

## Article

# Evaluating the Public Participation Processes in Community Regeneration Using the EPST Model: A Case Study in Nanjing, China

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**Abstract:** Public participation is increasingly becoming a necessary content in community regeneration in China, though there is a lack of evaluation of the public participation process. This study explores a method for evaluating the public participation process, with the aim of improving the effectiveness of public participation. Based on the American Customer Satisfaction Index (ACSI) and using the analysis method of structural equation modeling, this study has preliminarily established the evaluation model of public participation processes represented by “Expectation–Perception–Satisfaction–Trust (EPST)”, while taking a case study in Nanjing for empirical study. The results show that to improve general satisfaction and public trust in those activities participated in, it is necessary to upgrade public expectation and the public perceived quality at the same time. This study believes that the entire investigation and understanding of public demands before regeneration is the premise to improving the regeneration effect. For community regeneration in Chinese cities, the key is to mobilize public participation, while a detailed understanding of residents’ needs for community environment and community services is an important part of enhancing the effectiveness of regeneration. This study believes that in community regeneration, actively organizing various participation activities and giving full play to the role of local government and third-party organizations are conducive to enhancing the public’s satisfaction with regeneration.

**Keywords:** community regeneration; public participation; public satisfaction; process evaluation; EPST model; structural equation modeling (SEM)



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## 1. Introduction

In the past four decades, China’s urban regeneration has occurred simultaneously with reform and opening up [1]. Following major industrialization and urbanization in the 1980s and dramatic urban expansion in the 1990s, the urbanization process has moved toward urban redevelopment in existing built-up regions in order to maximize the efficiency and intensive use of land resources [2]. From the concept of “urban regeneration” first emphasized at the Central Economic Work Conference in 2019 to the “urban regeneration campaign” proposed in the government work report in 2021, urban regeneration has risen to become an important national strategy in the process of gradually becoming prominent in its status and role. Since China’s urbanization has shifted from incremental to stock regeneration, the logic of space construction based on real estate development and land financial profiteering is losing economic viability. Cooperation among stakeholders is becoming a key factor in the establishment of a sustainable urban development mechanism [3]. The task of urban regeneration is no longer limited to the physical changes of old buildings, abandoned buildings, and old residential areas [4].

In China, a growth alliance has been formed between local governments, private developers, and foreign investors [5–7]. Recently, with China’s urbanization entering the stage of stock regeneration from the stage of incremental expansion, the land fiscal

mechanism that has promoted the rapid development of cities since the reform and opening up seems to have malfunctioned [8]. Due to the strict control of urban planning, massive infrastructure deficit, and expensive transaction costs, especially the severe imbalance among various stakeholders, the logic of making money from land and housing is no longer applicable to the regeneration of old residential areas [9,10]. Due to the interaction of various institutions and stakeholders, the regeneration of old residential areas has led to many plights, which are referred to as the traps of regeneration of old residential areas in China [11]. Existing research mainly focuses on the relationships among stakeholders, such as the government, enterprises, and residents, and also the impact of urban regeneration in China on the outcome [12–15]. In China's current urban planning practice, the demand for public participation and cooperative planning is increasing, and there is an increasing emphasis on sound interactions among multiple stakeholders, including the public, developers, and government [16]. In recent years, "micro-regeneration", as a mode of urban regeneration, has been applied in several Chinese cities to ensure the interest balance among multiple stakeholders in the process of urban regeneration. It emphasizes participation in improving the community environment, and protecting and inheriting the community's history and culture [17].

Community participation in an urban regeneration has a long history in the West. Public participation in urban regeneration is a critical topic for policymakers, academics, and the general public, and is thus seen as the foundation of community planning success [18]. However, due to the social, political, and economic background of the community, the progress and technology of institutionalized community self-service in Western countries has a limited effect on developing countries [19]. When studying various community projects in developing countries, scholars have found that the efforts made by local governments to promote community participation are often related to the initiation of social service projects [20]. With the development of globalization and the increasing emphasis on establishing a modern governance system, public participation is becoming a decisive factor in the practice of urban regeneration in China [17]. When compared with the status quo in Western countries, China places considerable emphasis on micro-regeneration at the neighborhood level to promote public participation and social justice [15,21]. However, public participation in China is just a symbolic phenomenon and is insufficient [22]. In China, when compared with governments' roles in Western countries, local government has assumed more specific responsibilities, such as providing infrastructure and public service facilities [21].

Community regeneration in China has undergone a process from the transformation of simple physical space to improving a comprehensive community environment. According to the 14th Five-Year Plan, it is required to significantly improve the quality of urban living and accelerate urban regeneration by redeveloping and upgrading the functions of old residential areas, old manufacturing areas, old blocks, urban areas, and villages, among other idle zones. In this process, community regeneration plays an important or even leading role [23]. In community regeneration in China, public participation is relatively insufficient, but it has improved in recent years and its importance in community regeneration has gradually emerged. The regeneration of old communities is a complicated and arduous process that takes months or even years from the initial project decision to completion. Community regeneration involves a wide range of diversified and complex individuals and groups, while there are multiple factors affecting participation effects, including participants' enthusiasm and the coordination among various subjects. Therefore, it is concerning to systematically classify and integrate these factors [24]. From this sense, the success or failure of community regeneration depends dramatically on the extent and effectiveness of public participation. In turn, the evaluation of the public participation effect can provide targeted feedback and guidance on the direction and operation of public participation, which is of great significance.

Including the public in the process of community regeneration can also disclose the community's objectives and needs, demonstrating the community's sound construction and development [25]. Meanwhile, the government's primary aim is to increase residents'

satisfaction by completely reflecting their aspirations and addressing their own interests and needs, and thus to promote local development projects [26]. The evaluation of the public participation effect is an important step in the rational-adaptive planning model. To this end, planning, policies, and practices are designed, implemented, evaluated, or monitored to guide the next round of planning, policies, and practices [27]. From a time perspective, evaluation can be planned at the beginning of the participation process and defined as the process throughout the process to improve participation, or it can be performed post-participation to guide future practice; from the subject perspective, evaluation can be outsourced by the participation organizer, who may have subjective concerns. In this sense, it can also be performed by “neutral” observers such as mediators or researchers [28].

