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Evaluation and Analysis of Urban Waterfront Space Vitality Based on SEC Principle

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Abstract:

This paper takes the former Haishi Park as the research site, combines structured observation method, site measurement, quantitative analysis and so on, focuses on the spatial vitality of the former Haishi Park, uses the theory of SEC principle to evaluate it, and evaluates it according to the three evaluation indexes of social interaction, situational experience and creative interest in SEC principle, so as to explore the construction strategies to enhance the spatial vitality of urban waterfront. This paper uses the mathematical model method combining field survey and quantitative analysis to explore the urban waterfront space vitality evaluation system quantitative evaluation, and seeks more scientific theoretical basis, aiming to provide novel research ideas for the more systematic study of urban waterfront space vitality evaluation system in the future.

Keywords:

Urban Waterfront Space, Vitality Evaluation, SEC Principle

1. Introduction

The introduction of your article is organized as a funnel that begins with a definition of why the experiment is being performed and ends with a specific statement of your research approach. And it highlights controversial and diverging hypotheses when necessary.

1.1. Vitality of Urban Waterfront Space

Since the 1950s-1960s, with J.Jacobs, J.Gehl,C.Alexander, C.Norberg-Schulz,W.Whyte and other western scholars constantly reflect on urban practice and urban research, and put forward a series of views on urban public space, urban vitality, space and human behavior, which has laid a theoretical foundation for the subsequent evaluation research of urban public space vitality [1]. J.Jacobs first mentioned the creation of urban vitality in “Death and Life of Big American Cities”, arguing that “life” in the city was composed of human activities on the city streets. She stressed the importance of walking activities and the importance of mixed land use, small-scale blocks, coexistence of old and new buildings, building density, accessibility to

urban vitality [2]. William H· White's book "Social Life in Small Urban Space" mentioned that "people tend to go to places where they can sit", indicating the impact of facilities in public space on people's daily behavioral activities and urban vitality [3]. The core factor of the urban material environment is the vitality of the city. Whether a region has the vitality means whether it can have more attraction, thus bringing about the gathering of talents and capital [4]. The core of urban vitality is the people active in urban space. The existing studies mostly use the intensity of population activity to reflect the intensity of urban vitality.

1.2. SEC Principle

Guo Xiangmin in 2017 [5] By studying the essential impact of the digital technology revolution on the development of human society, et al. put forward a new public space value different from the pre-digital era.The theory of SEC Principle puts forward the concept of public spatial SEC Value according to the concept of public space sharing, that is, all spaces, whether indoor or outdoor, can determine their role in the future urban development according to the size of SEC Value experienced in their interpersonal communication. As a new type of space value, the core of SEC Principle is to measure the attraction of space from the perspective of human communication and space sharing. It can clearly and effectively show the power and source of the vigorous development of public space, help city managers to restrain or inhibit the development of ineffective and negative space, and point out the direction for guiding the construction of public space in the future.

2. Study Subjects and Study Methods

2.1. Waterfront Park Overview

Qianhai Stone Park is located in the Front Bay area, facing the Front Bay in the west and the Guiwan River in the north. The park takes the theme of seaside customs, terrain changes, rich spatial levels, perfect basic supporting facilities, simple forest style plant configuration, green, foil the main landscape "front sea stone", creating a unique local coastal landscape effect of "sparse, transparent and simple atmosphere". [6] Qianhai Stone Park was built in 2015. (Figure 1)

Figure 1. *Location Map of Qianhai Stone Park.*

The vegetation growth in the site is good, and the follow-up management, management and maintenance of terrain, garden road and building is relatively perfect. As of December 2019, the park has a high frequency of people, which still maintains a relatively stable operating load while maintaining a certain landscape effect.

2.2. Study Methods

(1) Literature research method

Systematically organize and consult the literature related to urban waterfront spatial vitality and SEC principle, to understand the research status and research results in the field, and to analyze, summarize and summarize the previous studies.

(2) Structured observation method

Structured Observation is Dr Visas Mehta, School of Architecture and Community Design [7]. The proposed research method.The method of field research and structured observation observation and records in Shenzhen Bay Park was studied.To investigate its development and construction in recent years, and experience the behavioral and psychological impact of various factors in the actual environment.In addition, the space should also take real photos, in-depth understanding and grasp the characteristics and practical problems of the waterfront space.

(3) Quantitative analysis

By applying the quantitative calculation method of SEC Value in the principle of public space in the digital era, the spatial cells, units and group SEC Value of Qianhai Stone Park were calculated to quantify the waterfront spatial vitality level of Shenzhen Bay Park.

3. Construction of the Vitality Evaluation System

3.1. SEC Value Analysis

The principle mainly from the perspective of perception, around the new needs of public space in the background of the digital era, it from the Social Interaction, Environmental Experience and Creative Interestingness, so as to quantitatively consider the charm of public space in the SEC Value.

