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Research on the Intelligent Upgrading of Community Cultural Activities: Evidence from Old Communities in Haidian District, Beijing

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Abstract: This paper investigates the current situation of community cultural activities based on questionnaire surveys of residents. It analyzes existing difficulties such as uneven information delivery, low public participation and single activity forms. Combining digital communication tools and online service channels, it puts forward a smart upgrade scheme for community cultural services. The study aims to build an efficient information communication mechanism, enrich cultural supply, and promote the high-quality development of community culture.

Keywords: *Community Culture; Smart Upgrade; Resident Survey; Communication System; Cultural Service*

1.1 Technical and Hardware Level: Unbalanced Infrastructure Layout, Resource Waste and Data Silos in System Construction

1.1.1 Polarized Regional Distribution of Digital Infrastructure. There are significant gaps in smart cultural hardware configuration among different types of communities in China. Mature urban core communities have been equipped with digital carriers such as smart cultural display screens, online activity reservation systems, and VR cultural experience devices, which can support new cultural activities such as online performances and cloud classrooms. However, old residential communities, suburban resettlement communities, and villages under township jurisdiction generally face problems such as incomplete wireless network coverage in public areas, insufficient broadband bandwidth, and scarce smart terminal points. Online live streaming and immersive cultural experiences often suffer from freezes and interruptions, hindering the digital implementation of public cultural services.

1.1.2 Independent Operation of Multiple Platforms Creates Data Silos. Community neighborhood committees, cultural centers, and property service enterprises belong to different management entities, each independently developing mini-programs, activity management backends, and cultural resource databases. The data standards of various systems are inconsistent and interfaces cannot interoperate. Residents' registration information, venue usage records, interest profiles, and cultural material libraries are fragmented, making it difficult to achieve unified activity scheduling, precise crowd profiling, and coordinated resource allocation. The intensive management advantages that digitalization should have are difficult to realize, instead increasing the repetitive workload of grassroots staff.

1.2 Content Supply Level: Imbalanced Supply-Demand Match, Homogenized Online Content, and Low Degree of Virtuality-Reality Integration

1.2.1 Top-Down Supply Model Has Not Undergone Fundamental Transformation. At present, most community smart cultural platforms still continue the traditional approach of assigning activity arrangements, lacking mechanisms for online public opinion collection, resident interest tag classification, and personalized customization. Differentiated needs such as youth aesthetic education and science popularization, middle-aged and elderly health and recreation, and lightweight youth social interaction have long remained unmet. The situation of government-side supply and passive resident participation persists, and digital technology has not solved the long-standing problem of supply-demand mismatch.

1.2.2 Serious Homogenization of Digital Content, Insufficient Exploration of Local Culture. The templating phenomenon of online cultural content is obvious. Online courses and cloud exhibitions mostly directly cite general online materials, lacking original content combined with community historical streets and alleys, local intangible cultural heritage, and neighborhood stories. At the same time, residents' original contributions on the platform update slowly and have high repetition, making it difficult to create community-specific cultural IP, and user activity on online platforms is relatively low.

1.2.3 Online and Offline Activities Are Fragmented, Online Registration and Offline Implementation Are Disconnected. There is a lack of closed-loop design such as live replay, cloud check-in, and points redemption. Digitalization merely copies traditional offline activities online, without extending new activity forms such as immersive experiences, cloud exhibition halls, and online relays. The integration of virtual and reality remains superficial and has not achieved substantive upgrading of cultural activity models.

1.3 Audience Participation Level: Pronounced Generational Digital Divide, Insufficient Participation Will of Different Groups

1.3.1 Generational Digital Capability Differences Hinder Platform Adoption. The age structure of permanent residents in the community is clearly stratified. Middle-aged and elderly groups account for a relatively high proportion of the grassroots community population, but they are generally unfamiliar with smartphone operations and do not know how to use mini-programs to complete online registration or participate in online cultural activities. Young people are busy with daily commuting and find it difficult to participate in offline activities, while online platforms lack fragmented and lightweight cultural content. Both generations struggle to adapt to existing smart

systems, creating a dilemma where the platform cannot cater to audiences at both ends.

