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Forging Enhanced Collaboration: Investigating Transaction Costs in Pre-Design Phase of Market-Oriented Community Renovation in China

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Abstract

In the context of urban regeneration, community renovation has been a vital approach for improving local living conditions and global sustainable development. Due to the financial burden and uneven regional development, China's community renovation has gradually shifted from the government-led model to the market-oriented model. However, these projects are subject to various intra- and inter-stakeholder barriers, particularly hidden transaction costs. This study investigates the transaction costs experienced by key stakeholders, including residents, developers, governments, and architects, with a specific focus on the pre-design phase of market-oriented community renovation projects in China. Data on stakeholders' experienced transaction costs and their origins were collected through semi-structured interviews and questionnaire surveys and were investigated using content analysis and quantitative analysis. Results show that developers bear the most categories of transaction costs. The most significant transaction costs persist in the interactions between developers and governments, including estimating benefits and costs and receiving project approval. Furthermore, negotiating costs are the primary obstructions that hinder stakeholder collaboration. By tracing the origins of these transaction costs, the study proposes measures to optimize the renovation process by reducing transaction costs.

Keywords: market-oriented community renovation; transaction cost; stakeholder collaboration; pre-design phase; urban regeneration

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1. Introduction

Housing retrofit is one of the most focused topics in the urban regeneration context worldwide [1–3]. By implementing environment-improved and energy-saving retrofit measures, housing retrofit can effectively contribute to achieving Sustainable Development Goals (SDGs), including good health and well-being (SDG 3), sustainable cities and communities (SDG 11), as well as affordable and clean energy (SDG 7) [4]. Housing retrofit is expected to deliver economic benefits, environmental benefits, social welfare, and better interior environment [5–7]. China faces a significant demand for housing retrofits. There are more than 170,000 old communities constructed before 2000 in China, accommodating more than 100 million residents, which requires renovation urgently [8]. Given that renovation typically targets entire gated communities [9,10], the term "community renovation" is used to describe housing retrofit in China [11,12]. Community renovation is more complicated

than housing retrofit, as it also encompasses the renovation of surrounding areas and involves a higher number of residents with complex property components.

Under the effect of neoliberal trends [13–15], market-oriented models have been actively adopted in urban regeneration and housing retrofit projects worldwide [16–18], seeking improved stakeholder participation and social innovation [19]. Private sector has become key stakeholders through mechanisms like energy performance contracts (EPCs) and one-stop shop integrated renovation services [20,21] to attract investment and improve long-term efficiency [17,18]. In contrast, community renovation in China was traditionally entirely funded by the government due to institutional difference [22]. Due to a general shortage and the potential inequity in financial means of local governments, the market-oriented community renovation model has gradually become more important in community renovation in China since 2020 [23]. In this emerging model, developers become the main investors of projects [24]. To realize return on investment, developers offer property management services and realize cost recovery through residents' payment. The market-oriented renovation model is widely regarded as an opportunity for expanding domestic demand and for the entire construction industry to transform from mass construction to targeted renovation in the trend of urban regeneration [11].

The transition of the renovation model leads to variations in stakeholder participation, and new challenges are emerging. Even with the support of various policy instruments, developers still struggle to take part in the community renovation projects due to high up-front investment costs and uncertainties in expected returns [25]. Furthermore, developers are faced with difficult and lengthy negotiations with residents to persuade them to participate and reach an agreement. Moreover, the government is reducing its excessive involvement in implementation by focusing on strategic planning rather than exercising overarching control [26].

The implementation of community renovation projects is hindered by various barriers, including economic barriers (e.g., the lack of financial sources [23] and long-term payback period [27]), behavior barriers (e.g., the reluctance to take part in the projects [28]), stakeholders lacking collaboration [21], institutional barriers (e.g., the lack of policy support [29] and over-interference by government [26]), etc. These barriers, with little direct influence on financial outcomes, can be easily neglected, but they can strongly affect the renovation results and even lead to an abortion of some projects due to the resistance of residents before construction [22]. Among all kinds of barriers, hidden costs, key elements in renovation barriers from business, are unexpectedly high [30]. They should be revealed to narrow down the barriers during the process [31].

Transaction costs refer to the hidden costs associated with conducting economic transactions [32]. In recent years, transaction cost perspective has been considered as an effective way to identify the barriers and hidden costs [30], particularly between private sectors and households in international literature where key transaction behaviors occur [33–35]. Transaction cost theory has been used in analyzing the key institutional barriers and risks of government-led urban regeneration [36] and energy retrofit [31] in China. In these studies, insights gained from the transaction cost perspective have informed strategies to promote community renovation projects.

However, these researchers analyzing transaction costs in community renovation have primarily focused on government-led renovation projects. With the change of business model from government-led to newly appeared market-oriented, it is necessary to unveil the hidden costs to optimize the market-oriented community renovation process and thus strengthen stakeholder synergy.

This study focuses on the pre-design phase of market-oriented community renovation, due to the complexity of stakeholder cooperation [2], effectiveness over renovation design [37,38], and limitations of current research in this phase [11,36].

Furthermore, the governments, consulting parties represented by architects, in situ residents, and developers [39–42] are considered as key stakeholders involved in the pre-design phase in the community renovation projects. Identifying the various transaction costs faced by each stakeholder will reveal the full image of the inside motivation mechanism in the renovation model.

The study aims to answer the following main research question: how to improve the pre-design phase process in market-oriented community renovation in China from the perspective of transaction cost. It can be divided into three sub-questions: (1) What are the transaction costs in the pre-design phase of market-oriented community renovation? (2) What are the most significant transaction costs for stakeholders? (3) What measures can be taken to reduce transaction costs in order to optimize the renovation process?

This study offers insights into enhancing community renovation in the context of a transition from government-led to market-oriented models in China. By applying transaction cost theory, it identifies key barriers to stakeholder collaboration and proposes optimizing strategies. The findings are also applicable to international contexts with similar backgrounds, providing perspectives on the role of private actors across different governance systems. Besides, this study establishes a methodological approach for identifying, quantifying, and tracing the origins of transaction costs. This framework supports decision-making and process improvements in renovation projects and can be applied to broader construction and urban development contexts.

This study aims to analyze transaction costs faced by stakeholders in the pre-design phase of market-oriented community renovation (see Figure 1). Firstly, through literature review, the transaction cost list in the pre-design phase of renovation was determined. Secondly, by means of semi-structured interviews, the stakeholders were required to analyze the transaction costs faced by them and the reasons that generate the transaction costs. Thirdly, questionnaire surveys were proposed to qualify the impact of transaction costs according to the respondent feedback. Fourthly, through the data analysis, the most significant transaction costs and the stakeholders facing them in the renovation were clarified so as to propose targeted optimization measures for the pre-design phase of market-oriented community renovation through reducing transaction costs by seeking back to their origins.