3.1.1. Social Interaction

The level of vitality of a public space is determined by people attracted to the space for offline activities and, determined in the final analysis, by the appeal of the social interaction functions that the space provides.Therefore, the consideration of social interaction effect is an important factor in quantify the SEC Value of vitality of public space.SEC Principle believes that the social interaction of public space can be measured from the three perspectives of function, exposure and communication.

3.1.2. Environmental Experience

Since digital technology has become the characteristic of The Times, the spirit of digitalization has profoundly affected the value orientation of urban public space experience shaping. Situation experience has become a new connotation of the development and evolution of public space, and the construction of digital technology and public space has moved towards a deep integration.Sacker's rule believes that the situational experience of a public space can be measured in terms of walking system, traffic accessibility and comfort.

3.1.3. Creative Interestingness

There is a relationship between creativity and public space: on the one hand, creativity can be built more pleasant, and interesting More attractive public space; on the other hand, public space helps to nurture and enhance creative and innovative thinking. The two promote each other, complement each other, and become an

inseparable unity. Sacker's rule believes that the creative interest of public space can be measured from the perspective of body size, quantity, distribution, high difference processing of spatial level and living attitude.

3.2 SEC Value Evaluation System

3.2.1. Topology of Space and Topological Space

SEC Principle constructs the topological relationship in mathematics, in a deformed way Spatial morphology transforms without changing the structural composition between individual spaces to determine the way of connection between various linear and dotted spatial elements, thus abstracting them into a spatial topological relationship graph.There are various forms of urban public space. The SEC Principle divides public space into three levels: spatial cell, spatial unit and spatial group.

3.2.2. Sharing Value of Public Spaces

SEC Principle created the "shared ball" concept based on the "Donba principle" and "gold split columns" and divided it into five circles. At the same time, according to the sphere volume calculation formula, the ratio of the number of people per interpersonal circle is 1:8:27:125:512, so as to determine the sharing coefficient of the space according to the relationship circle that the space can accommodate. (Figure 2)

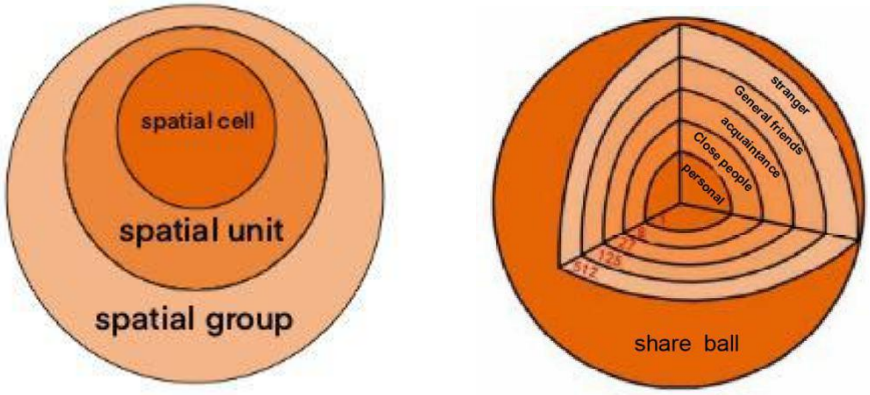

Figure 2. *Topological spatial hierarchy diagram Figure 2.2 Schematic diagram of shared balls.*

3.2.3. Formula for SEC Value

(1) Calformula for spatial cells

Among them, Kcell-kIt represents the spatial SEC value of a space cell; AREA represents the total area of indoor and out door space, where out and in represent outdoor and indoor space; SHARE represents the sharing coefficient; eNOpen value coefficient representing different functional spaces, eMIt represents the influence range of the different attraction points in the garden node space; NEG represents the influence coefficient of the negative factors inside and outside the overall space of the study subject; ACCESSautoIndicates the accessibility factor obtained by taking the vehicle, ACCESSfootIt indicates the accessibility coefficient coming from walking.

$$K_{cell-k} = \lg\left\{\left[\sum_{t=1}^{t}\left(\lg\left(AREA_{in-t}\times e^{N}\times SHARE_{in-t}\right)\right)+\sum_{m=1}^{m}\left(e^{N}\times SHARE_{out-m}\right)-NEG\right]\times\left(ACCESS_{auto}+ACCESS_{foot}\right)\right\}$$

(2) Calformula for SEC value of spatial unit

The spatial units are composed of several spatial cells, so the SEC value of the spatial units is the individual spatial cells The sum of the SEC Value, KunitRepresents the spatial unit segvalue; Kcell-kRepresents represents the spatial SEC value of a

space cell; CONTIN represents the continuous length of walking space in a space cell; TOP represents the number of topological steps in that space cell. The calculated expression is:

$$K_{unit} = \lg\left(\sum_{k=1}^{k} K_{cell-k} \times CONTIN_n \times TOP_n\right)$$

3.2.4. SEC Value Vitality Evaluation Criteria

(1) Space cell viability evaluation criteria

Space cells between 0.00~2.80 for Sacker are poor viability space; space cells between 2.81~3.80 are general viability level space between 3.81~4.80, and space cells between 4.81~5.81.

