Scholars Journal of Arts, Humanities and Social Sciences OPEN ACCESS
Abbreviated Key Title: Sch J Arts Humanit Soc Sci
ISSN 2347-9493 (Print) | ISSN 2347-5374 (Online)
Journal homepage: https://saspublishers.com

Research on the Optimization Countermeasures of National Fitness Space in Jinhua City Based on IPA Analysis

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DOI: 10.36347/sjahss.2024.v12i07.006 | **Received:** 17.06.2024 | **Accepted:** 25.07.2024 | **Published:** 27.07.2024

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Abstract **Original Research Article**

In this study, the importance-performance analysis (IPA) method is used to comprehensively evaluate the status quo of the national fitness space in Jinhua City, and the key issues are found through the IPA analysis method and the optimization countermeasures are proposed. The study found that the national fitness space in Jinhua has problems such as uneven distribution and aging facilities, and there are significant differences in residents ' satisfaction and importance. Through questionnaire survey and data analysis, the study identified seven indicators that need to be improved, such as the construction of sports and leisure project sites and the construction of community ' 10-minute fitness circle '. It is suggested that Jinhua City should increase the number of venues and facilities for fitness space, improve service quality, optimize management by digital technology, and strengthen the construction of community fitness circle to meet the growing fitness needs of citizens.

Keywords: Jinhua City, National Fitness Space, Sports Venues, IPA Analysis, Optimization Countermeasures.

INTRODUCTION

As an integral part of urban space, urban national fitness space is the basis for residents to participate in sports and fitness activities 1. Urban national fitness space includes not only specially set sports space, but also potential sports space, such as non-specialized space types that are attached to or exist in urban elements such as roads and parks and mainly undertake sports functions. Because of its good natural resources, the particularity of sports and leisure projects, and the lack of specialized fitness venues, non-specialized fitness venues carry a part of the residents ' fitness and leisure activities 2.

The construction and optimization of national fitness space is of great significance to promote the health of citizens and improve the quality of life. However, there are some problems in the current urban national fitness space, such as uneven distribution, aging facilities, single service function, and backward per capita sports field area. As a result, there is an unbalanced contradiction between the supply of fitness space and the demand of residents for exercise 3, which needs to be optimized and improved by scientific methods.

Jinhua City is located in the central part of Zhejiang Province, with convenient transportation. It is an important transportation hub in Zhejiang Province, and has rich natural and cultural landscapes. It is combined with national fitness activities to develop characteristic fitness tourism projects. At the same time, the population structure of Jinhua City is diverse. The optimization of national fitness space provides rich research samples and practical opportunities. The purpose of this study is to comprehensively evaluate the current situation of national fitness space in Jinhua City, identify key issues and propose corresponding optimization countermeasures through the importance-performance analysis (IPA) method, taking Jinhua City as an example. As an intuitive and easy-to-understand analysis tool, IPA can effectively reveal the gap between urban residents ' expectations and actual performance of the national fitness space in Jinhua, and provide clear improvement direction for decision makers.

Through the IPA analysis method, the key optimization points of the national fitness space in Jinhua City are found out, and practical optimization strategies are formulated in order to achieve the purpose of improving space utilization efficiency, enriching service functions and enhancing citizen satisfaction. It is expected that through the deepening of this study, it can not only provide theoretical support and practical guidance for the optimization of national fitness space in Jinhua, but also provide reference for the planning and improvement of national fitness space in other cities.

1 RESEARCH DESIGN

1.1 Questionnaire Distribution

The questionnaire survey was distributed through paper questionnaires and questionnaire stars to investigate the satisfaction and importance of the national fitness space in Jinhua. From July 6, 2023 to July 10, 2023, a questionnaire survey was conducted in several public places and commercial fitness venues in Jinhua City. A total of 350 questionnaires were distributed, including Sanjiang Liuan, Huhaitang Park, Jinhua Sports Center and some commercial sports venues.343 questionnaires were recovered, and 20 invalid questionnaires were excluded. The recovery rate was 98 % and the effective recovery rate was 92.3 %.

