

# Community Underground Space Governance Based on IAD Framework: A Case Study of X Community in Nanjing

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**Abstract.** Illegal use of underground space in the community is quite common in large and medium-sized cities, which easily leads to community security problems and conflicts, and is a thorny problem in community governance. Starting from the identification of the attributes of underground space resources, this paper explores the data from interviews, explores the governance dilemma of underground space in X community in Nanjing, and deeply analyzes the interaction process and behavior strategies of each subject in the context of underground space governance based on the IAD analysis framework. This study found that the underground space of community has some open and closed characteristics of Common-pool Resources(CPR), and has the possible conditions for residents to act together; fuzzy property rights, low rent, community attributes and other factors together form the dilemma of underground space governance; the key to the effective governance of this problem lies in perfecting the multi-level and multi-subject governance structure, and strengthening the autonomous action ability and sustainability of grass-roots organizations.

**Keywords:** IAD framework; Underground space; Community governance.

## 1. Introduction

Community underground space, as an important part of urban underground space, its effective utilization is of great significance to the community and even the country. However, the illegal use of underground space in communities, such as illegal renting, operating and pulling wires privately, has not stopped despite repeated prohibitions, which is a "stubborn disease" that is difficult to eradicate in community governance.

In the process of occupying and using the underground space in the community, there is often no clear space division in the underground space of the same building because of its vague property rights. The basic function of storage and the unrestrained profit-making behavior during the use of underground space make it difficult to exclude potential beneficiaries. However, as the scale and scope of underground space resource supply is certain, it objectively stimulates the residents to compete for the use of space. Therefore, for the residents in the same building, the community underground space has both non-exclusive and competitive characteristics, so it belongs to the CPR. In addition, the community underground space has its particularity. Because property ownership is unclear, the community underground space has the characteristics of partial open CPR. The use of underground space often affects the quality of life of nearby residents, and its rational use can provide convenience for residents, while disorderly use may endanger the safety of residents' lives and property, thus forming possible conditions for residents to act together. Because of its fixed spatial location and clear resource boundary, the underground space of the same building has a high exclusivity for the residents of other buildings. The physical properties of underground space make its possessors and users relatively stable and familiar with each other, showing the characteristics of partial closure. Therefore, the underground space of community has some open and closed characteristics of public pond resources.

The underground space problem of the X community in Nanjing has plagued people for 18 years. After street-led governance, grid organization and residents' participation and assistance, it took 10 months to eliminate the chaotic phenomenon of illegal use of underground space in the community, and received publicity and commendation from the central and local governments. Besides, residents had no petition, and were publicized and rewarded by the central and local governments for ten consecutive years. In the process of community underground space governance, how is the

institutional supply of grass-roots government set up, and how do multiple subjects interact to achieve efficient governance of underground space? This has important reference significance for the management of other CPR with the same attributes. Therefore, with the help of the institutional analysis and development (IAD) framework, this study explores the governance dilemma of community underground space, and deeply analyzes the interactive process and behavioral strategies of various subjects in the context of underground space governance.

## 2. Literature Review

Community underground space, as a part of urban underground space, refers to the underground space with residential areas as its core, mainly including basement and underground garage. At present, there are few researches on underground space in communities, mainly focusing on the ownership of underground space, chaos control and underground space reconstruction in residential areas and so on.

Most of the discussion about the ownership of underground space are in the underground space transformed by civil air defense projects. Civil air defense projects can be divided into public civil air defense projects funded by the government, organized and managed by the competent civil air defense department, and construction-type civil air defense projects invested and used by the society. The ownership of the former category should belong to the state. However, due to the contradictions of the existing laws, there are many disputes about social investment in civil air defense projects. At present, it is mainly divided into three categories: state ownership, developer ownership and owner ownership. Xu et al. analyzed the view that the ownership of property rights affects the maintenance management, and the maintenance management is related to the effectiveness of civil air defense from the perspective of the essential attributes of civil air defense projects. In order to maintain and guarantee its prevention and control efficiency, they believed that the maintenance and management of residential air defense basements should be reformed in the direction of the state-owned property right mode. Scholars who agree with the theory of ownership of developers believe that economic activities follow the principle of "whoever invests, who owns". Developers are investors in civil air defense construction, so they should be the owners of ownership. Scholars who hold the theory of owner's ownership believe that the actual cost of civil air defense projects is borne by the owner. Liu thinks that the civil air defense project should be owned by the owner from the perspective of divisional ownership of buildings and the practical use of civil air defense projects. Existing research shows that due to the lack of legislation on the ownership of underground space, which leads to many controversies in the practical application, and there are different opinions in academic circles. The ownership of the underground space right of social fund-raising is still inconclusive.

