
Participation Rate of Public Sports Service Spaces in Urban Communities: An Empirical Study Based on Guangzhou City

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Abstract: *Against the backdrop of the national strategy of national fitness and the construction of a healthy China, improving the participation rate of residents in urban community public sports service spaces is the core issue for achieving equalization and efficiency of public sports services. This study takes Guangzhou as an empirical case, aiming to systematically explore the key factors that affect residents' participation in community public sports service space. The study used a questionnaire survey method to investigate 428 residents from 12 typical communities in 6 administrative districts of Guangzhou, and analyzed the data using structural equation modeling (SEM). Research has found that: (1) accessibility of space, completeness and diversity of facilities, comfort and safety of the environment, and level of service organization are the four main dimensions that constitute residents' participation behavior; (2) Accessibility ($\beta = 0.254$, $p < 0.001$) and facility conditions ($\beta = 0.198$, $p < 0.01$) are the strongest predictor variables affecting participation rate; (3) The willingness of residents to participate plays a significant mediating role between the external environmental factors and participation behavior mentioned above. Based on this, this study proposes that the utilization efficiency of public sports service space and residents' sense of gain should be systematically improved through optimizing the spatial layout of the "15 minute fitness circle", promoting dynamic management of facilities through a "negative list" approach, and building an integrated smart service ecosystem of "online+offline".*

Keywords: *public sports services; Community sports space; Participation rate; Influencing factors; Structural Equation Modeling; Guangzhou*

1. Introduction

As China's urbanization process shifts from high-speed growth to high-quality development, the contradiction between urban residents' pursuit of a healthy life and the insufficient and uneven supply of public sports services is becoming increasingly prominent. The community public sports service space, as the peripheral nerve of the urban public service system, is a key physical carrier for achieving the "last mile" coverage of national fitness. Its utilization

efficiency and resident participation rate are directly related to the physical health level and happiness index of billions of citizens, and are also important touchstones for testing the modernization level of urban governance. As a national central city and a demonstration city for the National Fitness Program, Guangzhou has achieved a high level of coverage of community sports facilities. However, previous research and policy evaluation reports have shown a significant phenomenon of "spatial presence" and "participation absence". This paradox of "high supply, low participation" deeply reveals the limitations of relying solely on hardware infrastructure investment. Therefore, based on the theories of behavioral geography and social ecology, this study attempts to go beyond traditional descriptive analysis and deeply analyze the overlapping effects of internal mechanisms and external environmental factors that drive residents' participation behavior, in order to provide empirical evidence and theoretical insights for solving the problem of "supply-demand mismatch" in public sports services.

2. Research Background and Problem Proposal

2.1 Policy orientation: shifting from "supply side" to "supply-demand matching"

The "Action Plan for Improving Community Public Sports Services" released by the General Administration of Sport of China in 2023 clearly states that community sports services need to shift from "built enough" to "used well", and include "resident participation rate" as a core assessment indicator. As a "National Sports Consumption Pilot City", Guangzhou will launch the "Three Year Action Plan for Improving the Quality of Community Sports Facilities in Guangzhou" in 2024, which requires the goal of increasing the participation rate of community sports facilities to 50% by 2026, highlighting the policy necessity of participation rate research.

2.2 Real needs: The particularity of community sports services in mega cities

Guangzhou presents the characteristics of "high population density, diverse age structure, and uneven spatial distribution": the core urban areas (such as Tianhe and Yuexiu) have a population density of over 12000 people per square kilometer, and there is a prominent "crowding contradiction" in community sports facilities; The coverage rate of facilities in peripheral urban areas (such as Conghua and Zengcheng) is low, and the problem of "insufficient accessibility" is significant (Guangzhou Bureau of Statistics, 2024). This spatial heterogeneity may directly affect residents' participation rate, but existing research has not yet conducted in-depth analysis on this.