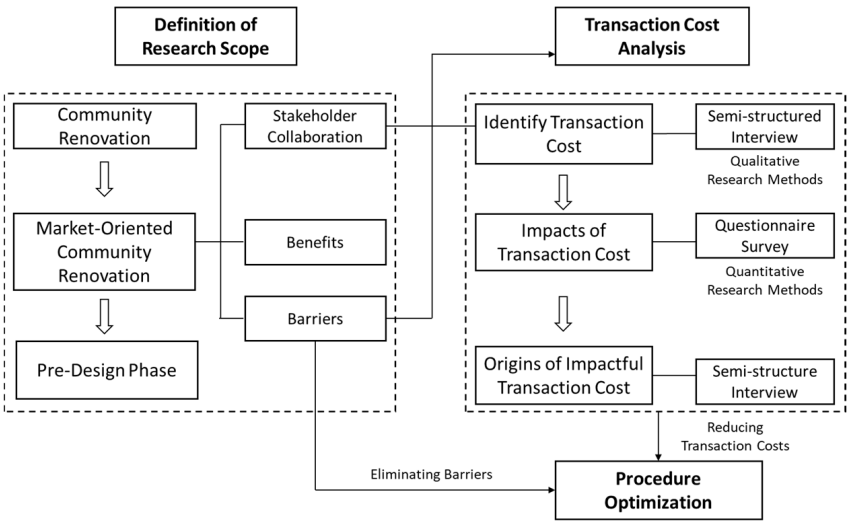

Figure 1. Research structure (Source: Author).

2. Literature Review

2.1. Market-Oriented Community Renovation in China

The private sector has become a vital driver of urban regeneration and housing retrofit worldwide. Over years of practice, various business models have emerged to reduce negotiating costs and enhance efficiency, including one-stop shop services [43], energy service agreements (ESAs) [44], and energy performance contracts (EPCs) [38]. These models have not only encouraged proactive participation from both residents and developers, but also diversified the financial sources supporting housing retrofit. Importantly, such business models are applied not only to single-family houses, but also to collective housing forms such as cooperatives [38], social housing [18], and multifamily dwellings [34], where internal negotiation among residents and coordinated communication between developers and multiple households are involved.

In contrast to the well-established private sector participation in housing retrofit internationally, China is undergoing a transition from a government-led to a market-oriented renovation model. The country is facing an urgent need to renovate numerous communities struggling with poor living environment, improper maintenance, and management issues [11]. The government took full charge of investment in community renovation before 2020 [22,45]. While the government-led model has rapidly improved the living quality of residents in many communities, it suffered from insufficient financial support and a lack of private funding sources, leading to potential inequities due to uneven regional development [24]. In recent years, China's urbanization has shifted from the incremental expansion to the stock renewal, in which community renovation plays a leading role [3,46]. Since the first published community renovation policy [8], recent policies have been highlighting private sector involvement, including developer engagements [47], resident co-financing, and long-term property management [48].

In this context, the market-oriented community renovation model gains momentum, as developers contribute private capital, receive approval and financial support from government, and engage architects to address resident needs through design. Both state-owned and private developers, such as Chinavisionary—the pioneer of this model with the renowned Jinsong Community project [46]—enter renovations through competitive investment and operations [49].

Developers are responsible for estimating potential costs and benefits, recovering investment, and earning revenue from residents by offering property services and repurposing idle spaces [46,48]. The government provides low-interest loans as financial support [42], monitors private department, and makes decisions collaboratively to approve renovation projects and encourage resident engagement. Residents are expected to reach internal consensus and benefit from the potential price premium enabled through the renovation [50], improved living environment, organized management, and grassroots operation. These benefits enhance their willingness to articulate renovation needs and contribute financially to developers' services. Architects, hired by the developer, serve as intermediaries, facilitating communication and negotiating design details between stakeholders. This model is of great significance in stimulating internal economic circulation, promoting social equity, reducing government financial pressure, enhancing residents' participation, and strengthening long-term operation [8]. Thus, the market-oriented community renovation model, through stakeholder collaboration, offers a more sustainable model than traditional government-led approaches (see Figure 2).

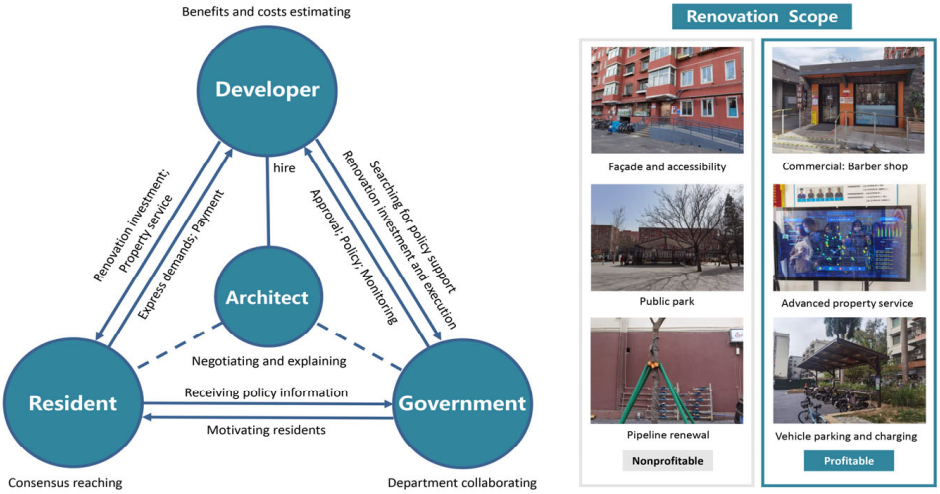

Figure 2. Stakeholder cooperation and renovation content in market-oriented community renovation model (Source: Author).

As illustrated in Figure 2, the market-oriented community renovation mainly focuses on the improvement of the public environment of the community. Specifically, the renovation scope can be grouped into two aspects according to different government policies [3,51–53]. Firstly, the non-profitable renovation scope aims to achieve rapid improvement of space quality through pipeline updates, greenery, and surrounding environment renovations. Secondly, the profit-oriented improvements for developers include integrating community services like canteens and retail stores, adding elevators, and developing daycare centers for children and the elderly. Such integrated renovation approaches help mitigate the potentially disruptive effects of isolated retrofit actions and contribute to carbon emission reduction [44]. The government also invests in infrastructure renovations. For instance, in a typical community renovation project located in the center of Huadu District, Guangzhou, covering 35,800 square meters with 667 households, the government allocated 47.6237 million RMB primarily for energy renovations in public corridors and internal roads. The developer invested 10.6355 million RMB in community canteens and public garden improvements, etc. [54]. While developers' investment may not always dominate total project costs, it significantly supports the success of community renovations.

The community renovation process can be divided into four stages: pre-design, design, construction, and operation [34,55]. Based on the current research, the pre-design phase is the procedure of evaluating current material dimensions and social values [2], which generates significant transaction costs for stakeholders to reach a consensus [37]. Moreover, explorations of transaction costs in the early stage (decision-making) are quite limited [3,11,36]. Therefore, this research narrows its focus to the pre-design phase to uncover the deeply hidden transaction costs in market-oriented community renovation.

The pre-design phase spans from project initiation to the completion of contract signing and consists of three stages: site selection, investigation and preliminary design, and consultation and contract signing, as is shown in Figure 3. In the "site selection" stage, the government selects target communities, while developers assess social, spatial, and economic conditions to estimate benefits and costs and submit renovation plans for approval [56]. During the "investigation and initial design" stage, architects hired by developers gather residents' demands, develop preliminary designs, and make adjustments based on feedback [41]. In the "consultation and contract signing" stage, developers hold a final consultation with residents to obtain their agreement. Subsequently, the contract signing is conducted door to door under the supervision of the government. The

implementation of renovation projects requires the approval of more than two-thirds of homeowners [31].

