

How to improve the integrity and sustainability of historic architectural complexes and their environments in modern urban planning--an example from the "Wenming Street" historic district renovation project in Kunming

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Abstract. Historic buildings are the bearers of human civilization. Kunming, a famous historical and cultural city in China, has numerous historical and cultural heritages and a diverse and prosperous historical and cultural background. This study takes the renovation project of the historic district of Wenming Street in Kunming as the research object and proposes a holistic, multi-dimensional, and multi-factor planning and renovation method that should focus on the district in the conservation and renovation of historic buildings through the hierarchical analysis method. Through expert scoring and weighting analysis, questionnaires, and index scores, it is found that there is a lack of "spirit of place" and insufficient expression of non-material elements in the renovation of the historic district. This study aims to realize the integration of the historic environment with the needs of modern life using a monistic logic and to provide theoretical reference and practical guidance for the conservation, renovation, and sustainable development of historic buildings and the historic environment.

Keywords: historic districts, conservation and renovation, integrity, sustainability, urban planning.

1. Background

In the course of the development of human civilization and rapid urbanization, architecture has occupied an essential historical position, carrying the history of the development of human civilization. 2050 will see China's urbanization level reach 70%-75%, and the spatial layout and structure of cities are undergoing significant changes, particularly in the form of architecture. This has a huge impact on historic buildings in cities, and the basic cause of this contradiction is the difference between modern development and traditional values or the conflict between development and conservation [1]. In order to strengthen the conservation of historic buildings, emphasis needs to be placed on balancing modern urban planning with the conservation and restoration of historic buildings so that the two can develop in synergy.

In order to better meet the requirements of the protection and management of historical and cultural cities under the new situation, Kunming has formulated a series of policies, mainly the Regulations on the Protection of Historical and Cultural Cities of Kunming, to clarify the protection objects and

measures required, and to strengthen public participation in historical and cultural protection[2]. The aim of this paper is to explore the relevant factors of coordinating planning and conservation, taking the renovation project of the historic district of Wenming Street in Kunming as an example and to provide evidence for a systematic and sustainable development scheme for the new city based on its historical heritage.

2. Renovation of old street in Kunming's Wenming neighbourhood

The Wenming Street Historical Quarter is a traditional commercial and living style area in Kunming with a mature scale, concentrating on the historical and regional cultural characteristics, and is an important part of the conservation of Kunming's historical and cultural city. As the spatial axis of this historic district, Wenmiao Street maps the history, culture, and development planning of the district [3]. The conservation and renovation of the Wenmiao area of Wenming Street have endeavored to preserve the buildings' original features in terms of architectural and cultural values. They have strictly followed the four principles of conservation and maintenance of heritage and ancient buildings, i.e., retaining the original form, the original structure, the original materials, and the original craftsmanship [4].

The conservation of the historic environment involves "one element, two aspects, multiple dimensions, and multiple elements," which requires the embodiment of the "one element" of the historic environment as a whole, the organic combination of the two aspects of the historic environment, the tangible architectural heritage and the intangible heritage of cultural activities[5], and the emphasis on The "multi-dimensional" conservation of the historic environment (building blocks, neighborhoods, landscapes, functions, memories) and the value of the cultural, historical, social, economic and ecological elements [6-8].

The "collage" theory is widely used and extended in urban planning, i.e., the extraction of reasonable buildings and environments from traditional neighborhoods, and the filling, refinement, and expansion of them, to ensure the continuity of space, texture, and culture, and the preservation of the authenticity and identity of historic buildings and environments based on spatial needs [9]. The overall renovation and conservation of the civilized quarter fully illustrate the practical application of the 'collage' theory of the city, which encompasses a wide range of buildings with a wide range of periods, architectural styles, and useful content. However, the over-concentration of the building blocks has resulted in a cluttered appearance and an overly rigid 'grey space' outside the buildings.

The famous Norwegian critic of architectural history and architecture, Norbert Schurr, suggests that each building that makes up a city is a place. That place should include structure and spirit, i.e., the external structure and the internal cultural heritage [10]. The historic built environment has evolved and contains a much stronger and more diverse 'spirit of place.' In the long-term interaction between people and places, the historic built environment will allow people to form a subconscious perception through objective architecture and subjective cultural connotations, thus forming a characteristic perception of the spatial environment [8]. The Street of Wenming has been refined over 900 years of development and change to create the complex cultural context it is today. Yet, the historical culture it contains needs to be adequately displayed.

