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INFLUENCING FACTORS OF RESIDENTS' PARTICIPATION IN THE SELF - RENOVATION BEHAVIOR OF DANGEROUS AND OLD RESIDENTIAL AREAS BASED ON THE THEORY OF PLANNED BEHAVIOR

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Abstract

This study investigates the determinants and pathways of residents' intention to participate in owner-led Self - Renovation in Dangerous and Old Residential Areas, using Haikou, China as the empirical context. Grounded in the Theory of Planned Behavior (TPB) and informed by the theory of the production of space, the research builds an integrated framework that links renewal-information perceptions (policy perception, planning/design perception, and perceived community management capacity), spatial conditions (basic living conditions, public activity space, and infrastructure), and community relations (community cohesion, sense of community belonging, and social support) to TPB components (behavioral attitude, subjective norms, and perceived behavioral control), and ultimately to participation intention. Data were collected through door-to-door and on-site surveys in 12 designated districts, yielding 343 valid

homeowner responses. Reliability and validity tests indicate satisfactory measurement quality, and structural equation modeling shows good overall model fit. Results confirm that attitude, subjective norms, and perceived behavioral control significantly and positively predict participation intention, with subjective norms exerting the strongest effect. Policy, planning/design, and community management perceptions significantly enhance both attitude and subjective norms. Poorer perceived living conditions, insufficient public space, and inadequate infrastructure strengthen positive attitudes toward participation. Community cohesion, belonging, and social support reinforce attitude and subjective norms, while belonging and social support also increase perceived behavioral control. The findings provide targeted leverage points for designing communication, mobilization, and support strategies to promote resident participation in urban self-governance renewal.

Keywords:

Dangerous and Old Residential Areas, Self-Renovation, Theory of Planned Behavior, SEM

1. Introduction and Literature Review

China is currently undergoing a period of economic transformation. Under the “new normal” of economic development, urban development has shifted from an incremental growth model toward the optimization and renewal of existing urban stock (Zou, 2015). In this process, Dangerous and Old Residential Areas are associated with potentially severe safety risks, which can easily trigger social tensions; accordingly, their renovation and governance have gradually become a key component of the new round of urban renewal initiatives (Li et al., 2023).

From the 1980s to the early 2000s, the renovation of such communities in China largely relied on a government-led approach. Through planning instruments and financial support, governments promoted large-scale demolition and reconstruction. A typical example is the “old residential community renovation programme”, which was usually dominated by government action and financed through fiscal subsidies and land development (Wang et al., 2021). This model reflects an early “top-down” governance logic: although it improved the urban environment and infrastructure in the short term, it also produced problems related to resident relocation and social equity (Nedučín et al., 2021).

In response to the renovation and governance of hazardous communities, China’s Ministry of Housing and Urban–Rural Development and local governments have introduced a series of policies that encourage and support owner-led Self - Renovation in demolition-and-reconstruction projects. These policies emphasise residents as the main actors, mobilise governmental and societal forces to participate jointly, and follow the principle of “those who benefit should contribute”, enabling land-use-right holders to carry out Self - Renovation of residential buildings. Because Self - Renovation processes are polycentric and endogenous, their governance can be understood as a form of self-governance (Ostrom, 1999).

The intellectual origins of self-governance theory can be traced back to Elinor Ostrom’s research on the governance of shared resources. Ostrom developed an institutional framework for self-governance that opened new pathways for addressing problems of resource provision and allocation and for overcoming collective-action dilemmas (Zou, 2015). Self-governance theory has often been applied to relatively small-scale problems of resource use and environmental pollution, i.e., conventional common-pool resource (CPR) challenges (Zhan & You, 2024; Luo et al., 2022). Some studies suggest that self-governance models that interact

constructively with government can help avoid a tragedy of the commons and improve governance effectiveness (Zhang et al., 2024). Others, however, find that when tackling rural water pollution as a commons problem, self-governance did not significantly improve farmers' health outcomes and therefore failed to effectively advance water-pollution governance (Engler et al., 2021). These findings imply, first, that the effectiveness of self-governance varies considerably across contexts and thus needs to be assessed in relation to specific settings; and second, that its performance in practice is influenced by multiple factors. Therefore, it is necessary to examine barriers to implementation and the interrelationships among those constraints.

Adam Polko further extends the commons concept and self-governance theory into urban research, summarizing the distinctive features of urban commons and assessing the applicability of Ostrom's principles in cities. Polko argues that urban commons are characterized by multifunctionality, high member mobility, and relatively weak ties among members (Polko, 2024). Moreover, due to agglomeration effects and the provision of shared resources, decisions by individual users may generate positive impacts for other members—what has been termed a “comedy of the commons” (Foster & Iaione, 2015). In urban commons, self-governance effectiveness is influenced by two broad factors. The first concerns relationships and interactions among urban elements, including multidimensional relations among residents, government, and the market (Foster & Iaione, 2019), as well as the alignment and conflicts among community stakeholders under land-resource constraints (Colding et al., 2013). The second concerns residents' participation. Compared with traditional commons, urban commons rely more heavily on voluntary participation; therefore, city governments must adopt open, diversified, and responsibility–authority-balanced measures to sustain residents' willingness and levels of participation (Polko, 2024).

To address these issues, prior studies have typically employed qualitative approaches. For example, Paredes and Vigiola examine how platform technologies in Bogotá, Colombia facilitated alternative self-governance arrangements among ride-hailing drivers during COVID-19 lockdowns, highlighting their roles in social innovation, institutional challenges, and advocacy for inclusive and resilient urban governance reforms (Paredes & Vigiola, 2024). Yip and Zheng investigate condominium self-governance in urban China and, through a strategic action field perspective, reveal key forces and the reshaping of power dynamics, as well as

political risks and far-reaching implications for interactions among the state, the market, and homeowner organisations (Yip & Zheng, 2024). Chaskin et al. explore the sociopolitical consequences of relocating residents from informal settlements to newly built housing in Mumbai's large-scale redevelopment, showing how self-governance mechanisms reshape civic responsibility and identity and how interactions between formal and informal governance affect community life and urban integration (Chaskin et al., 2024). These studies contribute by elaborating the potential of self-governance to address contemporary urban governance challenges and by unpacking its interaction with political, legal, and social environments. Nevertheless, two limitations remain.