(2) Evaluation criteria of spatial units

Not good between 0.00 ~ 2.90; between 2.91~3.50; between 3.51~5.50, and between 5.51~6.91.

(3) Evaluation criteria of space group

According to the overlay principle, the vitality level of space group composed of "n" dynamic space units is also abundant, composed of "n" units with good dynamic space is good; of n general space units is general; and of "n" less dynamic space units are poor. [8]

4. Evaluation and Analysis of Waterfront Spatial Vitality

4.1 Quantification of SEC Value Analysis

4.1.1 Social Interaction

(1) Diversity of landscape spatial functions

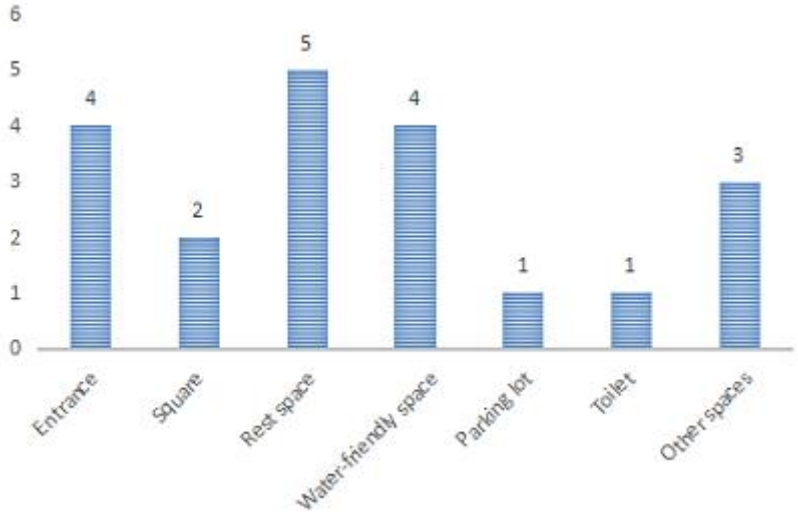

Figure 3. *Each Number of space function types.*

There are a total of seven landscape space function types in Front Bay Park, namely entrance space, square space, rest space, hydrophilic space, hydrophilic space, parking lot, toilets and other Spaces. (Figure 3, Figure 4)

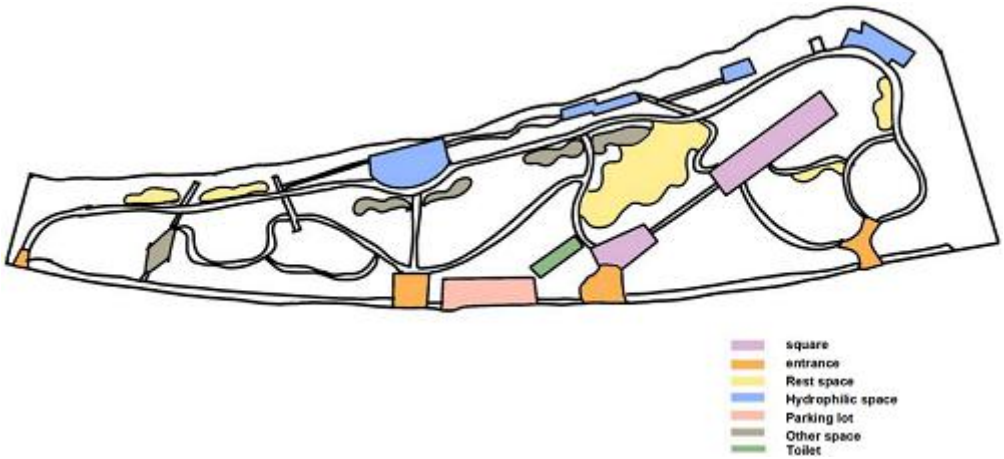

Figure 4. *Spatial distribution map of the landscape function.*

(2) Exposure of the landscape node space

SEC Principle argue that open public space is attractive and more socially interactive.The landscape node is empty,Inter exposure is crucial to allowing people to stay.According on the value of exposure, the former Bay Park has another open space, semi-open space and closed space. (Table 1, Figure 5)