1.1.1 Questionnaire Reliability Test

Cronbach 's α coefficient was used to measure satisfaction and demand. It is generally believed that the internal consistency reliability is insufficient when the Cronbach α coefficient value is lower than 0.6, and it can be accepted when it is higher than 0.6. When it reaches 0.7-0.8, it shows that the scale has high reliability. When it reaches 0.8-0.9, it shows that the reliability of the scale is very good. The satisfaction survey of fitness and leisure space elements in Jinhua City the Cronbach 's α value is 0.943, and the important Cronbach 's α value is 0.956, both of which are greater than 0.9, indicating that the reliability of the scale is good. The CITC value of each measurement item is greater than 0.4, and it is impossible to further improve the Cronbach coefficient value of the scale after deleting any item. Therefore, it is not necessary to delete the item.

1.1.2 Validity Testing

The questionnaire uses factor analysis to analyze the satisfaction and importance indicators of the use of national fitness space in Jinhua City, and uses KMO statistics to measure the satisfaction and importance of residents ' use of national fitness space. The results show that the KMO value of the satisfaction of national fitness space elements in Jinhua City is 0.974, and the KMO value of importance is 0.981. The significance of the statistical values of Bartlett 's spherical test is less than 0.001, and the validity of the questionnaire is good.

1.2 Research Methods

1.2.1 Questionnaire Survey Method

The questionnaire consists of two parts. The first part is the individual information and fitness behavior of the interviewees. The second part is the evaluation of the satisfaction and importance of the national fitness space in Jinhua City. Based on the analysis and reference of relevant research results at home and abroad, the research starts from the six dimensions of resource allocation, spatial layout, environmental design, atmosphere creation, guidance service and management service. A questionnaire including 32 indicators was designed to evaluate the satisfaction and importance of the national fitness space. Through the Likert 5 scale scoring method, the national fitness space in Jinhua was evaluated according to the standard of 1-5 points (very dissatisfied-very satisfied / very unimportant-very important).

1.2.2 IPA Analysis

The IPA analysis method (Important-Performance Analysis) is called the importance-perception performance analysis method. When it is used for satisfaction evaluation analysis, it is the importance-satisfaction analysis method. Importance refers to the user 's emphasis on attributes such as products or services, and perceived performance is a measure of the user 's actual performance of the product or service. The IPA analysis method was first applied in the commercial field. It was proposed by Martilla & James in 1977 4. It was initially applied to the marketing of automobile products. Because it is simple and easy to operate, intuitive and clear, easy to understand, it can accurately reflect and solve problems. Later, it was applied in tourism 6, sports 7, education 8, construction 9, business 10, and other industries ; the IPA analysis method is to construct an IPA map with the importance as the horizontal axis and the satisfaction as the vertical axis through the overall importance and satisfaction mean of the indicators. According to the importance and satisfaction of each indicator, it is positioned in the map to four quadrants. The first quadrant is the dominant area with high importance and satisfaction; the second quadrant is the maintenance area with high satisfaction and low importance; the third quadrant is the opportunity area with low importance and satisfaction; the fourth quadrant is a repair area with high importance but low satisfaction. The research will use the IPA analysis method to analyze the 32 indicators in the six dimensions of Jinhua 's national fitness space resource allocation, spatial layout, environmental design, atmosphere creation, guidance service, and management service.

2 RESULTS AND ANALYSIS

2.1 Respondents' Basic Information

A total of 323 subjects were included in the survey, of which 174 were males, accounting for 53.9 %, and 149 were females, accounting for 46.1 % (see table 1). The gender ratio of the survey population was not

much different. The age structure is roughly divided into seven levels. From the perspective of age distribution, the number of people aged 18-25 is the largest, accounting for 33.7 %, followed by people aged 26-35, accounting for 31.3 %. There are fewer people aged 66 and over, and the age distribution is mainly concentrated in people aged 18-35. The educational background is mainly concentrated in junior college or undergraduate (51.1 %), followed by high school or technical secondary school (28.2 %), postgraduate (14.2 %), junior high school and below (6.5 %). The occupational distribution of respondents was as follows : business and service personnel (25.4 %), professional and technical personnel (14.9 %), students (12.7 %), heads of state organs, party organizations, enterprises and institutions (11.5 %), others (9.6 %), retired (9.3 %), while clerical staff and related personnel (6.2 %), production and transportation operators (5.6 %), agriculture, forestry, animal husbandry, fishery and water conservancy production personnel (4.3 %), military personnel (0.6 %) points.