First, much of the existing literature relies on single-case narratives to identify spatial elements and interpret the interaction between self-governance and those elements, and thus lacks a unified framework for spatial-factor analysis. Urban research needs to begin from the fundamental characteristics of "space" (Ai & Kim, 2024). Accordingly, it is necessary to develop a comprehensive spatial-element framework that covers not only the physical environment but also social, economic, and cultural dimensions, so as to analyse the contextual conditions of self-governance and their effects on participation. Second, previous studies often treat self-governance as a pre-existing and spontaneously formed mechanism in which actors are already embedded in established governance structures. Yet in urban communities where mature self-governance mechanisms have not been established, cultivating the ideas and institutions of self-governance is important for enhancing civic democratic awareness and building a collaborative governance system involving government, market, and society (Shen et al., 2021). Such communities, however, are often constrained by multiple barriers, and existing research remains insufficient in identifying these barriers and systematically analysing their interrelationships.

Recent studies provide methodological inspirations for the present research. Yang et al., drawing on Lefebvre's theory of the production of space, develop a quantitative evaluation system of spatial elements for assessing danwei compounds, which informs this study's identification and analysis of spatial factors in hazardous communities undertaking Self - Renovation (Yang et al., 2021). In addition, Cheng et al. apply a Theory of Planned Behavior (TPB) framework to examine villagers' participation in rural micro-landscape governance, which further motivates our construction of a mechanism explaining residents' participation in Self - Renovation (Cheng et al., 2022).

In summary, this study adopts the Theory of Planned Behavior as the core analytical framework and integrates the theory of the production of space to investigate the determinants of residents' participation in Self - Renovation of Dangerous and Old Residential Areas, using Haikou as a case. The study has two objectives: (1) to identify factors influencing urban residents' participation in Self - Renovation; and (2) to determine which factors are most decisive. Based on the findings, the study also proposes practical management strategies to promote residents' participation in urban self-governance.

This study contributes in three ways. First, it develops a conceptual model of residents' participation in Self - Renovation by integrating the Theory of Planned Behavior with the theory of the production of space, thereby extending the application boundary of self-governance theory and filling a gap in research on determinants and mechanisms of participation. Second, it conducts an empirical analysis based on 343 resident questionnaires collected from designated hazardous communities in Haikou, enhancing the reliability and validity of the results and offering practical and social value for assessing real-world outcomes. Finally, it proposes evidence-based recommendations to support the construction of a new governance system characterized by “co-construction, co-governance, and sharing”.

2. Conceptual Model and Research Hypotheses

2.1 Conceptual Model

With urban development and the growing awareness of public participation, residents have increasingly recognized their role as key actors in grassroots governance and public decision-making. As the most directly affected stakeholders and primary beneficiaries of *Self - Renovation* in Dangerous and Old Residential Areas, residents' participation – both its enthusiasm and sustainability – largely determines whether the renovation agenda can be initiated, whether feasible schemes can be formed, and whether implementation can proceed steadily. Existing domestic and international studies on individual behavior and public participation have accumulated substantial theoretical and empirical evidence. A review of the literature on residents' participation in Self - Renovation in Dangerous and Old Residential Areas from an urban governance perspective suggests that, although scholars adopt diverse approaches, the most consistent foci fall into three categories: (1) sociodemographic characteristics (e.g., age, education, and household income) that shape participation capacity and preferences; and (2)

social interaction and neighborhood networks – i.e., community relations (e.g., community cohesion, sense of community belonging, and social support) that underpin negotiation efficiency and collective action.

However, compared with the relatively consolidated understanding of individual-level factors, discussions of how external environments, institutions, and resource provision influence participation through concrete mechanisms remain insufficient. In particular, research often underestimates how residents' *perceptions* of renewal information – such as policy and planning/design communication, implementation processes, and existing spatial conditions – constrain or incentivize participation. Fieldwork also indicates that residents are not necessarily unwilling to express opinions. In some Dangerous and Old Residential Areas, residents do voice concerns, yet limited community management capacity reduces their actual influence, thereby weakening confidence and willingness for subsequent participation. In addition, the spatial condition of a neighborhood (e.g., basic living conditions, public activity space, and infrastructure) plays an important role in shaping residents' judgments of urgency and their participation motivation. Thus, objective conditions – such as organizational arrangements, consultation mechanisms, and participation channels – directly affect residents' subjective assessments of participation costs, feasibility, and controllability of outcomes.

Based on these observations, this study situates itself in Self - Renovation in Dangerous and Old Residential Areas and adopts the Theory of Planned Behavior (TPB) to construct an analytical framework for residents' participation intention. The framework explains residents' decision logic through three dimensions – attitude, subjective norms, and perceived behavioral control – and is further extended by incorporating context-specific variables for Dangerous and Old Residential Areas. Specifically, the model includes policy perception, planning/design perception, perceived community management capacity, basic living conditions, public activity space, infrastructure, community cohesion, sense of community belonging, and social support, in order to test their directions of effect and pathways in forming residents' intention to participate in Self - Renovation.

2.2 Hypotheses

Attitude represents an individual's spontaneous evaluative response and is a key predictor of behavior. Huang et al. find that when citizens believe their actions benefit the urban

environment, they are more willing to participate in urban green-space governance (Huang et al., 2021). Song et al. similarly show that farmers with more positive ecological attitudes are more likely to participate in pesticide-packaging waste governance (Song et al., 2024). In the context of Self - Renovation in Dangerous and Old Residential Areas, residents' attitude refers to residents' evaluation of Self - Renovation and their preference for participation, shaped by outcome evaluations and behavioral-belief strength. The more positive the attitude, the stronger the intention to participate (Ho et al., 2011). Accordingly:

H1: Attitude positively affects residents' intention to participate in Self - Renovation.

