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Advantages, dilemmas and optimization of adaptive reuse of modern historic buildings in urban renewal

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Abstract. Against the backdrop of China's transition from large-scale urban redevelopment to stock-based, quality-oriented renewal, modern and contemporary historic buildings have emerged as core carriers of urban identity and key assets for high-quality urban development. Focusing on adaptive reuse practices, this paper identifies two dominant renewal modes: authenticity-led conservation and function-oriented adaptation. Through comparative analysis of cases including university heritage buildings, Beihai Old Street, and Dubai's Al Shindagha Museum, the study evaluates both the cultural and economic values of reuse, as well as practical dilemmas such as architectural fabric damage, over-commercialization, and community fragmentation. The findings reveal that the two modes are applicable to distinct contexts, each with inherent practical limitations. Long-term revitalization requires appropriate technical improvements and collaborative management among multiple stakeholders to balance heritage conservation and urban development. Theoretically, this study enriches the systematic evaluation framework for the pros and cons of modern and contemporary historic building reuse. Practically, it provides decision-making references and implementation guidance for heritage activation and sustainable historic district revitalization in urban stock renewal.

Keywords: historic buildings, urban renewal, adaptive reuse, advantages and disadvantages, historic district revitalization

1. Introduction

Global urban development has shifted from extensive outward expansion to inward stock optimization, repositioning modern and contemporary historic buildings from marginalized relics to pivotal resources in urban renewal agendas. Long dismissed as barriers to modernization, these structures are now widely recognized as physical records of collective memory and the foundation of urban place identity [1]. Research on the adaptive reuse of historic buildings has formed a growing body of literature in both international and Chinese scholarship. Internationally, adaptive reuse has evolved from a niche conservation movement to a mainstream urban strategy. For instance, Japan's dual-track conservation system preserves pre-modern traditional architecture for its unique cultural value, while prioritizing adaptive reuse for modern structures to improve urban functionality, offering a proven framework for balancing heritage value and operational utility. In China, rapid urbanization once led to widespread demolition and irreversible loss of modern historic building stock. In recent years, however, conservation frameworks have been strengthened and policy support

has increased, with the *14th Five-Year Plan* elevating historic building conservation to a national strategic priority [2]. Domestic studies have explored technical restoration methods, organic renewal pathways for historic districts [3], and the spatial-temporal evolution of cultural industries in heritage sites [4], laying a foundational knowledge base for renewal practice.

However, existing research still has notable limitations. First, modern and contemporary historic buildings differ from ancient heritage in construction technology, functional attributes, and conservation status, yet remain understudied, with insufficient attention to their unique value attributes and reuse constraints. Second, most existing studies explore technical restoration paths and socio-economic impacts separately, while few provide a holistic evaluation that systematically compares both the benefits and inherent challenges of reuse practices. Third, the two dominant renewal modes lack clear delineation of their applicable scenarios and comparative assessment of practical performance, leaving a gap for mode selection and optimization in real-world projects. To address these research gaps, this paper examines two prevailing renewal modes—authenticity-led conservation and function-oriented adaptive reuse—and evaluates their performance across cultural, economic, and social dimensions. The study adopts a systematic literature review and comparative case analysis. It first establishes the theoretical foundation of modern historic building reuse by clarifying core concepts and value connotations, then compares the operational logic and practical effects of the two typical renewal modes through case studies. On this basis, it sorts out the advantages and dilemmas of reuse practice and proposes targeted optimization strategies.

Theoretically, this study enriches the analytical framework for modern and contemporary historic building reuse by clarifying the characteristics and applicable boundaries of the two modes, and supplements systematic comparative research on the pros and cons of reuse practice. Practically, the findings provide references for urban planners, architects, and management departments, helping to balance heritage protection and development demands in stock renewal and promote the long-term revitalization of historic buildings and districts.

2. Theoretical foundation

2.1. Definition and value connotation

Modern and contemporary historic buildings are generally defined as structures erected between the mid-19th century and late 20th century with verifiable historical, cultural, artistic or scientific value, covering industrial heritage, public institutional buildings, traditional residential compounds, arcade-style commercial structures and historic university campuses [5]. Their value manifests in four interwoven dimensions: historical value as material witnesses of China's modernization, cultural value as spatial carriers of collective memory and urban identity, artistic value as representatives of period-specific architectural styles and technical achievements, and economic value as reusable stock assets with spatial adaptability [6].