Scholars have analyzed the illegal use of underground space in communities that this study is concerned about from different angles. Li et al. conducted an investigation on the basement residential groups in Chaoyang District, Beijing, and found that their housing stratification and social stratification were out of place, and further discussed the problems existing in the existing policies, such as unfair distribution of social welfare, excessive housing prices and rents, etc. However, no specific policy suggestions and governance methods were given. Besides renting out the basement, there are still some problems in the underground space of the community, such as privately digging the basement, renting out the business, privately connecting lines, and using open fire, etc. Scholars generally noticed the supervision and management role of autonomous organizations in the process of managing the underground space of the community. However, due to the complexity of social relations and the lack of self-governing organizations' own executive power, resident autonomy is not compulsory. Feng suggested that urban management departments should give autonomous organizations full autonomy, and establish incentive and restraint mechanisms for autonomous organizations; Nie et al. put forward the implementation opinions of volunteer system, self-government system of residents' small funds and supervision and management measures jointly released on We Chat platform. The phenomenon of illegal use of underground space in residential

areas caused by the increasingly tense relationship between people and land in big cities reflects the lack of housing policy and social policy in China and the lack of grass-roots governance capacity. Scholars have noticed the supervision and management role of played by autonomous organizations in managing the underground space of communities, but have not elaborated and studied their internal operation mechanism in detail.

### 3. Research Methods

#### 3.1 The IAD Framework

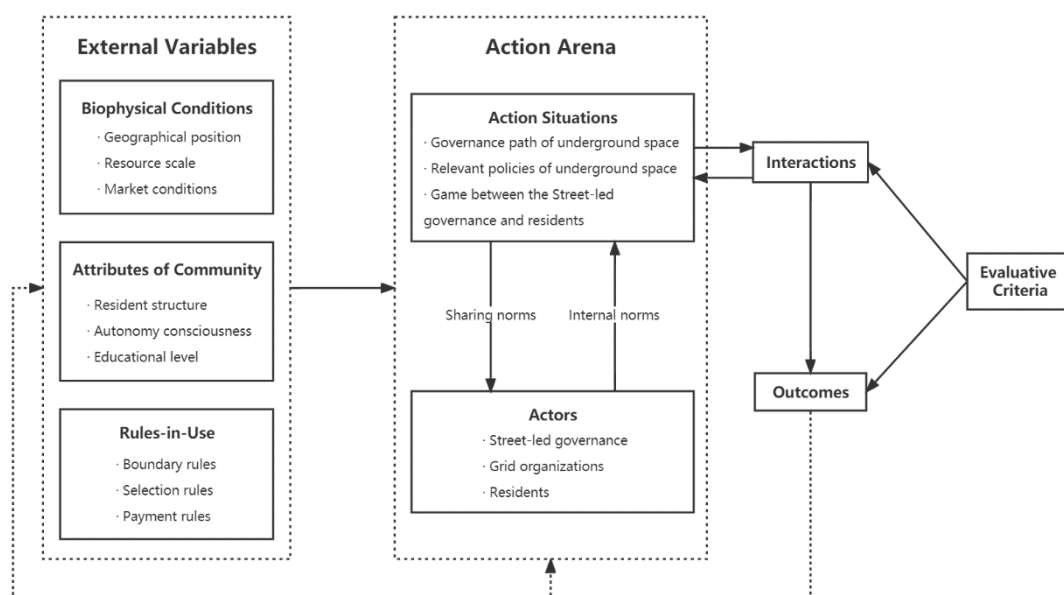
The Institutional Analysis and Development framework (IAD) is a theoretical tool for public policy analysis, which was first put forward by Ostrom (2010) and later revised by Bisaro and Hinkel (2016). Ostrom first created the IAD framework to analyze the governance of CPR, and later it was widely concerned because of its systematic and comprehensive analysis. At present, the IAD framework is mainly used in CPR management, public services, rural system reform and other fields. Fan, YB et al. used IAD framework to study the water resources management of rural communities in arid areas of northwest China, and found that community background factors, including community concept and institutional level, were the key determinants. Yuan et al. divided public pond resources into two types: closed and open, and proposed that the effective governance of closed common pool resources could be realized by perfecting multi-level governance structure. He et al. studied the influence of institutional rules, the relationship between cadres and the masses and their interaction on the maintenance of farmers' infrastructure, and pointed out that institutional rules and the relationship between cadres and the masses can affect the trust and cooperation in collective actions, thus solving the dilemma of management and protection actions. At present, domestic and foreign literatures have involved the governance of other resources at the community level, focusing on the influence of community background factors, social capital and institutional rules on the efficiency of management supervision. However, there is little research on the underground space in the community.

