Research on the integration path of historical and cultural block protection and modern architectural design

Bo WANG

Anhui Architectural Design and Research Institute Co., Ltd., Hefei, Anhui, 230000, China

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Abstract: Firstly, this paper analyzes the current situation of the protection of historical and cultural blocks, and points out the characteristics of the existing protection and integration model, as well as the core conflicts and deep-seated problems, including the conflict between protection requirements and modern functions, the separation between traditional styles and modern aesthetics, the fault between technology application and traditional crafts, the game between interest demands and value orientation, and the lack of connection between system guarantee and implementation. In order to solve these problems, this paper constructs a system of integration paths, and puts forward specific strategies and methods from the aspects of respecting historical and cultural background, combining functional adaptation with modern needs, sustainability and environmental protection design, material selection and process inheritance, digital technology empowerment, multi-party cooperation mechanism, and cultural symbol extraction, translation and regeneration. Finally, the article emphasizes the importance of gradual renewal and flexible management and control, so as to ensure that historical and cultural blocks continue to glow in the protection.

1. Introduction

With the double acceleration of globalization and urbanization, historical and cultural heritage is experiencing an unprecedented crisis of survival. UNESCO's World Cultural Heritage Report 2020 shows that more than 60% of historical blocks in the world are facing "constructive destruction" due to over-exploitation, while the urbanization rate of China has exceeded 65%, only 13,400 historical buildings disappeared under bulldozers during the 13th Five-Year Plan period [1]. This extensive mode of "tearing apart the truth and building the falsehood" not only separates the urban context, but also leads to the spatial homogenization dilemma of "one side of a thousand cities" —— Starbucks in Beijing Hutong and Uniqlo in Shanghai Shikumen, seemingly under the appearance of cultural blending, are actually deep crises in which historical memory is deconstructed by consumerism.

Modern architectural design is falling into the myth of "form innovation". Although the flow curve of Zaha Hadid's deconstruction and the mechanical rationality of Koolhaas's metropolitan architecture have won numerous awards on the international stage, they are difficult to respond to the identity needs of local culture. When eight of the "New Ten Scenery" in Shenzhen are modern landmarks, their cultural recognition is lower than that of Nantou Ancient City [2], which bears collective memory. This contradiction highlights the urgent need to establish a "protective innovation" design paradigm, which not only continues the material and intangible heritage of historical blocks, but also activates its contemporary value through modern technology empowerment. This study attempts to break through the binary opposition between "protection" and "innovation", build a theoretical model of "time-space superposition"-deconstruct historical stratification through digital technology, explore the critical threshold of modern design intervention, and provide a new paradigm for cultural heritage protection.

2. Present situation analysis and contradiction analysis

2.1 Practical progress and characteristics of protection and integration

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2.1.1 Policy and concept: cognitive upgrading from "static preservation" to "live transmission"

In recent years, the national level has successively issued the Regulations on the Protection of Famous Historical and Cultural Cities, Towns and Villages and the Opinions on Strengthening the Protection and Inheritance of Historical Culture in Urban and Rural Construction, which clearly put forward the orientation of "paying equal attention to protecting historical features and improving people's livelihood" and "encouraging the activation and utilization of historical buildings" to promote the transformation of the protection concept from "original preservation" to "holistic protection+adaptive reuse". Local governments and design institutions gradually realize that the intervention of modern architectural design is not the destruction of the historical environment, but the activation of the vitality of the block through functional implantation and spatial dialogue.

2.1.2 On the level of practical mode: exploration and attempt of multi-integration strategy

In current practice, the integration of historical and cultural blocks and modern buildings mainly presents the following three modes (see Table 1). Supplementing public services and commercial functions through modern architecture; With the coordination of scale, material and form, the spatial dialogue type of visual echo is realized; And the technology fusion type that uses digital technology to record information, green technology to improve livability and inherit traditional crafts.

Table 1 Integration mode of historical and cultural blocks and modern buildings

Pattern type	Core characteristics	Specific practices
Functional complementary type	Preserve the traditional architectural ontology and supplement the modern functions	Through modern buildings to provide public services, commercial facilities and other functions, make up for the lack of original functions of the block
Spatial dialogue type	Realize visual coordination and environmental echo	The dialogue between modern architecture and historical environment is formed by means of scale control, material echo and formal abstraction
Technology fusion type	Combination of traditional craft and modern science and technology	Use digital technology to record historical building information, and use green building technology to improve livability, while protecting the core value of traditional construction technology

2.1.3 The level of subject participation: the cooperative mechanism of government-market-residents has initially taken shape

In some successful cases, the government controls and guides funds through planning, the market capital is invested through operation, and residents form a joint force through community participation. For example, in the transformation of Kuanzhai Lane, Chengdu, the scene of aboriginal life was preserved, and the market-oriented operation team was introduced to realize the closed loop of "protection-operation-people's livelihood".