Unlike ancient heritage whose value relies mainly on antiquity and archaeological significance, modern and contemporary historic buildings occupy an ambiguous position in conservation systems. Their relative recency often excludes them from top-tier protection, leaving them vulnerable to demolition or inappropriate alteration. Meanwhile, their modern functional design grants greater spatial flexibility than pre-modern architecture, creating both unique opportunities and risks for reuse [5].

In summary, the four core values—historical, cultural, artistic and economic—jointly constitute the core protection value of modern and contemporary historic buildings, forming the fundamental basis for their adaptive reuse and sustainable development in urban renewal.

2.2. Core logic of historic building reuse

Historic building reuse is underpinned by a regeneration approach based on existing cultural values, fundamentally different from the demolition-reconstruction model dominant in earlier urban renewal phases [5]. The conventional demolition approach frames heritage protection and urban development as mutually exclusive, prioritizing economic output at the cost of historic fabric and place identity. In contrast, the reuse paradigm positions conservation and adaptation as complementary: rigorous conservation safeguards the authenticity and cultural identity of historic buildings, while targeted functional adaptation ensures their economic viability and long-term integration into contemporary urban life, enabling a balanced relationship between heritage inheritance and urban development [7].

Two distinct renewal modes have emerged from this logic. The authenticity-led conservation mode prioritizes preservation of original architectural fabric and historical features, with minimal functional changes, it applies to buildings of exceptionally high historical and artistic value. The function-oriented adaptive reuse mode emphasizes programmatic transformation while retaining key historic characteristics and spatial logic, widely adopted in historic district revitalization and industrial heritage conversion [1]. Both modes are anchored in the internationally recognized minimum intervention principle, which holds that alterations should be limited to what is strictly necessary for safety and functionality, with original fabric preserved wherever feasible [8].

3. Case study analysis of two renewal modes

3.1. Authenticity-led conservation: protective reuse of university heritage buildings

The authenticity-led mode prioritizes the preservation of original architectural fabric, historical style and spatial features, with functional adjustments strictly limited to basic modern use demands. It applies to high-value buildings whose original functions remain compatible with contemporary needs, allowing incremental upgrading rather than overall functional replacement. Institutional heritage represented by university historic buildings is a typical application scenario.

From a symbiosis perspective, university heritage activation follows three core principles: retaining the original spatial layout with targeted local modifications, aligning new functions with original spatial typology to minimize structural alteration, and integrating historic buildings as carriers of institutional memory into contemporary campus culture [7].

The renovation of the Office Building at No. 82 Dong'anmen, Beijing, exemplifies this mode. Adhering strictly to the minimum intervention principle, the project fully preserved and repaired the original facade, structural system and historical details, and only made moderate internal spatial reconfiguration to adapt to modern office functions and upgraded facilities [2]. This case confirms that authenticity-led conservation enables controlled evolution of historic buildings while maintaining their core historical identity.

3.2. Function-oriented adaptive reuse: revitalization of historic districts

The function-oriented mode focuses on transforming building programs and introducing new functions while retaining core historic features and overall spatial texture. It applies mainly to historic districts, industrial heritage and other sites where original functions have become obsolete, requiring economically sustainable new uses. Compared with authenticity-led conservation, this mode allows greater flexibility in internal spatial transformation, provided external appearance and key structural features remain intact.

Beihai Old Street in Guangxi offers a representative domestic case. Lined with well-preserved arcade buildings integrating Lingnan traditions and Western colonial influences, the street originally served as mixed residential and commercial shophouses. Its renewal adopted a three-tiered functional strategy: function optimization, retaining original use while upgrading facilities, function conversion, transforming spaces into cultural venues such as exhibition halls, and function replacement, introducing new programs including specialty cafes and cultural experience venues [6]. This approach has reactivated the declining district while preserving its core commercial and spatial traditions.

Dubai's Al Shindagha Museum represents a larger-scale international practice, converting an entire historic waterfront neighborhood into a museum complex. Framed from an innovation perspective, the project treats historic buildings as platforms for cultural innovation, integrating traditional fabric with immersive exhibition technologies and interactive programs [9], demonstrating how large-scale adaptation can turn underused neighborhoods into drivers of cultural and economic vitality.

However, a post-occupancy evaluation of modern villa reuse in Xiamen's Siming District reveals potential risks: while reuse preserved architectural heritage and introduced new functions, many projects suffered from uneven renovation quality, excessive internal alteration and gradual loss of original spatial characteristics [10]. These findings highlight the complexity of functional adaptation and the critical need to balance transformation with heritage integrity. Following Table 1 clearly summarizes historic building renewal modes between authenticity-led conservation model and function-oriented reuse model.