Subjective norms refer to the expectations and pressures residents perceive from others when deciding whether to participate in Self - Renovation. Stronger subjective norms imply greater social influence (expectations and pressures) from significant others, which facilitates participation intention (Adibe et al., 2024; Arkorful & Lugu, 2023). Thus:

H2: Subjective norms positively affect residents' intention to participate in Self - Renovation.

Perceived behavioral control refers to residents' subjective judgment—based on self-assessed abilities and resources—regarding whether they can cope with various demands and difficulties in the Self - Renovation process. When residents believe they have sufficient conditions, capabilities, and room for action, and can handle potential difficulties, they are more likely to form strong intention and act. Therefore:

H3: Perceived behavioral control positively affects residents' intention to participate in Self - Renovation.

Renewal-information perception refers to residents' cognition of spatial design, policy texts, and implementation capacity produced by authoritative actors such as planners and policymakers (Lefebvre, 2014). It consists of policy perception, planning/design perception, and perceived community management capacity. Effective perceptions—e.g., clear policy documents that communicate transparent information, values, and goals; attractive and feasible planning/design schemes; and effective community-level dissemination and mobilisation—can help residents understand necessity and potential benefits, reduce worries about consequences, enhance trust and support, and thus foster more positive attitudes toward participation (Chavis & Wandersman, 1990; Li, 2018; Liu et al., 2017; Ma et al., 2000; Shen et al., 2024). Hence:

H4: Policy perception positively affects residents' attitude toward participating in Self - Renovation.

H5: Planning/design perception positively affects residents' attitude toward participating in Self - Renovation.

H6: Perceived community management capacity positively affects residents' attitude toward participating in Self - Renovation.

Subjective norms capture the social pressure an individual perceives regarding whether to adopt a given behaviour (Yu et al., 2024). When renewal information (policy and planning/design) is widely publicised and endorsed within the community, residents may perceive participation as a form of social responsibility, strengthening normative pressure to participate (Lin et al., 2022). Therefore:

H7: Policy perception positively affects subjective norms regarding participation in Self - Renovation.

H8: Planning/design perception positively affects subjective norms regarding participation in Self - Renovation.

H9: Perceived community management capacity positively affects subjective norms regarding participation in Self - Renovation.

Spatial conditions refer to how people use and interact with space in daily life (e.g., built environment, networks, and facilities) (Lefebvre, 2014). Dangerous and Old Residential Areas typically feature poor housing quality, ageing and inadequate infrastructure, and insufficient public space. Such conditions often stimulate residents' positive attitudes toward improving living environments, and poor spatial conditions (e.g., dilapidated housing or lack of public services) can be important drivers of collective action (Tang, 2024). Thus:

H10: Poor basic living conditions positively affect residents' attitude toward participating in Self - Renovation.

H11: Backward/inadequate infrastructure positively affects residents' attitude toward participating in Self - Renovation.

H12: Insufficient public activity space positively affects residents' attitude toward participating in Self - Renovation.

Community relations include community cohesion, sense of community belonging, and social support. Community cohesion reflects trust, solidarity, and collective identity among

neighbors (Buckner, 1988; Sampson et al., 1997). Sense of community belonging reflects emotional attachment and “shared home” identification (McMillan & Chavis, 1986). Social support refers to information, assistance, and resource support available from other community members (e.g., coordination, experience sharing, and burden sharing) (Cohen & Wills, 1985). When residents experience stronger cohesion, belonging, and accessible support, they are more likely to interpret Self - Renovation as a collective action to protect shared interests and improve shared living environments, leading to more positive evaluations and attitudes. Accordingly:

H13: Community cohesion positively affects residents’ attitude toward participating in Self - Renovation.

H14: Sense of community belonging positively affects residents’ attitude toward participating in Self - Renovation.

H15: Social support positively affects residents’ attitude toward participating in Self - Renovation.

These three factors may also strengthen subjective norms by shaping shared expectations and an action climate within the community: cohesion facilitates stable consensus and coordinated action (Sampson et al., 1997); belonging reinforces values of responsibility toward the community and supports normative consensus formation (McMillan & Chavis, 1986); and social support reinforces the legitimacy and necessity of participation through sustained interaction and reciprocity (Cohen & Wills, 1985). Together, these dynamics help internalise “participation in Self - Renovation” as a perceivable social norm, which—through neighbour evaluation and group identification—translates into subjective normative pressure (Cialdini et al., 1990). Therefore:

H16: Community cohesion positively affects subjective norms regarding participation in Self - Renovation.

H17: Sense of community belonging positively affects subjective norms regarding participation in Self - Renovation.

H18: Social support positively affects subjective norms regarding participation in Self - Renovation.

In addition, community cohesion, belonging, and social support may enhance perceived behavioral control. Cohesion provides a basis of trust and coordinated action, lowering perceived negotiation costs, organizational difficulty, and uncertainty, thereby strengthening

perceived controllability and operability of participation (Thomas et al., 2016). Belonging strengthens commitment and sustained engagement and—through psychological ownership and agency—enhances self-efficacy and perceived control in the participation process (Soscia et al., 2019). Social support reduces participation barriers and increases expected problem-solving capacity through information sharing, instrumental support, and emotional support, helping residents believe they can overcome practical obstacles (Casaló & Escario, 2018). Thus:

H19: Community cohesion positively affects perceived behavioral control regarding participation in Self - Renovation.

H20: Sense of community belonging positively affects perceived behavioral control regarding participation in Self - Renovation.

H21: Social support positively affects perceived behavioral control regarding participation in Self - Renovation.