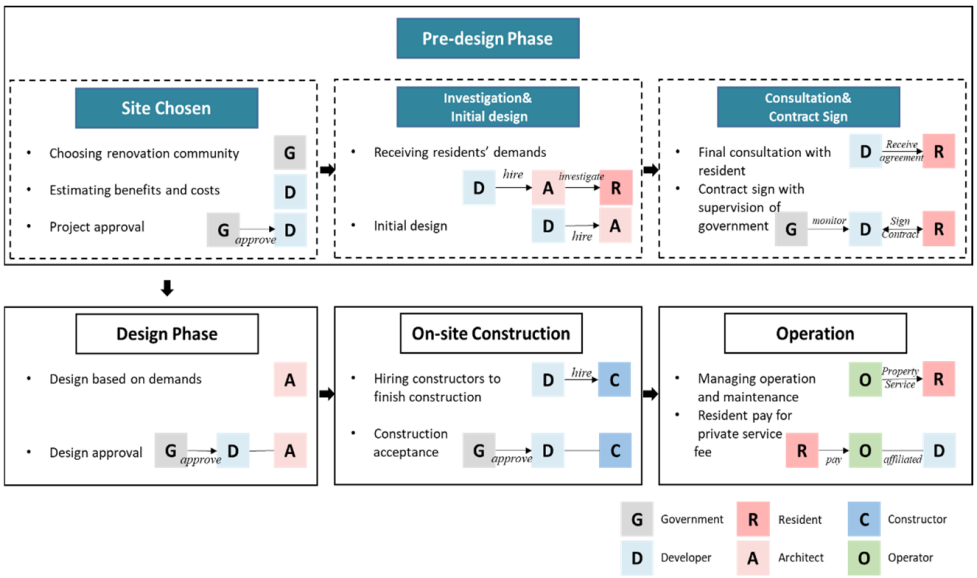

Figure 3. Stakeholder participation in market-oriented community renovation process (Source: Author).

The Chinese market-oriented renovation model aligns with international approaches in that both involve economic transactions between developers and residents and share similar implementation processes wherein residents make renovation decisions and developers provide corresponding services [34,39]. However, notable differences exist on both the resident and developer sides. First, Chinese gated communities, composed of multifamily apartments, typically involve a larger number of residents, making internal consensus-building considerably more complex [57]. Residents often exhibit low participation enthusiasm due to a longstanding reliance on government and their historical ties to work-unit (danwei) [58]. Second, under a strong-state institutional context, the market-oriented model is still in its infancy, with underdeveloped business models and lack of legal [56].

Market-oriented community renovation brings significant economic, environmental, and social benefits to stakeholders [45]. For developers, financial gain is a key motivator [45], enabling them to create competitive new business models. For governments, community renovation can improve public infrastructure and environmental facilities [28] and achieve historical preservation and cultural promotion [59]. The government's financial pressure can be reduced greatly; job opportunities related to retrofitting and operation will also increase [7]. Residents enjoy enhanced community services and living environments [7], which also encourage public participation in project negotiations. Additionally, homeowners are motivated to engage in renovation due to potential increases in property value and rent [28]. For architects, financial incentives drive them to participate in retrofit projects. Additionally, they are driven by the necessity of model transformation in the context of urban regeneration [60].

Despite the motivations driving stakeholders to participate in market-oriented community renovation, they are also suffering from various barriers, especially transaction costs, that hinder the successful implementation of community renovation.

2.2. Transaction Cost in Community Renovation

2.2.1. Transaction Cost Generating Factors

Transaction costs refer to the costs incurred during a transaction to reach an agreement [32] can also be interpreted as extra efforts to overcome non-economic barriers [61]. Transaction cost theory helps to examine business decisions regarding the optimal governance structure that minimizes transaction costs under a set of conditions [32,62]. Over time, transaction cost economics has gradually formed two branches, the measurement branch and the governance branch [63]. Of these, the governance branch is widely used in sociology-related disciplines to study organizational governance relationships in the transaction process.

According to Williamson's theory, transaction costs are mainly caused by three factors: transaction characteristics, transactor characteristics, and institutional aspects [64,65]. Transaction costs include due diligence in finding and evaluating related information, costs of negotiating and reaching decisions [66], monitoring task completion under alternative governing structures, and enforcing contractual provisions [62,67]. Therefore, Williamson categorizes transaction costs into three types: searching costs, negotiating and contracting costs, and monitoring costs [64]. The origins and typologies of transaction costs are presented in detail in Figure 4.

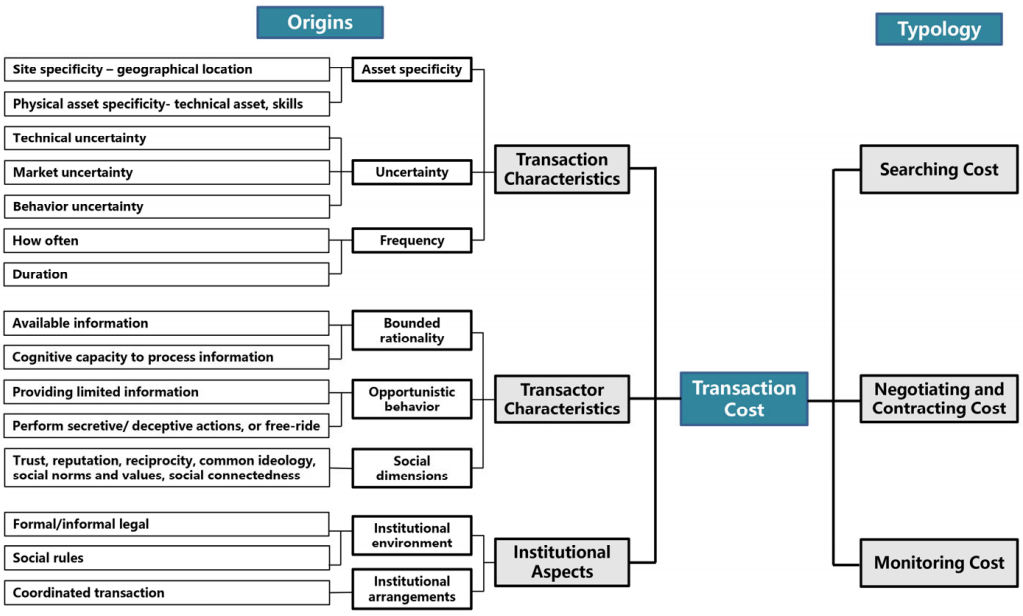

Figure 4. The factors generating transaction costs (Source: Author, based on the literature [68]).

2.2.2. Transaction Cost Perspective in Construction

Transaction costs are widely used to analyze the barriers in the process and governance of projects. The construction project process can be examined at each stage to pinpoint the sources of transaction costs [23,67]. Transaction cost economics interprets governance as organizing transactions in order to economize on transaction costs [69]. Transaction cost perspectives are used to analyze and indicate coordinating mechanisms [70], governance forms at levels such as land planning, institutional obstacles in urban village reconstruction [22], and expanding the market for contracting through institutional reforms that lower the associated transaction costs [66]. Although transaction costs do not directly contribute to the output of the development process, they have an important impact on process efficiency. Therefore, these costs must be minimized [71]. In the emerging market-oriented community renovation model, it is of vital importance to identify and reduce the transaction costs.