Table 1. *Quantity of each space*

Openness of space	Number
Open space	9
Half open space	4
Closed space	6

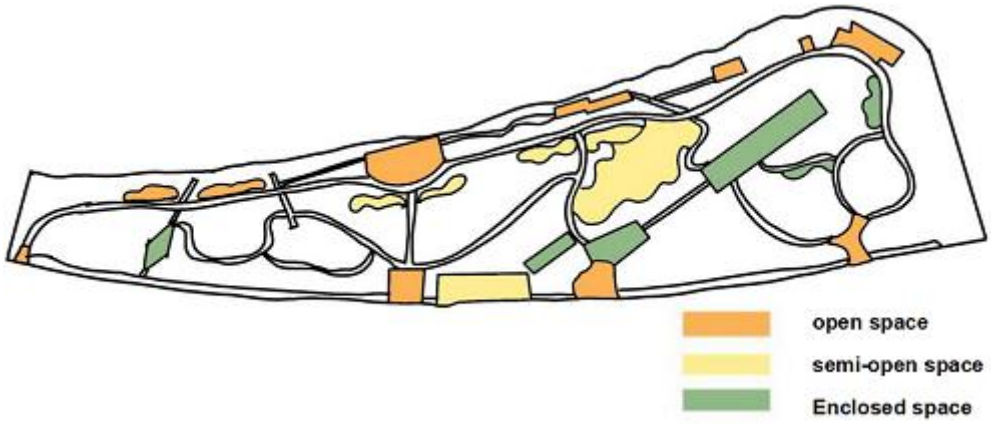

Figure 5. *Spatial distribution map of the landscape function.*

4.1.2 Environmental Experience

(1) Design of the walking space

Continuity of walking streamlines: The continuity of walking streamlines is mainly related to the continuous walking length and the number of turning points. On the one hand, the longer the length of continuous walking, the less difficult the walking activity is to be disturbed by external factors, and the stronger the sense of pleasure and experience in the walking space. On the other hand, with the same walking length, the more the number of turning points, the more interesting it is. (Figure 6)

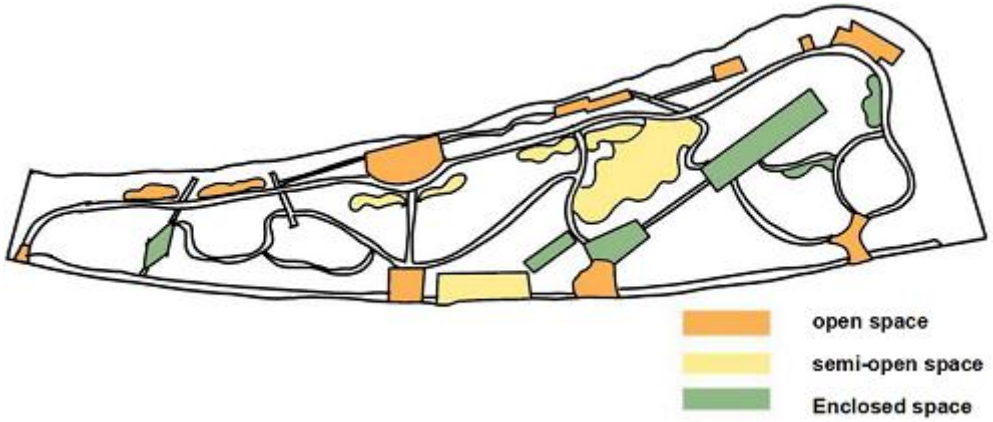

Figure 6. *Spatial distribution map of the landscape function.*

(2) Distribution of shelter

The shelter covering the ground can provide people with shade and comfortable activity space, improve environmental quality, and create for it. Create a good situational experience that increases the possibility of people to enter and use the space. The site belongs to the southern subtropical monsoon climate, with the same period of rain and heat, long summer and short winter, mild climate, sufficient sunshine and abundant rainfall.The annual average air temperature is 23.0 °C; the lowest January average of 1 5.4 °C and the highest July average of 28.9 °C. Among them, the green space covers 7.00 hectares, accounting for 76.7% of the total area. The vegetation cover structure has many garden vegetation types such as grass, grass + shrub, grass + tree, shrub tree and other + trees. [9] (Figure 7)

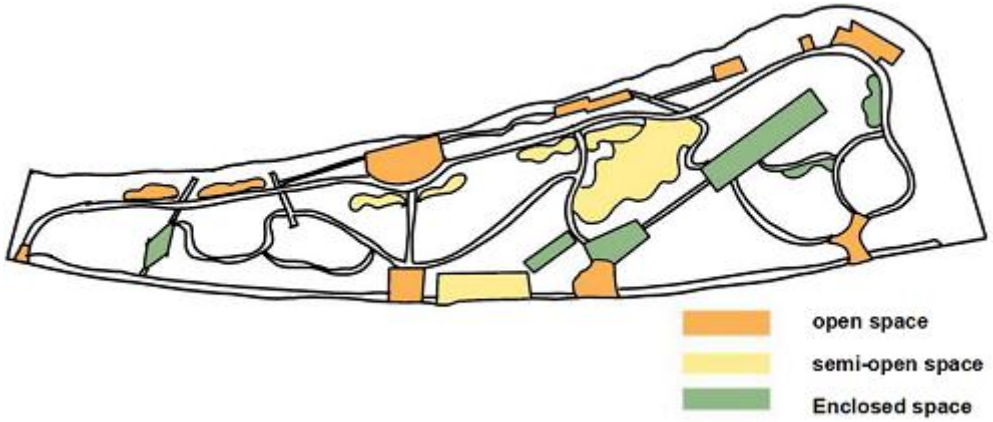

Figure 7. *Spatial distribution map of the landscape function.*

4.1.3 Creative Interestingness

(1) Landscape attraction point

Creative and artistic grade landscape sketches can directly attract tourists into their space call the landscape attraction point.There are few types of attraction points in Qianhai Stone Park, divided into three types of landscape attraction points: green plant landscape, landscape stone placement and landscape wall. (Figure 8)