Table 1: Basic information of respondents (N = 323)

Individual information	**Grouping**	**Percentage (%)**
Gender	Male	53.9
	Female	46.1
Age	17 years and under	2.5
	18-25 years old	33.7
	26-35 years old	31.3
	36-45 years old	20.1
	46-55 years old	8.4
	56-65 years old	3.1
	66 years and older	0.9
Education level	Junior high school and below	6.5
	High school or technical secondary school	28.2
	College or undergraduate	51.1
	Postgraduate and above	14.2
Profession	Heads of state organs, party organizations, enterprises and public institutions	11.5
	Professional and technical personnel	14.9
	Clerks and related personnel	6.2
	Business, service personnel	25.4
	Agricultural, forestry, animal husbandry, fishery, water conservancy production personnel	4.3
	Production, transportation operations related personnel	5.6
	Soldiers	0.6
	Students	12.7
	Retirement	9.3
	Other	9.6

2.2 Paired Sample T Test of National Fitness Space Index in Jinhua City

A comparative analysis of the data in Table 2 shows that the most important indicator of the respondents is the fitness atmosphere in the sports place (mean 4.10). The average importance of 18 indicators exceeds 3.90 (overall average), accounting for 56 % of the total indicators. Through the difference between satisfaction and importance (P-I), it can reflect the indicators that the respondents think important but are not satisfied with them. Therefore, according to the difference size, the top six are the construction and development level of sports and leisure venues, the guidance level of social sports instructors, the number of social sports instructors, the provision of technical guidance services, the construction and services of sports associations or sports organizations, and the balance of venue facilities in different regions. It shows that the respondents ' expectations and satisfaction with the six indicators do not match weLl, so the construction of these indicators should be paid attention to.

Table 2: Description of satisfaction and importance index of national fitness space elements in Jinhua City

Index	**Performance** (P)		**Importance** (I)		(P-I)	T	P
	Mean value	Sort	Mean Value	Sort			
1.The number of venues and facilities and per capita sports area	3.51	10	3.91	16	-0.40	-6.28	0
2.Types of sports	3.45	14	4.02	2	-0.57	-6.02	0
3.Standardization of site facilities	3.52	8	3.81	30	-0.29	-6.12	0
4.Equilibrium of site facilities configuration in different areas	3.39	20	4.01	4	-0.62	-7.22	0
5.Effect of opening school sports venues to the outside world	3.32	27	3.52	32	-0.20	-7.86	0

6.Development level of sports and leisure project site construction	3.07	32	3.94	13	-0.87	-5.76	0
7.Convenience of traffic around the place	3.58	3	3.99	5	-0.41	-5.09	0
8.Distance from the place of residence to the fitness place	3.65	2	3.93	14	-0.28	-4.16	0
9.Place layout rationality	3.50	11	3.91	18	-0.40	-5.45	0
10.Matching degree between sports event types and people 's needs	3.45	13	3.95	10	-0.50	-5.66	0
11. The effectiveness of community ' 10-minute fitness circle ' construction	3.36	22	3.96	8	-0.60	-8.09	0
12. Benefits of construction and utilization of site facilities	3.44	15	3.88	20	-0.44	-6.28	0
13.Environmental comfort	3.55	5	3.84	26	-0.29	-6.75	0
14.Site noise control	3.41	19	3.84	27	-0.44	-6.18	0
15.Landscape greening design of fitness place	3.51	9	3.83	29	-0.32	-4.98	0
16.Green coverage rate of residential areas and fitness places	3.56	4	3.95	9	-0.39	-3.65	0
17. Rational use of the natural environment	3.54	6	4.01	3	-0.47	-4.52	0
18.Lighting / shading / rain shelter effect	3.36	21	3.87	24	-0.52	-8.35	0
19. Atmosphere of fitness in sports venues	3.67	1	4.10	1	-0.44	-4.94	0
20.Residential sports culture atmosphere	3.42	18	3.87	23	-0.45	-7.68	0
21. Development of mass sports activities and events	3.34	24	3.89	19	-0.54	-8.05	0
22. Place fitness culture elements	3.33	26	3.92	15	-0.59	-8.08	0
23. Construction and services of sports associations or sports organizations	3.27	28	3.95	12	-0.68	-8.81	0
24.Providing technical guidance services	3.20	29	3.88	21	-0.68	-8.01	0
25. Number of social sports instructors	3.10	31	3.88	22	-0.78	-8.88	0
26. The level of guidance of social sports instructors	3.13	30	3.96	7	-0.84	-7.83	0
27. Management of opening hours of premises	3.54	7	3.77	31	-0.23	-6.61	0
28. Staffing of premises management	3.35	23	3.86	25	-0.51	-7.00	0
29.Reasonability of free or cost standards for venues	3.44	16	3.98	6	-0.54	-6.94	0
30.Place auxiliary facilities	3.43	17	3.84	28	-0.41	-7.82	0
31. Information management level of venues	3.34	25	3.95	11	-0.61	-8.05	0
32. Site safety	3.50	12	3.91	17	-0.41	-8.89	0