The IAD framework is composed of External Variables (Biophysical Conditions, Attributes of Community, Rules-in-Use), Action Arena (Action Situations and Actors), Interactions, Outcomes and Evaluative Criteria. It is devoted to explaining how External Variables, including Biophysical Conditions, Attributes of Community, Rules-in-Use, affect the behavioral motivation and results of actors in action scenes, and predicting and evaluating the interactive results of such action scenes. Using the IAD framework, this study tries to clarify the interaction process of various actors in the action scene of community underground space governance, and explore the effective governance strategies of community underground space.

IAD framework of community underground space governance mainly includes the following four layers (Figure 1): The first layer is External Variables, including: (1) resource attributes and location conditions of community underground space, such as the geographical location, resource scale and market conditions of the community. (2) the group attributes of community residents, such as the composition structure, social network, autonomy consciousness, cultural level, etc. (3) the application rules of community underground space governance mainly include boundary rules, selection rules and payment rules. The second layer is the Action Arena, which is the carrier of interaction between actors and action situations under the influence of exogenous variables. The behavior subjects of community underground space governance mainly include street-led governance, grid organizations and residents, and the action arena specifically include the governance path of community underground space, relevant policies and the game among the behavior subjects. The third layer is the interactions and outcomes. The interactions are the result of the dynamic interaction between actors and action arena in community underground space governance, including the main action path of street-led renovation of community underground space, the assistance and regulation of grid organizations, residents' resistance and compromise, and finally the contradiction of participating in governance; the result refers to the governance effect produced by the interactive mode of community

underground space governance, such as the reduction of illegal phenomena, the improvement of environmental conditions, and the improvement of community grassroots governance level. The fourth layer is the Evaluative Criteria, that is, the evaluation rules of interaction and outcomes, including the transformation effect of community underground space, the satisfaction degree of community residents to the governance effect, and the urban governance evaluation system to evaluate the results.

In the interaction between the action scene and the actors, there are internal norms that complement and strengthen the sharing norms. The Rules-in-Use of External Variables affect the behavioral motivation of actors, which is a common behavior norms of all actors. Rules do not act on isolated individuals, but on groups, so they will be restricted by social relationships. Therefore, the relationship among street-led governance, grid organizations and residents has a great influence on the governance effect. Good social relationship is easy for actors to establish internal norms, that is, internal norms of behavior generated by group consciousness, morality and sense of responsibility. The internal norms of violating the rules is a kind of personal spiritual cost (such as guilt and self-worth reduction). However, if there is a lack of good social relations, it is easy for the actors to perceive irrationality and unfairness, thus increasing the execution cost of the rules and reducing the possibility for the actors to maintain and comply with the rules. It is difficult not only to form internal specifications, but also to maintain shared specifications.



**Figure 1.** IAD framework of community underground space governance

### 3.2 Case Introduction

This study chooses X Community in Nanjing as the research object, because its action stage contains the main contradictions and conflicts in the underground space management of this community, and the management effect is remarkable. Being publicized and reported by the central and local media, it has strong reference and popularization. The specific performance is as follows.

The community was moved from state farm, and its residents are familiar with each other. It has a powerful social network, which is conducive to the construction of autonomous organizations, the formation of internal norms and the implementation of shared norms.

Due to the unclear property rights in the process of demolition and resettlement, the underground space is divided into several compartments of different sizes by residents for self-occupation, rental and business. The vague property rights and the potential economic value of resources aggravate the difficulty of governance.

Street-led governance, grid organizations and other parties worked together to rectify the underground space chaos, re-divided the underground space into independent units, and put an end

to the phenomenon of illegal use. For 62 consecutive months, it won first place in Nanjing City Management Assessment, and achieved good results.

