MALAYSIA ARCHITECTURAL JOURNAL

Malaysia Architectural Journal

Journal homepage:
https://majournal.my/index.php/maj
e-ISSN : 2716-6139

Exploring the Intrinsic Ecology and Suitable Density of Historic Districts Through a Comparative Analysis of Ancient and Modern Ecological Smart Practices

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ARTICLE INFO

Article history:
Received
Received in revised form
Accepted
Available online

Keywords:
Eco-historic districts, intrinsic ecology, suitable density, green capacity ratio

ABSTRACT

Although urban ecological policies and the public's aspiration for livable environments have expedited the pace of ecological revitalization, historic districts that have evolved through natural ecological processes often become obsolete and less habitable amid rapid urbanization. This raises a critical question: are historic districts inherently incapable of being ecological and livable? The thriving concept of "intrinsic ecology," characterized by its ability to transform city-district systems into healthy ecosystems with diverse environments, stable functions, and rapid restoration capabilities, holds potential for guiding the integration of ancient and modern ecological wisdom while supporting the dynamic involvement of cultures.This study explores the intrinsic ecology of historic districts from three aspects:1) Population Density: By comparing the population density before urban population expansion to the present day, determine the reasonable population density for historic districts.2) Building Density: Using the "Space-mate" tool for comparative analysis, form a spatial matrix to explore the intrinsic ecology of building density in Chinese historic districts. 3)Green Capacity Ratio: By using ecological districts as control samples, conduct dual comparative analyses (related comparison and upgraded comparison) to determine the intrinsic ecological advantages of the two-dimensional and three-dimensional green volume in historic districts.The study inform a density optimization strategy that supports cultural, social, natural, and economic ecology, contributing to the creation of eco-historic districts.

1. Introduction

China's urban regeneration has entered the stage of updating small-scale stock resources for quality improvement and vitality enhancement[1]. According to preliminary statistics, as of the end of 2021,

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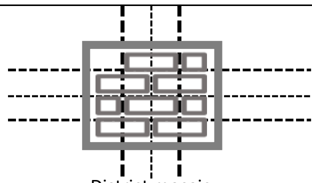
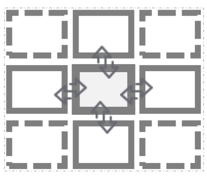
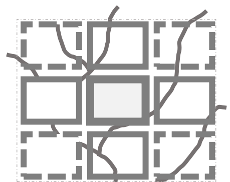
China has designated over 1200 historic districts with approximately 57500 designated historic buildings. By 2025, a multi-level and multi element urban and rural historical protection and inheritance system will be preliminarily constructed[2]. Historical heritage is a non-renewable resource that needs to be effectively protected and fully utilized. Integrating historical culture with modern life has become an important way to promote the protection, inheritance, and development of historical and cultural heritage[1][3]. China has regarded the protection and inheritance of historical and cultural heritage as an important driving force for promoting the overall development of politics, economy, society, culture, and ecology. By combining the protection and inheritance of historical heritage with the national strategic layout, it demonstrates the equal emphasis on protection and development, which is an important policy direction for the protection of famous cities and historic districts in the new era[4]. Re-examine the practical issues faced by the revival of historic districts from an ecological perspective. Propose and analyze the issues related to the protection and development of historic districts in China, and identify opportunities for ecological solutions. Realistic issues in historic districts include cultural, social, economic, natural, and livable aspects[5-6]. These issues are presented from three levels: the obsolete of comprehensive spatial environment in historic districts, the rupture of the relationship between historic districts and modern urban context, and the disconnection between historic districts and urban ecological development (Table 1).