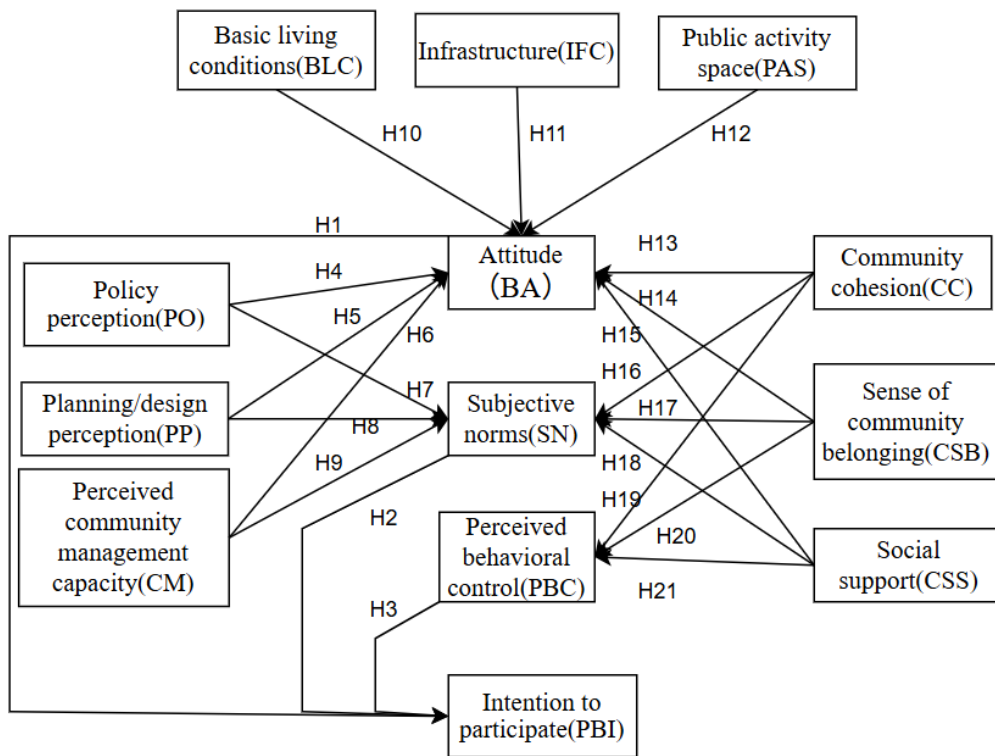


Figure 2.1: *Hypotheses Model of Factors Influencing Residents' Intention to Participate in Self - Renovation in Dangerous and Old Residential Areas*

3. Research Design

3.1 Variable Measurement

Except for demographic characteristics (gender, age, education level, and household income), all other items were measured using a 5-point Likert scale ranging from 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, to 5 = strongly agree (scores increase from 1 to 5). All measurement items were adapted from prior studies and revised to fit the context of Self - Renovation in Dangerous and Old Residential Areas.

The quantitative measurement of residents’ participation intention was adopted from Zhang and colleagues and Xu and colleagues (Zhang & Wang, 2022; Xu et al., 2020), as shown in Table 3.1.

Table 3.1 *Measurement Items for Residents’ Intention to Participate in Self - Renovation in Dangerous and Old Residential Areas*

Dependent variable	Code	Item
Participation intention	PBI1	I think I am willing to spend time participating in Self - Renovation projects.
	PBI2	I think I am willing to invest effort in participating in Self - Renovation projects.
	PBI3	I think I am willing to contribute financially to participate in Self - Renovation projects.

Items for attitude and subjective norms were drawn from Gao et al. and Cheng et al. (Gao et al., 2024; Cheng et al., 2022). Perceived behavioral control was measured using validated scales from Li et al. and Xing and He (Li et al., 2024; Xing & He, 2021). Measures for policy perception, planning/design perception, and community management perception were revised based on Yang et al. (2021). Basic living conditions, infrastructure, and public activity space were adapted from Delaisse et al. (2021); to avoid reverse scoring, these items were intentionally worded negatively (e.g., “dislike,” “dissatisfied”). Measures of community cohesion, sense of community belonging, and social support were adapted from Olinto (2015). Details are shown in Table 3.2.

Table 3.2 *Factors Influencing Residents’ Participation in Self - Renovation in Dangerous and Old Residential Areas*

Latent variable	Code	Item
Behavioral attitude	BA1	I am optimistic about Self - Renovation projects.
	BA2	I think Self - Renovation projects are necessary.
	BA3	I think Self - Renovation projects can bring many benefits.
	BA4	I support the implementation of Self - Renovation projects.
Subjective norms	SN1	My neighbors around me are willing to actively participate in Self - Renovation projects.
	SN2	Residents across the whole community participate very actively in Self - Renovation projects.
	SN3	To meet my neighbors' expectations, I think I should participate in Self - Renovation projects.
	SN4	To meet the expectations of community residents and the residents' committee, I think I should participate in Self - Renovation projects.
Perceived behavioral control	PBC1	I think I have sufficient time and energy to participate in Self - Renovation projects.
	PBC2	If I want to, I can participate in Self - Renovation projects easily.
	PBC3	I think my financial capacity can cover the costs of Self - Renovation.
	PBC4	I think I can cope with the impact of construction on my daily life and work arrangements.
Policy perception	PO1	I think government policies related to Self - Renovation in my district are clear and complete.
	PO2	I think these government policies help me clearly understand the prospects of Self - Renovation.
	PO3	I think these government policies make my rights and responsibilities clear.
Planning/design perception	PP1	I think the planning/design for Self - Renovation in my district is clear and complete.

Latent variable	Code	Item
	PP2	I think the planning/design helps me clearly understand the prospects of Self - Renovation.
	PP3	I think the planning/design makes my rights and responsibilities clear.
Community management perception	CM1	I think the community residents' committee can take proactive actions to promote Self - Renovation.
	CM2	I think the residents' committee can proactively mobilize residents to participate in Self - Renovation.
	CM3	I think the residents' committee can proactively publicize Self - Renovation projects.
Basic living conditions <i>(negative wording)</i>	BLC1	I am dissatisfied with building quality in the district before Self - Renovation.
	BLC2	I am worried about building quality in the district before Self - Renovation.
	BLC3	Building quality before Self - Renovation has caused difficulties in my life.
Public activity space <i>(negative wording)</i>	PAS1	I am dissatisfied with public activity space in the district before Self - Renovation.
	PAS2	I dislike the public activity space in the district before Self - Renovation.
	PAS3	The public activity space before Self - Renovation does not allow me to feel enjoyment.
Infrastructure <i>(negative wording)</i>	INFT1	I am dissatisfied with infrastructure in the district before Self - Renovation.
	INFT2	I think infrastructure in the district before Self - Renovation is insufficient.
	INFT3	I think infrastructure before Self - Renovation does not facilitate my daily life.
Community cohesion	CC1	I think most people in my district are willing to help each

Latent variable	Code	Item
		other.
	CC2	I think residents in my district are very united.
	CC3	Overall, I think relationships among residents in my district are very harmonious.
Sense of community belonging	CSB1	I feel a sense of belonging to my district.
	CSB2	I think my district and I are inseparable.
	CSB3	I like my community.
Social support	CSS1	I think my neighbors are warm and friendly to me.
	CSS2	I often receive help from my neighbors.
	CSS3	I often receive suggestions/advice from my neighbors.

