

Research on Development Evaluation and Enhancement Strategy of Chengdu Characteristic Neighborhoods Based on AHP-Entropy Value Method

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Abstract: *As an important part of the city, characteristic blocks play a variety of roles such as cultural heritage, commercial consumption, catering and shopping, leisure and entertainment. With the increase of consumption demand and the upgrading of industrial structure, people also put forward higher requirements for characteristic blocks. Taking the characteristic blocks in Chengdu as the research object, this paper constructs a set of comprehensive evaluation system covering the four levels of market, value, management and environment. Combined with the respective advantages of AHP and entropy method, this paper evaluates the typical 20 blocks in Chengdu, and puts forward some suggestions and strategies for the problems in the development of characteristic blocks, which provides a useful reference for the development of characteristic blocks in the city.*

Keywords: *Characteristic neighborhood; Entropy method; AHP; Enhancement strategy*

1. Introduction

With the acceleration of our country's urbanization process, the increase of consumption demand and the optimization and upgrading of industrial structure, as a unique urban public space, by virtue of its unique architectural style, cultural heritage, the scene of business, it plays a vital role in stimulating the consumption upsurge of residents, optimizing the integration of industrial resources, promoting the vigorous development of the service industry, and promoting the development of cities to improve quality and efficiency, the overall market has revitalized regional economic development. However, there are many challenges in the development of the characteristic blocks, such as the lack of unified planning, the confusion of management and the similarity of the development of business forms, which restrict the sustainable development of the characteristic blocks, therefore, it is particularly important to study the development evaluation of the characteristic blocks.

The characteristic block is a kind of urban public space with obvious regional location and regional characteristics, which has the similar type of elements or many kinds of outstanding features and produces strong attraction, bearing the historical and cultural, regional and national, time memory, with catering, entertainment, tourism, shopping and other functions^[1]. In recent years, scholars have done extensive research on the characteristic blocks. Zhang Jun et al. (2015) used the historical blocks along the Chinese Eastern Railway River Delta as the research object, and based on the visual word bag model analysis method, quantitatively analyzed the components of the blocks' spatial elements and the features of the facilities to evaluate them^[2]. Zhao (2018), taking Chuancheng Street Historical and cultural district as an example, evaluates the image of historical and cultural district by using web text method and IPA model combined with various participants^[3]. Chen (2023) uses fuzzy analytic hierarchy process (FAHP) to evaluate Qiaoxi historic district of the Hangzhou section of the canal from four aspects: overall planning and regulation, space and planning, format and positioning, architecture and location^[4].

Although there are more and more researches on the characteristic blocks in recent years, the evaluation methods of the current research are single and subjective. In view of the current research trends and the above deficiencies, this paper, based on a large number of references and expert opinions, constructs a quantitative research index system of characteristic blocks, and uses the method of

combining subjective and objective to conduct a comprehensive evaluation, to reflect the actual situation of the characteristic blocks more objectively and provide more scientific and reliable basis for the in-depth study of the characteristic blocks.

2. The general situation of characteristic blocks in Chengdu

According to statistics of Chengdu Characteristic Commercial Street Association, there are 215 characteristic streets in Chengdu at present, which bring together the cultural essence of ancient Shu, Han, Tang, Ming and Qing dynasties, and have a long historical and cultural background^[5]. With the development and clear positioning of different regions, Chengdu has created streets with different scales, different characteristics and unique atmosphere and style, forming regional symbols represented by Taikoo Li, Kuan Narrow lane and Jinli brand, taking urban living area as an important carrier area, and commercial blocks featuring digital economy to develop together. Chengdu characteristic districts are rich in cultural tourism resources, which not only become a new consumption scene, but also provide better leisure and entertainment places for urban residents. According to the characteristics of Chengdu characteristic streets and expert opinions, 20 characteristic streets such as wide lane and narrow lane are selected as research and evaluation objects.

3. Characteristic block evaluation index system and model construction

3.1. Characteristic block evaluation index system

Table 1: Comprehensive capability evaluation system of characteristic blocks.