Figure 8. *Qianhai Stone Park Landscape Stone Setting.*

(2) Spatial-level high-difference treatment

The overall terrain of Qianhai Stone Park is on both sides of the middle height, and there are 5 high difference treatment points in the park. In Communication and Space, Jan Gail said that "spatial interest is very important to public space", and the positive "height difference design" will greatly enhance the interest, then enhance spatial vitality, promote the exchange of activities, and strengthen the "high difference consensus" and characteristic perception. (Figure 9)

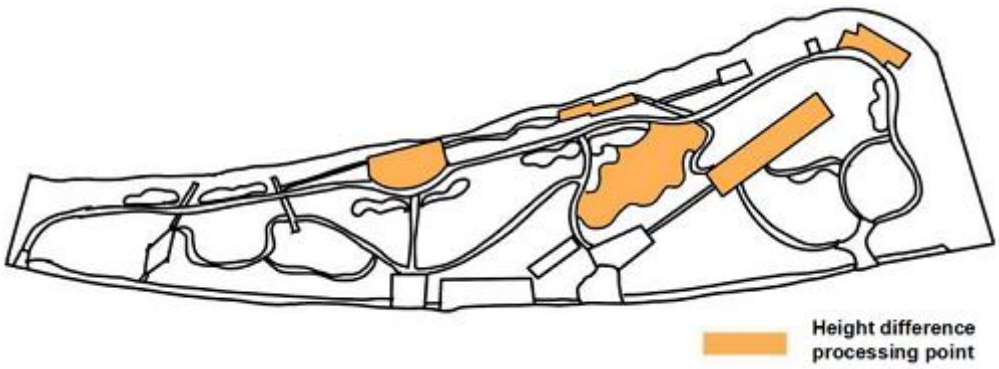

Figure 9. *Qianhai Stone Park Landscape Stone Setting.*

5. Quantitative Calculation of Spatial SEC Value in Qianhai Stone Park

5.1. Topological Graph and Spatial Classification

According to the principle of topological diagram, all dot space in linear space can be regarded as one topological step transformation; any path transition with more than one turn in linear or dot space is Think as a topological transformation.

5.1.1. Groups and Units of Space

According to the theory of SEC Principle, the roadway road and the river are defined as the space boundary. Based on the north of the west, the front bay and the river are in the west of Qianhai Stone Park, and the south is the roadway. Therefore, Qianhai Stone Park as a whole is regarded as a space group.Space units are a combination of spatial cells connected by several walking systems.The walking system of Qianhai Park is continuous, so Qianhai Park as a whole is used as a space unit. (Figure 10)

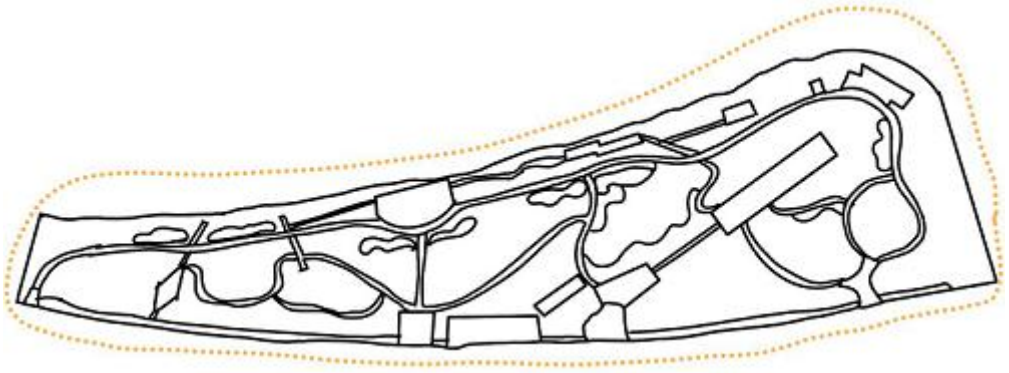

Figure 10. *Division diagram of the spatial unit.*

5.1.2. Spatial Cells

The most microscopic component of the space is shown after the topological relationship transformation, which is the space composed of a topological path and its surrounding green space, 1 spatial cell represents 1 landscape node space. Based to this paper, Qianhai ishi Park was divided into 18 spatial cells and numbered according to A-1-1 mode. (Figure 11)