Table 1
The practical problems of historic districts from ecological perspective

Classification		Problems
The obsolete of comprehensive spatial environment in historic districts	 District mosaic	The obsolete of pattern and function
		Population loss
		Spatial decline
		Green volume lost
		Incomplete Equity and sharing system
		Incomplete transportation system
The rupture of the relationship between historic districts and modern urban context	 District--Neighborhood--Historic City	The lack of integrity in the process of protection and development
		The obsolete of the historic boundaries
		The fracture of landscape context, the rupture of regional context
The disconnection between historic districts and urban ecological development	 District--Neighborhood--Modern City	The space separation caused by the inadequacy of ancient ecological concept and modern ecological theory
		The separation between historic district protection and urban ecological development
		The dilemma of urban infrastructure in a historic district

Intrinsic ecology is based on the complex ecology proposed by Professor Wang Rusong, which refers to the characteristic attributes that can promote the urban-district ecosystem to become a conservation diversity environment, has relatively stable functions, and can quickly recover from external interference. It characterizes the inherent capacity presented by the research object itself[5][7-8]. To be specific: 1) Inherent vitality (driving rapid system growth): the ability to cultivate emerging advantageous components such as competitiveness, consumption power, policy incentive power, and advantage degree; 2) Resource carrying capacity (stable system): natural environment carrying capacity, technological level, cultural resources, social relations, policy space, management system, etc; 3) System coordination (problem solving): Ecological integration at the levels of technology, policy, nature, and culture, requiring the ability to close loop feedback, the ability to integrate internal and external linkage, and the ability to reconcile spatiotemporal coordination; 4) Environmental resilience (resistance to interference): adaptability, diversity, resistant force, resilience, niche width, etc. The ecosystem with four characteristic attributes follows the ecological laws of self generation, competition, symbiosis, and regeneration in the process of exploration, adaptation, feedback, and integration, thus achieving a four-in-one eco-historic districts.

In response to the three density loss issues of population loss, spatial decline, and green volume lost in historic districts, combined with ancient ecological wisdom and modern ecological methods, the study explores the Intrinsic ecological characteristics from three aspects: population density, building density, and green capacity ratio[9-10]. To be specific: 1) population density is an important guarantee for the continuation of social structure, and the population density at the block scale is closely related to the social ecology . The compact texture of Chinese historic district determines their high density, and its formation is based on the social ethics structure of Chinese "big family", forming big families with three or four generations living together, thus forming a complex courtyard unit model[11]. Blood related families is the social logic of the relationship between patches and elements. The district accommodates a layered and interwoven social relationship, with its courtyard units and dense inlays, tightly connected to form a compact inlay with high-density material characteristics. 2) Building density is an important item in the ecological revitalization. The environmental quality, spatial comfort, and public space proportion are often closely related to the building density. Historic districts are characterized by small scale and high density, making it easy to achieve ecological goals such as environmental protection, energy conservation, and resource recycling[12-13]. Density and form are inseparable. Professor Meta Berghauser uses the spatial form of Dutch as a sample to form a "spatial matrix" that characterizes spatial form through the "spacemate" indicator of spatial density. It establishes a correlation chart to evaluate the relationship between density and spatial form. 3） The location of the historic district has a good natural ecological foundation, but in the process of urban regeneration, the comprehensive ecological environment gradually loses, causing irreversible damage to vegetation[9]. How to optimize the layout structure of green spaces and plant matching methods, enhance the level of green landscape and ecological benefits, will become the key to improving the spatial environment quality of historic districts[2]. Exploring the intrinsic ecology of the density of historic districts is an important step in creating eco-historic districts. The research has reference significance for the theory and practice of historic district regeneration.

2. Theoretical construction：The intrinsic ecology of the historic district

2.1 Ecological smart in ancient China

Chinese philosophy has strong practical and experiential characteristics, so in the process of transforming from philosophy of life to philosophy of space, the practical activities of ancient Chinese people are taken as the turning point[14-15]. The construction of Chinese philosophy as the fundamental philosophical interpretation of practical philosophy. Mr. Du Baorui from Taiwan University proposed a Chinese philosophical methodology of four fundamental philosophical issues, establishing a 'Quartet Framework' with practical philosophy as its fundamental form, and constructing four basic problems mainly based on the practical philosophy of Confucianism, Buddhism, and Taoism[14][16].