3.2 Data Collection

In this study, questionnaires were distributed through door-to-door and on-site surveys in 12 Dangerous and Old Residential Areas in Haikou that had been designated for Self - Renovation. A total of 360 questionnaires were distributed and 360 were returned. Because non-homeowners and respondents under the age of 18 are not eligible to participate in Self - Renovation, these samples were excluded. As a result, 343 valid questionnaires were retained. The questionnaire return rate was 100%, and the validity rate was 95.3%, meeting the basic requirements for questionnaire-based research.

4. Empirical Analysis

4.1 Validity and Reliability Test

Measurement error is inevitable in questionnaire surveys; therefore, reliability is commonly used to assess the scale's stability and internal consistency. Reliability reflects the extent to which repeated measurements of the same object using the same method yield stable and consistent results, and it can also be used to examine whether the internal logic of the data is sufficiently sound and dependable. Reliability is typically divided into internal reliability (the correlations and consistency among items designed for respondents) and external reliability (consistency of results across repeated measurement occasions). In empirical research, Cronbach's alpha is widely used to quantify reliability, ranging from 0 to 1. Values above 0.6 are generally acceptable, 0.7–0.8 indicate high reliability, and values above 0.8 indicate very high

reliability (Fornell & Larcker, 1981). In this study, $\alpha > 0.7$ was adopted as the criterion for acceptable reliability. Results are shown in Table 4.1.

Table 4.1 *Cronbach's Alpha Reliability Test Results*

Variable	Code	Cronbach's Alpha if item deleted	Cronbach's Alpha	Overall scale Cronbach's Alpha
BA	BA1	0.852	0.856	0.862
	BA2	0.858		
	BA3	0.849		
	BA4	0.859		
SN	SN1	0.856	0.862	
	SN2	0.867		
	SN3	0.859		
	SN4	0.871		
PBC	PBC1	0.862	0.859	
	PBC2	0.857		
	PBC3	0.848		
	PBC4	0.855		
PO	PO1	0.824	0.83	
	PO2	0.835		
	PO3	0.842		
PP	PP1	0.836	0.838	
	PP2	0.848		
	PP3	0.825		
CM	CM1	0.836	0.828	
	CM2	0.825		
	CM3	0.838		
BLC	BLC1	0.862	0.856	
	BLC2	0.854		
	BLC3	0.863		
PAS	PAS1	0.839	0.82	
	PAS2	0.821		
	PAS3	0.818		
INFT	INFT1	0.852	0.855	
	INFT2	0.865		

	INFT3	0.84	
CC	CC1	0.783	0.795
	CC2	0.801	
	CC3	0.792	
CSB	CSB1	0.874	0.881
	CSB2	0.893	
	CSB3	0.875	
CSS	CSS1	0.773	0.786
	CSS2	0.784	
	CSS3	0.77	
PBI	PBI1	0.856	0.85
	PBI2	0.862	
	PBI3	0.841	

Convergent validity describes how strongly observed variables under the same construct correlate. It is commonly assessed using average variance extracted (AVE) and composite reliability (CR). When factor loadings exceed 0.6, AVE exceeds 0.5, and CR exceeds 0.8, convergent validity is considered satisfactory (Jiang & Li, 2024). As shown in Table 4.5, all constructs meet these criteria, indicating good convergent validity.

Table 4.2 Convergent Validity Results

Construct	Item	Unstd. Factor Loading	Std. Factor Loading	S.E.	C.R.	P-value	CR	AVE
BA	BA1	1	0.785	-	-	-	0.856	0.599
	BA2	0.992	0.787	0.06	16.528	***		
	BA3	0.947	0.76	0.06	15.779	***		
	BA4	0.909	0.763	0.057	15.873	***		
SN	SN1	1	0.813	-	-	-	0.862	0.613
	SN2	0.966	0.754	0.059	16.392	***		
	SN3	0.929	0.772	0.055	16.94	***		
	SN4	0.983	0.791	0.056	17.562	***		
PBC	PBC1	1	0.732	-	-	-	0.859	0.602
	PBC2	1	0.804	0.066	15.263	***		
	PBC3	1.002	0.783	0.068	14.822	***		
	PBC4	1.005	0.783	0.068	14.823	***		

PO	PO1	1	0.799	-	-	-	0.83	0.618
	PO2	1	0.77	0.061	16.293	***		
	PO3	1.028	0.789	0.061	16.83	***		
PP	PP1	1	0.798	-	-	-	0.838	0.633
	PP2	1.064	0.81	0.062	17.113	***		
	PP3	0.988	0.778	0.061	16.195	***		
CM	CM1	1	0.765	-	-	-	0.828	0.615
	CM2	1.065	0.819	0.063	16.902	***		
	CM3	0.981	0.768	0.063	15.608	***		
BLC	BLC1	1	0.822	-	-	-	0.856	0.664
	BLC2	1.03	0.822	0.055	18.651	***		
	BLC3	0.955	0.8	0.053	17.903	***		
PAS	PAS1	1	0.775	-	-	-	0.82	0.604
	PAS2	1.056	0.763	0.068	15.633	***		
	PAS3	1.07	0.794	0.065	16.42	***		
INFT	INFT1	1	0.81	-	-	-	0.855	0.664
	INFT2	1.068	0.795	0.063	17.028	***		
	INFT3	1.11	0.84	0.06	18.405	***		
CC	CC1	1	0.773	-	-	-	0.795	0.57
	CC2	1.028	0.759	0.066	15.546	***		
	CC3	1.087	0.733	0.073	14.892	***		
CSB	CSB1	1	0.817	-	-	-	0.881	0.716
	CSB2	1.016	0.847	0.056	18.21	***		
	CSB3	1.028	0.872	0.054	18.949	***		
CSS	CSS1	1	0.749	-	-	-	0.786	0.552
	CSS2	1.027	0.749	0.069	14.95	***		
	CSS3	1.066	0.731	0.073	14.546	***		
PBI	PBI1	1	0.844	-	-	-	0.85	0.657
	PBI2	0.937	0.785	0.053	17.706	***		
	PBI3	0.911	0.802	0.05	18.307	***		

Note. *** $p < .001$.

