 0.818        |

(Continued)
| Path Relation                  | Estimate | S.E.  | C.R. | P     | Estimate (S) |
|-------------------------------|----------|-------|------|-------|--------------|
| Residence before moving ← Residence change  | 2.563    | 1.068 | 2.401| 0.016 | 0.696        |
| Residents’ satisfaction ← Individual attribute | 0.033    | 0.033 | 1.005| 0.315 | 0.05         |
| Residents’ satisfaction ← Supporting facility | 0.011    | 0.029 | 0.387| 0.699 | 0.016        |
| Residents’ satisfaction ← Community environment | 0.822    | 0.084 | 9.79 | ***   | 0.844        |
| Residents’ satisfaction ← Greening level | 0.039    | 0.04  | 0.988| 0.323 | 0.051        |
| Residents’ satisfaction ← Residence change | 0.043    | 0.245 | 0.175| 0.861 | 0.014        |
| Residents’ satisfaction ← Self-conditioned cognition | 0.709    | 0.221 | 3.217| 0.001 | 0.513        |
| Residents’ satisfaction ← Residence life | 0.155    | 0.191 | 0.812| 0.417 | 0.058        |
| Residents’ satisfaction ← Residence condition | −0.003  | 0.085 | −0.035| 0.972 | −0.003       |
| Residents’ satisfaction ← Neighbour interaction | 0.049    | 0.024 | 2.02 | 0.043 | 0.082        |

***Indicates significance at the P < 0.001 level. C.R. means the t value
The project was successful in the requalification but failed to offer a radically improved urban experience and quality; probably, only a much larger intervention could have achieved this impact.

However, it can as well be concluded that the regeneration of one part of the neighbourhood was able to improve also the other part with public facilities, the green landscape, and easily accessible commercial activities; the case study shows how the improvement of a whole site can be achieved by the intensive redevelopment of one limited area of the site.

In addition, it must be recognized that the Nanhuan project improved the conditions without provoking gentrification, and the residents did share the land added value due to the transformation, which is very probably one of the unspoken reasons for the overall satisfaction expressed by the residents. The fact that this regeneration project had no intention to produce gentrification and gentrification did not happen is the main element of its social sustainability. Also, the fact that the residents were engaged in a consultation process during the last phase of the realization of the new Nanhuan is an action towards the social sustainability of the regeneration output.

It must be also noted that some of the transformations of Nanhuan Village—such as well designed green space and places for the community life, convenient public transport connection, and multiple facilities—matter for improving social sustainability. The results showed that some fundamental human needs such as “air quality” “convenience” and “building quality” affect satisfaction and should be considered in every stage of the regeneration process. The results also show self-conditioned cognition and neighbor interaction are significant factors affecting the sustainability of the community life: a well-organized community management could
Table 8. Results of the overall performance tests

| Test index                          | Ideal standard | Model results | judgment of model adaptation |
|-------------------------------------|----------------|---------------|------------------------------|
| CFI—Comparative Fit Index           | >0.9           | 0.997         | True                         |
| CMIN/DF—Relative Chi-Square         | <3.00          | 1.027         | True                         |
| GFI—Goodness of Fit Index           | >0.8           | 0.956         | True                         |
| NFI—Normed Fix Index                | >0.9           | 0.910         | True                         |
| RMR—Root Mean square Residual       | <0.05          | 0.035         | True                         |
| RMSEA—Root Mean Square Error of Approximation | <0.05          | 0.009         | True                         |
| TLI—Tucker-Lewis Coefficient        | >0.9           | 0.996         | True                         |

guarantee orderly daily life. Residents engagement and empowerment could as well reach the level of promoting the self-upgrading of the spaces and structures.

5.2. Conclusion

Residents’ satisfaction with the living environment is increasingly considered in China for achieving people-oriented development in a harmonious society, which is a national goal declared by the 13th five-year plan of China; people-oriented development is the basis for socially sustainable development. Urban regeneration is as well declared a national goal by the 14th five-year plan to increase the efficiency of land use and improve the living quality. Given these national policies, this study analysed the residents’ satisfaction with the living environment of their resettlement community, Nanhuan neighbourhood in Suzhou, before and after its government-led regeneration.

The reason for conducting this assessment is few studies have compared the residents’ satisfaction before and after the transformation of their living conditions and analysed. The study is relevant also because it focuses on a case of housing reconstruction with increased FAR, and densification can be distinguished in developed China especially in the transformation of old neighbourhoods, where old means built before 2000 (Chen et al., 2021; Pellegrini & Chen, 2020). This trend is very relevant for the future of urbanization in China and goes along with the increase of market-oriented transformations in the governance of urban development, therefore the analysis of the main factors affecting residents’ satisfaction with Nanhuan can be useful for similar projects and for drafting processes of participation with multiple subjects (Gao et al., 2018; Lin & De Meulder, 2012).

This study provides a residents’ satisfaction evaluation questionnaire framework design reference for reconstructing of old communities. Social sustainability relies on creating a quality of life at the
community level, but the specific implementation path and carrier are unclear. By measuring residents’ satisfaction as a link, the study contributes to further choices about the transformation of resettlement communities built before 2000 and achieved socially sustainable regeneration.

Community regeneration planning is limited by multiple factors such as land use and investment quota, and the planning area and implementation contents are greatly limited. The residents’ satisfaction evaluation can directly reflect the influencing factors of different environmental and social factors. The remarkable satisfaction indicators can assist in the formulation of regeneration decision-making. The planning could strengthen the aspects with substantial influencing factors and ensure a significant improvement after the implementation according to the plan.

The study concentrated on the living conditions after the regeneration project to assess if the urban quality was perceived as improved by the inhabitants, and further investigation should focus on the process of transformation, especially on the compensation after relocation issue and people’s participation in the definition of the design solution, which can impact substantially the satisfaction level and the design of the site. The study shows how it is necessary to determine the priorities of community planning in combination with field investigation, spatial analysis, and people’s involvement to define the most appropriate planning strategies for the site.

6. Limitations
The main limitation of this research is the unavailability of official data about the population of the community and the very limited information about the process of planning, design, and construction of the community. All data for the study were produced by the research team.

With the available resources, the research concentrated on the interviews and questionnaires, carried out in the amount which was what necessary for the modelling, in future we will expand the research integrating the results of the modelling with qualitative research and assessment such as urban syntax analysis.

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