Based on quantitative studies of housing retrofit projects in market-oriented model, several categories of transaction costs have been identified as particularly impactful. In Sweden, residents' lack of trust in developers and the high searching cost for retrofit information have been recognized as the most significant transaction costs [35]. Besides, searching for appropriate passive retrofit technologies has proven to be a substantial transaction cost in the pre-design phase [40]. In Dutch case studies, the initiation of project and assessment of retrofit costs are also highlighted as major transaction costs [34]. Compared with the government-led model, in private business, the transaction costs for developers to reach the public are particularly prominent [16]. These findings underscore the importance of systematically identifying transaction cost categories in housing retrofit and determining which types are impactful in practice.

2.2.3. Transaction Cost in Community Renovation

A transaction is considered the basic unit of transaction cost analysis [72]. The pre-design phase of community renovation can be considered a series of transactions to reach a consensus among all stakeholders. Transaction costs are analyzed based on their typologies in the following sections, which are organized by different stakeholders, as shown in Table 1. Although this research focuses on China, the transaction costs identified in international contexts with similar business models are also relevant, as they stem from comparable transaction behaviors.

In terms of searching costs, stakeholders must acquire sufficient and reliable information to support renovation decisions. Due to the asset specificity conditions [31], governments face transaction costs searching for eligible communities for market-oriented community renovation projects [31]. Due to a low rate of investment return [73], developers are tasked with searching for supportive policies and financial subsidies [3], estimating the costs and benefits of the renovation project [34], and exploring available technical measures [74]. In this renovation model, experienced operators play a crucial role in cost recovery and the long-term maintenance of renovation results. Therefore, finding experienced operators [46] is a significant searching cost for developers. They also have to face the uncertainty of policy support [75], long-term operation [76], and site conditions. The ambiguous property rights in communities [22,46,77] bring huge transaction costs for developers to navigate the complex property rights, both from de jure rights and de facto control aspect [78]. Residents, with the least relevant knowledge and little informational support [28], bear huge searching costs to obtain information and assess participation outcomes [28]. Architects must invest effort in learning resident research methodologies [41] and repeatedly gather residents' renovation demands to inform project design [3].

In terms of negotiating and contracting costs, stakeholders must engage in negotiations within their own groups and with other stakeholders to pursue their interests to the fullest extent possible. Institutional arrangements create high levels of transaction costs [23], which complicate the negotiation process and make it difficult to regulate the distribution of capital gains between public and private actors [20]. Regarding internal bargaining, the government needs significant effort for additional internal coordination due to the involvement of numerous government departments in the project approval process [77]. Similarly, within old communities, residents need to negotiate with each other to establish a collective orientation toward participation in renovation projects [34], despite their differing statuses as homeowners or tenants, varying income levels, and diverse development visions [79]. All involved stakeholders—the government, developers, residents, and architects—undergo a complex and time-consuming negotiation process [31,46,80].

In terms of monitoring costs, the government bears the responsibility of supervising the high-quality completion of renovation projects. It must encourage the participation of

residents and developers through policy toolkits and financial incentives [81]. Additionally, the government needs to exercise its authority to oversee contract signing to prevent the negative impacts of excessive profit-seeking by capital.

Table 1. Transaction cost list in pre-design phase.

Developer				
Stages	**Transaction Cost**		**Description**	**Source**
Site selection	D1	Identifying property	**Searching cost** to identify complex and ambiguous property rights in the community.	[22,46]
	D2	Assessing costs and benefits	**Searching cost** to estimate and determine the benefits and costs of the project.	[34,76]
	D3	Receiving approval	**Negotiating cost** caused by institutional arrangements with different government departments to receive approval.	[23,40,56]
	D4	Finding subsidy and policy support	**Searching cost** to find subsidy and policy support through vague policy documents.	[3,5,45]
	D5	Finding experienced operators	**Searching cost** to find reliable and experienced operators responsible for the property.	[45,46,82]
Investigation and initial design	D6	Receiving residents' demands repeatedly	**Negotiating cost** to receive the demands of huge amount of residents repeatedly.	[31,46,77]
	D7	Determining available measures and technologies	**Searching cost** to determine available measures and technologies that can be used in the community renovation projects.	[74]
Contract signing	D8	Final consultation with residents	**Contracting cost** with residents to receive an agreement on the initial design.	[83]
	D9	Signing contracts door to door with residents	**Contracting cost** to obtain the number of signed consent forms that meet the criteria from residents.	[84]
Resident				
Investigation and initial design	R1	Negotiating within residents	**Negotiating** with other residents to share information and try to reach a consensus on taking part in the renovation projects.	[34,79]
	R2	Negotiating with developers	**Negotiating** with developers to express renovation needs, discuss payment matters, and protect one's own rights and interests.	[39,85]
	R3	Searching for renovation information	**Searching** for information about the renovation through the internet, news reports, and visits to demonstration projects.	[28,86]
Contract signing	R4	Searching cost of benefits and costs	**Searching cost** to calculate and estimate the costs and benefits of their own renovation according to the final proposal given by the developer while signing the consent form.	[87]

Table 1. *Cont.*

Government				
Site selection	G1	Searching for renovation site	**Searching** for old community site from both the current environment and the residents' willingness.	[31]
	G2	Collaborating to grant approval	**Contracting cost** for different government departments to decide the project approval due to immature institutional arrangement.	[56,88]
	G3	Motivating developers	**Monitoring cost** to launch policies and criteria to encourage developers to invest in the new mode.	[46,81]
Investigation and initial design	G4	Motivating residents	**Monitoring cost** to popularize the policy to motivate residents.	[89]
Contract signing	G5	Monitoring cost to developers	**Monitoring** developers to guarantee that the rights and needs of residents are satisfied.	[67]
Architect				
Investigation and initial design	A1	Learning skills to work with residents	**Searching** and enhancing skillsets for effective communication with residents to understand their needs and respect their privacy.	[41]
	A2	Receiving residents' demands repeatedly	**Negotiating cost** to spend huge efforts to receive residents' demands repeatedly.	[3]
	A3	Repeated pre-design works	**Negotiating cost** for repeated pre-design work due to the change in demands of residents and developers.	[80]
	A4	Negotiating with developers	**Negotiating** with developers to determine the design fee and payment method matching the workload.	[21]

3. Methodology

3.1. Semi-Structured Interviews

This research is mainly based on the qualitative data from semi-structured interviews and quantitative data from a questionnaire survey to analyze the transaction costs borne by stakeholders and the causes of these transaction costs.

Through semi-structured interviews, this research aims to derive a comprehensive list of transaction costs associated with market-oriented community renovation in China, which will be used to develop the survey questionnaire. In Section 2.2.3, a transaction cost list was obtained, which was based on studies from different countries and contexts. The semi-structured interviews were designed to verify the reviewed transaction costs and further identify new transaction costs.

Snowball sampling, based on the stakeholder participation, was used to ensure that each interviewee had experienced in the market-oriented community renovation. Semi-structured interviews were conducted with 19 stakeholder representatives, including 4 government officials, 6 developers from both city investment construction groups and private companies, 3 architects, and 6 residents (including both homeowners and renters). The number of interviewees was determined based on the principle of theoretical saturation, whereby no new categories of transaction costs were identified [90], and all types derived from the literature were confirmed in the interviews (see Table 2).

Table 2. The details of interviewees.