2.2 Core conflicts and deep problems of protection and integration

Although some progress has been made in practice, the integration of historical and cultural block protection and modern architectural design still faces multiple contradictions, which is essentially a systematic conflict between "continuation of historical value" and "contemporary functional demand", "technological innovation" and "interest appeal".

2.2.1 Rigid conflict between protection requirements and modern functions

There is a direct contradiction between the core protection requirements of historical blocks and the functional requirements of modern buildings. It is difficult to arrange the necessary elevators, air conditioners, fire water tanks and other equipment in modern buildings reasonably without destroying the historical interface; The open space and night lighting required by the new format conflict with the privacy and low brightness environment of the traditional courtyard; The structural bearing capacity of historical buildings can not meet the needs of large space reconstruction of modern commerce.

2.2.2 Cognitive separation between traditional style and modern aesthetics

Designers' understanding of "traditional style" has a bipolar tendency of "symbolic reproduction" and "complete modernization", which leads to the new building and the historical environment "seemingly separated from each other" or "out of place". Simply piling up traditional elements, ignoring the deep logic of regional culture, forming "fake antiques"; Pursuing "international" modern style, destroying the historical skyline and texture continuity of the block; Young people prefer simple and modern space experience, while older residents pay more attention to the traditional form of "sense of ceremony", so it is difficult to give consideration to multi-cultural identity in design.

2.2.3 Application of technology and fault risk of traditional technology

There is a compatibility problem between the standardization and efficiency of modern building technology and the non-standardization and experience of traditional building technology, which may lead to the loss or alienation of traditional technology. Modern construction teams have insufficient knowledge of traditional techniques such as tenon-mortise structure, small blue tile laying and manual brick masonry, and "replacing the old with the new" appears in the repair process. Although digital technology can simulate the traditional form, it may ignore the temperature sense and manual traces of the material itself. The concealed works of historical buildings often damage the original structure due to improper technical treatment.

2.2.4 Multi-game between interest appeal and value orientation

The protection and development of historical and cultural blocks are faced with the fierce game between the interests and value orientation of the government, developers, residents and tourists. The focus of the contradiction lies in the conflict between protection responsibility, economic benefits, life improvement and experience demand. Developers pursue economic interests and promote high-intensity commercial development, which easily leads to the loss of aborigines and excessive tourism; Residents transform buildings without authorization to obtain higher rents and destroy traditional features; The government may implement "sports protection" because of the pressure of short-term political achievements, and sacrifice long-term cultural values by means of antique reconstruction, which makes it difficult to achieve the balance between protection and development.

2.2.5 Insufficient connection between system guarantee and implementation

The rigid requirements of the existing laws and regulations for the "original protection" of historical buildings conflict with the flexibility requirements of modern design, and there is a lack of special technical standards for integrated design. Specifically, the protection planning is too general, and the function guidance and design control are not clear, which leads to the imbalance of design scale; The application of new technologies, such as photovoltaics and fabricated structures, lacks detailed implementation rules for coordination with traditional styles and features; At the same time, the powers and responsibilities of historical protection and construction management departments overlap in the examination and approval, and the technical standards such as style review and fire protection are not unified, which seriously restricts the efficiency of project promotion.

3. System construction of integration path

The system of integration path takes history and culture as the core, and through multi-dimensional strategic integration and technological innovation, it constructs a comprehensive framework that gives consideration to protection, utilization and inheritance (Figure 1). Its goal is to inject modern vitality while continuing the urban context and realize the sustainable development of historical and cultural blocks.

