Evaluation of Urban Pocket Parks Based on KANO model—A Case Study of Guilin

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Abstract: Pocket park, as a green activity space to fill the blank area of high-density city, plays an important role in the urban transformation period under the background of park city. In this paper, based on the KANO model, two types of pocket park in Guilin city, to customer satisfaction as the breakthrough point, the use of Better-Worse and FAST method for data analysis, research the current demand for the use of pocket parks, urban residents found the pocket park planning and design is too estimation and lack of regional and humanistic care, and public ideology into the lack, neglect the user experience and needs, contributions to urban vitality wake-up is weak. Combined with the results of data analysis, this paper puts forward suggestions on the renewal and promotion of pocket parks from the perspectives of users, pocket parks themselves and the government, which is also expected to provide new ways and ideas for the transformation of park cities in the new era.

Keywords: Pocket park; KANO model; Better-Worse; FAST; Customer satisfaction; Planning advic

China is in the prime time of rapid development. By 2019, The total population of China has reached 14.0005 billion, and it is expected to increase by 5 million in 2020. At this point, the average population density will reach 145.8 people per square kilometer. Living in such a high-density city, people begin to urgently need an open green space, so that the body and mind can breathe for a moment. For this reason, pocket Park, as a solution to the problem of land resource utilization in the urban area in the transformation of park city, has once again stepped onto the focus stage.

1 The Meaning and Characteristics of Pocket Park

1.1 Meaning

The concept of "pocket park" was first put forward by the American landscape designer Robert Zion in an exhibition in 1963 (Bruce, Pan & Fu, 2017). As a foreign word, pocket park is a literal translation of Vest-pocket park. It is also a nickname for the classic Perot Park, which compares the small urban open space to a pocket in a vest. As a humble little things, most of us in life won't be too much care about the existence of the pocket, but when we need it, such as the day is cold will hand into his pocket, and put some precious things in close-fitting pocket medium, we will feel the little things bring us the warmth, safety and privacy, pocket park also convey the meanings.
1.2 Characteristic

As an elastic space in a high-density city, pocket park is a small urban open green space scattered in patches or hidden in the urban structure, characterized by small scale, irregular shape, diverse sites, short service radius, wide application and convenient use (Zhang, 2007; Song & Zhang, 2018). Different from landscape and famous scenery, pocket park is in an awkward position in China. In the past, urban planning and development did not pay much attention to the design and implementation of pocket park. 2015 urban concept after the update, various community transformation began preliminary propulsion, the after entering a new era of socialism with Chinese characteristics, the level of material quickly improve makes people began not satisfied with the current high density urban living space, a large park with low accessibility cannot fill people strong green land use requirements, in order to alleviate the pressure of the city, the government began to use soft handling (Li, 2015) in the corners of the city construction scattered green living space, to meet the demand of people's social recreation, and growing up.

2 Research and Evaluation Analysis of Guilin Pocket Park Based on KANO Model

2.1 Establish a Two-dimensional KANO Model

In 1984, Noriaki Kano, a professor at Tokyo Institute of Technology in Japan, started from Frederick Herzberg's two-factor theory of quality, studied a two-dimensional nonlinear relationship curve model between service quality and user satisfaction, and named it KANO model (Kano, Seraku & Takahashi, 1984). KANO model was first applied in the field of product design, mainly to classify user requirements and prioritize them (Hong & Wu, 2019). With the increasing application of KANO model and the continuous integration of landscape architecture and other disciplines, it can not only be used to measure the quality characteristics of products, but also be used to evaluate user satisfaction and user demand of pocket Park, a special urban green product.

Figure 1  Kano demand model curve
As shown in Figure 1, the horizontal axis represents the realization degree of some function or service in the pocket park, and the vertical axis represents users’ satisfaction degree of environmental quality experience in the pocket Park. According to the crossover relation between horizontal and vertical coordinates, the characteristics of Kano demand model are divided into the following five types: charm characteristics, expected characteristics, indifference characteristics, necessary characteristics and reverse characteristics (Peppers, Rogers & Dorf, 1999; Wind & Rangaswamy, 2001; Tseng & Radke, 2011).

2.2 Kano Questionnaire was Established

Kano questionnaire is for pocket park (product) of the function of each concrete characteristics of positive and negative questions from two levels, with "very satisfied, granted, it doesn't matter, can endure, not satisfied" five types as options, respectively to collect users for pocket park has a particular function satisfaction, in order to reflect the presence of a function with the value, as shown in figure 2.

<table>
<thead>
<tr>
<th>Function</th>
<th>very satisfied</th>
<th>granted</th>
<th>it doesn't matter</th>
<th>can endure</th>
<th>not satisfied</th>
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<td>4</td>
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<td>3</td>
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Pocket parks in cities are mainly divided into three types due to their different demand groups. The first type is commercial pocket parks, mainly used by white-collar workers and leisure shoppers in this area. The second is the residential pocket park. The user structure is the most complex, and residents of all ages, personalities, education levels and income levels can exist. The third type is the traffic hub pocket park, the user is mainly passing pedestrians. Because the users of the hub pocket park are relatively single, this paper focuses on the discussion of commercial and residential pocket park. Based on these two types, a commercial pocket park located near Wanfu Square (Figure 3) and a residential pocket park located in Wa Yaokou (Figure 4) were found in Guilin city, and Kano questionnaire was distributed among users.
2.3 Results of Kano Questionnaire

During the field visit, a total of 200 Kano questionnaires were distributed, including 100 for commercial and 100 for residential pocket parks. 70 and 86 questionnaires were returned, among which 66 and 78 were valid. The user satisfaction with this functional requirement in these valid questionnaires was quantified, and then the features in Table 1 were selected to obtain the final features of this function.