Table 1. Comparison of two historic building renewal modes

Renewal Model	Core Idea	Suitable Object	Typical Case
Authenticity-led conservation	Preserve original fabric and historical features, follow minimum intervention principle, only minor internal adjustments for basic modern use.	High-value buildings with original functions still compatible with contemporary use (e.g., institutional heritage, key cultural relic buildings).	Renovation of No. 82 Dong'anmen Office Building, Beijing, university heritage building reuse
Function-oriented reuse	Retain core historical features and overall texture, focus on functional transformation and new industry introduction, flexible internal adaptation.	Sites with obsolete original functions requiring revitalization (e.g., historic districts, industrial heritage, abandoned public buildings).	Beihai Old Street revitalization, Dubai Al Shindagha Museum, Beijing 798 Art District

4. Analysis of advantages and practical dilemmas

4.1. Positive values and empowerment effects

4.1.1. Cultural dimension: sustaining urban context and collective memory

The most fundamental value of historic building reuse lies in safeguarding cultural inheritance and maintaining urban spatial continuity. As tangible links between past and present, historic buildings carry layered collective memory and place identity irreproducible by new construction or simulated heritage [1]. Japan's practice illustrates this distinction: pre-modern architecture is protected for cultural uniqueness, while modern buildings are valued for documenting urban modernization and shaping contemporary cityscape character.

In China, the renewal of Beihai Old Street exemplifies this cultural value beyond individual building preservation. The project retained not only arcade fabric but also historic street scale, traditional commercial patterns and grassroots social practices that constitute the district's living cultural identity [6]. By adapting historic buildings to contemporary needs while preserving core historical character, reuse ensures urban heritage remains an active component of daily life rather than a static museum relic.

4.1.2. Economic dimension: activating stock assets and driving industrial transformation

Economically, adaptive reuse unlocks the latent value of underutilized stock assets, stimulates local vitality and drives regional industrial transformation. In Beihai Old Street, converting declining shophouses into cultural venues, specialty retail and catering spaces transformed a stagnating neighborhood into a popular commercial and tourist destination through cultural capitalization [6].

At a larger scale, the Al Shindagha Museum project generates broad economic spillovers, including job creation, tourism revenue growth and cultural industry agglomeration [9]. Research on functional coupling confirms that a balanced mix of cultural, tourism, commercial and community functions generates positive synergies enhancing overall economic vitality and long-term sustainability [11]. Beijing's 798 Art District is a classic example: adaptive reuse turned an abandoned industrial complex into a world-renowned creative cluster, delivering substantial economic returns while serving as a cultural exchange platform [12].

4.2. Practical dilemmas and negative impacts

4.2.1. Technical constraints and architectural fabric damage

Reuse of modern historic buildings faces pronounced technical challenges that can cause irreversible damage to fabric and historical features if improperly addressed. After decades of service, most suffer from structural deterioration, material aging and outdated service systems. Structural reinforcement is the foremost challenge: designed to outdated codes, many modern historic buildings fail to meet current seismic safety standards. Conventional reinforcement methods often require extensive alteration that damages original features and compromises authenticity [2].

Fire safety upgrading presents another persistent dilemma. Modern historic buildings typically have inadequate fire resistance, evacuation routes and protection systems, yet upgrading to current codes often requires permanent modifications to walls, floors and facades that undermine historical integrity. While the minimum intervention principle provides a normative framework advocating reversible solutions [8], implementation demands specialized heritage engineering expertise unevenly distributed, especially in small-scale local projects.

4.2.2. Over-commercialization and cultural attribute dilution

A core operational tension exists between economic viability and cultural authenticity, frequently manifesting as over-commercialization. Research identifies functional imbalance and cultural fragmentation as typical consequences of commercially driven renewal [11]. When commercial and tourism functions dominate without regulation, historic districts risk becoming hollowed-out commercial spaces severed from cultural roots, as seen in the Nanjing Confucius Temple district where commercial prioritization has gradually eroded its historical and cultural connotations [13, 14].

Over-commercialization takes concrete forms: chain retailers displacing local time-honored businesses, high-rent tenants crowding out public and cultural uses, and "Disneyfication" of historical elements into simplified tourist spectacles stripped of original meaning. International research confirms that commercial enhancement delivers short-term economic benefits but often costs cultural authenticity without targeted regulation [7]. A post-occupancy study of Xiamen villas also documents similar trends, with commercial-

oriented renovations prioritizing functionality over historical integrity and gradually erasing original spatial character [10].