Number	Identity	Gender	Age	Working Time Span	Living Time Span *
g1	Government–District Housing Construction Committee Director	Male	46	13	/
g2	Government–District Housing Construction Committee Staff	Male	38	8	/
g3	Government–Urban Planning Departments Staff	Male	42	10	/
g4	Government–Community Committee Secretary	Male	35	3	/
d1	Developer–Private Company Manager	Female	37	8	/
d2	Developer–Private Company Manager	Male	36	7	/
d3	Developer–Private Company Staff	Female	37	7	/
d4	Developer–City Investment Construction Group Staff	Male	45	16	/
d5	Developer–City Investment Construction Group Staff	Male	28	2	/
d6	Developer–City Investment Construction Group Staff	Female	33	6	/
a1	Architect–Design for Project	Male	44	16	/
a2	Architect–Pre-Design Investigation	Female	46	23	/
a3	Architect–Pre-Design Investigation	Male	41	17	/
r1	Resident–Elderly Homeowner	Male	73	/	39
r2	Resident–Homeowner; Parents with Children	Female	52	/	23
r3	Resident–Homeowner; Parents with Children	Male	43	/	16
r4	Resident–Homeowner; Parents with Children	Male	54	/	31
r5	Resident–Renter	Female	28	/	2
r6	Resident–Renter	Male	31	/	4

* Note: for residents, including homeowner and renter, their living span in the community was asked; for other stakeholders, their time span working related to community renovation was asked.

To improve data quality and participant comprehension, the term "transaction costs" was operationalized in both interviews and questionnaires as "extra efforts to overcome barriers." This simplified phrasing was adopted in response to prior research indicating that "transaction costs" are conceptually complex and often unclear to non-expert participants, particularly residents [61].

Therefore, participants were asked to "provide examples of the extra efforts they had to deal with in the pre-design phase." The interviewer gave hints to participants to let them analyze the transaction costs following their actions in the renovation process step by step. This approach ensured that all transaction costs were covered without omissions. After identifying the transaction costs, the costs mentioned in the interview were restated; participants were asked about their "perception of the impacts of transaction costs and reasons for why they considered each transaction cost was significant." The origins of transaction costs were emphasized, which could lead to the effective strategies for reducing

transaction costs, thus optimizing the renovation process [91]. Interviewees were also asked to "provide possible reasons generating transaction costs" to reveal the factors contributing to these costs.

The interviews were conducted from January 2023 to May 2023, ranging in length from 28 to 65 min, with an average duration of 48 min. The information mentioned by interviewees was coded and analyzed through qualitative analysis software Atlas.ti 23.

3.2. Questionnaire Survey

To determine the significance of different transaction costs, quantitative research was conducted through questionnaire survey and data analysis.

A pre-test was conducted with eight respondents, representing all stakeholder types, to verify the clarity and comprehensibility of survey questions. Their comments and feedback led to modifications in the phrasing of some survey questions.

The questionnaire consists of two parts: (1) socio-demographic characteristics, including factors such as gender, age, and educational background [28], which may influence participation and perception of transaction costs; and (2) respondents' evaluation of transaction costs. To measure the significance of transaction costs, participants were asked a series of Likert-scale questions assessing the perceived magnitude of each transaction cost. In these questions, the transaction costs were phrased as barriers to advancing community renovation projects in the pre-design phase. Moreover, the questions were tailored to each type of stakeholder based on the pre-identified transaction costs that they might encounter. For example, in the questionnaire for developers, the transaction cost "D1-identifying property" was measured by asking participating developers to indicate the extent to which they perceived the barrier—"spending effort to identify the property ownership of all buildings involved in the renovation project"—as significant, using a scale from 1 (very low) to 5 (very high).

Questionnaires were distributed to the stakeholders: developers, government officials, architects, and residents, including both homeowners and tenants, who had experience in market-oriented community renovation. Respondents were assured that their response would not reveal their identity. The questionnaires did not include tracking numbers to enhance the respondents' trust in anonymity [28]. This study employed a snowball sampling approach to stakeholders with experience involved in the model and targeted adult stakeholders aged 18 and above. It was assumed that underage residents could not play a decisive role in renovation decisions due to a lack of financial independence. The questionnaire survey was conducted between July 2023 and March 2024. A total of 433 questionnaires were collected, including 253 through face-to-face surveys, with particular attention given to elderly participants who may have difficulty accessing online platforms, and 180 through online surveys. In total, 77 questionnaires were discarded due to the abnormal completion times (less than 3 mins or more than 30 min) or incorrect answers to trap questions. Responses exceeding 30 min were excluded due to highly abnormal durations, which suggested potential interruptions or lack of focus during completion [92]. Ultimately, 356 valid responses were obtained with a validity rate of 82.2%, which were used for the analyses in this study. The socio-demographic characteristics of the sample are described in Table 3. Each step of data collection and processing was conducted with full ethical consideration and documented to ensure transparency, reproducibility, and analytical validity.

Table 3. Socio-demographics of the data sample (N = 356).

	Characteristics	Ratio of Respondents (%)
Sex	Male	54.2%
	Female	45.8%
Age	18–29	26.1%
	30–39	32.3%
	40–49	16.6%
	50–59	11.8%
	60 and above	13.2%
Education	Junior high school and below	2.2%
	High school	9.3%
	Technical school	14.0%
	Bachelor	55.1%
	Master's degree and above	19.4%
Role	Homeowner	40.7%
	Tenant	17.1%
	Government	15.4%
	Developer	13.5%
	Architect	13.2%
Living Time Span (For Residents)	0–5 years	30.6%
	6–10 years	23.3%
	11–20 years	16.0%
	21–30 years	17.5%
	More than 30 years	12.6%
Working Time Span (For Other Stakeholders)	0–5 years	32.7%
	6–10 years	32.0%
	11–20 years	24.0%
	21–30 years	11.3%
	More than 30 years	0.0%

Tables 4 and 5 show the reliability and validity of the scales. In Table 4, the Cronbach's alpha coefficients of all the focal variables exceed 0.70, indicating good reliability and confirming internal consistency. According to Table 5, the Kaiser–Meyer–Olkin (KMO) values of all the variables exceed 0.70, and the Bartlett's sphericity test of each variable is significant [93]. Thus, the questionnaire demonstrates good content validity.

To ensure the transparency and replicability of the research process, each step of the methodology was conducted following clear, documented procedures. Semi-structured interviews were designed based on a literature-informed framework, recorded with participant consent, and analyzed using thematic coding. The questionnaire was designed from verified theoretically saturated interview results and pre-tested for clarity and reliability. Both online and face-to-face surveys were conducted to reach different respondent groups. Data cleaning was performed using predefined thresholds for completion time and con-

sistency checks. All methodological choices were grounded in established literature and aimed at ensuring rigor and credibility throughout the research.

Table 4. Reliability analysis.

Variables	Number of Items	Cronbach's α	Reference
Residents	4	0.768	Cronbach's $\alpha \geq 0.70$
Developers	9	0.780	
Governments	5	0.785	
Architects	4	0.769	

Table 5. Validity analysis.

Variables	KMO	Bartlett's Sphericity Test		
		Approx. χ^2	*df*	Sig.
Residents	0.743	209.19	6	0.000
Developers	0.716	111.14	36	0.000
Governments	0.737	77.34	10	0.000
Architects	0.705	47.23	6	0.000

4. Results

Through semi-structured interviews, the transaction costs obtained from literature review were verified, and no additional transaction costs were discovered, which proves the validity of Table 1. The impacts of each transaction cost were analyzed using descriptive statistics in SPSS 27.0.