Exploring the impact of ecological views on the construction of space in the process of Chinese cultural development, we will take 'ecological views' and 'spatial practice' as the breakthrough point, and use the 'Quartet Framework' based on the basic problems of Chinese philosophy in practical philosophy as the research foundation to construct the four basic problems of Chinese ecological philosophy's spatial view: 'ecological spatiotemporal theory', 'ecological ontology', 'ecological technique theory', and 'ecological realm theory' (Figure 1).

Ecological spatiotemporal theory and ecological wisdom explore the knowledge system of worldview such as the origin of heaven and earth, spatial structure, and spatiotemporal relationships. It directly explores the question of 'existence' to answer what the objective world where ecological space is located is? Including the following aspects[2][17]:

·The world view of 'Observation timing'

·The natural view of 'Unity of heaven and man'

·The holistic view of 'Interdependence of all things'

Ecological ontology is the exploration of the value system of the meaning, purpose, and value of the existence of ecological space. The question of 'existence' and 'value' is related, which triggers the views of technique and realm theory to answer what subjective value should be held in creating ecological space.[2] including the following aspects:

·Choosing 'auspiciousness';

·Making 'appropriate'

Ecological technical theory is an exploration of the operating system of metaphysical categories based on spatiotemporal theory and ontology, which triggers the process of 'space training', 'space cultivation', and 'space practice' to answer how to create ecological space.[16][18] including the following aspects:

·'Circle of Heaven and Place' and 'Guibiao Shadow Measurement'

·The ecological construction of ancient city: suitable site selection; urban structure and spatial construction

The ecological realm theory is based on the previous three theories to form the ultimate target system, which can explore the ultimate goal of behavior: what kind of ecological space should it become.[16][19] including the following aspects:

·Landscape city

·Livable city

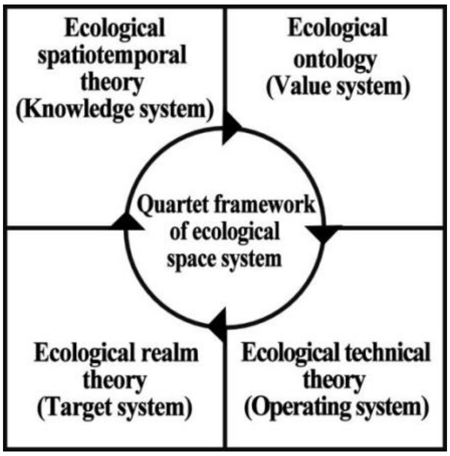


Fig. 1. Quartet framework of ecological space system

2.2 Integration of ancient ecological smart and modern ecological wisdom

The research explores the impact of China's ecological space philosophy and traditional construction concepts on the formation process of historic cities and districts, the possible integration of traditional ecological concepts and construction methods, as well as modern ecological concepts. The four basic issues of China's ecological philosophy spatial view, namely 'ecological spatiotemporal theory', 'ecological ontology', 'ecological technical theory', and 'ecological realm theory', have an impact on the formation and development of ancient urban spaces. The tracing of the origin of ecological construction in historic districts can not only integrate traditional ecological wisdom and modern ecological ideas, but also create opportunities for the coupling of ancient and modern ecological spatial views in knowledge, target, value, and operating systems. Finally, by combining the material space presented by the ecological theory with modern ecological concepts and operating systems, we aim to explore the formation of a comprehensive ecological view in the context of modern urban development and society, as well as the inspiration for the creation of historic spaces (Table 2).