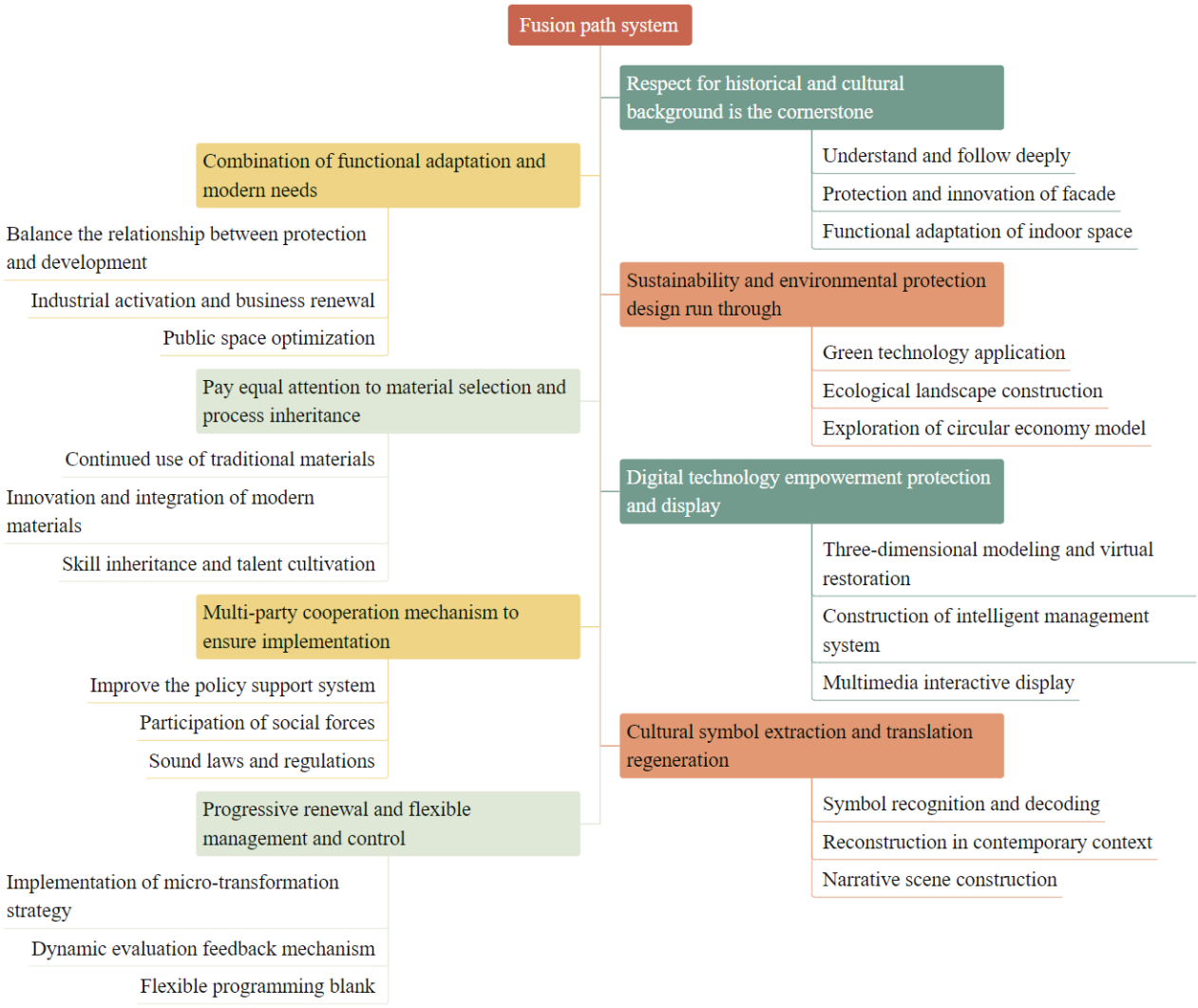

Figure 1 The system of integration path between the protection of historical and cultural blocks and modern architectural design

3.1 Respect for historical and cultural background is the cornerstone

Designers should deeply understand the historical context, cultural tradition and architectural style of the block, and ensure that the new construction or renovation project will not destroy the harmony of the original environment. Preserve the features of architectural appearance, structure and materials, continue the spatial layout, organically integrate old and new buildings, and maintain the historical charm of the block [3]. Accurately retain the original features of the facade of historical buildings, such as window frames, porches, sculptures and other elements. On this basis, carefully add modern elements, and realize the dialogue between ancient and modern through clever design, which not only highlights the historical features but also meets the needs of modern functions. On the premise of protecting indoor historical sites, we should rationally adjust the spatial layout to adapt to modern life. While retaining traditional materials, it integrates environmental protection and energy-saving technologies, giving consideration to practicality and cultural atmosphere, so as

to rejuvenate the historical space [4].

3.2 Combination of functional adaptation and modern needs

Balance the relationship between protection and development, go beyond simple appearance preservation, and pay attention to improving the practical use value of the block. Through the design strategy, modern functions are embedded in historical buildings, and the two complement each other, which not only retains cultural characteristics but also enhances practicality. Combine the cultural genes of the block to introduce emerging industries, such as artistic creation, cultural innovation retail, cultural travel experience and so on. Use idle buildings to build museums, exhibition halls or cultural centers to promote the parallel development of economic vitality and cultural heritage. Integrate open areas such as green spaces and squares, add leisure facilities and intelligent service systems, improve the quality of life of residents, promote community interaction and tourists' participation, and form an environment suitable for living and traveling [5].