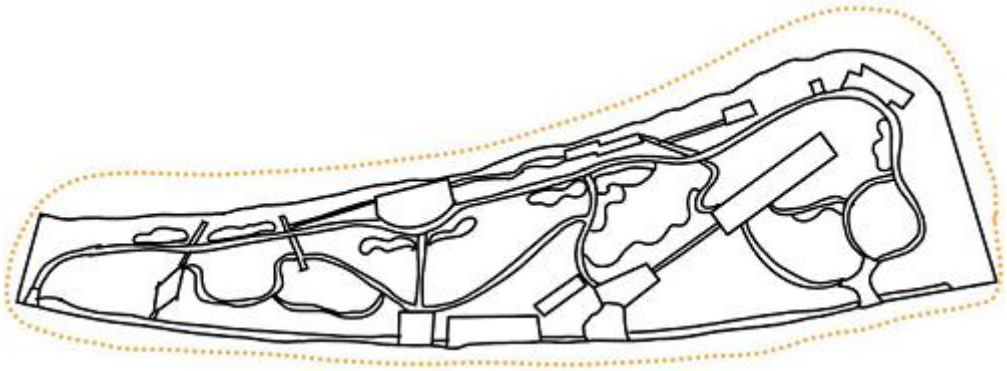

Figure 11. *Division plot of spatial cells.*

5.2. Spatial Cell SEC Value Calculation

In this paper, we combine the above formula with the landscape elements in Qianhaistone Park to calculate the spatial cell SEC value calculation

Line redefinition:

$$K_{cell-k} = \lg\left\{\left[\sum_{t=1}^{t}\left(\lg\left(AREA_{la-space} \times e^{N} \times SHARE_{la-space}\right)\right) + \sum_{m=1}^{m}\left(e^{N} \times SHARE_{attraction}\right)\right] \times \left(ACCESS_{auto} + ACCESS_{foot}\right)\right\}$$

5.2.1. Calculation of Landscape Function Space and Attraction Point

For the landscape node space in the park, different functions have different exposure coefficients eNAnd the sharing coefficient, SHARElа-space, the sum of the product of the area, exposure and sharing coefficients of different landscape spaces leads to the SEC value of landscape node space in each spatial cell.In the formula, the exposure coefficient is eNMedium N value 0~2, the greater the value, the greater the exposure coefficient.That is, the N value of the open space is 2, the half-open space is 1, and the N value of the closed space is 0. Sharing coefficient SHARElа-spaceThe sharing coefficient of the space is determined according to the relational circle that the space can accommodate, and between 1 (13), 9 (13 + 23), 36 (313 + 23 + 33), 161 (13

+ 23 + 33 + 53), 673 (13 + 23 + 33 + 53 + 83), the richer the spatial function, the greater the sharing coefficient value.For landscap e attraction points, different types and different body types have different influence ranges eMAnd the sharing coefficient, SHAREattraction. The sum of the product of different attraction coefficients and shared coefficients yields the value of landscape attraction points in each spatial cell.Attraction point co efficient eMThe M in took the value 0~2 according on the body size of the attraction point and whether there is a high difference space, or otherwise 0, the larger the attraction point size, the greater the M value, the wider the range of influence.Attraction point-sharing coefficient SHAREattractionSharing coefficient SHARE with the landscape node spacela-spaceThe value principle is consistent, the higher the quality of the landscape attraction point, the greater the sharing coefficient. (Table 2)

Table 2. *Sharing of spatial cells in Qianhai stone Park.*

Spatial number	Space area AREAla-space	Open coefficients N	Sharing coefficient SHARElа-space	Attraction point M1	Sharing coefficient attraction1
A-1-1	286	2	36	2	161
A-1-2	192	-	36	1	36
A-1-3	200	-	36	1	36
A-1-4	1260	-	673	2	161
A-1-5	672	2	673	2	161
A-1-6	198	2	673	1	36
A-1-7	300	2	36	1	36
A-1-8	816	-	161	1	36
A-1-9	1800	1	673	2	161
A-1-10	470	1	9	1	36
A-1-11	468	2	673	2	161
A-1-12	200	-	1	1	36
A-1-13	650	1	1	1	36
A-1-14	110	2	36	1	36
A-1-15	330	1	9	1	36
A-1-16	500	2	673	2	161
A-1-17	350	2	161	1	36
A-1-18	108	-	36	1	36
A-1-19	56	2	9	1	36

5.2.2. Calculation of Traffic Accessibility in Stone Park

Traffic accessibility is the convenience of using the transportation system from the designated location [11] SEC Principle makes the following provisions on the traffic accessibility coefficient according to all kinds of traffic modes and its influence coefficient: the walker is an independent individual, the personnel arrival coefficient through walking is the benchmark unit “1”, and the scope of influence is mainly the sidewalk outside the park and the walking entrances and exits.Because because the walking road and the surrounding space

The distance between cells is limited, so the distance is 20m wide as the spatial range of walking; for the walking entrance and exit, its influence range is large, so the circular area with a radius of 50m as the range of entrance and exit. The arrival coefficient of a private car in ② is twice that of walking, so the influence coefficient is “2”, and the influence scope mainly includes the roadway outside the park and the parking lot in the park.For the roadway, the area also covered by a distance of 20m

wide as the space influence area, the periphery of the park is shifted 10m, to the park is shifted 20m; to the park for the parking lot, the circular area with a radius of 100m as its influence area. ③ A bus has a staff arrival factor of four times the walking factor, so the impact factor is "4", which mainly depends on the location of the bus stops.People take the bus, they need to walk to the destination, so the walking distance of 200m and 400m marks the polar influence range of the bus station, where 200m radius indicates high accessibility and 400m radius indicates low accessibility coefficient. (Table 3)

(1) Walking accessibility: According to the actual research, the east side of Qianhai Stone Park is Jinan Middle Street, and the west side is close to the front bay, with a total of four walking entrances and exits.