Discriminant validity reflects the extent to which constructs are empirically distinct. A common criterion is that the square root of a construct's AVE should be greater than its correlations with other constructs (You et al., 2023). As shown in Table 4.6, the square roots of

AVE (diagonal) are greater than the maximum absolute inter-construct correlations, indicating good discriminant validity.

Table 4.3 Discriminant Validity Results

	BA	SN	PBC	PBI	PO	PP	CM	BLC	PAS	INFT	CC	CSB	CSS
BA	0.774												
SN	0.782	0.783											
PBC	0.772	0.772	0.776										
PBI	0.655	0.684	0.660	0.811									
PO	0.693	0.751	0.706	0.651	0.786								
PP	0.656	0.677	0.655	0.659	0.680	0.796							
CM	0.671	0.683	0.678	0.655	0.731	0.692	0.784						
BLC	0.679	0.676	0.652	0.727	0.637	0.623	0.682	0.815					
PAS	0.669	0.648	0.648	0.681	0.640	0.595	0.652	0.715	0.777				
INFT	0.646	0.674	0.633	0.663	0.664	0.607	0.639	0.712	0.681	0.815			
CC	0.688	0.686	0.685	0.644	0.650	0.596	0.653	0.647	0.641	0.635	0.755		
CSB	0.645	0.617	0.661	0.576	0.580	0.561	0.607	0.594	0.595	0.580	0.750	0.846	
CSS	0.632	0.644	0.595	0.672	0.629	0.596	0.629	0.697	0.661	0.697	0.638	0.544	0.743

Note. Diagonal values are $\sqrt{\text{AVE}}$ for each construct; the lower triangle presents the Pearson correlation matrix.

4.2 Goodness-of-Fit Test for Measurement Model and Structure Relation Model

This study employed a structural equation model (SEM) to test the research hypotheses proposed above. Prior to conducting path analysis, a model fit assessment was performed to evaluate the degree of agreement between the theoretical model and the observed measurement data. In general, better fit indicates stronger empirical support for the proposed model. Moreover, the more fit indices that meet their recommended thresholds, the stronger the correspondence between the sample data and the hypothesised model. Commonly used goodness-of-fit indices include the chi-square/degree of freedom ratio (CMIN/DF), root mean square error of approximation (RMSEA), standardized root mean square residual (SRMR), normed fit index (NFI), Tucker - Lewis index (TLI), comparative fit index (CFI), and incremental fit index (IFI).

Table 4.4 Overall Model Fit Indices

Index	Acceptable Threshold	Result
χ^2/df	$1 < \chi^2/df < 3$ (good), < 5 (acceptable)	1.578
RMSEA	< 0.08 (acceptable)	0.041
SRMR	< 0.05 (good)	0.031
NFI	> 0.90 (good); > 0.80 (acceptable)	0.902
TLI	> 0.90 (good); > 0.80 (acceptable)	0.955
CFI	> 0.90 (good); > 0.80 (acceptable)	0.961
IFI	> 0.90 (good); > 0.80 (acceptable)	0.962

As shown in Table 4.4, the CMIN/DF is 1.578 (< 3), RMSEA is 0.041 (< 0.08), and SRMR is 0.031 (< 0.05). In addition, NFI = 0.902, TLI = 0.955, CFI = 0.961, and IFI = 0.962, all exceeding 0.90. These results indicate a good overall model fit, satisfying the requirements for SEM analysis.

4.3 Hypothesis Test

This study used Amos 28.0 to test the significance of the path coefficients among latent variables, thereby clarifying the influence pathways between variables and verifying whether the proposed hypotheses are supported. Based on the estimated path coefficients, the direct effects among latent constructs in the participation mechanism model can be obtained. The corresponding standardized effects are reported in Table 4.5.

Table 4.5 SEM Path Coefficients

Path	Standardized Estimate	Unstandardized Estimate	S.E.	z (C.R.)	p
BA→PBI	0.262	0.257	0.051	5.016	***
SN→PBI	0.378	0.384	0.054	7.145	***
PBC→PBI	0.223	0.219	0.051	4.308	***
PO→BA	0.412	0.414	0.055	7.485	***
PP→BA	0.233	0.237	0.056	4.212	***
CM→BA	0.217	0.219	0.061	3.599	***
PO→SN	0.389	0.377	0.051	7.423	***
PP→SN	0.26	0.256	0.052	4.939	***
CM→SN	0.238	0.233	0.056	4.162	***
BLC→BA	0.28	0.281	0.063	4.489	***
PAS→BA	0.319	0.333	0.061	5.494	***
INFT→BA	0.249	0.258	0.062	4.181	***

CC→BA	0.298	0.32	0.069	4.667	***
CSB→BA	0.186	0.172	0.051	3.371	**
CSS→BA	0.399	0.45	0.056	8.096	***
CC→SN	0.386	0.4	0.066	6.068	***
CSB→SN	0.109	0.098	0.049	1.986	**
CSS→SN	0.384	0.418	0.053	7.821	***
CC→BA	0.298	0.32	0.069	4.667	***
CSB→PBC	0.261	0.243	0.053	4.573	***
CSS→PBC	0.337	0.38	0.058	6.595	***

The SEM results show that behavioral attitude (BA), subjective norms (SN), and perceived behavioral control (PBC) have standardized path coefficients of 0.262, 0.378, and 0.223 on participation behavioral intention (PBI), respectively, and all are statistically significant ($p < 0.05$). This indicates that BA, SN, and PBC exert significant positive effects on residents' intention to participate in Self - Renovation in Dangerous and Old Residential Areas; therefore, H1–H3 are supported.