The evaluation of the public participation effect is the standard for evaluating public participation. Related studies evaluate public participation from different perspectives, with most evaluation standards positioned as hierarchical, static, and independent judgment factors. For example, the depth and width of public participation, participation equality, and participation efficiency are adopted as effect evaluation criteria [29]. When public participation is regarded as a continuous event, the effect evaluation is undertaken from two perspectives: the process and the result [30]. The above studies are evaluated from the external perspective while ignoring the internal participants’ perception and gaming relationship. As a result, the evaluation model is usually static and single, and insufficient to handle the increasingly diversified public participation model. Some scholars also start with the stakeholders of public participation to evaluate the effect. For example, Nadeem and Fischer (2011) believe that participating in decision-making and the perspective of the participating public play a key role in evaluating the effectiveness of public participation [31]. Beierle and Cayford’s “social objectives” are to provide information to the public, incorporate public values into decision-making, improve the quality of decision-making, and increase the trust in institutions [32,33]. Webler (1995) emphasizes the goals of “fairness” and “ability” [34,35], while Innes and Booher (2002) consider capacity and resilience the main criteria for evaluating the cooperation process [36]. Laurian (2005) emphasizes the balance of communication and power-sharing between institutions and citizens [37].

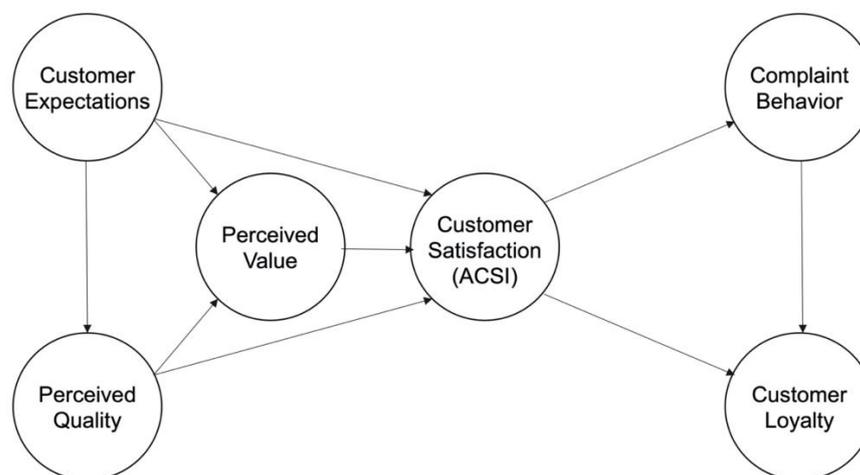
Generally speaking, the evaluation criteria of public participation can be divided into two categories: process evaluation and result evaluation, respectively [38–40]. This article focuses on the perspective of process evaluation. Both the forms and the evaluation criteria of public participation should be selected according to the objectives of the participation process [41], and will also be affected by the evaluation perspective, mainly from the viewpoints of the planners, participants, and researchers [38,42]. This article takes the expectation and satisfaction of public participants as the starting point, on the basis of the whole process of community regeneration. It explores the effect evaluation method of public participation and improves the current process of public participation to enhance the efficiency of public participation and improve the general effect of community regeneration, and provides a reference for the government’s community regeneration policy formulation and process management.

## 2. Materials and Methods

### 2.1. Analysis Framework

Research on customer satisfaction originated from the field of economic management. Cardozo (1965) first put forward the concept of “customer satisfaction” [43]. The Sweden Customer Satisfaction Barometer (SCSB), built in Sweden in 1989, is the first accurate national customer satisfaction index [44]. Research on customer satisfaction has developed around two different evaluation types: transaction satisfaction and cumulative satisfaction, respectively, [45] with more research on the latter including the relationship between perceived quality and satisfaction [46] and the role of emotion in satisfaction evaluation [47]. In the 1990s, cumulative satisfaction was developed and recognized, which defined satisfaction as the overall experience of customers with products or service providers so far [48], which can better predict subsequent behavior and economic performance [49,50].

Since then, in 1994, Fornell et al. created the American Customer Satisfaction Index (ACSI) model based on the SCSB model [49]. ACSI has become the internationally recognized and most widely used customer satisfaction index measurement model [51]. Compared with SCSB, the main innovation of the ACSI model lies in its addition of a latent variable—Perceived Quality (Figure 1).



**Figure 1.** The American Customer Satisfaction Index (ACSI) model. (Source: [49]).

For years, the development has resulted in the quantification of “customer satisfaction” via a causal relationship model, and the results that can only be felt subjectively can now be intuitively described by mathematical models. The customer satisfaction model contains five variables, which are further divided into three stages: two antecedent variables, perceived performance and customer expectations, which represent the subject’s prejudgment prior to the event; a core variable, customer satisfaction, which refers to the subject’s reaction to the event; and two outcome variables, customer complaints and customer loyalty, which represent the subject’s perception of the result.

The customer satisfaction model has been applied in many fields internationally [52]. During the procedural community regeneration, the evaluation of public participation satisfaction is similar to that of the public economic event satisfaction. Therefore, the latter has become an important reference for the construction of the public participation satisfaction model.

Theoretically, customer satisfaction stems from the service/product supply relationship. This type of supply relationship exists in modern society in many subjects, e.g., between the government and the public, between the market and the public. The essence of public participation refers to the public service provided by the government to the public, and then more service subjects are engaged; therefore, the customer satisfaction model also applies to public participation. From the customer satisfaction model, it can be seen that customer expectations and perceived performance affect customer satisfaction; it can then be deduced that public satisfaction is mainly affected by public expectations and the participation perception in public participation in the regeneration of old residential areas, while public satisfaction directly affects the public’s next participation behavior and willingness. Therefore, this article analyzes the satisfaction of public participation from three levels: the influencing factors, the core variables, and the outcome variables (Figure 2). Based on the analysis of public demands in community regeneration mentioned below, it can be seen that compared with customer purchase, public participation is characterized by richer content, periodicity, and diversity of subjects; therefore, these characteristics will be studied from the perspective of influencing factors.