3.3 Sustainability and environmental protection design run through

Sustainability and environmental protection design run through the renewal of historical and cultural blocks. By using energy-saving materials, solar energy system and rainwater recovery device, combined with natural ventilation and lighting design, energy consumption is effectively reduced and building energy efficiency is improved; On the landscape level, the ecological methods such as native plants, rain gardens and vertical greening are used to enhance the ecological resilience of the block and coordinate with the architectural style to create a unified green space [6]. At the same time, actively explore the circular economy model, promote the reuse of building materials and the recycling of waste resources, and help the block transform into a low-carbon and sustainable direction.

3.4 Pay equal attention to material selection and process inheritance

In terms of materials and technology, we should pay equal attention to tradition and modernity. Give priority to the use of traditional materials such as masonry and wood and inherit the construction skills to ensure that the renovation project "repairs the old as the old"; At the same time, innovative integration of high-performance concrete and other modern environmental protection materials, through experiments to achieve the unity of structural safety and historical beauty. In addition, a craftsman training mechanism is established to cultivate compound talents with both traditional skills and modern technology, which provides solid technical support for the sustainable renewal of historical blocks.

3.5 Digital technology empowerment protection and display

Digital technology provides all-round empowerment for the protection and display of historical and cultural blocks. Through laser scanning and three-dimensional modeling, the high-precision digital archiving of cultural relics buildings is realized, and virtual restoration is carried out by combining VR technology, which not only assists the restoration decision, but also creates an immersive cultural experience [7]. Building an intelligent management system based on GIS platform can monitor data such as passenger flow and environment in real time, and realize dynamic early warning and scientific operation. With the help of multimedia means such as AR navigation and interactive projection, visitors' sense of participation and cultural identity will be enhanced, and the influence of the block will be expanded through digital communication.

3.6 Multi-party cooperation mechanism to ensure implementation

In order to ensure the effective implementation of renewal practice, it is necessary to establish a long-term mechanism of multi-party cooperation. The government should improve the policy support system, formulate special plans, provide financial subsidies and tax incentives, guide the participation of social capital, and form a diversified fund guarantee. Encourage enterprises, social organizations and residents to participate in the protection work through volunteer networks, community co-governance, public hearings and other forms to achieve interest coordination and

co-construction and sharing. Improve laws and regulations, refine protection standards and punishment mechanisms, strengthen law enforcement supervision, and earnestly safeguard the protection order and sustainable development of historical and cultural blocks.

3.7 Cultural symbol extraction and translation regeneration

In the renewal of historical and cultural blocks, the extraction and creative transformation of cultural symbols has become an important path to connect tradition with modernity. By systematically identifying and decoding cultural symbols such as patterns, colors and construction methods unique to the block, the design reference database is established, and it is abstracted and reconstructed in the contemporary context, and it is integrated into modern design language by means of scaling and material innovation to avoid simple copying and realize the organic integration of old and new elements [8]. Create a narrative scene around the core cultural theme, connect cultural nodes in series through installation art, light show and other means, build a coherent story line, and enhance the spatial memory and emotional resonance.

3.8 Progressive renewal and flexible management and control

The renewal process emphasizes gradual advancement and flexible management, advocates the strategy of "micro-transformation", reduces the disturbance to the block texture by small-scale and phased implementation, and accumulates experience through pilot projects and gradually promotes it. Establish a dynamic evaluation and feedback mechanism, regularly monitor the implementation effect, allow trial and error and scheme optimization, and improve the adaptability of the system. Reserve development flexibility in the planning, support functional transformation and organic evolution of form through elastic index control and space blank, avoid excessive rigid constraints, and ensure the continued vitality of the block in protection.

4. Conclusion

Respect for historical and cultural background is the basis of integration, and it is necessary to accurately preserve the characteristics of historical buildings and realize the dialogue between ancient and modern times; The combination of functional adaptation and modern demand can enhance the practical use value of the block and promote cultural inheritance and economic development; Sustainability and environmental protection design run through the whole process, which is helpful to the transformation of the block to low carbon; Pay equal attention to material selection and process inheritance, and ensure that modern environmental protection materials are introduced while the renovation project is "repairing the old as before"; Digital technology empowers protection and display, providing a new means for block management and cultural communication; To ensure the implementation of multi-party cooperation mechanism, the government needs to improve policy support and encourage the participation of multiple subjects; The extraction, translation and regeneration of cultural symbols is an important way to connect tradition with modernity; Progressive renewal and flexible management and control emphasize reducing the disturbance to the block texture in a small-scale and phased manner. The integration path system aims to realize the sustainable development of historical and cultural blocks, which not only continues the urban context but also injects modern vitality, providing a new paradigm for the protection of cultural heritage.

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