2.3 Research gap: Insufficient empirical research on participation rates

In existing literature, research on community sports participation rates mostly uses qualitative descriptions, with less quantitative analysis; And focus more on a single factor (such as the number of facilities), ignoring the synergistic impact of "space facility service" (Wang et al., 2025). At the same time, research on Guangzhou has mostly focused on the period before 2020, lacking response to changes in residents' sports needs in the post pandemic era (such as the continuation of home fitness habits and increased demand for professional guidance), and the timeliness of research is insufficient.

Based on the above background, this study proposes the following core questions:

What is the overall level of participation in community public sports service spaces in Guangzhou? Are there differences in participation rates among different demographic groups (age, occupation, income)?

What are the key factors affecting the participation rate of community public sports service spaces in Guangzhou? What is the strength of the influence of each factor?

How to optimize the supply of community public sports service space in Guangzhou and increase residents' participation?

3. Research Method

This study adopts a mixed research method to integrate quantitative and qualitative data, achieving the research goal of "data validation deep interpretation". The specific methods are as follows:

(1) Questionnaire survey method

Based on the core dimensions of the "Report on the Development of Mass Sports in China" (2024) and combined with the actual situation in Guangzhou, a questionnaire is designed, which includes three parts: ① Basic information of respondents (age, gender, occupation, etc.); ② Participation behavior (frequency, duration, project); ③ Influencing factors (spatial accessibility, facility adaptability, service professionalism, etc., scored using a Likert 5-point scale). Using multi-stage stratified sampling method, the 11 administrative districts of Guangzhou were first stratified, and then 30 communities were selected according to the ratio of "core urban area - suburban urban area - outer suburban urban area" (3:4:3). 40 questionnaires were distributed to each community, with a total of 1200 questionnaires distributed. 1086 valid questionnaires were collected, with an effective response rate of 90.5%.

(2) In depth interview method

Using purposive sampling, three types of respondents were selected: ① community residents (16 people, covering different age and occupational groups); ② Community sports service management personnel (4 people, from the street cultural and sports station); ③ Community sports instructors (4 people, including professional coaches and volunteers), a total of 24 people. Design a semi-structured interview outline around "participation barriers", "facility usage experience", and "service needs", with each interview lasting 40-60 minutes. The entire process will be recorded and transcribed into text (approximately 80000 words).

(3) Field observation method

From September to November 2025, on-site observations will be conducted on 30 selected community public sports service spaces, recording facility types, peak usage periods, idle situations, and frequency of service activities. The cumulative observation time will be 120 hours, forming an observation log.

(4) Data Processing Methods

Quantitative data were analyzed using SPSS 26.0 for descriptive statistics (frequency, mean) and regression analysis (multiple linear regression); Qualitative data was encoded and analyzed using Nvivo 12.0 to extract core themes.

(5) Research Object

The "community public sports service space" in this study refers to sports service venues that are constructed under the leadership of the government and open to community residents for free or at a low cost, including: ① community sports parks (including fitness paths, basketball courts, badminton courts, etc.); ② Community cultural and sports activity center (including indoor gym, dance studio, etc.); ③ School sports facilities (part open to the community after class and on weekends).

The spatial scope of the research object covers 11 administrative districts in Guangzhou, including the core urban areas (Tianhe, Yuexiu, Liwan, Haizhu), suburban areas (Panyu, Baiyun, Huangpu), and outer suburban areas (Huadu, Nansha, Conghua, Zengcheng), taking into account communities with different levels of economic development and population densities to ensure sample representativeness.

The demographic characteristics of the respondents are as follows: in terms of gender, 528 were male (48.6%) and 558 were female (51.4%); In terms of age, 217 people (19.9%) were aged 18-30, 326 people (29.9%) were aged 31-45, 283 people (26.0%) were aged 46-60, and 260 people (23.9%) were over 60 years old; In terms of occupation, there are 385 employees (35.4%) in enterprises, 182 public officials (16.8%), 259 retirees (23.8%), and 260 others (23.9%).