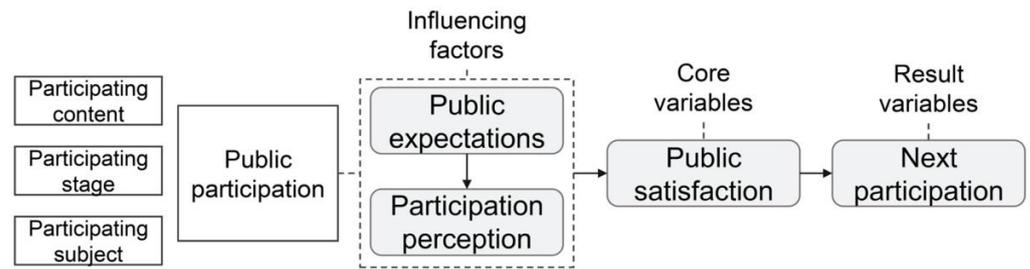


Figure 2. Analysis of the satisfaction of public participation framework. (Source: the authors).

Since the evaluation object of the public participation satisfaction model aims at public services provided by the government and other participants, it is public and complex, and is somewhat different from the customer satisfaction model in management. Therefore, some adjustment has been made regarding the public participation satisfaction model in this article based on the ACSI model:

- (1) Since the government mainly provides public services, customer loyalty can be replaced by trust in the government. There are many participants in the process of public participation, and there is no longer a single provider of public services, but multiple providers. Thus, trust in the government is transformed into trust in other subjects, which can instead be termed “public trust”.
- (2) Referring to the customer satisfaction model in China, while considering our country’s national conditions, the variable “customer complaints” is deleted.
- (3) The “customer expectations” and “customer satisfaction” variables are changed to “public expectations” and “public satisfaction”, respectively.

Thus, a model for evaluating the public participation process in community regeneration is formed; it is known as the “Expectation–Perception–Satisfaction–Trust (EPST)” model and is shown in Figure 3. In the process of public participation in community micro-regeneration, the public forms a perception of public services provided by the government and other subjects, thereby generating public participation satisfaction. In the beginning, the level of public expectations directly affects the public prejudice of satisfaction. In the course of participation, the overall public impression of participation quality comes from their own feelings about participation. It is also affected by their expectations, thereby affecting public satisfaction. For example, the improvement of public satisfaction with public participation will increase public trust in the government and other subjects, and vice versa.

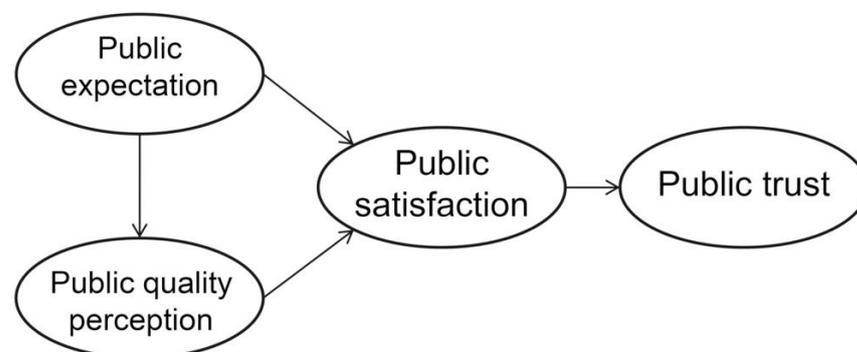


Figure 3. Framework of EPST model. (Source: the authors).

In this model, public expectation is the public prejudice of the outcome of participation before public participation, which will directly affect the quality perception of the process and also affect the public satisfaction with participation in the event. According to the model, the following hypotheses are made in this paper. (1) Public expectation has a beneficial effect on quality perception and public satisfaction, with the former referring to

the public's subjective assessment of public participation based on their experience, energy use, and surrounding environment. (2) Perceived quality has a positive impact on public satisfaction because quality perception acts as an agent between public expectation and public satisfaction. In comparing their expectation and actual feelings after participation, the public will form a subjective judgment of whether their own demands have been fulfilled through public participation. This judgment reflects their degree of satisfaction with their participation in the event and has a significant impact on their expectations and behavior towards future participation in similar events. (3) In this sense, public satisfaction has a positive impact on public trust. When the public accepts public goods or services, they will put themselves at a disadvantage by taking risks and uncertainties. Thus, public trust refers to people's loyalty to events in which they are a disadvantageous party, which can be stated in terms of the public's willingness to keep engaging in community regeneration.

## 2.2. Research Case

Jiangsu Province has focused on studying the urbanization development of high-density areas and improving the living environment for years, with good outcomes. In 2016, in response to the objective demands for the construction of aging communities, Jiangsu Province took the lead in performing the pilot and demonstration work of constructing suitable residential areas for the elderly. In 2018, the concept of livability was added. The construction plan of the "Livable Demonstration Residential Area" was proposed and promoted, with four residential areas in Nanjing covered, including the Nanjing Yaofangmen Livable Demonstration Residential Area.

Yaofangmen (YFM) Community, located in the fringe area of downtown Nanjing, was named after the Yaofang Gate of the nearby Outer City Wall of the Ming Dynasty. The community covers an area of approximately 0.9 square kilometers, involving three communities and ten residential areas, with a total population of 22,000. The community was built in 2000, including the relocation community, the commercial housing community, and the housing-reform house residential area (Figure 4). Young and middle-aged residents form the majority of the community, which features a sufficient labor force and strong production and consumption capacity. Nonetheless, due to a lack of resting time, it is difficult for them to participate in community public activities. At the same time, there is an aging phenomenon in the community. The migrant population in the community has reached 35% and mostly concentrates in the newly built residential areas, resulting in a completely different community atmosphere. Residential buildings are mainly multi-story and high-rise. At present, this community is defined by an aged public space environment and public service facilities, as well as poor community management that demands community-wide regeneration.

Due to a variety of factors, different groups have varying desires when it comes to community regeneration and reconstruction. Their individual interests are strongly intertwined to the beautification and reinforcement of houses, the building of public space, and the strengthening of supporting infrastructure in the community. During the interviews, no matter the residents, the tenants and merchants all expressed their support for the beautification of the street environment. Despite this, they do not care much about specific issues and tolerate the effects.