1.3.2 Neighborhood Alienation, Residents Lack a Sense of Belonging to Community Public Spaces and Collective Cultural Activities. In addition, existing smart platforms lack positive feedback mechanisms such as points incentives and online honors, so participating in online cultural activities lacks a sense of gain. Activities are mostly carried out through repeated mobilization by community staff, making it difficult to form a community atmosphere of spontaneous resident participation.

1.3.3 Lack of Age-Friendly and Accessible Design, Marginalization of Special Groups. People with disabilities, low-education individuals, and elderly people living alone lack adapted large-font modes, voice guidance, and manual agency channels, further raising the operational threshold of smart platforms. Digital transformation has not taken into account the inclusiveness of public cultural services.

1.4 Operational Guarantee Level: Long-Term Shortcomings in Funding, Talent, and Coordination Mechanisms

1.4.1 Single Funding Source, Lack of Market-Based Self-Generation Mechanism. The intelligent construction of community culture relies heavily on one-time government fiscal appropriations, with narrow participation channels for social enterprises, cultural and tourism institutions, and public welfare social organizations. The investment cost of hardware procurement is high, and there is no dedicated continuous funding for later platform maintenance, content creation, and equipment maintenance. Once fiscal tightening occurs, projects are extremely vulnerable to stagnation. A diversified funding model has not yet been established, and many smart projects exhibit short-term characteristics.

1.4.2 Large Gap in Composite Digital Professionals. Grassroots community staff hold multiple jobs including property management, and dedicated cultural positions are understaffed. Existing staff only have experience in organizing traditional offline activities and lack the composite capabilities of public cultural planning, big data analysis, new media operation, and platform backend maintenance. They cannot rely on data to judge resident preferences and then design creative online activities, leading to the problem of "emphasizing construction over operation."

1.4.3 Vague Rights and Responsibilities of Multiple Parties, Low Cross-Department Collaboration Efficiency. The division of rights and responsibilities among community neighborhood committees, sub-district cultural and tourism offices, third-party technology service providers, property companies, and social organizations is unclear. When system failures or content delays occur, multiple parties shift responsibility to each other. The lack of a unified coordination body has left the operation of smart projects in a management vacuum.

1.5 Institutional Security Level: Imperfect Data Supervision, Deviated Orientation of Evaluation System

1.5.1 Privacy Security Risks in Residents' Personal Information. Smart platforms collect residents' personal information such as names, contact information, activity trajectories, and interest preferences, but grassroots communities lack professional data encryption and hierarchical storage technologies. Some third-party technology service providers have irregular internal management, posing risks of resident information leakage and illegal commercial use. The Personal Information Protection Law lacks detailed implementation rules at the community micro-level, and residents' sense of privacy security is insufficient, leading to resistance to real-name participation in online cultural activities.

1.5.2 Lagging Online Content Review and Value Guidance Mechanisms. Cloud live streaming and biased opinions spread through community smart channels. Currently, there is a lack of pre-review of online content, which can easily create information cocoons and weaken the leading role of grassroots mainstream culture.