Further, policy perception (PO), planning and design perception (PP), and community management perception (CM) positively affect behavioral attitude (BA), with standardized coefficients of 0.412, 0.233, and 0.217, respectively (all $p < 0.05$). These three perceptions also positively affect subjective norms (SN), with standardized coefficients of 0.389, 0.260, and 0.238, respectively (all $p < 0.05$). Accordingly, H4–H9 are supported.

In addition, the standardized effects of basic living conditions (BLC), public activity space (PAS), and infrastructure (INFT) on behavioral attitude (BA) are 0.280, 0.319, and 0.249, respectively, all significant ($p < 0.05$). Combined with the item meanings, poorer BLC, insufficient PAS, and underdeveloped INFT are associated with a stronger behavioral attitude toward participating in Self - Renovation in Dangerous and Old Residential Areas. Thus, H10–H12 are supported.

Similarly, community cohesion (CC), community sense of belonging (CSB), and community social support (CSS) show significant positive effects on behavioral attitude (BA) (standardized coefficients: 0.298, 0.186, and 0.399, respectively; $p < 0.05$). They also significantly and positively affect subjective norms (SN) (standardized coefficients: 0.386, 0.109, and 0.384, respectively; $p < 0.05$). In addition, CSB and CSS significantly and positively affect

perceived behavioral control (PBC) (standardized coefficients: 0.261 and 0.337, respectively; $p < 0.05$). Therefore, H13–H21 are supported.

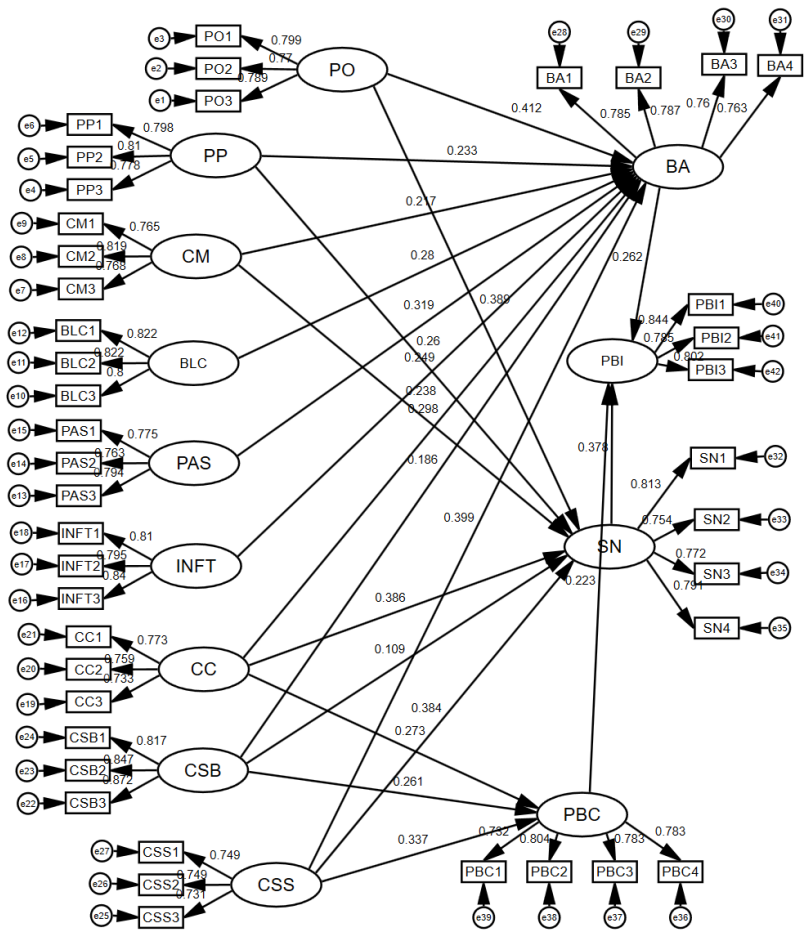


Figure 4.1: Path Analysis Diagram of Factors Influencing Residents’ Intention to Participate in Self - Renovation in Dangerous and Old Residential Areas

5. Conclusions, Implications and Limitations

5.1 Conclusions

Based on the survey results on residents’ intention to participate in Self - Renovation in Dangerous and Old Residential Areas in Haikou, this study quantitatively examined the effects of policy perception, planning and design perception, community management perception, basic living conditions, public activity space, infrastructure, community cohesion, community sense of belonging, social support, behavioral attitude, subjective norms, and perceived behavioral control on participation intention. The analysis results are discussed as follows.

The model testing results indicate that, in the Self - Renovation of Dangerous and Old Residential Areas, residents’ behavioral attitude, subjective norms, and perceived behavioral

control all have significant positive effects on participation intention. Among them, subjective norms exert the strongest effect, followed by behavioral attitude, while perceived behavioral control is relatively weaker. Overall, the key influence pathways emphasized by the Theory of Planned Behavior are empirically supported in this study.

Policy perception, planning and design perception, and community management perception have significant positive effects on residents' behavioral attitude and subjective norms toward participating in Self - Renovation. This may be because clear perceptions of policy and planning information, together with effective community management, can enhance residents' confidence in the outcomes of Self - Renovation, thereby fostering a positive attitude toward participating in Self - Renovation projects. In addition, when policies, planning information, and community management are well established, residents may also believe that other residents have already reached a consensus on participation; refusing to participate could lead to social exclusion from others, which in turn strengthens residents' subjective norms to participate in Self - Renovation.

Poor basic living conditions, insufficient public activity space, and outdated infrastructure have significant positive effects on residents' behavioral attitude toward participating in Self - Renovation. Perceptions of the living environment reflect residents' real needs for Self - Renovation. Facilities in Dangerous and Old Residential Areas are aging and the environment is poor; residents are dissatisfied with their living conditions and may even worry about residential safety. Under such circumstances, residents are more likely to develop a proactive attitude toward participating in Self - Renovation.