2.3 Analysis of Jinhua National Fitness Space IPA

The importance is set to the X-axis, the satisfaction is set to the Y-axis, the mean value of importance is set to the reference axis of the X-axis, and the mean value of satisfaction is set to the reference axis of the Y-axis, which constitutes four quadrants, followed by: the first quadrant-continuing improvement area, the second quadrant-moderate control area, the third quadrant-active expansion area, and the fourth quadrant-key improvement area. The following figure is the IPA quadrant diagram of the 32 indicators of the respondents ' evaluation of the national fitness space elements in Jinhua (as shown in figure 1).

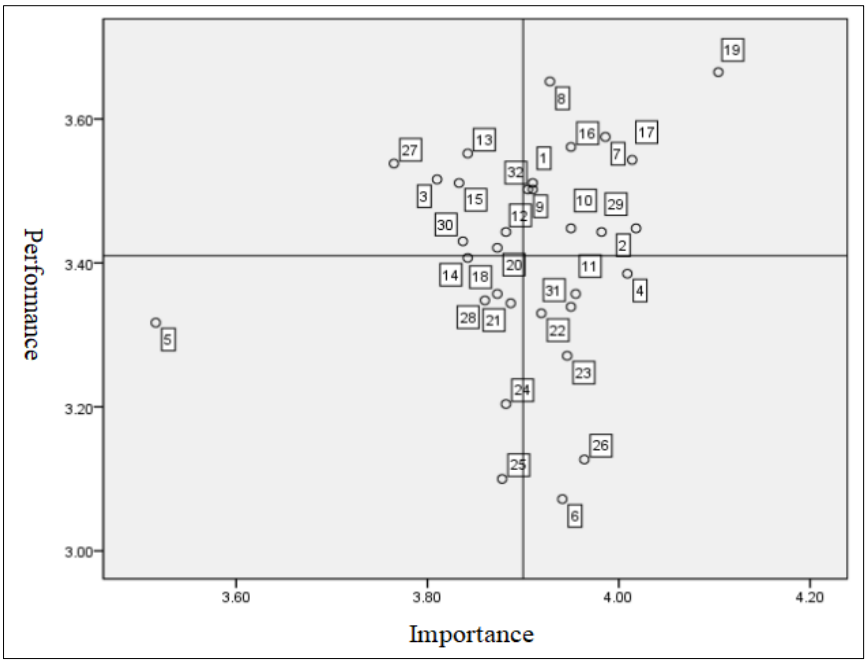

Fig. 1: Jinhua national fitness space IPA quadrant diagram

According to the IPA quadrant diagram, 32 fitness space elements are divided into four quadrants. According to the analysis of different quadrants, the relationship between the importance and satisfaction of the respondents to the national space elements in Jinhua is obtained.