Target layer index A	Index layer B	Index layer C	Index layer D
Evaluation system of the comprehensive ability of the characteristic block	Market level B1	Market size C1	Area of the block D11
			Number of merchants D12
			Radiation range of the block D13
		Market transaction C2	Price Compliance D21
			Orderliness of trading D22
			Supporting Services D23
			Transaction efficiency D24
			Consumer satisfaction D31
			Block popularity D32
	Competitive level C3	Customer reception volume D33	
		Provide employment D41	
		Supplemental role of market hierarchy D42	
	Value level B2	Social value C4	HuiMin influence degree D43
			Regional cultural characteristics D51
		Cultural value C5	Cultural Customs Activity D52
			Heritage and History D53
			Publicity Effectiveness D61
	Management level B3	Policy support C6	Sustainability D62
			Policy support D63
			Operating green channel policy D64
		Management level C7	Modernization of governance methods D71
			Establishment of management system D72
			Educational level of management personnel D73
			Number of management personnel D74
	Environment level B4	Infrastructure C8	Reasonable degree of stall division D81
			Completeness of identification system D82
			Complete public facilities D83
			Traffic convenience D84
		Environmental health C9	Visual aesthetic degree D91
			Air Quality Status D92
			Sanitary cleanliness D93

The characteristic block is an important part of the city system, which is composed of many subsystems. According to the characteristics of the characteristic blocks, the domestic literature and the experts' opinions^[6-8], this paper divides the characteristic blocks into market level, value level, management level and environment level, based on the principles of science, Operability, goal consistency and dynamic development, the comprehensive capacity sub-indicators of the special blocks were constructed. As shown in Table 1, the comprehensive capacity evaluation of the special blocks was finally divided into three levels of indicators, a total of 31 sub-indicators.

3.2. Subjective weight calculation

The Analytic Hierarchy Process (AHP) is a quantitative analysis method for multi-attribute decision making. By establishing a hierarchical model, the decision problem is decomposed into different levels

of elements such as objectives, criteria and solutions, and the relative importance of elements at each level is determined by comparing, and then the weight of the importance degree of the solution is obtained. The calculation process of analytic hierarchy process mainly includes the following steps: firstly, the hierarchy model is established, the importance of each index is compared, the importance is assigned according to the matrix scale, and the judgment matrix $A=(a_{ij})_{nm}$ is established, a_{ij} denotes the relative importance of elements i and j , then compares the elements of each layer of the judgment matrix, judges the importance rank of elements of each layer, and tests the consistency of the constructed judgment matrix, according to Formula (1)-(2), the consistency scale is calculated, the judgment matrix is normalized according to formula (3), and the importance weight W_1 is calculated according to Formula (4)^[9]. The weight values of each index of the evaluation index system can be obtained by calculating the expert judgment matrix and hierarchical single ranking. The results are shown in Table 2.

$$CI = [\lambda_{\max} - n / (n - 1)] \tag{1}$$

$$CR = CI / RI \tag{2}$$

$$W_1 = a_{ij} / \sum_{i=1}^n a_{ij} \tag{3}$$

$$W_1 = \left(\prod_{j=1}^n a_{ij} \right)^{1/n} \tag{4}$$

Among them, CR consistency ratio, λ_{\max} is the largest eigenvalue of the judgment matrix, RI is a constant, which can be obtained by looking up table.

Table 2: Weights obtained by analytic hierarchy process.

Target level indicators	Index layer B	Index B AHP weight	Index layer C	Index C AHP weight	Index layer D	Index D AHP weight	Index D AHP total ranking weight value
A	B1	0.455	C1	0.117	D11	0.413	0.022
					D12	0.260	0.014
					D13	0.327	0.017
			C2	0.268	D21	0.641	0.078
					D22	0.176	0.021
					D23	0.128	0.016
					D24	0.056	0.007
					D31	0.683	0.191
					D32	0.200	0.056
	C3	0.614	D33	0.117	0.033		
			D41	0.659	0.063		
			D42	0.079	0.007		
	B2	0.118	C4	0.806	D43	0.263	0.025
					D51	0.614	0.014
					D52	0.117	0.003
	C5	0.194	0.194	D53	0.268	0.006	
				D61	0.327	0.071	
				D62	0.476	0.104	
				D63	0.124	0.027	
				D64	0.074	0.016	
				D71	0.278	0.012	
	B3	0.261	C6	0.833	D72	0.542	0.024
					D73	0.100	0.004
					D74	0.080	0.003
C7			0.167	D81	0.564	0.031	
				D82	0.079	0.004	
				D83	0.163	0.009	
B4	0.166	C8	0.333	D84	0.194	0.011	
				D91	0.157	0.017	
				D92	0.249	0.028	
		C9	0.667	0.667	D93	0.594	0.066