Table 2
The integration of China's ecological space philosophy and modern ecological wisdom

Classification		Ecological spatiotemporal theory	Ecological ontology	Ecological technical theory	Ecological realm theory
Ancient ecollogical smart	Shama -nism	Observation timing; Circle of Heaven and Place	Adapt to the will of heaven, Primitive meaning of life	Selecting site choosing house; Rule based celestial measurement	Divine eco-space Primitive eco-space
	Confucia -nism	Unity of heaven and man; The overall cycle of heaven, earth, creatures, and humans	Being real person; Governing country; Understanding the truth	Theory of yinyang and five elements; Follow astronomical phenomena field; divination	Internal eco-space
	Taoism	Tao generates all things; Interdependence of all things	The way follows nature; Control by doing nothing; Highest excellence like water	Tailored to local conditions; Material conservation and efficiency	Self-cultivation eco-space
	Buddh -ism	Samsara; Benevolence	Parinirvana non-materialised ; Emptiness	Superior Topography; Defense preparations; Disaster prevention and theft prevention	Salvation eco-space
Modern ecological wisdom	City Scale	Holism; System theory	Ecology, livability, Intensification	Broaden sources and reduce expenditure; Self-energy	Shanshui City
		Full life cycle regeneration, life community	Self regeneration; ecological succession	Complex ecology; Urban ecology; Landscape ecology	Ecological City; Livable City; Green City
	District Scale	Biodiversity; Social equity	Ecological green; Self-organization; Self-regeneration	GSI; GI; EI technology; Diversified cooperation	Ecological District; Green Street; Complete Street
	Building Scale	The lifecycle of closed circuits	Zero exchange of energy	Appropriate energy-saving and emission reduction technologies	Ecological architecture; Green buildings

3.
4. Case study: Reasonable population density, building density and green capacity

3.1 Reasonable population density

3.1.1 Population density in ancient Chinese neighborhoods

In ancient times, the density index was calculated based on population density as the measurement standard and cities as the basic density unit. In this unit, the commonly used measurement index is: population density=resident population/city area, where the urban area is the area of the outermost city wall [11]. From the 'Li Fang System' period of the Tang Dynasty to the 'Street and Lane System' period of the Song Dynasty, and then to the mature quadrangle dwellings period of the Yuan, Ming, and Qing Dynasties, the population density has greatly increased with the gathering and increase of urban population. For example, in the Xuanyang Fang (52ha) of the Tang Dynasty, there were about 185 households with a population of 3000, a population density of 57.69 people/ha, and a plot ratio of only 0.1. During the busiest period of the Song Dynasty in Dongjing, due to the reorganization of street and alley systems, the per capita living area was only 3-5 square meters, and the average population density of the blocks could reach 260 people/ha. During the mature period of the Yuan, Ming, and Qing dynasties, the plot ratio of residential blocks in the Yuan dynasty reached 0.2, with an average population density of about 150 people/ha. During the Ming and Qing dynasties, the plot ratio of residential blocks in Beijing was about 0.35, with a population density of up to 170 people/ha. The density of modern residential areas has increased significantly, reaching up to 400 people/ha. The current high population density residential model is obviously not suitable for studying population density in historic districts.

3.1.2 Population density and resident retention rate of eco-historic district

The famous Chinese residential scholar Ruan Yisan strongly opposed the practice of a large number of residents moving out and transforming historic districts into cultural and tourism functions, and proposed that historical neighborhoods lose their traditional way of life and customs, thus losing their 'authenticity of life'. The authenticity of life refers to the fact that historical neighborhoods are not only residential areas where people lived in the past, but also continue to function as an organic component of social life[20-21]. He proposed two evaluation criteria: 1) original resident retention rate; 2) Lifestyle preservation degree. After comparing and analyzing the existing population data and planned population data in the protection planning schemes of 13 blocks, it was found that a 60% resident retention rate can basically ensure that the social life structure and way of historic districts are not destroyed, while also meeting the national housing standards and modern living standards (Table 3).