(2) Car accessibility

There is no roadway in Qianhai Stone Park, so the area covered by the 20m offset of the roadway to the park is the influence scope of the roadway. Also, there is 1 parking lot.

(3) Public transport accessibility

Public transportation accessibility: There are three bus stations close to the park, namely Qianwan North Station, Qianhai Stone Park Station and Qianhai Sea Park Station.

Table 3. *Traffic accessibility of spatial cells in Qianhai ishi Park.*

	Bus		Car lane		Walking		
	The 200 m radius	The 400 m radius	The 20 m offset	The 100 m radius	The 20 m offset + 50 m radius		
Number	Product of the weights (4) with the number of bars		weight (2) The product with the bar number	weight (20)	Weight (1) The sum of the walking path and the walking entrance	transit Maximum Value (the sum of)	The sum of traffic accessibility
A-1-1	4	8	2	-	2	1.6	40.5
A-1-2	-	8	-	-	-	0.8	
A-1-3	-	8	-	-	-	0.8	
A-1-4	-	8	-	-	-	0.8	
A-1-5	-	8	-	-	-	0.8	
A-1-6	-	8	-	-	-	0.8	
A-1-7	4	8	2	20	2	3.6	
A-1-8	4	8	-	20	1	3.3	
A-1-9	4	8	-	20	-	3.2	
A-1-10	4	8	-	20	-	3.2	
A-1-11	4	8	-	20	-	3.2	
A-1-12	4	8	-	20	1	3.3	
A-1-13	4	4	2	20	2	3.2	
A-1-14	4	4	2	20	2	3.2	
A-1-15	4	4	-	20	-	2.8	
A-1-16	4	4	-	20	-	2.8	
A-1-17	4	4	-	-	-	0.8	

A-1-18	4	4	2	-	1	1.1	
A-1-19	4	4	2	-	2	1.2	

5.2.3. Calculation of SEC Value of Space Cells

By comprehensively considering the impact of the above landscape attraction points, landscape space area, and traffic accessibility. According to the formula of space cells in SEC Principle, the SEC value of each space cell in Qianhai Stone Park is calculated. (Table 4)

Table 4. *Segvalues of various spatial cells in Qianhai stone Park.*

Spatial number	Landscape space function AREAla-space×eN ×SHARElа-space	Landscape attraction points eM× SHAREattraction	Availability ACCESS	Kcell-k	Kcell-The sum of k
A-1-1	76173.92	1191.1424	1.6	3.28	49.34
A-1-2	6912	97.92	0.8	1.91	
A-1-3	7200	97.92	0.8	1.91	
A-1-4	847980	1191.1424	0.8	2.98	
A-1-5	3345970.79	1191.1424	0.8	2.98	
A-1-6	985866.39	97.92	0.8	1.92	
A-1-7	79902.72	97.92	3.6	2.57	
A-1-8	131376	97.92	3.3	2.53	
A-1-9	3295008	1191.1424	3.2	3.58	
A-1-10	11505.6	97.92	3.2	2.51	
A-1-11	2330229.66	1191.1424	3.2	3.58	
A-1-12	200	97.92	3.3	2.52	
A-1-13	1768	97.92	3.2	2.51	
A-1-14	29297.66	97.92	3.2	2.54	
A-1-15	8078.4	97.92	2.8	2.46	
A-1-16	2489561.6	1191.1424	2.8	3.53	
A-1-17	416899.84	97.92	0.8	1.92	
A-1-18	3888	97.92	1.1	2.05	
A-1-19	3728.79	97.92	1.2	2.09	

5.2.4. Space Unit and Space Group SEC Value Calculation

The north side of Qianhai Park is the front bay and the river, and the south side of the east is the roadway, and the walking system is continuous. Therefore, Qianhai Park is regarded as a space unit and space group, which only need to calculate the SEC value of the space unit. The continuous walking length and the number of topological steps and the various spatial cells obtained the SEC value of 5.89.

6. Analysis of the Vitality Evaluation of Qianhai Stone Park

From the figure above, the SEC value range of spatial cells in Qianhai Park is 1.91~3.58, the minimum of spatial cell is 1.91 and the maximum of 3.58. According to the vitality level classification standard of spatial cell scale, the assessment of the maximum value of waterfront space cells is between 3.81~4.90, and the vitality level is good with no vibrant space cells, so the landscape space cell vitality of Qianhai Park needs to be improved. At the same time, according to the classification standard of spatial vitality level of SEC Principle, this paper makes statistics on the number of spatial cells of each vitality level of the park. According to the classification standard

of vitality level of spatial unit SEC value, it is found that the SEC value of spatial unit in Qianhai Stone Park is between 5.51 ~ 6.90, so its vitality level is abundant. (Table 5)