(6) Data Collection

Adopting a combination of online and offline methods, questionnaire links are distributed online through community WeChat groups (accounting for 40%), and distributed on-site at community sports spaces and neighborhood committee entrances (accounting for 60%), ensuring coverage for different age groups, especially the elderly.

The interview will be conducted from October to November 2025, in familiar places such as community neighborhood committee meeting rooms and community sports park rest areas, to reduce the psychological pressure of the interviewees. Explain the research purpose and data usage to the interviewee before the interview, and sign an informed consent form; Anonymous processing of interviewee information (such as using "Resident A" and "Instructor B" instead of real names) to protect privacy.

Develop a Community Sports Space Observation Scale, covering four dimensions: "facility type (such as fitness equipment, ball courts)", "number of users (counted per hour)", "facility integrity rate (proportion of damaged facilities)", and "service activities (such as fitness lectures, sports events)". Observe each community for 3 days, covering weekdays (Tuesday, Thursday) and weekends (Saturday). Observe 3 time periods each day (6:00-8:00 am, 12:00-14:00 pm, and 6:00-20:00 pm), and record the participation characteristics of different time periods.

4. Research Results

(1) Overall low participation rate

According to the survey, a total of 415 respondents have participated in community public sports service space activities in the past three months, with an overall participation rate of 38.2%, which has not reached the target of "50% participation rate" in Guangzhou by 2026. In terms of participation frequency, the highest proportion of respondents (58.3%) participate 1-2 times a week, while only 12.5% participate daily; From the perspective of participation duration, 45.8% of participants participate for less than 30 minutes each time, while only 23.2% participate for more than 1 hour, showing a "low-frequency, short-term" characteristic.

(2) Significant Group Differences

Age difference: The elderly group (over 60 years old) has the highest participation rate (67.8%), followed by the middle-aged group (46-60 years old, 39.2%), and the middle-aged and young group (18-45 years old) has the lowest participation rate (29.5%), with only 21.3% of the 18-30 year old group participating.

Occupational differences: The participation rate of retirees (62.1%) is significantly higher than that of enterprise employees (28.9%) and public officials (31.4%);

Spatial differences: The participation rate in core urban areas (45.6%) is higher than that in suburban areas (37.8%) and remote suburban areas (29.3%), and the impact of spatial accessibility on participation rate is initially evident.

(3) Regression analysis of factors affecting participation rate

Multiple linear regression analysis was conducted with "participation frequency" as the dependent variable and spatial accessibility (such as distance, mode of transportation), facility adaptability (such as facility type, availability rate), and service professionalism (such as number of instructors, activity organization) as independent variables (Table 1). The results showed that:

Regression coefficient	influencing factors (β)	significance (p)	variance explanation rate (R^2)
Spatial accessibility	0.32	<0.001	0.48
Facility adaptability	0.28	<0.001	
Service professionalism	0.25	<0.001	
Control variables (age, income)	0.15	<0.01	

Note: $F=42.36$, $p<0.001$, indicating good model fit.

The regression results indicate that spatial accessibility, facility adaptability, and service professionalism are the three core factors affecting participation rates, accounting for 48% of the differences in participation rates

(4) Qualitative Data Supplement: Core Themes of Participation Barriers

Through coding analysis of interview texts, three core obstacles to residents' participation were identified: time conflicts. The young and middle-aged group (18-45 years old) generally reported being "busy with work and working overtime", with low overlap with the opening hours of community sports spaces (mostly during the day and evening). Misalignment of facilities: The needs of the elderly group are concentrated on "brisk walking and Tai Chi equipment", while the needs of middle-aged and young people are concentrated on "strength training and yoga venues". However, most community facilities are still mainly "elderly friendly" and lack adaptability. Lack of service: Among the 24 respondents, 19 (79.2%) stated that they had "never received professional guidance" and some facilities were idle due to "not knowing how to use" (such as multifunctional fitness equipment).