Table 3
Population density and resident retention rate in historic districts

Index	Pingjiang Road, Suzhou	Ciqikou, Chongqing	He Huatang, Nanjing	Dongguan Street, Yangzhou	Qingguo Lane, Changzhou	Kuanzhai Alley, Chengdu
per capita living space (㎡/person)	25.68	46.42	25 (building)	25 (building)	22 (building)	172.96
Population density (person/ha)	182	215	380	158	173	50.7
resident retention rate	95%	68.9%	38%	59.9%	59.1%	11.7%

In case studies of neighborhoods in China, reasonable predictions are often made based on the current state of socio-economic development, referring to surveys of residents' willingness, to predict the population composition and lifestyle changes of residents in historic districts in the future. To be specific:

i. The Pingjiang Road historic district in Suzhou currently has a permanent population of 19,000 people, a population density of 193 people/ha, a planned population of 18,000 people, and a population density of 182 people/ha, and ultimately needs to relocate about 1000 people. Excluding factors such as aging and the loss of young population, from the perspective of planned population, the relocation rate has reached the highest of 95% in the historical block of the case, of which 46.22 hectares are planned residential land, accounting for about 42% of the total land. The per capita residential land area can reach more than 25 square meters, which basically meets the standards of modern life.

ii. The Dongguan Street historic district in Yangzhou currently has a permanent population of 20, 354 people and a residential land area of approximately 39 hectares. The residential population density is relatively high. According to the standard of a per capita residential land area of 25 square meters, the planned population of the block is 12,200 people and 3486 households, accounting for approximately 60% of the existing population. According to the plan, approximately 8,154 residents and 2,330 households need to be relocated, with a planned population density of 158 people/ha.

iii. The population structure goal of Qingguo Lane historic district in Changzhou is to maintain a return rate of no less than 50% for the original residents. The original permanent population was 2,553 people (1085 households), with a planned population of 1,509 people (553 households). The relocation rate reached the planned target of 59.1%, and the per capita construction land was 22 square meters/person, with a planned population density of 173 people/ha.

iv. The Kuanzhai Alley historic district in Chengdu originally had 944 permanent households. According to the wishes of residents, 110 households were relocated and retained, with a return rate of only 11.7%, which does not meet the standards for ecological population retention rate. But the initial relocation was involving multiple residents, respecting their wishes and implementing relocation that met their preferential conditions. The remaining residents also joined the ranks of cooperative construction and self repair, which indirectly compensated for the huge changes in social life structure caused by the low return rate.

The population density and resident retention rate of the ecological historic district refer to the density of ancient population and modern communities, the planning density of the case block, and the density of the ecological block. The reasonable population density is approximately 150-300 people/ha. In order to maintain the social ecology, the resident retention rate should be around 60%.

3.2 Reasonable building density and plot ratio

The research selected four historic districts in the United States that are in line with urban development planning and ecological concepts. Their texture remains intact, cultural identity and sense of belonging are strong, and they can be used as target districts of ecological revitalization[22]. The density of these target cases is basically the same, around 45%. Among them, Pearl District and Pioneer Square are residential and commercial areas in the central urban area, so they have more floors and a plot ratio of 2-3. Although they have more floors, the street space is not oppressive. The middle and low rise buildings and narrow streets are conducive to shaping a livable community. Combining sunshine, climate conditions, district greening and building interval can effectively reduce the sense of oppression brought by high plot ratio (Figure 2, Table 4).

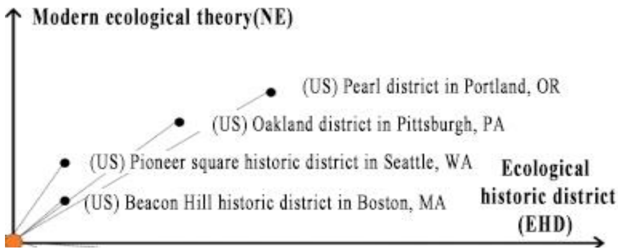
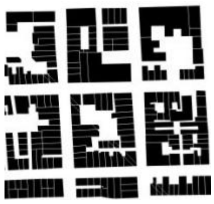
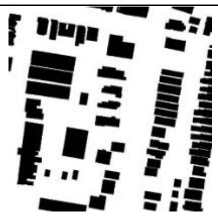
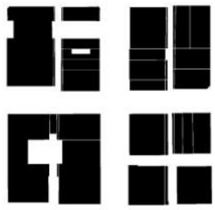
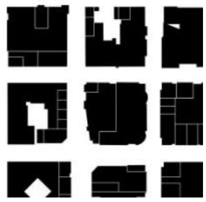