Through a survey, this study summarizes the interest concerns of residents and workers in the community into four perspectives: the economy, the environment, the public space, and the culture, respectively (Table 1), the relationship among which advances from necessity to a higher level. Firstly, economic concerns mainly refer to the public consideration of their own wealth. For example, residents are very concerned about whether their house value has appreciated or depreciated upon building renovation and the addition of surrounding facilities. Secondly, the demand at the environmental level refers to public concerns about the physical environment inside and outside the residential area, including the physical aging, safety hazards, environmental beautification, and environmental accessibility that usually exist in old residential areas. Thirdly, the concerns about public

space mainly come from the demand for social interaction and social activities, which refers to street space; space for the slow-moving environment, rest, and communication; public transportation space; and the community commercial service space “outside the enclosure” of the block. Fourthly, cultural concerns refer to the highest level of public demands, the expectations for community atmosphere, neighborhood relationships, and image of the entire neighborhood.

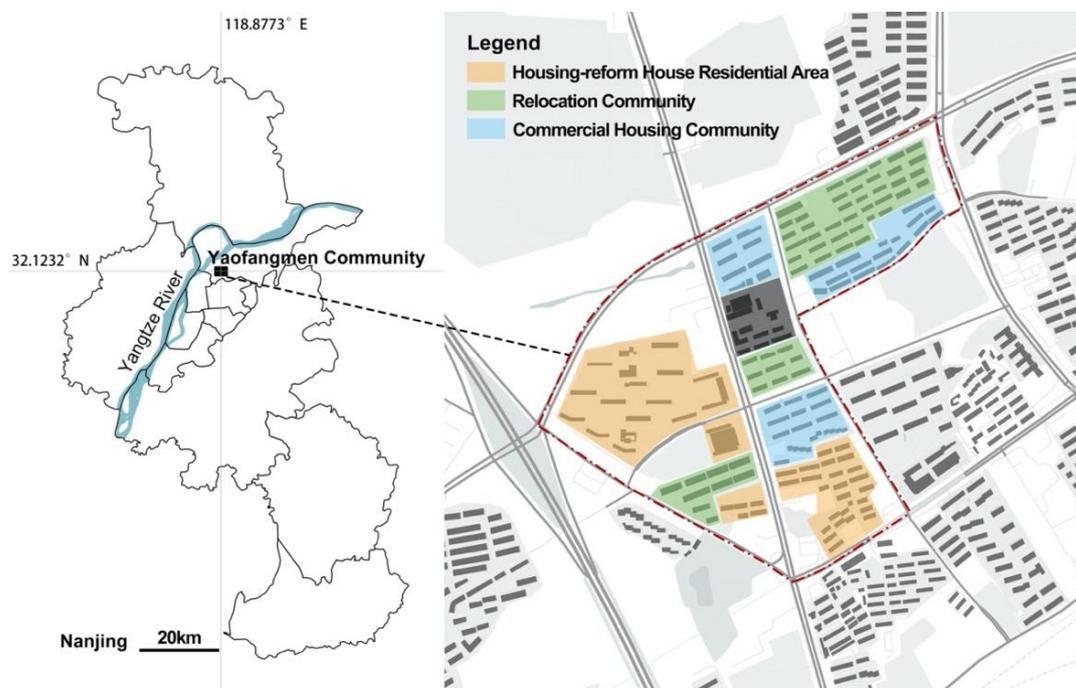


Figure 4. Location and layout of YFM Community. (Source: the authors).

Table 1. The interest concerns of the public for community regeneration.

	Public Subject	Interest Concerns
Internal environment of the residential area	The residents	House appreciation Housing safety Buildings appearance Infrastructure and supporting living facilities Environment afforestation Supply of public space and interaction space
	The tenants	Renting safety Renting environment
External environment of the residential area	The residents	Living convenience Beautiful environment A sense of belonging
	The tenants	Living convenience Beautiful appearance
	The merchants	Space supply in front of the door

Source: on-site investigation.

In the renovation process, YFM Community has also undertaken a large number of practical activities for public participation with the participants, including the government, and public and third-party organizations. Specific public participation is led by grassroots government and third-party design institutions. The main participation content focuses on community publicity, consultation with public opinions, residents’ consultative meetings, online exchanges, joint maintenance with residents, etc. In addition, some interesting activities for public participation have also been organized, including a creative design

competition for primary school students, a summer camp for college students, and various symposiums and interviews held by residents (Table 2).

**Table 2.** Stages and content of public participation in community regeneration.

Stage	Content of Participation Activities	Organizers
Pre-regeneration	To consult with public opinions To assess the demands To prepare the renovation list To perform community publicity	Governments at the grassroots level Planners and designers
During regeneration	To establish residents' council To seek opinions through public symposiums To develop creative design activities for primary school students To plan and design summer camps for college student To collect online opinions	Governments at the grassroots level Planners and designers Third-party organizations
Post-regeneration	To publicize the regeneration results To provide feedback comments To establish a community operation committee	Governments at the grassroots level Third-party organizations

Source: on-site investigation.

The government departments include the sub-district offices, neighborhood committees, and related departments at the municipal and district level. Through understanding, the sub-district offices and neighborhood committees of three communities have been mainly engaged in constructing a "Livable YFM". The grassroots government departments have played a leading role in determining the renovation project, holding residents' consultative meetings, implementing the project scheme, etc. Meanwhile, they provide basic data support for the design institution and guide residents to participate in the research of the design institution. Residents and tenants in the community are the primary beneficiaries of micro-regeneration. Through the "building leader" approach, grassroots government departments typically engage passionate residents in the community to participate in regeneration operations.

The third-party organizations involved in constructing a "Livable YFM" are frequently divided into two categories: those organized by the residents themselves and those organized by the community designers. The former usually includes the women's federation, interest clubs, etc., which participate in the limited scope of activities and basically exert no impact on the regeneration process. The latter usually organize diversified activities. As leaders of third-party organizations, they frequently mobilize children, enthusiastic residents, and professional college students in the community to participate in a variety of creative activities, summer camps, and seminars. Additionally, they establish a "community designer" mechanism to assign professional designers to monitor the planning and design of a specific area, providing a very meaningful and effective platform for public participation.