3. Analysis of integrated design elements for the historic district of Wenming Street

The evaluation system for the historic environment consists of two main aspects: the non-material cultural elements and the material spatial elements. This paper visualizes the data through quantitative analysis of the multiple components included in the two aspects.

3.1. Hierarchical analysis & expert scoring(research methods)

The historic environment is often based on the value of historical ecology and culture, highlighting the overall integrity of the conservation object and the conservation area. Therefore, a hierarchical analysis structure model and a corresponding index system are constructed to achieve a high degree of restoration of the historic district environment (Figure 1, Table 1).

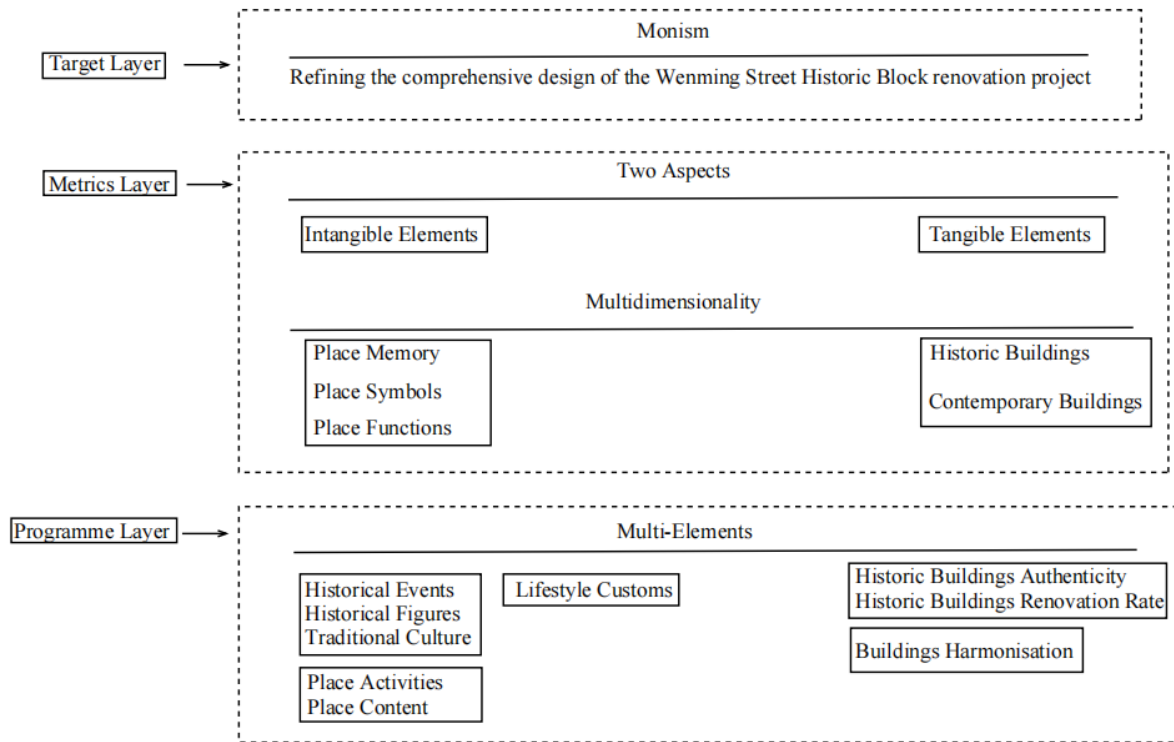


Figure 1. Hierarchical analysis structural model.

Table 1. Index system.

Monism	Two Aspects	Multidimensionality	Multi-Elements
Refining the comprehensive design of the Wenming Street Historic Block renovation project	Intangible Elements A1	Place Memory B1	Historical Events Influence C1
		Place Symbols B2	Historical Figures Influence C2
		Place Functions B3	Traditional Culture Influence C3
	Tangible Elements A2	Historic Buildings B4	Lifestyle Customs Preservation C4
		Contemporary Buildings B5	Place Activities Preservation C5
			Place Content Preservation C6
			Historic Buildings Authenticity C7
			Historic Buildings Renovation Rate C8
			Buildings Harmonisation C9

After identifying the various factors, a judgment matrix was established using the nine-point ratio scale (Table 2). A total of five experts were invited to score the indicators in this study, and the scores were taken as mean values. The weight values of the indicators at each level relative to the target level were calculated.