Fig. 2. Target historic districts

Table 4
Target historic districts space capacity (spacemate index)

Type	Beacon Hill historic district, Boston	Oakland district, Pittsburgh	Pioneer square historic district, Seattle	Pearl district, Portland
FSI	1.7	1.1	2.3	3.1
GSI	49.6%	39.1%	45.5%	42.9%
Average Floors	3.4	2.8	4.5	7.2
OSR	0.30	0.55	0.24	0.18
200*200m				

Taking six Chinese historic districts in hot summer and cold winter regions as an example, these districts are mainly composed of low rise buildings with an average of only 1.7 floors, which is lower than the target district's average of 4.5 floors, resulting in a plot ratio of only 0.8. However, due to the longer formation time of the neighborhood, more complex and compact texture has been formed through sedimentation and layering, with an average density of about 50%, which is 5% higher than the average density of the target districts. Its morphology are based on courtyards, which are small and compact. Although the density is higher, the open space ratio of 0.62 is much greater than the target district's 0.32, providing a more effective and controllable open space per unit building area. In summary, China's historical neighborhoods themselves have a more distinct intrinsic ecology for the target cases, with a more compact and dense texture and more reasonable and effective open space, laying a more solid foundation for creating eco-historic districts (Table 5).

Table 5
Density of historic districts of Chinese cases (spacemate index)

Type	Pingjiang Road	Chongqing Ciqikou	He Huatang	Dongguan Street	Qingguo Lane	Kuanzhai Alley
FSI	0.8	0.96	0.68	0.73	0.7	1.02
GSI	40%	39.5%	58.7%	65.8%	47%	50.8
Average Floors	2	2.4	1.16	1.11	1.49	2.01
OSR	0.75	0.63	0.61	0.47	0.76	0.48
200*200m						

Spatially assign the density of the target districts and the Chinese historic districts, and form a visualization diagram of the hierarchical relationship between the density and form of the districts using ‘Spacemate’. Analyzing the space matrix of the comparison between the target districts and the Chinese historic districts sample range, it can be seen from the figure that the target district mostly revolves around the ‘F’ area, with the main distribution of multi-storied courtyards and slab-type buildings. The Chinese historic district sample is completely different, with more distribution in the ‘C’ and ‘D’ area or higher density areas, and the form is more inclined towards high-density, low-rise courtyards and slab-type mixed building forms. This representation indicates that Chinese historic districts have a more overall, orderly, and compact district form, providing a foundation for ecological environment protection, energy conservation, and resource recycling in the future (Figure 3).

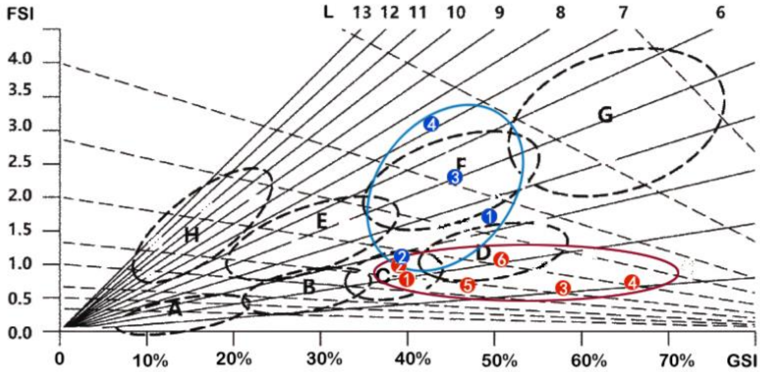


Fig. 3. Comparison diagram of spacemate and spacematrix of case historic district and target historic district (red area: case historic district; blue area: target historic district)