Community cohesion, community sense of belonging, and social support have significant positive effects on residents' behavioral attitude, subjective norms, and perceived behavioral control regarding participation in Self - Renovation. Specifically, stronger community cohesion implies more frequent neighbor interactions and a more stable foundation of trust, making it easier for residents to develop a shared understanding of reconstruction goals and plans through communication, reducing concerns about risks and uncertainties, and thereby increasing expected benefits and value judgments of participation—ultimately strengthening a positive behavioral attitude. High cohesion also makes collective action more salient within the community: when most neighbors express support or have already taken action, individuals are more likely to perceive group pressure and moral obligations that they “should participate,” thus

reinforcing subjective norms. Moreover, a stronger sense of belonging enhances residents' "ownership" of community issues, making them more inclined to view Self - Renovation as a necessary action to safeguard the shared living environment and the community's future development. In this context, participation is no longer merely a cost-benefit trade-off but also involves emotional investment and a sense of responsibility, which helps form a more stable participation attitude. Social support functions through informational, emotional, and practical-resource channels: on the one hand, acquaintance networks can accelerate the diffusion of policy and procedural information and reduce information asymmetry; on the other hand, experience sharing and mutual assistance among neighbors can alleviate individual anxiety in coordination, voting, fundraising, and interfacing with construction processes. More importantly, when residents expect support—"others will do it together, and help will be available when problems arise"—their perceived feasibility of participation, ability to allocate time and effort, and confidence in pushing reconstruction implementation increase markedly, thereby significantly enhancing perceived behavioral control and further consolidating participation attitudes and the likelihood of sustained participation.

5.2 Implications

First, institutionalize communication for "transparent information supply + consensus building." Priority should be given to improving residents' perceptions of policies and planning/design so as to strengthen behavioral attitude and subjective norms at the source. Because limited understanding of reconstruction policies, design schemes, and community management can weaken participation judgments, subdistricts and communities should act as accountable organizers and establish a formal system for information disclosure and explanation. Key items—necessity of reconstruction, safety risks, funding composition, cost-sharing rules, construction schedules, boundaries of rights and responsibilities, and post-project operation and maintenance—should be disclosed in a standardized manner. To lower comprehension barriers and reduce uncertainty and misinterpretation, information should be presented through visualized drawings, pilot sections or model buildings, and itemized cost lists. Meanwhile, regular consultation platforms (resident councils, building liaisons, and online disclosure/Q&A columns) should be set up to shift from "a few decide while most wait" to a process of "repeated communication-stage-based voting-dynamic revision." Procedural fairness can increase trust and normative pressure, fostering a shared expectation that "everyone will participate, so I

should participate as well.” This approach aligns with the governance orientation of neighborhood renewal that emphasizes respecting residents’ preferences, soliciting opinions, and enabling participation throughout all stages.

Second, build a two-way incentive and rule system—positive incentives as the core, negative constraints as support—targeting subjective norms while addressing funding sensitivity. Since subjective norms exert the strongest effect on participation intention, policy tools should be designed around collective action and social evaluation. On the positive side, public recognition, point systems redeemable for community services (e.g., priority access to parking or activity spaces, service vouchers), and “model households” that demonstrate participation can create visible benefits and social approval for active participants. On the negative side, enforceable correction mechanisms—grounded in community conventions and relevant regulations—should deter behaviors that undermine mandatory safety-related reconstruction, deliberately spread misinformation, or damage public facilities, thereby preventing free-riding from eroding collective action. Given that fundraising difficulties and divergent preferences are common pain points in renewal projects, financing should be separated into basic necessities (safety, pipelines, fire protection, etc.) and upgrade items (landscaping, additional facilities, etc.), each matched with appropriate cost-sharing and subsidy arrangements. Layered decision-making can reduce one-off fundraising resistance and mitigate long-term conflict driven by income disparities.

Third, systematically enhance perceived behavioral control by lowering participation costs and turning social ties into sustainable organizational capacity. Many residents are constrained by time, energy, or financial capacity—willing to participate but unable to do so. A practical “participation support package” is needed: simplified procedures (one-time document checklists, proxy/assistance services), reduced time costs (evening/weekend meetings, online voting and feedback collection), professional support (transparent selection of third-party evaluation, design consulting, and construction supervision), and mechanisms for dispute mediation and risk sharing. These measures can shift participation from “high-cost and uncertain” to “predictable and feasible.” Because Dangerous and Old Residential Areas often face weak property services and post-project management challenges, reconstruction and governance should be advanced together: cultivate homeowners’ committees (or interim representative mechanisms), introduce professional property management or area-based governance, and clarify

funding sources and responsibility boundaries for operation and maintenance after upgrades. This creates a positive feedback loop—“better reconstruction, better management, stronger willingness to participate again.” At the spatial level, small-scale, incremental “micro-renewal” with low disturbance and targeted functional implementation can deliver quickly perceived improvements in public space and facilities, strengthening residents’ sense of gain, consolidating positive attitudes, and enabling deliberation on more complex issues later

5.3 Limitations

Several limitations should be acknowledged. First, the study is based on cross-sectional self-reported questionnaire data, which constrains causal inference. Although the SEM results are consistent with the proposed TPB-based mechanism, reciprocal relationships (e.g., prior participation experiences shaping perceptions, norms, and control) cannot be ruled out. Longitudinal or quasi-experimental designs would better identify causal pathways and dynamic feedback during different reconstruction stages.

Second, the sample is drawn from 12 designated Dangerous and Old Residential Areas in Haikou and includes only eligible homeowners aged 18 and above. While this improves policy relevance for owner-led Self - Renovation, it limits generalizability to other cities with different institutional arrangements, housing markets, or community structures, and excludes important stakeholder groups such as tenants, migrant residents, and non-registered occupants who may still influence community deliberation and collective action.

Third, the model focuses on intention rather than actual participation behavior. In practice, intention - behavior gaps may emerge due to financing shocks, construction disruptions, or policy changes. Incorporating observed behaviors (e.g., attendance, voting, contributions) and testing mediation/moderation (e.g., income constraints moderating perceived control) would enhance explanatory power.

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