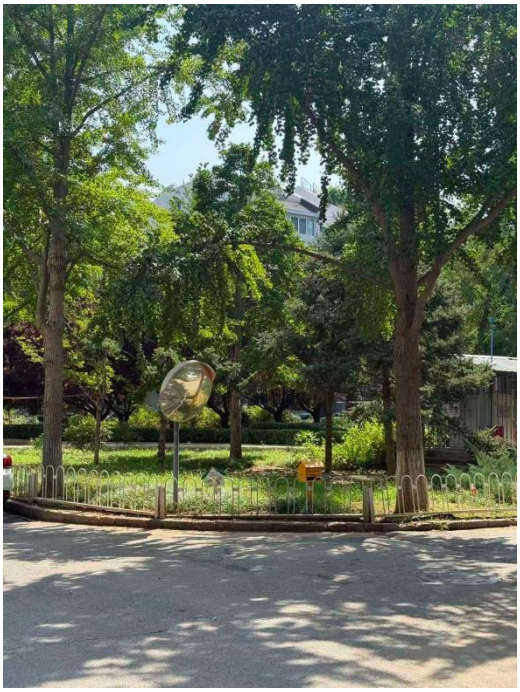
1.5.3 Assessment Standards Emphasize Construction Quantity Over Actual Public Benefits. Current assessments still use the number of platforms launched and smart hardware procurement quantity as evaluation indicators, ignoring core effectiveness such as resident activity, activity satisfaction, and community cultural belonging. The assessment orientation of emphasizing construction over operation and form over substance has spawned a large number of superficial "digital image projects," deviating from the original intention of public cultural benefits for the people.

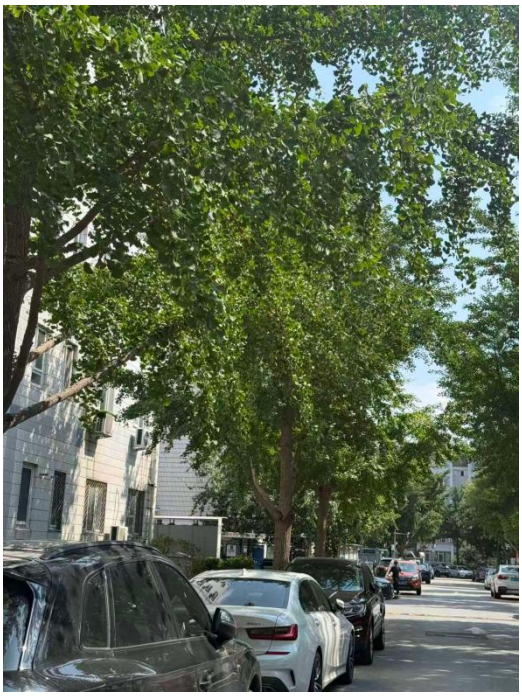
1.6 Overall, the intelligent upgrading of community cultural activities is trapped in practical dilemmas. It is not simply a problem of technological backwardness, but the result of multiple overlapping contradictions: infrastructure layout, supply-demand structure, residents' digital literacy, long-term operation models, and regulatory assessment systems. Planning lacks stratified and categorized differentiation, the traditional single government supply model has not shifted to a diversified co-governance pattern, and the instrumental rationality of technology has overridden the core value of people-oriented culture. This ultimately results in the current situation where intelligent transformation has only a technological shell without a cultural core, and the proportion of cultural empowerment converted into benefits is low and cannot be effectively utilized. This is also the focus of this college student innovation project.

2.1 Field Survey









2.1 Practical Reasons for the Intelligent Upgrading of Cultural Activities in Haidian District Communities

2.1.1 Limited Community Space Resources, Traditional Community Cultural Activities Face Venue Constraints. This community is an old residential area built in an early era. Inside the community are mainly residential buildings, parking lots, and green spaces, with only small leisure corridors and small green open spaces. The number of indoor activity rooms specifically used for community cultural activities is limited. Traditional offline cultural activities are greatly constrained by venue and time. When carrying out activities such as calligraphy and painting, lectures, and literary performances, problems of insufficient venue and limited participation numbers easily arise. Intelligent construction can build online cloud exhibition halls and online classrooms, expanding the spatial boundaries of cultural activities and making up for physical venue limitations.

2.1.2 Diverse Community Demographics, Differentiated Cultural Needs Evident. It can be seen that the community has both permanent elderly residents and a large number of private cars, indicating that the resident population includes elderly groups, young and middle-aged office workers, and external tenants. Haidian District is densely populated with universities and high-tech enterprises, and community residents differ greatly in age, occupation, and interests: the elderly prefer opera, handicrafts, and health science popularization; young people enjoy book clubs, online salons, and cultural and creative activities. Traditional notification methods relying on bulletin boards and verbal relaying cannot cater to the needs of different groups. Implementing classified push and demand collection through smart platforms can adapt to diversified resident needs.