<table>
<thead>
<tr>
<th>User demand</th>
<th>Landscape does not have this function</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>very satisfied</td>
</tr>
<tr>
<td>very satisfied</td>
<td>Q</td>
</tr>
<tr>
<td>granted</td>
<td>R</td>
</tr>
<tr>
<td>it doesn't matter</td>
<td>R</td>
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<tr>
<td>can endure</td>
<td>R</td>
</tr>
<tr>
<td>not satisfied</td>
<td>R</td>
</tr>
</tbody>
</table>

N(Necessary); E(Expected); C(Charm); I (Indifferent); R (Reverse); Q (Questionable)

The results of the commercial pocket park survey are as follows:
- Necessary features: safety function; social function; rest function
- Expected features: privacy function; barrier-free design function; noise reduction function
- Charm features: entertainment function; exercise function; decompression function; aesthetic
function; biodiversity function
Indifferent features: educational function; toilet function; religious function; mouth function;
accessibility function; open function; dust removal function; rainwater collection function

The results of the residential pocket park survey are as follows:

Necessary features: entertainment function; safety function; social function; rest function; barrier-free design function
Expected features: Privacy features
Charm features: education function; exercise function; decompression function; aesthetic function;
toilet function; noise reduction function; dust removal function
Indifferent characteristics: religious function; mouth function; accessibility function; open function;
biodiversity function; rainwater collection function

Through the questionnaire survey of users of two different types of pocket parks, it can be found that due to the different users, some functional features are also classified differently. Residential pocket park users because the old man and the child for a larger proportion, and the entertainment function and has become a user accessible design essential properties, the functions of education, such as toilet, dust function because of the demand of parents and children also promoted to charm characteristics, and for the noise reduction function, because the elderly are prone to frolic easy to generate sound, emptiness, children in residential pocket park, importance than the commercial type pocket park down instead.

2.4 Deficiencies of Kano Two-dimensional Model

Most of the analysis methods of Kano two-dimensional model are used to detect users’ satisfaction with products (Lei, Liu & Jing, 2018). Pocket park is a place for people in high-density cities to relieve pressure and relax. It is also a special product and a landscape design with a service nature greater than ornamental nature. Therefore, KANO model can be used to evaluate and analyze the user satisfaction of the users. However, the traditional two-dimensional KANO model still has its drawbacks: (1) the KANO model, which evolved from the two-factor theory of quality, is a typical qualitative analysis, which can only reflect the satisfaction of users, but cannot calculate the degree of satisfaction; (2) The classification of KANO model is determined by selecting the element with the highest occurrence frequency. In the case of no significant advantage in the maximum occurrence frequency, the classification results will be diversified and the logic is not rigorous enough; (3) In the same Kano category, there is no clear order of importance of functional features, so priority cannot be judged when making decisions on functions of the same category. Based on these three defects, it is necessary to make use of other analysis methods to make up for the loopholes in data screening based on the analysis of KANO model.
2.5 Optimization of KANO Model

2.5.1 Better-Worse Coefficient Analysis

The KANO model cannot quantitatively calculate the degree of influence of this feature on increasing user satisfaction or eliminating user dissatisfaction. To make up for this defect, Berger et al. (2011) put forward two indexes, Better and Worse, to reflect user satisfaction.

There is a satisfaction coefficient for this function: \[ \text{Better} = \frac{(A+O)}{(A+O+M+I)} \]

There is no dissatisfaction coefficient for this function: \[ \text{Worse} = -1 \times \frac{(O+M)}{(A+O+M+I)} \]

The satisfaction coefficient Better is usually positive, and the dissatisfaction coefficient Worse is usually negative, with the absolute value ranging from 0 to 1. According to the Better-Worse coefficient, services with a higher absolute value have a higher priority. According to the results obtained by KANO model, and then introduced into the formula, the functional feature quartile map is obtained.

By comparing the functions of Figure 5 and Figure 6 in the same feature, it can be concluded that:

**Commercial pocket Park Priority (from high to low):**

- Necessary features: safety features; social function; rest function
- Expected features: privacy features; barrier-free design function; noise reduction function
- Charm features: entertainment function; aesthetic function; decompression function; exercise function; biodiversity function
- Indifferent characteristics: educational function; mouth function; toilet function; open function; accessibility; rainwater collection function; dust removal function; religious function

**Residential pocket Park Priority (from high to low):**

- Necessary features: safety features; social function; rest function; entertainment function; barrier-free design function
Expected features: privacy features
Charm features: educational function; decompression function; exercise function; dust removal function; aesthetic function; toilet function; noise reduction function
Indifferent characteristics: accessibility; open function; biodiversity function; rainwater collection function; mouth function; religious function

2.5.2 Technical Method of Functional Analysis System (FAST method)

The FAST (Function Analysis System Technique) Technique is a top-down systematic Analysis method, which is used to define the internal functions of the so-called landscape (product), determine the internal relations between the functions, and find out the value of the main functions to the landscape (product). It orders functions in a logical order, distinguishes the relationship between priorities, and verifies the interdependence of functions (Otto & Wood, 2007). By analyzing users' functional requirements for the landscape, the functions of the landscape are carefully processed (Figure 7).