As shown in Table 6, developers are the stakeholders with the most categories of transaction costs. The most significant transaction costs faced by developers are assessing costs and benefits, searching for reliable operators, and receiving approval. They encounter substantial searching costs in assessing potential benefits and costs before deciding on their participation. Given the relatively nascent nature of the market-based model, coupled with vague policies and an underdeveloped market and operational framework, many developers are adopting a cautious stance, opting to wait for market maturation (interviewee d3). Four types of transaction costs for developers have an average score below 3, which can be considered to have a relatively low perceived impact.

Market-oriented community renovation faces challenges due to unclear government organizational structures and ambiguous power dynamics [70]. Interviewees d2, d3, and d4 emphasized the importance of decentralization and market-oriented forces. In contrast, interviewees d1, d5, and d6 advocated for a stronger government role to minimize transaction costs and build residents' trust. The ambiguity in the allocation of power between developers and governments is further reflected in official documents. For instance, in Tianjin, the approach is described as "government-led with developer participation" [52], whereas in Beijing, it is articulated as "government-supported with developer participation" [49]. Policy inconsistencies create confusion for stakeholders, complicating their engagement in the renovation process.

Table 6. Ranking of transaction costs in the pre-design phase.

Stakeholder		Transaction Cost	Mean Score	Median	Variance	Rank
Developer N = 48	D1	Identifying property	3.604	4	0.797	4
	D2	Assessing costs and benefits	4.083	4	0.674	1
	D3	Receiving approval	3.771	4	1.117	3
	D4	Finding subsidy and policy support	3.438	4	1.102	5
	D5	Finding experienced operators	4.042	4	0.722	2
	D6	Receiving residents' demands repeatedly	2.875	3	1.303	7
	D7	Determining available measures and technologies	2.854	3	1.021	8
	D8	Final consultation with residents	2.729	3	0.712	9
	D9	Signing contracts door to door with residents	2.896	3	0.946	6
Government N = 55	G1	Searching for renovation site	3.055	3	1.349	5
	G2	Collaborating to grant approval	3.691	4	0.847	2
	G3	Motivating developers	4.000	4	0.852	1
	G4	Motivating residents	3.145	3	0.978	3
	G5	Monitoring cost to developers	3.093	3	0.899	4
Resident N = 206	R1	Searching for renovation information	3.306	4	1.345	4
		For homeowners n = 145	*3.283*	*3*	*1.371*	
		For tenants n = 61	*3.361*	*4*	*1.301*	
	R2	Negotiating with residents	3.602	4	1.119	1
		For homeowners	*3.683*	*4*	*1.038*	
		For tenants	*3.410*	*3*	*1.154*	
	R3	Negotiating with developers	3.553	4	1.204	2
		For homeowners	*3.572*	*4*	*1.233*	
		For tenants	*3.508*	*4*	*1.154*	
	R4	Searching cost to estimate benefits and costs	3.335	3	1.131	3
		For homeowners	*3.386*	*3*	*1.072*	
		For tenants	*3.213*	*3*	*1.270*	
Architect N = 47	A1	Learning skills to work with residents	3.064	3	1.061	4
	A2	Receiving residents' demands repeatedly	3.553	4	1.296	3
	A3	Repeated pre-design works	3.979	4	0.891	1
	A4	Negotiating with developers	3.830	4	0.710	2

Governments primarily face transaction costs related to motivating developers and coordinating approval processes. District governments are primarily responsible for overseeing community renovation projects, while the Housing and Urban-Rural Construction

Department (HURCD) handles coordination. The renovation process may involve up to 17 other government departments [94]; however, it is difficult for HURCD to motivate so many government departments of equal administrative standing (interviewee g1, g3). Strengthened cooperation and a streamlined approval process are urgently needed.

For residents, negotiating cost with residents and developers hinders their participation in community renovation. In most cases, property rights for a residential building are jointly held by its homeowners, requiring unanimous agreement from all unit occupants for even minor alterations. But residents often contend with markedly distinct financial capabilities and personal circumstances (interviewee r3). Achieving consensus among numerous residents presents a formidable challenge, necessitating careful consideration of how to protect their interests while advancing the renovation process. Moreover, tenants typically report lower transaction costs compared to homeowners; however, this disparity does not indicate a greater willingness among tenants to participate in renovation projects. Instead, it reflects a more negative attitude (interviewee r2, r5, r6) due to tenants' limited rights in comparison to homeowners. Tenants can experience difficulties in obtaining information from residents due to restricted access and feelings of exclusion, along with negative attitudes toward intra-resident communication. With high rental rates in some communities, it is crucial to motivate both tenants and homeowners.

For architects, negotiating with developers and repeating pre-design work are the main transaction costs they bear. Architects often serve as key mediators, bridging the gap between developers, government authorities, and residents. However, their contributions are often undervalued, and they do not receive fair compensation despite shouldering substantial negotiating costs (interviewee a1, a2, a3).

Additionally, the correlation between stakeholders' social demographics and their assessment of transaction costs was tested. The correlation analysis helps identify which stakeholders report relatively high transaction costs, thereby guiding the development of tailored measures to effectively reduce these costs [31].

As shown in Table 7, the searching cost for renovation information exhibits a positive correlation with residents' age and length of residency. Older residents typically have fewer information sources, a reduced ability to discern misinformation, and a greater reliance on their neighborhood, leading to difficulties accessing accurate information. The government's perception of transaction costs associated with motivating developers is positively correlated with their age and working hours. Experienced governmental officers tend to perceive greater challenges in attracting market capital, highlighting the need for targeted policies and measures to incentivize developers. Developers with longer job tenure tend to be more aware of the transaction costs required to secure reliable operators. Conversely, job tenure is negatively correlated with the ability to find feasible technical measures. No clear correlation exists between architects' personal characteristics and their perception of transaction costs. Therefore, to reduce transaction costs and facilitate project implementation, key measures include providing tailored information for elderly residents, promoting market-incentivizing policies, and cultivating experienced community operators.

Table 7. Relationships between socio-demographics and transaction costs.

	Statistic	**Transaction Costs**			
Resident (N = 206)		R1	R2	R3	R4
Homeowner vs. tenant [1]	*F*	0.022	0.644	0.022	0.361
Gender [1]	*F*	0.181	1.746	2.970	0.719

Table 7. *Cont.*

	Statistic	**Transaction Costs**								
Age [2]	*r*	**0.187** **	−0.038	0.036	−0.093					
Education [3]	*F*	1.954	0.854	1.211	0.807					
Living time span [2]	*r*	**0.139** *	−0.033	0.054	0.079					
Government (N = 55)		G1	G2	G3	G4	G5				
Gender [1]	*F*	3.683	0.084	0.010	0.303	0.545				
Age [2]	*r*	0.092	−0.052	**0.434** **	0.036	0.197				
Education [3]	*F*	2.169	0.543	1.240	0.827	1.293				
Working time span [2]	*r*	0.161	0.066	**0.389** **	−0.021	0.152				
Developer (N = 48)		D1	D2	D3	D4	D5	D6	D7	D8	D9
Gender [1]	*F*	0.337	0.018	0.000	1.137	0.023	0.932	0.027	2.038	0.001
Age [2]	*r*	−0.134	0.017	−0.024	0.039	0.199	0.061	**−0.321** *	−0.151	−0.130
Education [3]	*F*	0.041	2.809	1.532	0.991	1.339	1.852	0.133	0.470	0.508
Working time span [2]	*r*	−0.150	0.091	−0.100	0.094	**0.377** **	0.223	−0.036	−0.178	0.049
Architect (N = 47)		A1	A2	A3	A4					
Gender [1]	*F*	1.787	0.398	0.003	0.047					
Age [2]	*r*	0.128	−0.057	0.081	−0.023					
Education [3]	*F*	1.617	0.843	0.392	1.377					
Working time span [2]	*r*	0.100	0.032	0.145	0.056					

Note: * and ** denote statistical significance at the $p < 0.05$ and $p < 0.01$ levels, respectively. [1] Independent sample *t*-test. [2] Pearson correlation analysis. [3] One-way ANOVA.