3.3. Objective weight calculation

In this paper, the entropy method is used to calculate the objective weight of the index, which has high precision and objectivity, and can make full use of the existing data, greatly reducing the workload. The entropy method is an objective weighting method to determine the index weight through the

amount of information provided by each index observation value. In information engineering, entropy is a measure of uncertainty in a system. In this paper, the method of entropy is used to determine the weight of each index as follows: the influence of each index dimension is eliminated by formula (5) and (6), the proportion of index value is calculated by formula (7), the entropy value and coefficient of difference are calculated by formula (8) and (9) respectively. Using the survey data, the weight of each index of the evaluation index system can be obtained through the above steps. The results are shown in Table 3.

$$x'_{ij} = \frac{x_{ij} - \min(x_{1j}, x_{2j}, \dots, x_{nj})}{\max(x_{1j}, x_{2j}, \dots, x_{nj}) - \min(x_{1j}, x_{2j}, \dots, x_{nj})} \tag{5}$$

$$x'_{ij} = \frac{\max(x_{1j}, x_{2j}, \dots, x_{nj}) - x_{ij}}{\max(x_{1j}, x_{2j}, \dots, x_{nj}) - \min(x_{1j}, x_{2j}, \dots, x_{nj})} \tag{6}$$

$$p_{ij} = \frac{x_{ij}}{\sum_i x_{ij}} \tag{7}$$

$$e_j = -\frac{1}{\ln n} \sum_{i=1}^n p_{ij} \ln(p_{ij}), e_j \geq 0 \tag{8}$$

$$g_j = 1 - e_j \tag{9}$$

$$w_j = \frac{g_j}{\sum_j g_j}, j = 1, 2, \dots, m \tag{10}$$

Table 3: Weight calculated by entropy method.

Target layer	Index layer B	Entropy weight	Index layer C	Entropy weight	Index layer D	Entropy weight
A	B1	0.333	C1	0.083	D11	0.031
					D12	0.021
					D13	0.031
			C2	0.172	D21	0.029
					D22	0.045
					D23	0.055
					D24	0.044
					D31	0.018
					D32	0.033
	C3	0.078	D33	0.027		
			D41	0.021		
	B2	0.213	C4	0.081	D42	0.024
					D43	0.036
			C5	0.132	D51	0.039
					D52	0.043
					D53	0.050
	B3	0.254	C6	0.115	D61	0.018
					D62	0.038
					D63	0.027
					D64	0.032
C7			0.139	D71	0.059	
				D72	0.031	
				D73	0.022	
B4	0.200	C8	0.100	D74	0.027	
				D81	0.022	
				D82	0.028	
				D83	0.024	
		C9	0.100	D84	0.025	
				D91	0.044	
				D92	0.029	
				D93	0.027	

3.4. Final weight of the index

In order to make the weights of each index more scientific, and combine the advantages of entropy method and AHP, the final weights of each index are calculated by means of entropy method and AHP total ranking, the results are shown in Table 4.

Table 4: Table of final weights for indicators.

Target-level indicators	Index B layer	Final weight of indicator B	Indicator C layer	Final weight of indicator C	Index D layer	Final weight of indicator D layer
A	B1	0.394	C1	0.068	D11	0.027
					D12	0.017
					D13	0.024
			C2	0.147	D21	0.054
					D22	0.033
					D23	0.035
					D24	0.025
					D31	0.105
					D32	0.044
	C3	0.179	D33	0.030		
			D41	0.042		
			D42	0.016		
	B2	0.165	C4	0.088	D43	0.030
					D51	0.026
					D52	0.023
	C5	0.077	C6	0.166	D53	0.028
					D61	0.045
					D62	0.071
					D63	0.027
					D64	0.024
					D71	0.036
	B3	0.258	C7	0.091	D72	0.027
					D73	0.013
					D74	0.015
D81					0.027	
B4	0.183	C8	0.078	D82	0.016	
				D83	0.017	
				D84	0.018	
		C9	0.105	D91	0.031	
				D92	0.028	
				D93	0.046	

4. Evaluation results of characteristic blocks

Table 5: Draws the block score result and the rank.