### 3.3 Data Collection

In order to deeply analyze the governance logic of community underground space, the data and sources collected in this study are as follows: (1) Relevant system and policy documents of community basement governance in X, the data comes from the websites of official website, Nanjing Municipal People's Government and Jiangsu Provincial People's Air Defense Office and other government agencies. (2) The news reports of X community basement governance come from newspapers, websites, etc. (3) The concrete work, conflicts and governance effects in the process of X community basement governance come from semi-structured interviews with the streets, grid organizations and residents from March to May, 2022. The interview forms include interviews and telephone calls, including community attributes such as community personnel structure, basement management plan, conflicts, effectiveness of conflict and restoration work.

## 4. External Variables

### 4.1 Biophysical Conditions: Dilemma in the utilization of underground space resources

Y Street, to which the X community belongs, enjoys a superior geographical location and convenient transportation. There are important government agencies such as the district government and the district committees. The university town in its jurisdiction is composed of 12 universities and other primary and secondary schools, which is an important higher education gathering area in China. In addition, there are many "five small industries" in Y Street, and there are many floating population. With its good basic conditions and superior geographical location, the streets has attracted a large number of local students, floating population and other tenants to rent houses. Among them, because of the low price of the basement, the win-win situation of low transportation cost and low living cost is realized. The house price in Y Street is about 40,000 square meters, and the normal house rent in X Community is about 2,000 to 3,000 yuan per month. However, compared with this, the rent of basement only needs about 300 yuan per month.

Community X is the only demolition and resettlement community in Y Street, which is composed of two parts: the north and south districts. There are 19 buildings in the North District and 20 buildings in the South District, with a total of 1,617 households. The basement was originally designed to park bicycles. However, due to unclear property rights and no space division, the basement is shared by residents of the same building. The basement was shared by residents of the same building. The shared space and vague property rights make the underground space of the community non-exclusive, because residents can't exclude the occupation and use of other households. In the process of demolition and resettlement, the basement was occupied by residents, and 1056 compartments of different sizes were built privately, each of which was about 8 square meters, for self-occupation, rental, business operation or stacking of sundries. In addition, the basement partition materials used by residents are very simple, and do not have the functions of heat preservation and fire prevention. It is not uncommon for people in the basements to use gas, high-power electrical appliances and other appliances to cook, pull wires and pile up sundries without permission. This leads to dirty environment in the basement, and there is a great potential safety hazards. Before the basement renovation, small fires often occurred in the residential area, which seriously infringed the rights and interests of other residents. Because of the economic and practical value of the basement in the actual use process, and the negative externalities caused by other residents' illegal use of the basement, the residents who occupy and don't occupy the basement compete for the right to use the basement, and the neighborhood disputes are constant, and the underground space shows its competitiveness in the actual use process.

The vague property right and unclear boundary of underground space make it non-exclusive, while the limited resources and potential economic value lead to the competition in use. The profit-seeking

behavior of residents will make the utilization of underground space resources fall into the tragedy of commons.

#### **4.2 Attributes of Community: Residential Structure and Social Relations**

The predecessor of Community X is the state-owned farm, with three production teams under its jurisdiction. Farmers mainly make a living by farming and raising livestock. Since 1996, the state-owned farms have been demolished, and farmers have been placed in X community. Under the influence of geographical relations, the social network among community residents are relatively close. In an interview with the community police, she mentioned: "... [residents] used to be either from a village or from a production team. They have a close relationship and know each other well." Good social relations enable residents to have great potential to form internal norms. And the social capital accumulated by the village head or production team leader in the past management process gives them a certain right to speak among the residents, which helps to promote compliance and implementation of sharing norms.