2.1.3 Low Efficiency of Traditional Information Dissemination Methods, Barriers to Information Reach. Field observation shows that the community only has paper bulletin boards and waste sorting signs, lacking digital promotional carriers. Under the traditional model, community cultural activities rely on posted posters, neighborhood word-of-mouth, and WeChat group notifications. On one hand, some elderly people cannot use mobile phones and find it difficult to obtain activity information;

on the other hand, office workers are not in the community during the day and cannot see offline announcements in time. Intelligent upgrading can connect online notification and registration channels, expand the reach of cultural activity information, and lower the threshold for residents to access cultural activity information.

2.1.4 Existing Hardware Foundation Has Renovation Conditions, But Insufficient Intelligent Utilization. The community has already been equipped with monitoring equipment, electronic equipment boxes, public leisure facilities, and green landscape basic hardware, possessing the material foundation for intelligent transformation. However, existing hardware is mostly used for security and waste sorting management, not for community cultural services. The existing smart hardware in the community has single functions, only undertaking basic management functions, and has not played a role in cultural dissemination. Promoting the intelligent upgrading of cultural activities can revitalize existing community hardware resources, use community large screens and online platforms to display residents' calligraphy and painting works, replay cultural activities, and achieve hardware utilization.

2.1.5 Contemporary Requirements for Community Governance Modernization, Aligning with Haidian District's Digital Construction Background. As a national science and technology innovation highland, Haidian District's digital governance is an important direction for community construction. Traditional community cultural activities mainly rely on manual organization and paper ledger records, lacking outcome retention after activities end, making activity effects difficult to statistically evaluate. Through intelligent upgrading, realizing the full-process digitalization of activity registration, check-in, feedback, and outcome archiving can accumulate resident participation data, provide data support for community cultural activity planning, improve the refined level of community cultural governance, and align with the development direction of urban community governance modernization.

2.1.6 Solving the Practical Dilemma of Insufficient Community Human Resources. Old communities have limited staff establishment, and traditional cultural activity organization requires a large amount of manual work for notification, registration, personnel statistics, and activity archiving. Smart platforms can simplify registration statistics, resident opinion collection, and other tasks, reduce the clerical burden on community staff, and improve the organization and operation efficiency of community cultural activities.

3.1 Specific Problems Existing in the Intelligent Upgrading of Community Cultural Activities in Haidian District

3.1.1 Templated Smart Platforms, Specific Manifestations of Supply-Demand Mismatch

Most community smart cultural carriers in Haidian District mainly rely on district-level uniformly developed WeChat mini-programs and official accounts, lacking personalized community customization modules.

Activity push is one-size-fits-all, without layered precise services. Taking some communities around Shangdi and Zhongguancun as examples, the jurisdiction has a large number of young internet white-collar workers and university students, as well as many retired elderly residents. The platform simply lists and publishes activity notifications without setting resident interest tags or targeted push based on age, occupation, and preferences. It often happens that opera and health lectures for the elderly are pushed to office workers; while book clubs, intangible cultural heritage handicrafts, and online salons popular with young people are invisible to the elderly. Many residents open the mini-program and cannot find activities they are interested in.

Platform functions emphasize publishing and registration over interaction and accumulation. The vast majority of community online platforms only implement basic functions such as "activity publishing, online registration, and notification reminders." They lack modules for resident work upload and display, interest communities, and activity demand collection. After residents participate in offline calligraphy, painting, and photography activities, their works can only be displayed offline, without online exhibition halls; if residents want to propose what cultural activities they hope to carry out, they can only go to the neighborhood committee in person, and the online feedback entrance has very low usage rate.