Name of characteristic street	Comprehensive score	Rank
Wide and Narrow Alley	8.62	1
Chunxi Road	8.02	2
Wenshu Fang	7.83	3
Huaxi LIVE 528 Special Street	7.45	4
Jianshe Lane	7.21	5
Wuhouci Jinli Ancient Street	6.94	6
Wangpingfang Pedestrian Street	6.67	7
Due to the commercial characteristic blocks	6.5	8
Taohuali Pedestrian Street	6.46	9
Yulin East Road Special Commercial Street	5.97	10
Huanglongxi Ancient Town	5.82	11
Xiahe Xiwen Creative District	5.78	12
Yipintianxia characteristic commercial block	5.77	13
Jinmen Pedestrian Street	5.6	14
Characteristic commercial street in Jinsha District	5.49	15
Vientiane City Special Commercial Area	5.38	16
Wangfujing Discovery Street	5.28	17
Tianhui Vanke City Square	5.18	18
OCT Happy Valley	5.09	19
Taisheng Road Characteristic Commercial Block	5.00	20
Average value	6.30	—

From Table 5, the scores of wide and narrow lanes, Chunxi Road Street and Manjusri Square were higher than 7.5, and the number of middle-level blocks (5.5-7.5) was 11, the number of blocks with low

overall capacity -LRB-score below 5.5) was six. The average score of the extracted market is 6.3, which is in the middle level, indicating that the overall level of the characteristic blocks in Chengdu has some room for improvement.

5. Policy suggestions on promoting characteristic blocks in Chengdu

5.1. Commercial Street specialization, promote the integration of business and travel literature

Management departments could prioritize the development of professional commercial streets to promote the overall advancement of commerce, tourism, and literature. Initially, a significant international consumer market must be established. By nurturing high-end neighborhoods, enhancing their allure, influence, and coverage, increasing footfall, and elevating the level and scale of consumption, these distinctive neighborhoods can become emblematic of Chengdu. Secondly, it is essential to create critical convergence points for international consumption resources. By improving and upgrading the hardware environment and software conditions of Wenliu-characteristic blocks, industry integration and innovation can be fostered, new models and forms of business can be cultivated, and a comprehensive, in-depth, and extensive new model of integrated development can be achieved. Finally, it is imperative to establish a significant platform for international people-to-people exchanges. By cultivating brand festivals in the cultural district, creating a scene-like exhibition space for fashion consumption display and release, and striving to host brand festival activities with international influence, we can promote the exchange of ideas and cultural understanding on a global scale.

5.2. Three-level linkage, strengthen the scientific management of blocks

Block is the basic unit of a city, but also an important object of urban management, through the form of three-level linkage, improve the governance level of characteristic blocks. The first is to establish a coordination mechanism at the provincial, municipal and district levels to ensure the continuous advancement of community upgrading and transformation, clarify the division of responsibilities of all parties, form a joint work force, coordinate community planning, construction, capital, technology, talent and other issues, promote block innovation demonstration, and create a good atmosphere and environment for the block. Second, optimize the operation organization and steadily improve the level of operation and management. Establish a construction management model of "leading group + Management committee + investment and operation company" to achieve a good development situation of co-construction, co-governance, sharing and co-prosperity of the area. Third, improve the standardized management system of the community to achieve standardized management. The block development limited liability company has been established, the commercial housing Alliance has been established, and management systems such as the "Street Format Adjustment Guide Catalogue" have been formulated to ensure the standardized, scientific and orderly management of characteristic blocks.

5.3. Digital Business Information, improve access standards

Business registration system, the industry and commerce department for merchants or stalls to provide reliable electronic certification, business needs to show the quality of QR code, consumers can scan QR code to obtain stall owner's credit information. In addition, managers should make full use of digital tools, such as check-in, business rating, service supervision, so that organizers in the management of street stalls more evidence-based. In addition, it can also establish a booth credit evaluation system, the operator's food safety management, product quality, service quality evaluation, and so on, to provide reference for consumers. Regarding food stalls, they should have food circulation permits and health certificates of the operators. In case of food safety problems and commodity quality disputes, they should protect the legitimate rights and interests of both parties according to the information on record, maintain market equity and stability.

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