3.3 Appropriate green capacity ratio

Compared to ecological districts, the green space ratio of historic districts that have in accordance with nature does not meet the current greening standards, and the 2 D greening standards cannot fully reflect the ecological benefits of historic district. For this purpose, the Nanjing He Huatang Historic District (42 species of trees, 15 species of commonly used shrubs, vines, ground cover, and hedges) and the Nanjing Lang Shi International Ecological District (24 species of trees, 23 species of commonly used shrubs et al.) were selected as comparative cases. Starting from the suitability analysis of the 2 D green quantity standard in the historic district, plant species and spatial information were collected through 3 D oblique photography and field research. Combining spatial information and green quantity calculation methods, the most suitable calculation method reflecting the true green quantity and ecological benefits of the historic district was obtained through comparative analysis of cases (Figure 4).

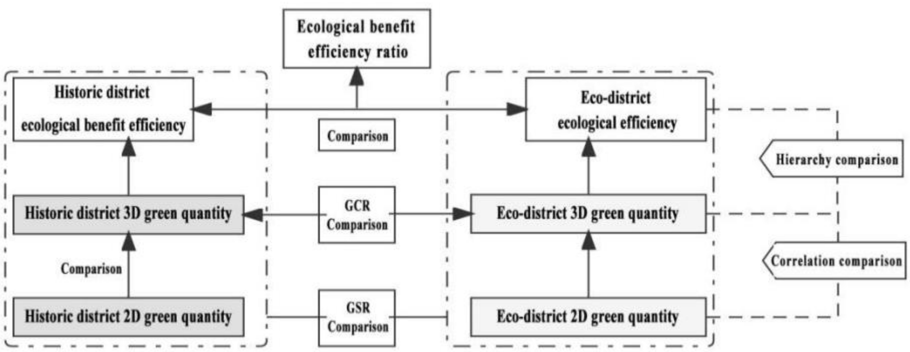


Fig. 4. ‘Sample-Index’ double contrast analysis structure

This study selected the most widely used green space ratio (GSR) as the 2 D green quantity indicator, and the green capacity ratio (GCR), which can directly reflect the real green quantity and ecological benefits of the district, as the 3 D green quantity indicator. Through a comparative study using a formula, it was found that the GSR of the He Huatang District was 0.71%, and the Lang Shi District was 47.9%. The GSR ratio of the two plots is 67.5, with the Lang Shi District being 1.36 times higher than the ecological city GSR standard (35%), while He Huatang is much lower than this standard. Judging from the 2 D green quantity alone, the two sample districts are in completely different levels of green quantity. Evaluate the 3 D green quantity indicators and calculate the leaf area index and GCR of ecological and historic districts. The results show that the GCR of historic district (0.823) is lower than that of ecological district (9.894), and the difference is 12 times. Through comparative analysis, there is a significant difference in the results of the two measurement methods, and the ratio of 3 D green quantity that can more accurately reflect ecological benefits is relatively small (Table 6).

Table 6
Evaluation of GSR and GCR assessment

Districts	Land area/m2	GSR/%	GCR
He Huatang Historic District	125 660	0.71	9.894
Lang Shi International Ecological District	37 115	47.9（>35）	0.823

Obtain the GSR and GCR of two experimental plots through the formula, and calculate the ecological efficiency and ecological efficiency ratio of the plots through the double contrast analysis formula:

Eco-district ecological efficiency = 9.894/47.9% = 20.656

Historic district ecological efficiency = 0.823/0.71% = 115.915

Ecological efficiency ratio = 115.915/20.656 = （47.9%/0.71%） / （9.894/0.823） = 5.612

The ecological efficiency of ecological district refers to a total leaf area index of 20.656 per unit green space area; Similarly, it can be concluded that the ecological efficiency of the historic district is 115.915, with a significant difference between the two values. This indicates that the values obtained from the 3 D green quantity measurement and the 2 D green quantity measurement are not equal, indicating that the 2 D green quantity measurement cannot accurately reflect the true green quantity and ecological benefits of the district. The numerical result of the ecological efficiency ratio is 5.612>1, indicating that the ecological efficiency of historic district is higher.