### 2.3. Data

In actual inquiry and verification, the SCSB and ACSI models established the traditional index variable systems and scales. In reference to these index variable systems and classic scales, this study has formulated observation variables to evaluate the public participation process following the actual conditions of public participation in the studied case (Table 3).

**Table 3.** Variables for evaluating the public participation process.

Classic Scales Referred to	Observed Variables	Content Explanation
Degree of overall expectation	Expectation for general quality (X1)	Expect to participate well in community regeneration.
Expectation of product/service reliability	Expectation for sustainability (X2)	Expect to participate in community regeneration during the entire process.
	Expectation for adjustability (X3)	Expect that the problems arising in the course of participation can be solved.
	Expectation for reliability (X4)	Expect that activities participated in are well organized.
Expectation of product/service value maintenance	Social and cultural expectation (X5)	Expect that participation can achieve a better community environment and improve the community's reputation.
	Economic expectation (X6)	Expect to appropriate the house/increase the cost performance of renting.
	Expectation for physical space (X7)	Expect that participation can improve the community's residing environment.
Overall quality perception	Perception of general quality (X8)	General comment about participation in community regeneration.
	Perception of preceding activities (X9)	Comment about the activity arrangement before participation (such as brochures, publicity, exhibitions, meetings, TV publicity, questionnaires, and surveys).
	Perception of mid-term activities (X10)	Comment about the activity arrangement during participation (such as consultative meetings, opinion surveys, residents meetings, interaction teams, and interviews and dialogue).
Perception of product/service characteristics	Perception of post-activities (X11)	Comment about the activity arrangement after participation (such as return visits, comments, and common maintenance after regeneration).
	Perception of government services (X12)	Comment about the performance of governments at the grassroots level and the residential committee during participation.
	Perception of market services (X13)	Comment about the performance of property management companies and investment companies during participation.
Service perception	Perception of third-party services (X14)	Comment about the performance of the design institution, social organizations, and clubs during participation.
	Cost performance perception (X15)	Comment about my own gains during participation.
Overall satisfaction	Overall quality satisfaction (X16)	Satisfaction with the overall quality of residential participation.
Degree of demand satisfaction	Demand satisfaction (X17)	Comment about satisfying my own demand for regeneration.
Satisfaction compared with the expected effect	Expected satisfaction (X18)	Comment whether the expected effects are reached.

Table 3. Cont.

Classic Scales Referred to	Observed Variables	Content Explanation
Possibility of repurchase	Possibility of re-participation (X19)	Willingness to participate in related activities again.
Possibility of recommending others to purchase	To promote the possibility of participation (X20)	Willingness to recommend others to participate in activities related to community regeneration.
Possibility of continuous purchase despite price increase	To enhance the possibility of participation (X21)	Willingness to participate in regeneration activities despite more costs.

Source: the authors.

Based on the analysis framework, we surveyed from a variety of perspectives, including the public's expectation of participating in community regeneration, the public's perception, satisfaction, and feedback regarding participation, etc., and then confirmed appropriate measurable variables based on the existing scale. The questionnaire set the variables in reference to classic variables commonly used by researchers, which were further adjusted and amended in combination with the abovementioned theoretical analysis and expert consultation. Through the oral interpretation of the observed variables, relatively easy-to-understand and straightforward items were then obtained for the questionnaire survey. This part adopted a 5-level scale, with 5 being the most satisfied, 1 being the least satisfied, and the satisfaction levels declining from 5 to 1.

The anonymous questionnaire survey took place between January and February 2021. After the final collection of the questionnaires, 189 questionnaires were recovered with 164 providing valid feedback. In addition, some residents, merchants, community managers, and planning designers in YFM Community were interviewed anonymously in February 2021. In the analysis, the exploratory factors of the questionnaires were firstly analyzed to obtain the dimension composition that would affect public satisfaction. A structural equation model was constructed using the collected results as the measurement model, with customer satisfaction and public participation theories used to investigate how the public interacted with one another during participation on multiple dimensions. Additionally, the factor loadings in the structural equation model were further normalized to establish a local index system to measure the locality. Finally, the model and measurement results were analyzed and discussed.

### 3. Results

#### 3.1. Process of Structural Equation Modeling (SEM) Analysis

Statistical analysis software was applied to analyze the exploratory factors by extracting the common factors from 21 items. These items directly reflect the mutually independent common factors, which were the latent variables of the measurement model, and each item was an observed variable. The results showed (in Table 4) that the KMO value of each dimension was 0.88, 0.921, 0.881, and 0.885, with all values greater than 0.7, while the Bartlett sphericity test was significant ( $p < 0.001$ ), indicating that the data were suitable for exploratory factor analysis. The principal component analysis method was used to extract factors with eigenvalues greater than 1, with the maximum variance method used for rotation to finally extract three common factors. The cumulative variance explanation rate was 66.079%, exceeding 60%.

According to the previous analysis framework (Figure 2), common factor 1 and common factor 3 can be named "the quality perception" and "the public expectation", respectively, while common factor 2 includes two such variables, "satisfaction" and "next participation", in the previous analysis framework that are strongly mutually correlated. Under the condition that the explanatory degree is greater than 60%, the principal component explanatory degree is good, and the factor loading of each principal component is greater than 0.5, this article decomposes common factor 2 to two factors, namely "public

satisfaction” (including the three items X16, X17, and X18) and “public trust” (including the three items X19, X20 and X21), respectively, for equation model fitting analysis.