Emphasizing construction over operation, some platforms have become decorations. Some communities launched smart cultural modules to meet the civilized city evaluation indicators, but there is no dedicated person to maintain them afterwards. Activity information updates lag, past activities still hang on the homepage; registration channels are not closed after expiration; resident messages go unreplied for long periods, and the platform's actual activity is low.

3.1.2 Prominent Digital Divide, Difficulties in Reaching Elderly Groups with Smart Services

Haidian District has a high proportion of old residential areas and a large elderly population base, making them the main disadvantaged group for smart cultural services.

Online channels are not friendly to the elderly. All cultural activities rely on mini-program appointments for registration. Many elderly people do not know how to use smartphones and cannot register online. Although the community retains offline registration methods, online and offline data are not interconnected, and grid workers cannot synchronize online activity quotas. It often happens that online registration is full, but elderly people who come offline find there are no spots.

Some communities one-sidedly pursue intelligence and weaken offline services. Individual communities invest a large number of resources in online live streaming and cloud exhibition halls, reducing the frequency of offline activity room usage. The elderly are accustomed to face-to-face participation in handicrafts, chess and card activities, and opera performances, which online cloud activities can hardly replace, causing this group to be marginalized by smart services.

Auxiliary fallback measures are not properly implemented. Some communities have not set up the convenient service of "grid worker proxy registration" or dedicated offline operation guidance. Elderly people who want to participate in cultural activities can only rely on neighborhood word-of-mouth, and information acquisition lags behind.

3.1.3 Fragmented High-Quality Cultural Resources in the Jurisdiction, Insufficient Resource Integration Capability of Smart Platforms

Haidian District has a large number of high-quality resources such as universities, cultural centers, museums, intangible cultural heritage inheritors, and literary and artistic associations, but the smart system has not broken through resource barriers.

Fragmented resource libraries cannot be digitally called. University associations, intangible cultural heritage inheritors, and literary and artistic volunteer resources in the jurisdiction are scattered. When communities carry out cultural activities, they still rely on staff to manually contact teachers and instructors by phone and WeChat. The smart platform has not established a resource database of teachers, venues, and programs, and cannot achieve one-click appointment and one-click mobilization. For example, university student literary and artistic teams have the ability to enter communities to carry out science popularization and literary activities, but community smart platforms have no docking entrance, making it difficult for resources to be implemented on the ground.

Digital management of social organizations and volunteers is lacking. Volunteer recruitment, scheduling, and service records for cultural activities mostly rely on manual statistics in WeChat groups. Without access to the smart platform, volunteer service hours and participation cannot be automatically recorded, recruitment efficiency is low, and personnel mobility is high.

Public cultural venues are disconnected from community services. The venue and course resources of Haidian District Library and sub-district cultural centers are not interconnected with community mini-programs. Residents cannot book sub-district libraries and cultural activity rooms through community smart platforms; they need to jump between multiple different APPs, resulting in poor user experience.

3.1.4 Online Platforms Are Disconnected from Offline Positions, Online-Offline Closed Loop Is Broken

Many communities have completed online mini-program construction, but the intelligent transformation of offline cultural positions lags behind, resulting in a disconnect between online and offline.

Offline activity room reservation systems are virtually useless. Although community calligraphy rooms, dance rooms, and libraries have launched online reservation functions, in actual operation, residents still need to register in person at the neighborhood committee. Online reserved spots often conflict with on-site registration, and residents cannot use the venue after making a reservation.

Low utilization rate of offline smart hardware. Community electronic bulletin large screens and smart promotional boards are mostly only used to play notification posters, not to display residents' calligraphy, painting, and photography works or replay cultural activity videos. Some large screens are out of order and idle for long periods without regular maintenance.

The full activity process is not connected. Residents register online, but offline attendance does not implement QR code check-in; after activities end, satisfaction questionnaires are not collected online; activity photos and resident works are not archived online. After a cultural activity ends, data and outcomes only remain on the neighborhood committee's paper ledger and cannot be accumulated and reused.