Table 5. *SEC Principle space vitality evaluation form.*

Sykmetric value range	Spatial cell viability levels	Number of space (individual)
4.81~5.50	Full	0
3.91~4.80	Good	0
2.81~3.90	Generally	4
0.00~2.80	Poor	15

7. Strategy and Suggestions for the Cell Vitality Improvement in Urban Waterfront Space

Kevin Lynch's theory of "urban form" believes that vitality is the most important indicator to evaluate the urban spatial form, and vitality is the continuation of the city. Through analyzing the three aspects of social interaction, situational experience and creative interest of various Spaces in Qianhai Park, the causes of its spatial vitality are derived, take this as a reference, take its essence, remove dross, and summarize the construction strategy to enhance the vitality of public space of green space in future urban parks.

7.1. Organize an Efficient and Convenient Green Travel Network, and Optimize the Space and Road System in the Park

According to SEC Principle, the external traffic accessibility and walking streamline continuity of Qianhai Park are analyzed. It can be seen that the overall traffic accessibility is high, and the internal walking system has the characteristics of continuity, comfort and interest, which enhances the pleasure of people in walking and playing and enhances the internal space vitality. Therefore, through the development of an efficient and convenient green travel network featuring public transportation, bike-sharing and walking, the green space accessibility of urban parks will be improved. At the same time, optimize the spatial road system in the park to ensure the continuity of the walking streamline in the park, and adopt reasonable increase the number of road turning points, enrich the landscape types on both sides of the road, expand the shade area and other methods to enhance the interest and comfort of the walking streamline, which is very important to enhance the public space vitality of the urban park green space.

7.2. Create a New Creative and Cultural Space, and Stimulate Users' Creative Thinking

In the park, there is a giant paraffin stone - engraved with the word "Qianhai". On December 7,2012, General Secretary Xi Jinping stood in front of the boulder and issued a call for reform and opening up to start again. On October 24,2018, he came here again to declare to the world that China's reform and opening up will not stop. As the most representative symbol of Qianhai, Qianhai Stone has witnessed important historical moments and carried the spirit of Qianhai, and has been regarded as the "rock" of ideal and faith education by Shenzhen people.It creates a strong cultural and artistic atmosphere, easily arouses the public's rich association with the historical scene of Shenzhen, and enhances the spatial attraction. It can be seen that the cultural vitality of public space is the soul of its development. Create the green space

containing urban memory, continue the regional spirit, stimulate the public's feelings for the city, thus to attract an endless stream of people to enhance the spatial vitality. In addition, creative culture can also provide the freshness of public experience and perception. The creative cultural achievements at different stages can promote the renewal and metabolism of cultural blood in public space, and become the internal power source to promote the development of public space [12]. By implanting new creative culture, creating creative and interesting space can not only stimulate users' creative thinking, but also create more social and economic value for the society, but also effectively enhance the urban park green space the appeal of public spaces.

7.3. Artly Use the Original Topography of the Space to Create an Interesting Space

Qianhai Stone Park cleverly makes use of the terrain to create a variable walking road system and activity space. At the same time, the rich landscape attraction points and various paving forms in the park effectively seize the attention of users' curiosity and improve the interest of the park. Therefore, respect the original terrain of public space, skillfully deal with the poor space level, by creating a platform, platform, sinking space, etc., and combining the plant community landscape and various layout design techniques, enrich the sense of space hierarchy, give play to the site potential, enhance the space experience and interest, and then enhance the urban parks Green space public space vitality.

8. Conclusions

Theoretical basis still needs to be improved.Although the SEC Principle combined with social, economic, transportation, space, psychological, mathematical relationship and other multiple factors put forward the quantitative evaluation space vitality measurement system, but there are still some details to further improve, such as in the traffic feasibility assessment to include non-motor vehicle accessibility and other more dynamic factors, collect and use big data method for practical verification, etc., in order to get a more accurate evaluation standard. I believe that as the field of research continues to expand, the country's law will continue to mature. Study cases are relatively limited. This paper only considers the function, spatial exposure, traffic accessibility, walking system integrity and other factors of Qianhai park, the exclusion of urban road noise, park noise and other negative factors NEG lack of scientific, rigor, and limitations, the results may have some deviation, so more vitality considerations can be added in further research to improve the accuracy of the results.

With the virtual nature of the digital world becoming more and more apparent, the public space that can meet the human face-to-face communication and real emotion in this era has ushered in a golden development opportunity. How to improve the vitality of urban public space has become a research topic of great significance. This paper uses the mathematical model method combining field survey and quantitative analysis to explore the urban waterfront space vitality evaluation system quantitative evaluation, and seeks more scientific theoretical basis, aiming to provide novel research ideas for the more systematic study of urban waterfront space vitality evaluation system in the future. The author expects to be criticized and corrected by all experts and scholars, and strengthen the study of the SEC Value rule and urban waterfront space vitality in the future, and improve this research of practical significance.

Conflicts of Interest

The authors declare that there is no conflict of interest regarding the publication of this article.

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