**Table 4.** Analysis of Exploratory Factors.

Items	Factors		
	1	2	3
Expectation for overall quality (X1)			0.675
Expectation for sustainability (X2)			0.598
Expectation for adjustability (X3)			0.594
Expectation for reliability (X4)			0.518
Social and cultural expectation (X5)			0.721
Economic expectation (X6)			0.714
Expectation for physical space (X7)			0.708
Perception of general quality (X8)	0.692		
Perception of preceding activities (X9)	0.669		
Perception of mid-term activities (X10)	0.753		
Perception of post-activities (X11)	0.682		
Perception of government services (X12)	0.646		
Perception of market services (X13)	0.637		
Perception of third-party services (X14)	0.822		
Cost performance perception (X15)	0.591		
Satisfaction with general quality (X16)		0.645	
Demand satisfaction (X17)		0.566	
Expectation satisfaction (X18)		0.627	
Possibility of re-participation (X19)		0.774	
Possibility of participation promotion (X20)		0.766	
Possibility of reinforced participation (X21)		0.748	

Note: the factor loading < 0.4 has been removed. Abstraction method: principal component analysis. Rotation method: Kaiser normalized maximum variance method. The rotation converged after 6 iterations.

As shown in Figure 3, the public participation satisfaction model in community regeneration is developed using the satisfaction model’s architectural mechanism and the common elements generated from the measurement model. The structural equation modeling tool was used for model validation and modification to obtain the optimal model, as shown in Figure 5. According to the predicted model, X5 and X6 were associated with X7, respectively, because they all belonged to the same latent variable and were closely related in content; X13 was deleted because the standardized factor loadings did not meet the standard, and the reason for this deletion was that “market” did not play a significant role or the capacity of the service varied, resulting in “market” having little effect on public perception as a whole. According to commonly used model-fit criteria [53], the overall model fit is good. The *p*-values of the unstandardized parameters of the measurement model were all less than 0.001, which met the significance requirement, and the *p*-values of the unstandardized parameters of the structural model were all less than 0.01, indicating that each path met the requirement of being significant at the 0.05 level (see Table 5). Therefore, the model can better reflect the influence mechanism of public participation satisfaction.

The index weights need to be determined before calculating the combined values of public satisfaction and other structural variables. The weight of each observed variable is the value obtained after its normalization in the structural variables. The product of each and their mean values are the scores of the observed variables, but before that, the obtained mean values need to be converted into percentages in order to obtain the score of the structural variables and the score of each observed variable, as shown in Table 6.

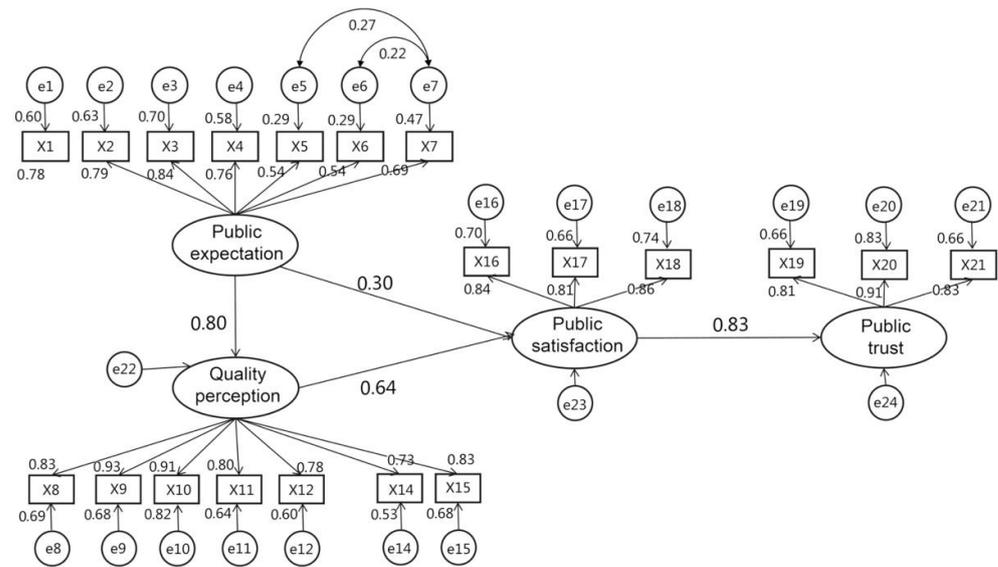


Figure 5. Model results.

Table 5. Model estimation parameters.

Items			Estimate	S.E.	C.R.	p.
Expectation for overall quality (X1)	<—	Public expectation	1.000			
Expectation for sustainability (X2)	<—	Public expectation	1.059	0.099	10.656	***
Expectation for adjustability (X3)	<—	Public expectation	1.052	0.093	11.367	***
Expectation for reliability (X4)	<—	Public expectation	0.994	0.098	10.163	***
Social and cultural expectation (X5)	<—	Public expectation	0.573	0.084	6.861	***
Economic expectation (X6)	<—	Public expectation	0.637	0.092	6.907	***
Expectation for physical space (X7)	<—	Public expectation	0.701	0.078	8.997	***
Perception of general quality (X8)	<—	Quality perception	0.915	0.070	12.987	***
Perception of preceding activities (X9)	<—	Quality perception	1.033	0.081	12.803	***
Perception of mid-term activities (X10)	<—	Quality perception	1.207	0.081	14.911	***
Perception of post-activities (X11)	<—	Quality perception	0.982	0.081	12.186	***
Perception of government services (X12)	<—	Quality perception	0.900	0.077	11.639	***
Perception of third-party services (X14)	<—	Quality perception	0.893	0.084	10.662	***
Cost performance perception (X15)	<—	Quality perception	1.000			
Satisfaction with general quality (X16)	<—	Public satisfaction	0.895	0.066	13.651	***
Demand satisfaction (X17)	<—	Public satisfaction	0.968	0.075	12.863	***
Expectation satisfaction (X18)	<—	Public satisfaction	1.000			
Possibility of re-participation (X19)	<—	Public trust	1.000			
Possibility of participation promotion (X20)	<—	Public trust	1.352	0.101	13.394	***
Possibility of reinforced participation (X21)	<—	Public trust	1.265	0.106	11.972	***

Note: \*\*\*  $p < 0.001$ .

Table 6. Weight and score of each factor.