4.2.3. Community fragmentation and resident displacement

Reuse can also generate negative social externalities, most notably community fragmentation and resident displacement closely associated with gentrification. As revitalization increases area attractiveness and drives up property values and rents, long-term low-income residents and local small businesses are gradually priced out, fundamentally transforming the social fabric of historic districts.

Long overlooked in practice, the social dimension is increasingly recognized as critical to sustainable heritage revitalization. Displacement raises not only social equity concerns but also erodes intangible cultural heritage embedded in community life and social networks. In China, this issue is acute in residential historic districts, where tourism-oriented redevelopment often relocates original residents to peripheral urban areas, resulting in "cultural hollowing": physical buildings are preserved, but the living culture that gave them meaning is lost. The concept of community symbiosis offers a normative framework emphasizing continuity and diversity [7], but its implementation requires innovative policy tools still underdeveloped in Chinese urban renewal practice.

5. Optimization strategies for sustainable reuse

5.1. Technical optimization for building renovation

Addressing technical challenges requires targeted approaches balancing safety, functionality and heritage preservation, aligned with the minimum intervention principle. For structural reinforcement, precision technologies using Fiber-Reinforced Polymers (FRP) can improve bearing capacity and seismic performance with minimal visual impact on original fabric, making them suitable for heritage renovation [2]. For building services, integrated design should route new pipelines through existing structural voids, attic spaces or non-historic annexes, using reversible methods such as raised floors to avoid permanent damage to historic walls and floors [8].

For fire safety, performance-based design offers an alternative to rigid prescriptive codes. Combining advanced smoke detection, high-pressure mist suppression and targeted compartmentalization can meet safety standards without extensive structural alteration. For energy efficiency, minimum-intervention retrofits should be prioritized, including improving envelope air sealing, adding thermal insulation in non-visible layers and installing high-performance windows matching original profiles, reducing energy consumption while preserving external historical appearance [8].

5.2. Multi-dimensional countermeasures for economic and social dilemmas

Addressing over-commercialization and community displacement requires comprehensive collaborative management among different stakeholders integrating economic, social and cultural objectives. On the economic front, diversified funding mechanisms can reduce overreliance on commercial revenue. A mix of government grants, heritage conservation funds, corporate sponsorships and public crowdfunding can share conservation costs and reduce pressure for excessive commercialization. Japan's system offers a reference, with stable government funding and legal frameworks supporting high-standard conservation without compromising authenticity [1]. Balanced functional planning is also essential: a reasonable mixed-use structure integrating cultural facilities, community services, commerce and residences generates positive synergies and enhances long-term district vitality [11]. The digital cultural industry is a promising pathway,

using digital technology to create cultural products that generate economic value while reinforcing cultural identity.

On the social front, inclusive governance and benefit-sharing mechanisms are critical to prevent community fragmentation. Measures including affordable housing mandates, local resident hiring preferences and reserved community public spaces can ensure revitalization benefits extend to original residents rather than only external investors and tourists. The symbiotic renewal framework frames historic districts as dynamic social ecosystems where diverse stakeholders coexist and benefit mutually [7]. Realizing this requires embedding community participation in all stages of renewal planning, implementation and operation, rather than treating residents as passive subjects.

6. Conclusion

This study systematically investigates the advantages and practical dilemmas of adaptive reuse for modern and contemporary historic buildings in the context of China's urban stock renewal, and compares the applicability of two dominant modes: authenticity-led conservation and function-oriented adaptive reuse. The findings confirm that the adaptive reuse of historic buildings delivers core values in cultural continuity and economic revitalization, but also faces three interrelated constraints: technical risks to original building fabric, over-commercialization that erodes cultural authenticity, and community displacement driven by gentrification. To address these challenges, targeted optimization strategies are proposed from two dimensions: technical renovation improvement and multi-stakeholder collaborative governance, pointing toward a symbiotic renewal model.

This study has three main limitations. First, case selection is concentrated in Chinese contexts, which limits the generalizability of the findings. Second, environmental sustainability and climate adaptation are not sufficiently discussed. Third, the proposed strategies remain at a framework level without detailed technical implementation guidelines. Future research can be expanded in three directions: cross-cultural comparative studies, climate-adaptive reuse technologies, and targeted implementation guidelines for different categories of modern historic buildings. Overall, adaptive reuse is an indispensable strategy for delivering high-quality urban renewal. Through balanced governance and inclusive multi-stakeholder collaboration, modern historic buildings can be effectively transformed into multifunctional, sustainable urban assets.

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