The farmland on which residents live has been collected by the state, and the landless peasants have lost their income sources and can only make a living in nearby universities and other places. However, most of them were engaged in agriculture before, and their education level was not high. Basically, they were elementary schools or junior high schools. Therefore, the employment of residents is generally difficult. After the farm demolition, the employment of residents has become a historical problem. In the field investigation, it is found that renting houses in X community is very common, and the rental is an important source of income for local residents. Some residents even rented out the seized basement. According to the survey, among the 1617 households in this community, about 200 households rented out their basement. As some residents are the direct beneficiaries of illegal use of the basement, others were reluctant to dissuade them because of their face, and the residents' willingness to rectify was indifferent. The basement had not been rectified, and they were in the dilemma of collective action. From the relocation of residents in 1996 to the placement in 2017, the environmental condition of the basement was very bad. In addition, there are a series of problems left over from history in this community, such as demolition and resettlement, employment of restructured personnel, employee trusteeship, etc. More than 1,100 households in 1,716 households petitioned, and even hundreds of residents held banners to petition jointly. Residents petitioned for many times, but the problem was not well solved, so that before 2010, the relationship between residents and grass-roots governments became increasingly rigid, resulting in the lack of government credibility. Since the end of 2010, the streets and communities have organized job fair of "Send jobs to thousands of people" to solve the employment problem of residents. Besides, the streets have also improved the living standards of residents through various ways, such as changing natural gas and contacting nearby universities to help students with their study. Through the above measures, the streets gradually gained the recognition and trust of residents.

#### **4.3 Rules-in-Use: The combination of rules for the participants**

The interaction path among external variables, action arena, interaction, outcomes and evaluation rules is based on the incentive and constraint of Rules-in-Use . Ostrom divides the Rules-in-Use into seven categories, and the rules involved will change according to the actual situation . Rules-in-Use affect the interaction process and result. This case specifically involves boundary rules, choice rules and payoff rules. Boundary rules refer to the procedures and standards for each governance subject to obtain or leave a certain identity , such as the qualifications or identities that grid personnel must possess. Choice rules refer to the collection of actors' choices, including rights and obligations. Payoff rules refer to the incentives and sanctions corresponding to the results based on behavior choices of various governance subjects. For example, for individuals who have made outstanding contributions in community governance, the streets will give material and spiritual rewards, but residents who refuse to rectify can also be dealt with according to law.

## **5. The main action strategy in the Action Arena**

### **5.1 Administrative intervention: The action strategy of street-led governance**

Illegal use of basements in residential areas often involves the interests of residents, foreign tenants and other complex groups, which is difficult to control. It is difficult to obtain timely and comprehensive information for street-led governance, with high supervision cost and incomplete remediation effect. The street-led governance starts from the aspects of concentrating regional resources and uniting public forces to solve the dilemma of supervision and information acquisition.

**The Fusion and Co-governance of Multiple Forces.** The street-led governance coordinated public security, fire control, urban management, housing construction and other departments to set up a joint special rectification working group, and in view of the problems existing in the basement of the community, jointly formulated a rectification work plan. Streets brought together the government, resident units, social organizations and other forces to jointly solve the basement problem. A total of 6.5 million yuan was donated voluntarily by 56 resident units to reward individuals who have made outstanding contributions to community work.

**A Flexible Grass-roots Organization.** Set up three-level street network. The first-level network is based on the community, the second-level network is divided according to the area, area, residential buildings and population, and the first-and second-level network is in charge of the street community staff. The third-level network is specific to the resident units, and the backbone of the party members is the grid leader. Most of the members of the third-level grid are residents of this community, and they have the dual identities of the executive subject and the affected group.

**People-oriented Strategy of Administration.** Before the renovation work began, the street-led governance organized community party members and cadres and residents' volunteers to investigate residents' wishes for renovation, then holds residents' congresses and party members' congresses to further understand residents' occupation, discuss the details of renovation, and finally mobilized them from door to door. Because the basement has economic benefits to the individual residents, the residents who rent or use the basement for self-occupation are often unwilling to vacate. The street-led governance often came to persuade, and the largest number of households even petition for 36 times. In order to completely eradicate the hidden dangers in the basement, the community also helped tenants to find new houses, solved residents' financial difficulties, and eradicated the illegal use of the basement from the source.

**Layers upon Layers of In-depth Governance Plans.** In addition to the basement redistribution, painting, electricity connection and other basic transformations, the street-led governance further optimized the infrastructure of the X community, equipped with squares and kindergartens, and helped residents access natural gas to improve their living environment. In the choice of governance objects, the street-led governance first chose the residents who have strong willingness to renovate, so that other residents can see the effect of the basement governance, and then persuaded the residents with weak willingness one by one.

**Joint Governance of Public Forces.** The street-led governance fully stimulated residents' willingness to self-government, and carried out the activity of "I will stand guard this month" in the community, and guided residents to voluntarily clean and supervise the basement. At the same time, the residents' volunteers were given the right to supervise whether the grid staff actively found problems and reported them in time.