1) The first quadrant (continued ascending zone); the satisfaction and importance of this area are higher than the average level. There are 11 indicators, including the number of venues and facilities, the area of per capita sports venues, the types of sports events, the convenience of transportation around the place, the distance from the place of residence to the fitness place, the rationality of the layout of the place, the matching degree between the types of sports events and the needs of the masses, the green coverage of residential areas and fitness places, the rational use of the natural environment, the fitness atmosphere of the sports place, the rationality of the free or cost standard of the place, and the safety of the place. On the basis of maintaining the status quo, steadily strengthening and improving various indicators can meet the needs of exercisers.
2) The second quadrant (moderate regulation area); the importance of this area is low but the satisfaction is high. There are seven indicators: site facilities standardization, site facilities construction and utilization efficiency, site environment comfort, landscape greening design of fitness sites, sports culture atmosphere of residential areas, site opening time management, and site auxiliary facilities. It can be seen that the respondents have obtained high satisfaction in seven aspects: site facilities standardization, site facilities construction and utilization efficiency, site environment comfort, landscape greening design of fitness sites, sports culture atmosphere of residential areas, site opening time management, and site auxiliary facilities. In the future construction of fitness space, it is only necessary to maintain the existing satisfaction.
3) The third quadrant (active expansion area); the satisfaction and importance of the third quadrant indicators are lower than the average level. The indicators that fall into the third quadrant include your evaluation of the implementation effect of the opening up of school sports venues, noise control of venues, lighting / shading / rain avoidance effects of venues, mass sports fitness and sports leisure activities and events, provision of technical guidance services, and number of social sports instructors.
4) The fourth quadrant (key improvement area); in this quadrant area, the importance of indicators is higher and satisfaction is lower. A total of 7 indicators are distributed in this area, namely, the balance of venue facilities in different regions, the level of construction and development of sports and leisure venues, the effectiveness of community ' 10-minute fitness circle ' construction, the elements of venue fitness culture, the construction and service of sports associations or sports organizations, the guidance level of social sports instructors, and the information management level of venues. At present, the ' 15-minute ' fitness circle is basically covered, but the ' 10-minute ' fitness circle has not been fully constructed. In terms of the balance of the distribution of venues and facilities, fitness facilities do not meet the needs of exercise. Most of the sports facilities that residents like are distributed in sports parks, national fitness centers and other places, which leads to the dissatisfaction of the interviewed residents.

3. CONCLUSION

1) The respondents ' average evaluation of the overall satisfaction of the national fitness space in Jinhua is 3.41, and the average evaluation of the overall importance is 4.10. The score gap between the two is large, and there is still much room for improvement in the national fitness space in Jinhua.
2) 11 of the 32 indicators of the national fitness space in Jinhua are distributed in the first quadrant. Most of these indicators come from the three dimensions of resource allocation, spatial layout and environmental design. The second quadrant distributed 7 indicators, 4 indicators from the spatial layout and environmental design, which also shows that the material basis of the national fitness space in Jinhua is relatively good.
3) Most of the indicators in the three dimensions of atmosphere construction, guidance service and management service are distributed in the third quadrant and the fourth quadrant ; there are deficiencies in the construction and management services of the fitness soft environment of the national fitness space in Jinhua City, especially in the aspects of guidance services and atmosphere creation. When communicating with the interviewees, the interviewees also mentioned that they hope to get scientific guidance during exercise, and also hope to join sports associations and participate in exercise with more people.

4. SUGGESTIONS

1) Jinhua should continue to transform or increase the number of venues and facilities in the national fitness space, expand the area of sports venues and facilities, open some schools to the

society in light of the actual situation 13, increase the number of sports venues and facilities available to residents, and ensure the diversification of facilities and facilities to meet the needs of different age and interest groups. At the same time, improve the quality of service, including strengthening the safety supervision of the place, optimizing the opening time of the place, service process, and opening some sports facilities to residents for free or low fees.

2) Using digital technology, such as big data analysis, etc., to establish a digital and intelligent fitness space management system. Through online reservation system, online health consultation and other functions, personalized service is provided. In addition, the use of Internet of Things technology to monitor the use of facilities to achieve efficient allocation and maintenance of resources, while improving the convenience and interactivity of the fitness experience through digital means 12.
3) Optimize the configuration of venues and facilities in different regions 14, strengthen the construction effect of community fitness circle, enrich the cultural elements of place fitness, enhance the construction of sports and leisure venues, hold various sports events and activities, cultivate residents ' health awareness, popularize scientific fitness knowledge through education and publicity activities, improve residents ' fitness enthusiasm, and strengthen the construction of urban sports culture.
4) The government should introduce relevant policies to provide financial subsidies, tax incentives and other incentives to encourage public and private investment in the construction and operation of national fitness space. At the same time, integrate education, health, sports and other multi-sectoral resources to form a joint force to jointly promote the development of fitness space 11. Attracting social capital participation, realizing resource sharing and complementary advantages, and improving the efficiency and quality of fitness space construction and operation.

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