Factor	Path Coefficient	Index Weights	Mean Value	Percentage	Score
Expectation for overall quality (X1)	0.78	0.16	3.94	78.80	12.44
Expectation for sustainability (X2)	0.79	0.16	3.82	76.40	12.22
Expectation for adjustability (X3)	0.84	0.17	4.10	82.00	13.94
Expectation for reliability (X4)	0.76	0.15	3.93	78.60	12.09
Social and cultural expectation (X5)	0.54	0.11	4.17	83.40	9.12
Economic expectation (X6)	0.54	0.11	3.92	78.40	8.57
Expectation for physical space (X7)	0.69	0.14	4.37	87.40	12.21
<b>Public expectation</b>					<b>80.59</b>

Table 6. Cont.

Factor	Path Coefficient	Index Weights	Mean Value	Percentage	Score
Perception of general quality (X8)	0.83	0.14	3.52	70.40	10.06
Perception of preceding activities (X9)	0.93	0.16	3.51	70.20	11.24
Perception of mid-term activities (X10)	0.91	0.16	3.26	65.20	10.21
Perception of post-activities (X11)	0.8	0.14	2.99	59.80	8.23
Perception of government services (X12)	0.78	0.13	3.98	79.60	10.69
Perception of third-party services (X14)	0.73	0.13	3.10	62.00	7.79
Cost performance perception (X15)	0.83	0.14	3.38	67.60	9.66
<b>Quality perception</b>					<b>67.88</b>
Satisfaction with general quality (X16)	0.84	0.33	3.76	75.20	25.17
Demand satisfaction (X17)	0.81	0.32	3.48	69.60	22.46
Expectation satisfaction (X18)	0.86	0.34	3.50	70.00	23.98
<b>Public satisfaction</b>					<b>71.61</b>
Possibility of re-participation (X19)	0.81	0.32	4.12	82.40	26.17
Possibility of participation promotion (X20)	0.91	0.36	3.78	75.60	26.98
Possibility of reinforced participation (X21)	0.83	0.33	3.30	66.00	21.48
<b>Public trust</b>					<b>74.63</b>

### 3.2. Results of SEM Analysis

#### 3.2.1. There Is a Clear Structure of “Expectation–Perception–Satisfaction–Trust”

In the public participation satisfaction model, there are four structural variables and four relationships, and all four relationships are positively connected. The results (Figure 5) verified the abovementioned hypotheses. Firstly, public expectation has a strong influence on quality perception, and the higher the public expectation, the stronger the public quality perception. Secondly, quality perception has the greatest influence on public satisfaction. Thirdly, public satisfaction has a strong positive relationship with public trust, and public satisfaction has a strong influence on public trust. Fourthly, quality perception plays a mediating effect between public expectation and public satisfaction.

In the final score, public expectation has the highest score, indicating that the overall public expectation of micro-regeneration at the neighborhood level is relatively high. The public quality perception score is much lower than that of public expectation. Therefore, it can be judged that in the process of participation, the form, degree, and quality of public participation did not meet public expectations, which also led to a low public satisfaction score. The public trust score is similar to and slightly higher than the public satisfaction score, which indicates that the degree of public trust in public participation is closely related to satisfaction. If we want to increase public trust, we must carefully manage each participation activity in order to increase public satisfaction.

#### 3.2.2. Public Expectation Focuses on Environment Regeneration in Physical Space

As illustrated in Figure 5, the public has higher expectations for the overall quality (X1), sustainability (X2), adjustability (X3), design reliability (X4), and spatial material needs (X7) of community regeneration, indicating that the public is more concerned with material issues such as the environment and public space in the demand hierarchy, and is also more concerned with rapid feedback and resolution of issues that arise during public participation. As a resident stated: “The community’s overall environment is not bad, but the parking is a bit chaotic and takes up valuable green space. Due to the absence of someone to manage and maintain the green area, it is both unattractive and ineffective. As there is no one to manage and maintain the green space, it is not beautiful and not useful. I hope these problems can be solved”.

The path coefficients of public expectations for social and cultural needs (X5) and economic needs (X6) are low, indicating that people do not pay much attention to these two points. At the moment, there are few economic and cultural components to community regeneration, and because public participation does not include these components, people

pay less attention to them; additionally, economic and cultural enhancement are based on the improvement of community physical space, which is one of regeneration's indirect benefits. Though it did not become the aspect that residents were most concerned about in the public participation process, some residents noticed the possible economic benefits, including one resident who said: "The houses are older, and some roofs and walls are leaking, so I hope they can be repaired and fixed beautifully, which will also increase house prices". Among the observed variables of public expectation scores, social and cultural expectations and economic expectations scored significantly lower than other variables, corroborating the above analysis's conclusion that people do not have high expectations for public participation in enhancing the community's cultural and economic levels.

### 3.2.3. Differences in Public Perceptions of Participatory Activities in Each Stage of Regeneration

Public perception coefficients of quality are relatively high during regeneration, showing that inhabitants are sensitive to the overall quality of regeneration. Firstly, the public's perception path coefficients for previous (X9) and mid-term (X10) activities are the highest, indicating that individuals are more motivated to participate in activities. Residents pay more attention to participatory activities, and such activities have better effects, as one resident argued: "The community assistant called me to attend the forum, and those who attended were from old neighborhoods, and we mainly want the regeneration program to meet our daily needs and not to make fancy things that do not work well".

Secondly, the public's perception path coefficient for third-party services (X14) is the lowest in this group, indicating that third-party organizations' influence on residents' community regeneration participation is not very significant. Some small-scale regeneration in YFM Community is generally a direct decision of the grassroots government and related units, while the lack of participation and coordination of third-party organizations (either community planners or other social organizations) in the middle also resulted in a lack of presence of third-party organizations. According to a community manager: "The municipal government has made our community a model; the district government also attaches importance to our community. Our community cooperates with the Provincial Planning Institute, and a lot of work is done by the community. Planners are mainly responsible for the design". A planner involved in the community's renewal said: "We mainly cooperate with the community by attending some matchmaking meetings they organize to understand the needs of all parties and give better design solutions".

Thirdly, the public's perception path coefficient for post-activities (X11) is also lower, indicating that activities such as common maintenance and opinion inquiries after regeneration are largely not better arranged or the opinions of previous public participation results are not effectively implemented. As another community manager said: "Completed projects will be publicized on bulletin boards. We plan to set up a special committee to carry out the post-regeneration work, and it remains to be verified how effective it will be". In addition, the final scores of these two observed variables are also the lowest, verifying the public's poor perception of post-activities and the poor perception of third-party services.