### **5.2 Affection and Prestige: Grid Organization's Action Strategy**

Grid staff serving the X community is generally composed of community workers and residents. Most of them are community residents, so they can get information in time, supervise and have low administrative cost. As grid personnel have the dual identities of community residents and grid organizations, the responsibility of remediation and the willingness to improve the living environment make them more active in the process of supervision.

Social Network and Emotional Resources. The members of the third-level grid were generally prestigious community residents, who helped the street-led governance mediate the contradiction of basement use. Such people often had strong social capital and a network of relationships, which provided the basis for their actions to control the chaos in the basement. Grid's staff C is the captain of the former state-owned farm production team. She took the lead in responding to the call of street-led governance's renovation of the basement. Although the family's financial situation is difficult, she took the initiative to rectify the self-occupied basement. She said, "It is also for everyone to ensure the safety of the basement. As an old party member, I cannot harm everyone's interests." Driven by her, more than ten households took the initiative to clean the basement. Secondly, for the residents who are still unwilling to renovate the basement after many times of mobilization by grid personnel, the grid organization will find and select close-knit members in the organization, and mobilize residents to make rectification? N Residents transformed the basement into a chess room. At first, he didn't want to renovate the basement. But after being dissuaded by the grid staff several times, he was influenced by the staff. He not only rectified his own basement, but even actively helped other residents to rectify them.

### **5.3 Interests and Compromise: Residents' Action Strategies**

As the actual occupier of the basement, the 18-year unpaid possession has caused the residents to have the psychological illusion of "private ownership". Whether residents accept the renovation of the basement and give up the potential economic value of the basement depends on the measurement of expected results and costs.

Most residents in X community have been farming for a long time, and lost their farmland after relocation, and most families are in financial difficulties. As the income source or residence of some residents, vacating the basement will not only cause inconvenience to the residents with related interests, but even make some families fall into a livelihood dilemma. L Residents don't have stable jobs, so they have to renting basement for three or four hundred yuan a month to subsidize their families. Street-led governance help residents with family difficulties, not only providing unemployed residents with employment and entrepreneurial opportunities, but also providing them with low-cost housing to live. "The community has provided us with stable jobs, so we don't have to rely on the rent in the basement. Besides, the rent is only a few hundred." In addition, most residents of X community moved in from state-owned farms, and the geographical relationship made the internal social network close, and the internal norms formed within the residents group reduced the implementation cost of external policies. Residents who haven't vacated the basement are under the administrative pressure from the street, the emotional pressure from the grid organization and residents, and they are feeling guilty and uneasy, even their self-esteem is frustrated, and their personal spiritual cost increases. "Those who used to be on a farm are familiar with each other, but now they bow their heads and don't see what they look up to, and they are embarrassed not to change". The expected income of residents is greater than the cost, and they have chosen to accept the renovation of the basement.

Good supervision is the premise of credible commitment, which is the foundation of long-term collective action. Through the petition, a volunteer team was set up among residents in the X community. The street-led governance encouraged volunteers to actively supervise the use of the basement. Volunteers also had the right to supervise the grid organization. Residents not only know the information about the basements, but also supervise the behaviors of grid organizations and other residents. The perfect supervision system gradually builds up the trust among residents, that is, believes that other residents abide by the rules of basement use, so as to maintain and continue the effect of basement renovation with street-led governance leading, grid organization assisting and residents participating.



## 6. Discussion

With the help of IAD framework, this study explores the governance logic of underground space in communities. It is found that the whole village relocation of the community has realized the transformation from the traditional village acquaintance society to the resettlement community semi-acquaintance society. The underground space of the community involves the interests of residents, tenants and other complex groups, and it has important economic value, so it will encounter many obstacles in governance. Although this kind of community has experienced the transition from the acquaintance society in the traditional rural areas to the semi-acquaintance society in the resettlement community, it still retains the original social network among the residents. It turns out that the village cadres, production captains and other more prestigious people in the village still have abundant social capital. Xu et al. think that the effective governance of community space conflict can be achieved by using the relationship network of semi-acquaintances of resettlement community. Our study agrees with this view, and further explains the internal logic of social network in the process of community underground space governance. First of all, the street-led governance will give these people the right to help manage and supervise. Although some of them also use underground space illegally, they will take the initiative to rectify it because of their identity and face. Street-led governance supply system, set up a three-level grid organization, and give members certain rights. These prestigious people make use of their own social capital, as the main policy executors and contradiction adjusters in the process of underground space governance, which greatly promote the process of community underground space governance. For those residents who refuse to rectify the basement, under the influence of the original social network, the repeated dissuasion of grid staff and the views and attitudes of other residents will exert emotional pressure on them and force them to rectify.