The results indicate that historic district can create more ecological benefits per unit green space area than ecological district, and historic districts have more advantages in green quantity. The reasons for this may be as follows: 1) Large trees have more diverse characteristics in community configuration; 2) The proportion of total leaf area of trees is larger; 3) Historic districts provide more temporal and spatial benefits to trees; 4) Historic districts have richer 3 D greening.

3. Strategies to create Eco-historic district

The location of the historic district has a natural ecological foundation, but in the process of urban growth, the comprehensive ecological environment gradually loses [3][9]. How to study the density of population, space, and greenery to form ecological revival strategies for historic districts will become the key to forming eco- historic district:

i. **Cultural ecology.** Explore the intrinsic ecology of historic district in terms of texture and population density, and establish reasonable spatial capacity for historic districts. Considering the compact texture of the historic district, the green space layout should break up the whole into parts, providing sufficient growth space for plants to achieve the best ecological benefits. Adapting to the unique greening pattern in historic districts, a combination of large trees and other plants is used to create a good public space, giving people a unique sense of belonging in historic neighborhoods.

ii. **Social ecology.** The intrinsic density ecology of historic districts is characterized by the form of courtyards, and the density of courtyard buildings with the same depth in the same plot can reach three times that of point-style buildings. Respecting the formation and development laws of historic districts, the green layout may not necessarily be suitable for a uniform pattern of trees, shrubs, and grass. An ancient trees can often form a landmark public space.

iii. **Natural ecology.** Respect the natural selection and growth laws of vegetation, consider sufficient growth space and requirements for light, water, soil, etc., and ensure appropriate density. If the plane layout cannot meet the diversity ratio mode of multi-level trees and shrubs, encourage spontaneous greening behavior and fully utilize the advantages of vertical multi-level 3 D greening. Vertical greening and the configuration of trees, shrubs, and grasses should adapt to the diversity of seasonal changes. Green spaces should be centralized layout in boundary gaps, back streets, riverside greenways and other areas to meet the needs of biodiversity.

iv. **Economic ecology.** Historic district contains self-energy, the protection of historic texture and population density is an important way to follow their intrinsic economic ecology. In the planning of green spaces in historic districts, it is advisable to choose more adaptable and low-cost local species for vegetation, adopt a tailored overall layout and greening method, and encourage multiple parties to jointly maintain the spatial environment and economic ecology of historic districts.

4. Conclusions

This study establishes a vertical spatiotemporal axis to trace the ancient Chinese ecological views that influenced the formation of historic districts, allowing the districts to remain unfading and ecologically sustainable. Weaving horizontal inspirations in this vertical axis: the cross temporal combination of ideas and practices, the coupling and transformation of ancient ecological smart and modern ecological wisdom; By reinterpreting the formation and development of historic cities and districts with the ancient ecological space philosophy, exploring the possible promotion of modern ecological concepts in the revival of historic district, and addressing practical issues such as population loss, spatial decline, and green volume lost, this study explores the reasonable ecological density from three aspects: population density, building density, and green capacity ratio, and proposes ecological revival strategies that are beneficial to cultural ecology, social ecology, natural ecology, and economic ecology. The combination of ancient ecological wisdom and modern ecological wisdom will guide our thinking on modern urban construction and the revival of historic districts.

Acknowledgement

This work was supported by the National Natural Science Foundation of China Youth Project (No. 52308008), the China Postdoctoral Science Foundation (No. 2023M730408), the National Natural Science Foundation of China (No. 52478006), the National Natural Science Foundation of China (No. 52078072), and the Fundamental Research Operating Expenses of the Central Universities and Colleges (2024CDJXY014).

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