Table 2. Saaty's nine-point ratio scale.

Importance Intensity	Definition
1	Equal importance of two elements
3	Weak importance of the former element over the later one
5	Essential or strong importance of the former element over the later
7	Demonstrated importance of the former element over the later one
9	Absolute importance of the former element over the later one
2, 4, 6, 8	Intermediate values between the two adjacent judgments

The results of the hierarchical analysis are shown for one expert (Table 3), and all satisfy the consistency test.

Table 3. Elements of hierarchical analysis.

(a)				
	Intangible Elements A1	Tangible Elements A2	Weight(w)	
Intangible Elements A1	1	2	0.6667	
Tangible Elements A2	1/2	1	0.3333	
(b)				
Intangible Elements A1	Place Memory B1	Place Symbols B2	Place Functions B3	Weight(w)
Place Memory B1	1	2	1/2	0.2970
Place Symbols B2	1/2	1	1/3	0.1634
Place Functions B3	2	3	1	0.5396
(c)				
Tangible Elements A2	Historic Buildings B4	Contemporary Buildings B5	Weight(w)	
Historic Buildings B4	1	2	0.6667	
Contemporary Buildings B5	1/2	1	0.3333	
(d)				
Place Memory B1	Historical Events Influence C1	Historical Figures Influence C2	Traditional Culture Influence C3	Weight (w)
Historical Events Influence C1	1	2	2	0.4934
Historical Figures Influence C2	1/2	1	2	0.3108
Traditional Culture Influence C3	1/2	1/2	1	0.1958
(e)				
Place Functions B3	Place Activities Preservation C5	Place Content Preservation C6	Weight (w)	
Place Activities Preservation C5	1	3	0.7500	
Place Content Preservation C6	1/3	1	0.2500	
(f)				
Historic Buildings B4	Historic Buildings Authenticity C7	Historic Buildings Renovation Rate C8	Weight(w)	
Historic Buildings Authenticity C7	1	1/3	0.2500	
Historic Buildings Renovation Rate C8	3	1	0.7500	

3.2. Results of the five experts' scores(results)

The results of the five experts' scores (Table 4) show that the conservation and renovation of the neighborhood should continue to focus on the historic buildings themselves, emphasizing improving the renovation and maintenance of the historic buildings they contain. The old buildings should be identified for renovation in terms of their historical value, cultural background, and traditional appearance. Regular maintenance should be carried out on the renovated and repaired historic buildings. To improve the harmony between historic and modern buildings in the neighborhood and to achieve harmony between interior and exterior. Provide a diversified overall plan to improve spatial integration by increasing the number of squares and green spaces around buildings.

Table 4. Summary of the weighting of elements to improve the comprehensive design of the Wenming Street historic district renovation project.

Monism	Two Aspects	Weight(w)	Multidimensionality	Weight(w)	Multi-Elements	Weight(w)
Refining the comprehensive design of the Wenming Street Historic Block renovation project	Intangible Elements A1	0.5667	Place Memory B1	0.2112	Historical Events Influence C1	0.0875
					Historical Figures Influence C2	0.0824
					Traditional Culture Influence C3	0.0413
	Tangible Elements A2	0.4333	Place Symbols B2	0.1062	Lifestyle Customs Preservation C4	0.1062
					Place Activities Preservation C5	0.1687
			Place Functions B3	0.2493	Place Content Preservation C6	0.0806
					Historic Buildings Authenticity C7	0.0843
			Historic Buildings B4	0.2528	Historic Buildings Renovation Rate C8	0.1685
					Buildings Harmonisation C9	0.1806
			Contemporary Buildings B5	0.1806		

3.3. Analysis of the results of the questionnaire and fuzzy composite evaluation

To further optimize and improve the elements of the renovation project of the Wenming Street historic district and increase public participation, a corresponding questionnaire was designed and randomly distributed to local chat groups in Kunming. Two hundred thirty-eight questionnaires were distributed to local or permanent residents of Kunming, and 224 valid questionnaires were obtained, with an efficiency rate of 94.12%. The values of all elements were graded into five values of "1, 2, 3, 4, and 5" and assigned with criteria to determine the specific value range of different scores to achieve uniform quantification of the data (Tables 5-6).