![Figure 7 FAST function tree diagram](image)

By further analyzing the functional requirements of users for pocket park, FAST method function tree is created, as shown in Figure 8 and Figure 9. Pocket park is designed as an urban elastic space that meets the needs of different users and has all the required functions.
Figure 8  FAST functional tree in commercial pocket park

Figure 9  FAST functional tree in residential pocket park
3 Data Analysis Results and Design Planning Suggestions

3.1 Data Analysis

Through the establishment of KANO model and the subsequent modification of this model, we can get users' various demands for pocket parks, including recreation, social security, sports decompression, privacy aesthetics, etc. After analyzing the data, it is found that the behavioral needs and characteristics of pocket park users are different from those of ordinary urban gardens: (1) the users are generally nearby office workers and residents, mainly the elderly and other people who can't go far away. They use them more frequently, for a longer time, and are less affected by the environment, climate and temperature; (2) The main activities of users are rest and heart-to-heart talk, and most of the time is after early morning and evening, and the flow of people in the afternoon on weekends is also large; (3) The users are mostly concentrated around the edge of the tree pool and strange stories. They are not interested in the open square that cannot shade from the sun and do not depend on the green space; (4) For the old people who accompany with them to the park, the satisfaction rating is ok due to the entertainment and chatting activities such as chess and CARDS, friends, etc., while for the users who have no entertainment activities and wander for leisure, the satisfaction rating is low, and they are not strongly dependent on the infrastructure in the park (Li, Zheng, Shao & Yan, 2008).

With the comparative investigation of inner pocket park in guilin and the analysis of user satisfaction, it is found that there are many obvious problems in the inner pocket park in guilin: (1) the construction is basically a model planning, lacking of specific regional targeting; (2) More decoration than use, or even lack of rich decoration, less care for user experience; (3) Lack of humanized design, design does not follow the principle of people-oriented, only greening rather than landscape; (4) Through the design reflects the limitations of domestic designers in the design concept and professional quality; (5) Planning and design is only unilateral construction and lacks the integration of public ideology.

3.2 Design Planning Suggestions

Although on the face of the pocket park fill the gap of urban high-speed development and blank, but in the use value, but neglect the user experience and the demand, the actual situation of the user more focused on the open seat belt, and even bring their own small tables have a rest in the shade, was originally used in leisure activities open square users, this is associated with serious disconnect between design and users, and the serious lack of humanistic care (Gao & Cui, 2016). To solve above problems found, combined with the user satisfaction model, put forward the following Suggestions: (1) urban rapid development will bring high density residential environment, the central city land is scarce and expensive unbalanced green land area and the number of residents, gradually moving in the tiny green areas (Xiao & Li, 2017), type of commercial land affiliated green space often spontaneous into pocket park (LeFlore, 2012). Urban planning should pay attention to the construction of small and micro green space, promote the construction of pocket park; (2) At present, the number
of pocket parks in the city is small, and the green space area in the park is insufficient. Therefore, it is necessary to balance the land allocation appropriately and increase the green space area appropriately to improve people's green space use demand; (3) Pocket park is a small and micro green space. In terms of management, it appropriately combines the surrounding commercial and municipal facilities, reduces the management cost and is more conducive to economic development; (4) Among the basic functions, pocket park should focus on improving rest facilities with significant impact on user satisfaction evaluation, privacy environment with high user expectation and planting of noise-reducing vegetation, so as to meet the needs of most people; (5) Carry out scientific and reasonable detailed design suitable for the old and young, implant horticultural therapy, rehabilitation, fitness and other public green Spaces in the park to meet the development needs of the new era, and make the pocket park become a spiritual link to connect the mass culture, drive the economic vitality of the city and the harmony of neighborhood, so as to achieve better and faster development.

4 Conclusion

The pocket park is suitable in scale, away from noise, practical and convenient in function, and has high aesthetic value. It is the hub connecting the high-speed developed city with the natural environment.

Pocket Park not only enriches the boring life of urban residents, but also is a landscape design full of human interest and contains high cultural significance. At present, the construction of pocket parks in China is in the initial stage of development. Due to the functional complexity of small and micro green Spaces, it is more important for designers to integrate their ideas. As a pointy landscape in urban space, it is frequently used but also fills every blank corner of the city. Its social significance is far greater than the aesthetic significance of the landscape itself. Therefore, in order to inject fresh vitality into the crowded city, the whole society, the government and the public should participate in the construction of pocket parks and make efforts to enjoy a higher quality of life.

References