3.1.5 Weak Data Application, Lack of Scientific Evaluation and Feedback Mechanisms

The core of intelligence is to use data to optimize cultural services, but most communities in Haidian District have data applications that remain at a shallow level.

Data statistics are relatively simple. The system only counts the number of registrants and activity sessions, lacking detailed dimensions: participation rates of different age groups, activity satisfaction, and resident preference analysis. It is impossible to judge through data which types of activities are popular and which have low participation, and activities can only be planned based on staff experience.

Resident demand feedback closed loop is missing. Online questionnaires and opinion message boards are set up, but after residents submit suggestions, there is no feedback processing mechanism. Activities that residents propose hoping to carry out are not followed up and implemented, and residents' enthusiasm for participating in feedback gradually declines.

Risks exist in resident information security management. The registration system collects residents' personal information such as age, contact information, and interests. Some communities do not have comprehensive data management norms, posing risks of resident information leakage.

3.1.6 Grassroots Human Resources and Funding Constraints, Insufficient Sustainable Operation Capability

Intelligent upgrading is not just about building systems; long-term operation is a practical difficulty.

Insufficient personnel strength. Community staff establishment is limited, and there are no dedicated positions responsible for cultural smart operation. Mini-program maintenance, activity publishing, online Q&A, and resident feedback handling are all done part-time by grid workers. The workload is heavy, and information updates and replies tend to be untimely.

Insufficient special funds. There is a lack of dedicated funds for smart cultural hardware equipment repair, online activity operation, and platform iteration. Hardware equipment is not repaired in time after damage; it is difficult to carry out high-quality smart cultural projects such as online live streaming and digital exhibition halls.

4 Optimization Suggestions for the Intelligent Construction of Cultural Services in Old Communities in Haidian District

Based on the questionnaire survey results of 216 residents in old communities of Haidian District, current community cultural activities have problems such as traditionalized information dissemination channels, mismatched resident participation time, insufficient venue supply, low content matching, and pronounced digital divide among elderly groups. At the same time, over 80% of residents have positive acceptance towards intelligent upgrading of cultural services. Based on the practical pain points reflected in the survey and combined with the actual governance of old communities, targeted optimization suggestions are proposed from five dimensions: information dissemination, activity supply, smart platform construction, age-friendly renovation, and venue coordination.

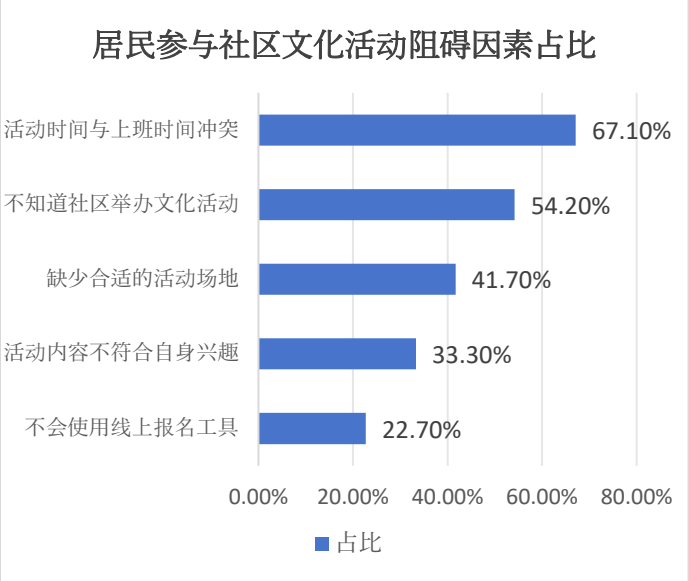
4.1 Build a Diversified Information Dissemination System, Open

Up Intelligent Information Reach Channels

The survey shows that only 5.1% of residents obtain cultural activity information through community smart platforms, and nearly 80% rely on traditional methods such as bulletin boards, WeChat groups, and verbal relaying, with narrow information coverage and poor timeliness. In this regard, communities should build an integrated online and offline information push network.