Table 5. Improving the criteria for assigning elements to the comprehensive design of the renovation of the historic district of Wenming Street: Intangible Elements.

Multidimen- sionality	Multi- Elements	Assignment Basis	5	4	3	2	1
Place Memory	Historical Events Influence	The proportion of people who know about historical events such as the Ma Zhen patriotic movement, Wang Chi economic revival, the commemoration of the victory in the Chinese People's War of Resistance against Japanese Aggression, and the Yunnan liberation movement (%)	≥ 90	80~90	70~80	60~70	<60
	Historical Figures Influence	The proportion of people who know about historical figures such as Ma Zhen and Wang Chi (%)	≥ 90	80~90	70~80	60~70	<60
	Traditional Culture Influence	The proportion of people who know traditional cultures such as Confucianism, red revolutionary culture, celebrity culture, and related street culture (%)	≥ 90	80~90	70~80	60~70	<60
Place Symbols	Lifestyle Customs Preservation	The proportion of indigenous inhabitants (%)	≥ 60	50~60	40~50	30~40	<30
Place Functions	Place Activities Preservation	The proportion of shops retain their original function as bookshops, grocery shops, carving shops, teahouses, etc. (%)	≥ 60	50~60	40~50	30~40	<30
	Place Content Preservation	The proportion of people aware of patriotic cultural and celebrity spirit promotional activities held in the block since its renovation (%)	≥ 90	80~90	70~80	60~70	<60

Table 6. Improving the criteria for assigning elements to the comprehensive design of the renovation of the historic district of Wenming Street: Tangible Elements.

Multidimen- sionality	Multi-Elements	Assignment Basis	5	4	3	2	1
Historic Buildings	Historic Buildings Authenticity	The proportion of national critical provincial or municipal level cultural heritage protection units (%)	≥ 90	60~80	40~60	10~40	<10
	Historic Buildings Renovation Rate	The proportion of well-preserved historic buildings and historic buildings which have been renovated (%)	≥ 80	60~80	40~60	20~40	<20
Contemporary Buildings	Buildings Harmonisation	The proportions of buildings (including building mass, materials, and color) appear to be significantly inharmonious with the original architectural style of the block since its renovation (%)	<10	10~15	15~20	20~25	≥ 25

The final scores were calculated by multiplying the scores of each level of elements with their corresponding weights (Figures 2-4). The overall score indicates that the renovation project of the Wenming Street historic district lacks the "spirit of place," poor integration of architectural styles, and lack of clear communication of the district's historical and cultural background and meaning. The direction of subsequent improvement may include planning a cultural park and a historical and cultural promenade, which can be used to present the heritage and development of the historical and cultural background. In addition, the existing old buildings could be replaced by activities more closely related to the traditional culture of the neighborhood, and the modern commercial center could be reduced by adding a special hostel, bookstore, teahouse, etc.

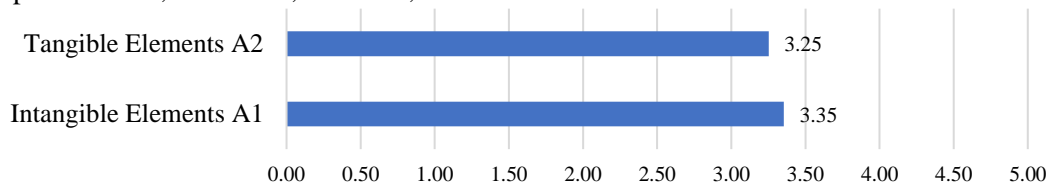


Figure 2. Results of the first element of the indicator tier.

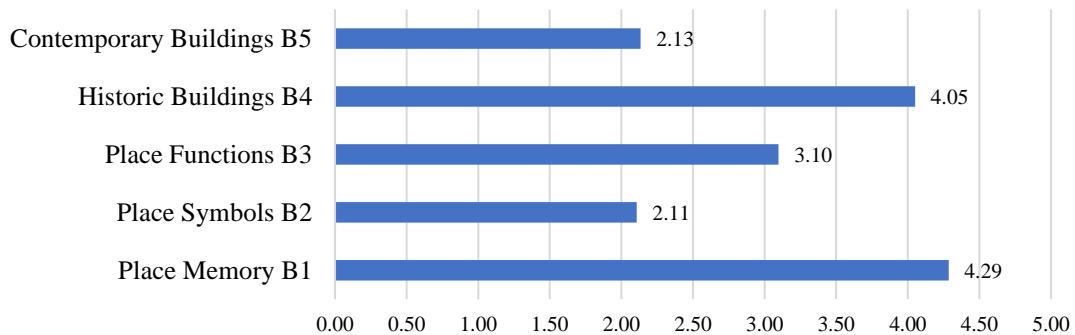


Figure 3. Results of Tier 2 requirement scores for the indicator tier.