### 3.2.4. Public Satisfaction and Public Trust as a Response to the Overall Expectation of Regeneration

Ultimately, the path coefficients for public satisfaction with general quality (X16), demand satisfaction (X17), and expectation satisfaction (X18) are all relatively high, indicating that all of these variables have a significant effect on public satisfaction and that improving all three variables would significantly increase public satisfaction. As the path coefficient of satisfaction is the highest when compared to the expectation satisfaction (X18), residents' requests and expectations should be studied in several parts of regeneration operations. All three observed variables in public trust have large path coefficients, indicating high levels of popular satisfaction. However, the possibility of reinforced participation (X21) score is low, indicating that increasing participation costs will affect public trust. Therefore, it is necessary to focus on lowering the threshold and increasing the convenience of public participation when performing participation activities.

## 4. Discussion

The integration and unification of government benefits, resident benefits, and developer rewards are the comprehensive benefits of urban regeneration. Resource integration and benefit reconstruction constitute one of the key tasks of urban regeneration [54–56], which inevitably requires increased attention to numerous stakeholders during the regeneration process, complicating urban challenges [4,57]. Through the use of a greater emphasis on social capital, urban regeneration's logic has shifted away from space production and toward community construction [11]. As a result, the strength and network of relationships, and operating mechanism of various stakeholders, including the restoration and integration of social capital, have become the focal points of urban regeneration in the new era [57–61]. However, the fundamental objective of community revitalization is to benefit residents. Prior to conducting public participation activities, thorough demand research of the public should be undertaken, and tailored activities should be conducted on this premise. Through the effective cooperation of multiple departments, the public's demands and suggestions of activities should be actively fed back as much as possible, to promote a larger level of public satisfaction and trust enhancement. Concerning residents' regeneration needs, precise and complete planning of activities contributes to increased satisfaction and public trust. To sustain and improve public perceptions of participation prior to and during the regeneration process, it is also necessary to strengthen public perceptions of participation following regeneration, for example, by organizing residents' joint participation in the maintenance of regeneration results, conducting regular public opinion surveys, and incorporating residents' opinions to the greatest extent possible.

The government is decisive in community regeneration. Its role in community regeneration and community participation differs between China and Western countries. Although multi-party cooperation is essential in urban regeneration, local governments in China, compared to Western countries, need to perform more specific work and decision-making in guiding and organizing community participation, such as providing resources, policies, and financial support [22]. On the one hand, local governments and developers make decisions jointly and almost dominate everything in community decision-making. On the other hand, there is a lack of effective communication channels between the government and community residents [15,62]. Local authorities make decisions, release the results, and then notify community residents while the process, discussion, and negotiation of the interests of community residents are ignored or not emphasized. In other words, community residents could not effectively participate in routine affairs in the past, so that through the development of localization and globalization, governments and the public have recognized that only through participation in decision-making can local communities' interests be protected and their traditional lifestyles and values be respected [17]. In this study, the government plays a leading role in the construction of the public participation platform, the planning of regeneration, and the implementation of regeneration, but the effectiveness of public participation lies in how effectively residents are motivated to participate, which depends on the level of government policy formulation and process management.

Third-party organizations play an important role in breaking down barriers between the government and the public to establish an equal platform for dialogue, consultation, and cooperation among multiple stakeholders, promoting joint action between the government and the public [17]. This study finds that urban planners have great potential for community regeneration. They are becoming an important part of the urban and rural planning systems to promote community participation in regeneration [24,63]. As a consequence of the rational assignment of work tasks and the enhancement of work efficiency, third-party organizations with organizational capabilities and experience, as well as relevant professionals, should be nurtured and recruited to participate in community regeneration and renovation. As a result, a feasible approach to participatory community planning must be further developed in the context of future community regeneration, including an examination of the legal role of public participation in the community planning system and the establishment of a long-term mechanism for involving more community planners outside the established professional system.

## 5. Conclusions

Public participation as a critical component of community regeneration has been investigated by several cities in sequence. Nonetheless, its procedure is now under-evaluated. This study proposes an analytical framework for assessing public participation in community regeneration, based on the idea that building a relationship of trust between the various participants, especially between the government and residents, can enhance the quality of residents' participation in community regeneration, and thus achieve better participation results. The purpose of this study is to analyze and evaluate the public participation process of community regeneration using the EPST model in order to emphasize the importance of human perceptions during public participation and to identify those factors that affect the effectiveness of public participation during community regeneration. Simultaneously, in light of the regeneration features of various communities, it aims to assure the objectivity and relevance of data collected through surveys and to resolve the contradiction between the comprehensiveness and independence of the assessment index system.

This research adopts the EPST model to conduct an empirical study on YFM Community in Nanjing. The results show that both public expectations and public quality perceptions need to be raised to improve public satisfaction and public trust in public participation. The empirical study also proves that the public's demands in community regeneration are mainly focused on the improvement of the physical space environment, and the participation process is more focused on various activities. At this stage, grassroots government completes the service task of public engagement in community regeneration, with market participation and efficiency being low, and third-party organizations' participation being insufficient. For community regeneration in Chinese cities, the key is to mobilize public participation, while a detailed understanding of residents' needs for community environment and community services is also an important part of enhancing the effectiveness of regeneration. In this process, the role of local governments and especially third-party organizations should be further enhanced, with the latter yet to be fully utilized in China.

For both community regeneration participants and academics, public participation in community regeneration is a challenging process. This study constructed a framework for evaluating resident-based public participation processes in community regeneration and provided scientific support for the sustainability of community regeneration in China. This study mainly used questionnaires, which had some limitations in data acquisition. Subsequent studies could further employ methods such as focus groups and semi-structured interviews to achieve more in-depth academic results.

**Supplementary Materials:** The following supporting information can be downloaded at: <https://www.mdpi.com/article/10.3390/land11091405/s1>, Table S1: Data for structural equation modeling analysis.

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