On one hand, retain traditional offline channels such as community bulletin boards and building notifications to ensure basic information acquisition for the elderly; on the other hand, upgrade community smart mini-programs and official accounts, synchronizing activity previews, registration channels, and activity reviews online to make up for the communication shortcomings of traditional channels. At the same time, establish a WeChat group notification mechanism, pushing adapted activities in a classified manner for middle-aged, young, and elderly groups, solving the problem of asymmetric information transmission and lowering the participation barrier for residents.

4.2 Optimize Activity Time and Content Design, Match Residents' Differentiated Needs



Data shows that 67.1% of residents cannot participate because activity times conflict with work hours, and 33.3% believe activity content does not match their interests. Communities should break the traditional model of holding activities at fixed times and implement a staggered activity mechanism: offering middle-aged and young cultural activities on weekday evenings and all day weekends, and daytime activities suitable for the elderly such as chess and card games, calligraphy and painting, and health lectures, balancing the time needs of office workers and retired groups.

At the same time, conduct surveys on residents' cultural needs, establish a dynamic adjustment mechanism for activity lists, and customize differentiated content such as intangible cultural heritage experiences, parent-child activities, sports and fitness, and literary performances for different groups such as teenagers, middle-aged and elderly people, and office workers. This will avoid the simplification of activity forms, improve the matching between content and resident interests, and enhance residents' willingness to participate from the source.

4.3 Revitalize Existing Space Resources, Address Hardware Shortcomings in Activity Venues

In this survey, 41.7% of residents reported lacking suitable activity venues, and tight space resources in old communities are a common practical problem. Communities can coordinate and revitalize idle rooms, community squares, and other existing spaces, transforming them into small cultural activity rooms and shared activity spaces; collaborate with surrounding enterprises, cultural and creative venues, and New Era Civilization Practice Stations to achieve venue resource sharing and expand external activity positions.

At the same time, carry out intelligent transformation of existing venues, equip with online reservation systems, and residents can book venues in advance through mini-programs to carry out spontaneous cultural activities, achieving efficient utilization of venue resources and solving venue constraint problems.

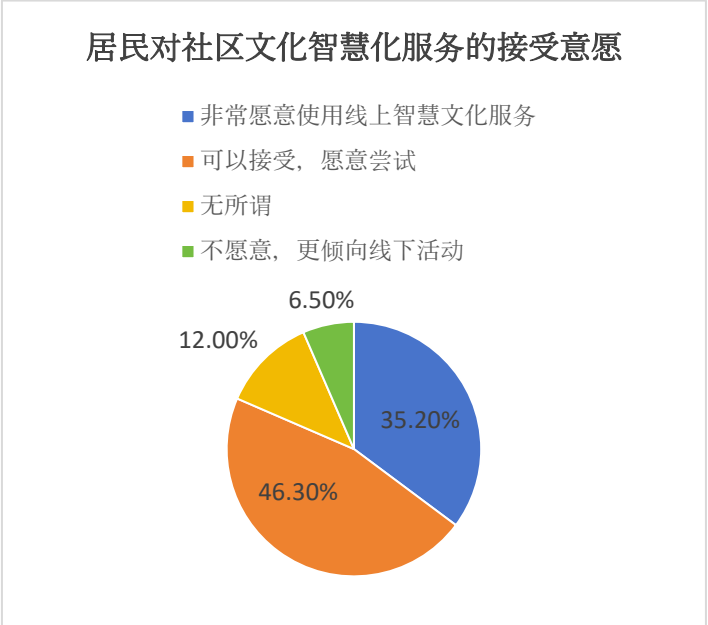
4.4 Promote Age-Friendly Renovation of Smart Platforms, Overcome Digital Usage Barriers

The survey shows that 22.7% of residents have problems not knowing how to use online registration tools, and insufficient digital operation ability of middle-aged and elderly groups is an important obstacle to intelligent construction. The community smart cultural service platform needs to simplify the operation interface, enlarge fonts, streamline functional modules, retain core functions such as registration, inquiry, and activity reservation, and remove complex operation processes.