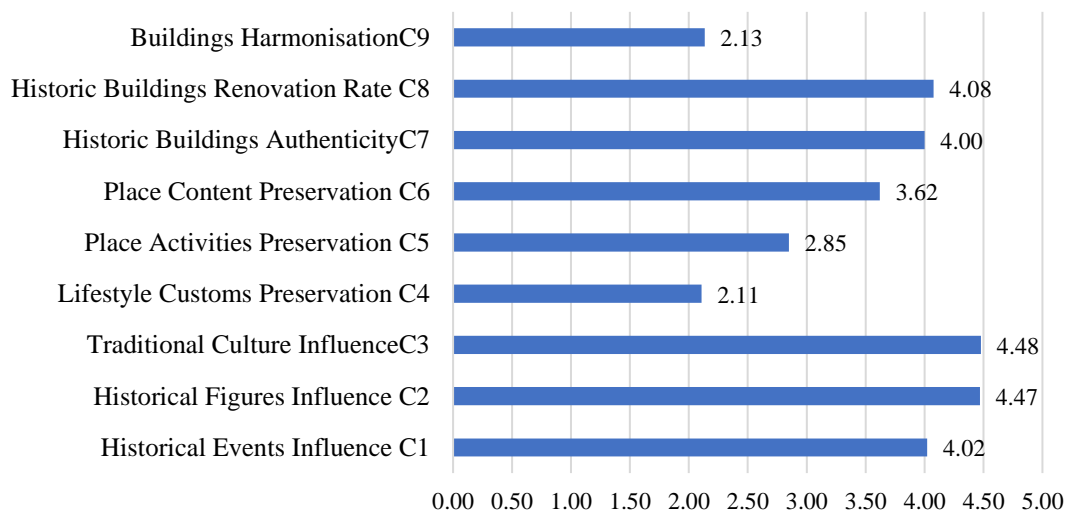


Figure 4. Programme level element score results.

4. Conclusion

It is not suitable for countries worldwide to carry out large-scale demolition of historic buildings based on urban expansion, a move that can lead to a fracturing of the historical landscape and cause severe damage to national and even world history and culture. At the same time, it is also important not to limit

oneself to the static conservation of individual buildings, which can lead to a fragmentation of conservation and development, a lack of control over elements such as the overall landscape and pattern, and a fragmentation of the historic environment. The current focus of research on the conservation and renovation of historic buildings has been extended from the static preservation of single buildings to the dynamic planning and protection of lots, focusing on entire neighborhoods. It should continue to be extended to the integrated conservation of the city, forming a multi-level systemic view. On the other hand, protecting historical buildings and the environment should also combine the real and the imaginary, integrating elements of intangible history and folk culture with elements of architectural space. For example, the analysis of the conservation and renovation project of the historic district of Wenming Street shows that only material building repairs cannot meet the needs of the overall continuation of the historic environment, but rather the implementation of the architecture carrying history, highlighting the artistic style of the city, enriching the cultural connotation of the architecture and forming a distinct and coordinated cultural environment planning, to achieve the organic integration of the historic architecture and the historic environment and sustainable development.

5. Limitations of the research

As a representative second-tier city in China, Kunming's level of economic development in 2021 is not optimistic in the post-epidemic era, and the proposal to reduce the proportion of modern businesses in civilized neighborhoods, based on the results of a survey of residents may add to the burden of economic development in the city. However, civilization and culture are the software strength of a town, and the more culturally distinctive a city is, the more attractive and visible it will be. Stimulated by the cultural factor, it can attract investment, promote tourism and even lead to a significant economic development of the whole city.

The target neighborhood for this study is located in the urban center of Kunming, where urban development, like most other cities, follows an expansion from the inside out. The established urban space can constrain the subsequent growth of historic buildings, and subsequent research could focus on improving the integrity of the historic building stock and the historic environment within the limited urban space.

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