Decentralization of the government at the grass-roots level encourages people's autonomy, but can the governance effect promoted by the network of semi-acquaintances be sustained? Aitken D believes that residents' participation motivation is affected by responsibility, status and emotional factors, and they may not be interested in participation itself, so decentralization of government may not improve residents' participation. With the gradual integration of the floating population into the community, the heterogeneity of the community population is increasing, which weakens the original social network. Most community residents are not willing to govern independently, while the sense of community responsibility of foreign tenants is not strong. In addition, the lack of substantive reward and punishment measures and the sustainability of governance effect are also worth considering. Therefore, whether the governance effect can be maintained in the future, and how to encourage the public to actively participate in the community underground space governance for a long time, requires further theoretical research.

However, there are some limitations in this research. For example, the logic of community underground space governance proposed in this study is only based on a single case study, and its reliability and effectiveness have not been tested by statistical results. In the future, abstract concepts can be manipulated into variables and a model can be constructed, and the path relationship among variables in the model can be tested through a large sample questionnaire.

## 7. Conclusion

Community underground space involves complex interest groups, so it is difficult to manage. Moreover, due to the high cost of information acquisition and regular supervision, it is difficult to completely eradicate the chaos of illegal use of underground space. Coupled with the transitional characteristics of resettlement community, the property right of community underground space is vague, and the first-come-first-served strategy makes underground space have the characteristics of public pond resources. Based on the analysis of resource attributes, the paper analyzes the interaction of multiple subjects in the process of community underground space governance, and explores its internal logic through the case study of X community and IAD framework. The main conclusions of the thesis are as follows.

Firstly, community underground space is a special type of CPR. Its particularity lies in: because of its vague property rights, it has the nature of some open common-pool resources; at the same time, it also has the nature of partially closed common-pool resources, that is, the owners are relatively fixed and familiar with each other, and it is easy to reach a relatively consistent willingness to act. The utilization of underground space resources in the community is closely related to the interests of residents. It is very expensive for external subjects such as the government to obtain information and supervise the implementation of governance. Therefore, public participation and self-governance are indispensable parts of underground space governance.

Secondly, the governance dilemma of community underground space is mainly caused by the following three reasons: (1) The geographical location of the residential area is superior, the surrounding house prices and rental prices are relatively expensive, while the basement rent is very low. Moreover, there is a large floating population in the region, and the demand for renting houses is great. (2) The property right of underground space is vague, and the first-come-first-served strategy adopted in resettlement leads to unfair distribution of space and aggravates the contradictions and conflicts among residents. (3) The majority of residents in resettlement communities are landless farmers, often without fixed jobs, and their families are in poor economic condition. The rent of underground space is a stable source of income.

Finally, the interactive process between multiple subjects in the governance of community underground space can be summarized as follows. By centralizing regional resources, uniting the public forces, delegating rights to the masses, taking into account the social capital accumulated in resettlement communities, and setting up flexible grass-roots organizations, the government has reduced the cost of information acquisition and supervision; and adopt the people-oriented governance strategy and layers of in-depth governance programs to solve the people's livelihood problems. Grid staff often have rich social capital, and help the government with the help of social networks. As a "middleman" between the government and residents, grid staff, as community residents, can not only act as assistant executors of policies and mediators of contradiction, but also convey residents' suggestions and opinions in time, thus greatly reducing administrative costs. The government has made a strong effort to rectify the situation, which makes it difficult for residents to obtain stable economic income from the basement. In addition, the government has also provided residents with ways to start businesses and obtain employment, thus solving the income problem of residents; grid staff repeatedly come to dissuade them, which increases the spiritual cost of residents. Residents are under the administrative pressure from the government and emotional pressure from the grid organizations at the same time. The expected income of basement renovation was higher than the cost, so they finally chose to accept the renovation. With the encouragement and promotion of the government, residents gradually participate in the management of underground space, and supervise the grid organizations and other residents' misconduct.

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