5. Discussion

This study focuses on China, a country with a huge demand for community renovation. Following the shift from a government-led model to a market-oriented model, it identifies the transaction costs and qualifies their impacts on developers, governments, residents, and architects in the pre-design stages of community renovation.

Although grounded in the Chinese context, the findings are applicable to international settings where housing retrofit is similarly transitioning to market-oriented approaches. Through semi-structured interviews, the typology of transaction costs identified in this study aligns broadly with those observed in international literature, as is shown in Table 1. However, a key contribution of this research lies in the differentiated impact of these transaction costs [16,34,35,40], which reflects China's unique spatial and institutional characteristics and thereby demonstrates the necessity of conducting context-specific, quantitative analyses of transaction costs in community renovation.

Due to institutional differences, the impact of transaction costs in China differs notably from many Western contexts, where transaction costs are often concentrated between developers and households [34,35,40]. As evident from the results, despite economic transactions primarily occurring between developers and residents, our findings highlight that in China, the most impactful transaction costs continue to arise in interactions with developers and governments. This reflects that due to strong political control and different political systems, state control remains a critical factor even amid market-oriented renovations, with strict approval and over-intervened process. This phenomenon aligns with the observation made by Wu [26], wherein it is asserted that despite private developers' increasing influence, government authorities retain substantial control, and developers and residents rely heavily

on governments [58]. To encourage developer participation in community renovations, the government should delegate more power, grant greater freedom, and enhance support [24].

Additionally, the large scale of Chinese gated communities, which typically involve more residents than their Western counterparts [57], leads to significantly higher negotiating costs related to consensus-reaching. China's renovation projects are based on the community as the fundamental unit; this contrasts with the collective practices in Western contexts, such as cooperatives and multifamily housing, which can reduce asset specificity and thus minimize transaction costs [21,79].

Given these context-specific features in China, high transaction costs between governments and developers, as well as substantial negotiating costs, this study traces the origins of transaction costs and proposes targeted strategies for optimization in the market-oriented community renovation.

5.1. Consistency of Policy and Laws

The transaction costs stem largely from institutional aspects [66], including society's significant dependence on the government [58,89], insufficient legal support, and underdeveloped mechanisms for government collaboration [95], government–developer cooperation [81], and operation market [39]. Regarding transaction characteristics, renovation projects require a long time to recover costs, which brings about huge behavioral uncertainty in financial returns [29]. To reduce the transaction costs generated between governments and developers, the following measures can be implemented:

(1) Consistency of policy and soundness of regulations are urgently needed [27,31,36,70]. Developers face high transaction costs in assessing benefits and risks, as interviewee d1 noted, "the length of private property management (up to 20 years) spans multiple government tenures, the uncertainty of policy hinders us most." Frequent policy adjustments [75,77] discourage developer participation, resulting in risks such as the absence of compulsory regulations for residents' regular payments and insufficient supervision of the operational quality for developers. As a result, both residents and developers are discouraged from participating in renovation projects.
Regulatory measures are essential to address these issues. Policy consistency is essential to ensure long-term operational stability [5,88] and the financial convenience of the private part [20]. While developers may account for cost and revenue variations, including resident income forecasts, they nevertheless require strong legal and policy support to build confidence and enforce residents' payment compliance. The private and public sectors need strong integration and clearly defined responsibilities [43]. Besides, the profit-oriented nature of the industry must not be overlooked [16]. Developers tend to aim for minimal compliance with standards; governmental oversight and legal mandates should be imperative [6] to guarantee high-quality property services and rights of residents.

(2) Streamlined approval process. Aside from furnishing policy support, governments also assume a pivotal function in the approval of projects [29]. Currently, multiple departments are involved, creating complexity and high negotiation costs. For example, even a community garden renovation requires approvals from the district committee, housing, garden, and municipal departments. As noted by interviewee d3, developers and governments are both struggling in endless negotiations. Meanwhile, HURCD is generally considered the leading government department, but it is difficult for it to drive and direct other departments of the same administrative level, leading to issues such as suboptimal efficiency in the approval procedure [16,29].
Unlike streamlined digital permit systems and streamlined processes for procurement [29], the fragmented and hierarchically parallel structure among Chinese depart-

ments leads to administrative inefficiency and protracted negotiations. Insufficient inter-departmental communication further escalates transaction costs for developers in receiving approval and searching for property rights information [56].

(3) Diversifying business models. The market-oriented renovation model is still in its infancy and suffers from a lack of diversified business models. Integrated service models such as one-stop shops and energy performance contracts (EPCs) offer comprehensive mechanisms and professional operators [16,44]. The absence of diverse and mature service models increases developers' transaction costs, particularly those related to information collection, stakeholder coordination, and risk management [43,66]. Moreover, policy mismatch [87] appears in the market-oriented community renovation process. Although existing policy documents outline developer investments and resident payments, these regulations often lack specificity and strict enforcement. Some policies even suggest reducing institutional transaction costs through streamlined approvals and transparent information [73,96], yet such barriers persist, slowing renovation progress. There is a pressing need for more robust and detailed policies to address these challenges.

5.2. Enhancing the Trust Between Developers and Residents

Residents' main transaction costs arise from negotiations with developers, emphasizing the need to enhance trust between two stakeholders. Improved trust reduces negotiating costs and minimizes residents' time spent searching for reliable information [39].

Key sources of transaction costs include: (1) Transaction characteristics. Residents are worried about the uncertainty of renovation results. Poor outcomes and operations without sufficient supervision may lead to their refusing payment. (2) Transactor characteristics. Residents, as the least informed stakeholders, exhibit bounded rationality; their skeptical attitude toward the developers makes them less motivated to participate in the renovation, and it is difficult to reach the minimum number of consenters allowed. Developers may engage in opportunistic behavior, withholding information or manipulating contracts for profit [38]. (3) Institutional factors. In a big government society, residents inherently harbor distrust toward livelihood projects initiated by developers in social dimensions. This stands in contrast to post-socialist countries such as Croatia, where residents often display strong distrust toward governmental institutions following systemic transition [18]. Residents express concerns about the capital's profit-seeking behavior, the economic costs, and the transaction costs that residents need to bear have increased significantly compared to government-led model. Fostering trust and facilitating communication between residents and developers becomes paramount in the effort to alleviate transaction costs for residents.

Two key strategies can enhance trust between residents and developers: (1) Promoting demonstration projects. Publicizing successful projects can showcase developers' renovation and management capabilities, encouraging resident confidence [79,97]. Through interviews, developers should show their services as advanced private property management will encourage residents. Interviewee r2 highlighted the impact of demonstration projects, stating, "Developers care more about what we want than the government when we pay." With the market-oriented renovation model remains in its infancy, limited completed projects reduce residents' direct exposure and understanding. Personal exposure to renovation results enhances understanding and boosts residents' willingness to participate. (2) Enhancing communication between developers and residents. Proactive engagement can prevent distrust and conflict; professional mediator intervention can effectively address residents' queries and reduce the transaction costs.