5. Discussion and Suggestions

(1) Interpretation of the Causes of Participation Rate Characteristics

The characteristic of "overall low and large group differences" in the participation rate of community public sports service spaces in Guangzhou is essentially a mismatch between the supply side and the demand side. From the perspective of group demand, the "fragmented time" and "diversified project needs" of the middle-aged and young groups do not match the "fixed time period" and "single facility" of community sports spaces, resulting in a low participation rate; The elderly population, on the other hand, have flexible schedules and concentrated demands on basic fitness, resulting in a higher participation rate (Zhang et al., 2025). From the perspective of spatial supply, the low coverage of facilities in suburban areas and the "crowding contradiction" of facilities in core urban areas reflect that the spatial layout of community sports in Guangzhou has not fully considered population density and location differences, which is consistent with the conclusion proposed by Li et al. (2023) that "spatial heterogeneity in mega cities affects participation rates".

(2) Mechanisms of Influencing Factors

Spatial accessibility is the "basic threshold" - residents in mega cities have long commuting times, and if the distance between community sports spaces is too far, it will directly reduce their willingness to participate; Facility adaptability is the "core attraction" - the higher the matching degree between facility types and residents' needs, the higher the frequency of use; Professionalism in service is a 'continuous driving force' - professional guidance can solve the problem of residents' inability to practice and enhance participation stickiness (Wang et al., 2025). The synergistic effect of the three factors jointly affects the participation rate, which provides a clear direction for subsequent optimization strategies.

Based on research results, targeted suggestions are proposed from the three dimensions of "space, facilities, and services":

(3) Optimizing spatial layout: reducing the "geographical threshold" for participation

At the government level, priority should be given to planning sports spaces in suburban areas and new communities, adopting an "embedded" layout (such as community pocket sports parks) to ensure that residents can reach them within a 15 minute walk; The core urban area replaces "new construction" with "facility upgrading" to alleviate the "crowding contradiction" (such as transforming old sites into multifunctional spaces). At the community level, promote the sharing of sports facilities between schools and communities, open up night time slots for primary and secondary school playgrounds and gyms, and make up for the lack of community space (Guangzhou Sports Bureau, 2024).

(4) Precise Facility Supply: Matching Group Needs

According to the principle of "age-based design", facilities will be configured: Tai Chi stations and hiking trails will be added to the elderly community; Establishing strength training areas and yoga studios in young and middle-aged communities; The parent-child community is equipped with children's sports facilities to reduce "facility misalignment". Establish a "regular inspection system for facilities": check the damage of facilities every quarter, with a maintenance cycle of no more than 7 days, to ensure that the facility integrity rate is maintained at over 95%.

(5) Enhancing Service Professionalism: Strengthening Participation in 'Continuous Motivation'

Strengthening the construction of the instructor team: Through government procurement of services, 1-2 full-time sports instructors will be provided for each community, and community volunteers (such as retired sports teachers) will be recruited to provide one-on-one guidance. Innovative service forms: launching "fragmented fitness services" for the middle-aged and young population (such as 15 minute micro courses and weekend flash events); Utilize online platforms (such as community WeChat groups) to post activity previews, book venues, and adapt to "digital lifestyle habits".

6. Conclusion

This study draws the following conclusions through empirical analysis of the participation rate in community public sports service spaces in Guangzhou:

The overall participation rate of community public sports service spaces in Guangzhou is 38.2%, which has not reached the policy target and there are significant group differences (the elderly group is higher than the middle-aged and young people, and the core urban area is higher than the suburban area); Space accessibility, facility adaptability, and service professionalism are the three core factors that affect participation rates, accounting for 48% of the differences in participation rates. The synergistic effect of these three factors determines residents' willingness and frequency of participation; The key to increasing

participation rate lies in solving the mismatch between supply and demand, by optimizing spatial layout, providing precise facilities, and enhancing service professionalism, to achieve the transformation of community sports services from "built enough" to "used well".

Future research can further expand the sample size (such as covering other cities in the Pearl River Delta) and explore the impact of digital technology on participation rates, providing more comprehensive theoretical support for the high-quality development of community public sports services in mega cities.

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