Regularly carry out public welfare training on smartphone usage and online platform operation, with community volunteers providing one-on-one guidance to elderly residents on using mini-programs; at the same time, retain offline manual registration channels and implement a registration model of "online registration as the main method, offline as fallback supplement," balancing digital convenience with the usage needs of elderly groups and eliminating the digital divide.

5 Research Conclusions and Future Prospects

5.1 Research Conclusions



This study takes old communities in Haidian District, Beijing as the research scenario, collects 216 valid samples through questionnaire sampling, and conducts empirical analysis around the current situation of community cultural activity participation, residents' perception and acceptance of intelligent cultural services. It systematically sorts out the practical dilemmas and transformation foundation of current old community cultural service operation, and forms the following core conclusions.

At the information dissemination level, the distribution of community cultural activity information still highly relies on traditional paths such as offline bulletin boards, interpersonal communication, and community group notifications. The information publishing and reach effectiveness of digital smart platforms have not been effectively brought into play, and the usage rate of online channels is at a low level. The coverage boundary and timeliness shortcomings of traditional communication models directly cause some residents to have insufficient awareness of community cultural activities, becoming a prerequisite obstacle restricting resident participation.

From the perspective of constraints on resident participation, the mismatch between activity time slots and residents' daily work schedules is the primary influencing factor. At the same time, problems such as insufficient activity venue supply and low matching between cultural content supply and residents' personalized needs objectively exist. Middle-aged and elderly groups' insufficient operational adaptability to online registration and smart service tools further exacerbates participation barriers. Multiple practical constraints together lead to the overall participation rate of community cultural activities needing to be improved.

At the level of public opinion foundation for intelligent transformation, survey data shows that most residents hold a positive and accepting attitude towards the intelligent upgrading of community cultural services, and are willing to try or actively accept online cultural service models. Only a few groups prefer traditional offline cultural activities. This data characteristic indicates that promoting the intelligent transformation of cultural services in old communities of Haidian District has broad mass support. Residents' demand for digital cultural services provides practical feasibility for the subsequent digital transformation of community cultural governance.

Overall, at the present stage, the cultural service system of old communities in Haidian District is still dominated by traditional operation models. Intelligent construction has demand support and public opinion conditions, but there are still obvious shortcomings in information channel integration, activity supply optimization, age-friendly digital service adaptation, and spatial resource coordination. The traditional cultural service model has been difficult to match the diversified cultural needs of residents in the new era, and systematic intelligent transformation is urgently needed to achieve service quality improvement and efficiency enhancement.

5.2 Research Limitations and Future Prospects

The scope of this survey is limited to some old communities in Haidian District. The geographical coverage and group stratification of samples have certain limitations, and it has not fully taken into account the differences in communities with different locations and governance foundations. Subsequent research can further expand the survey sample scope, conduct comparative analysis across multiple communities, refine the demand differences of different groups, and improve the universality of research conclusions.

In the future process of promoting the intelligent cultural construction of old communities, we should adhere to demand orientation, gradually promote digital implementation, and avoid over-intelligent construction. On one hand, build an integrated online and offline cultural service supply system, optimize activity time arrangement and content design, revitalize existing space resources, and solve practical pain points at the venue, time, and content levels; on the other hand, focus on digital usage barriers for elderly groups, promote age-friendly renovation of smart service platforms, and support regular digital assistance services, balancing digital convenience with group inclusiveness.

In the long run, we can rely on smart governance platforms to build a closed loop of community cultural services, achieving integrated operation of activity publishing, registration and reservation, demand feedback, and resource allocation. Continuously adapting to residents' dynamic cultural needs, creating a refined and inclusive community cultural service model, empowering grassroots governance through cultural intelligence, enhancing residents' cultural sense of gain and belonging, and supporting the modernization of urban grassroots cultural governance.