5.3. Intervention of Professional Mediator

Negotiating cost is the most significant type of transaction cost in market-oriented community renovation, impacting communication between various stakeholders and within residents and governments. These costs stem from a lack of interdisciplinary coordination and expertise [29]. Unequal access to renovation information leads to bounded rationality, hindering decision-making. Many interviewees emphasized the need for professional mediators with both communication skills and renovation knowledge.

The intervention of professional mediators to be responsible for the pre-stage research and stakeholder coordination will reduce negotiating costs efficiently [17,87]. Currently, most mediators are architects or non-profit organizations, with some acting as third-party mediators called community planners [9] funded by the government so they are not economically controlled by developers, ensuring relative fairness in negotiations and providing consulting services for residents, thus reducing searching costs and negotiation costs. Similar mediators, such as Urban FM [27], facilitators in EPCs project [38] in Norway, and market intermediaries in the UK [44], are working to find a better communication platform for stakeholders and lower transaction costs significantly.

Professional mediators can efficiently provide residents with objective and effective information, addressing the limitations of relying on the internet (with potential misunderstandings and unfriendliness to the elderly) or developers (with trust issues). They can support and represent residents and share experiences of technical, economic outcomes, and clients [38]. Residents often need to spend considerable time on internal negotiations due to inconsistent channels, information access, and economic disparities, leading to elevated transaction costs for consensus-building and information acquisition.

Furthermore, mediators can play a pivotal role in expediting the establishment of resident organizations during the renovation. "Most of the owners' committees in old communities do not exist or are in a state of incapacity. Non-profit organizations collaborate with the government to promote committee formation, fostering platforms for constructive dialogue, which was not taken seriously in the government-led community renovation" (interviewee a2). Strengthening grassroots governance and internal coordination enhances prospects for future renovations. Hence, the intervention of professional mediators can reduce the negotiating costs between the government and residents, between developers and residents, and among residents, as is shown in Figure 5.

The influence of market-oriented renovation projects remains limited, as a delicate balance must be struck between profit-driven motives and social goals [16]. Several interviewees (g1, d6, r3) expressed concerns that while developers pursue profits, they potentially lead to resident distrust. Even though they have the capacity to offer more customized services than the government-led model, market-oriented ones place greater demands on residents' financial capacity and willingness to participate. For low-income communities or those suffering from particularly poor living conditions, public investment remains indispensable. These two approaches should be viewed as complementary: while private sector involvement enhances flexibility and innovation, public sector intervention ensures equity and access [98,99].

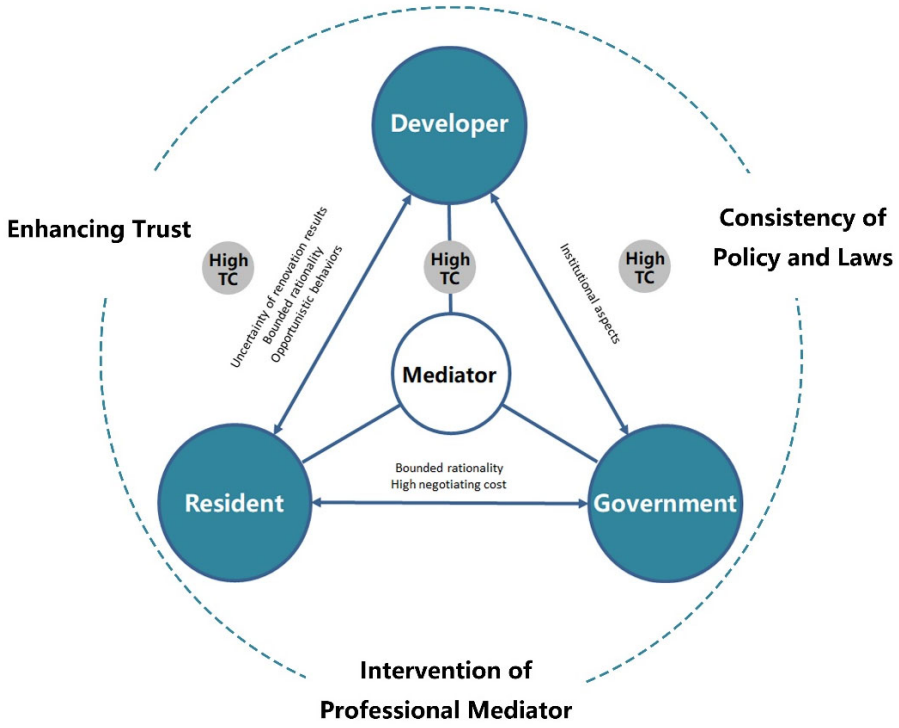

Figure 5. Optimization methods (Source: Author).

6. Conclusions

Owing to significant community renovation demands, financial constraints, and disparities in the government-led model, developers have emerged as integral stakeholders actively investing in renovation projects to enhance both living conditions and energy efficiency in China. To improve the renovation process and foster stakeholder collaboration, a crucial step is to analyze the transaction costs faced in the pre-design phase, where most barriers are encountered and project implementation is determined.

Through semi-structured interviews and questionnaire surveys, this paper has revealed the content and impact of transaction costs faced by developers, governments, residents, and architects in the pre-design phase of market-oriented community renovation. Three key results have been revealed: 1. Developers face the widest range of transaction costs, including assessing costs and benefits, finding reliable operators, and receiving approval. 2. The most impactful transaction costs still exist between governments and developers, even after the change of stakeholder roles, as developers rely on government approvals, policies, and subsidies, while governments struggle with interdepartmental coordination and decision-making. 3. Negotiating costs are the most significant transaction costs, arising in interactions between developers, governments, residents, and architects, as well as within government and resident groups.

To reduce these main transaction costs and consequently alleviate the barriers in the renovation process, the following strategies can be taken by rooting the factors generating the transaction costs, based on the interviews and international experiences from literatures. Firstly, consistency of policy and laws should be emphasized to overcome the uncertainty of policy and renovation results, incentivizing developers to invest and actively participate in market-oriented community renovation. Secondly, trust between developers and residents should be strengthened through increased publicity and promotion of demonstration projects, as well as improved communication. Thirdly, the professional mediators with renovation acknowledgement and communication skills should be involved to reduce the negotiating costs between stakeholders and support grassroots self-management mechanisms for long-term operation and future renovations.

This study focuses on the pre-design phase due to its critical role in determining project feasibility and stakeholder alignment; it does not cover transaction costs arising in later stages such as design, construction, and long-term operation. Future research could extend this framework to investigate how transaction costs evolve across the full lifecycle of market-oriented community renovation projects, offering a more comprehensive understanding of institutional and behavioral barriers throughout the process.

Moreover, although this study is situated in the Chinese context, its findings have broader relevance to international settings undergoing a shift from government-led to market-oriented renovation models. The methodological framework—combining literature review, semi-structured interviews, and stakeholder-specific surveys—proves effective for identifying, classifying, and analyzing transaction costs in complex multi-actor projects. Beyond identification, this study further traces the origins of the impactful transaction costs and proposes optimization strategies accordingly. This integrated approach to mapping transaction costs and linking them to actionable process improvements represents both an applicable and innovative contribution to the literature on housing renewal and collaborative governance.

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