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The Sustainable Development Strategy for the Renewal and Reuse of Industrial Heritage: A Case Study of the A2 Factory Building in Nanjing 1865 Creative Industry Park

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Abstract

Background and Aim: Industrial heritage, as a carrier of history, holds significant research value in cultural, aesthetic, and economic contexts. However, in the context of urban renewal, a large number of industrial heritage sites are facing decline due to their functions no longer meeting contemporary needs. This study investigates the renovation plan of the A2 Factory at Nanjing 1865 Creative Industry Park, exploring design strategies for the preservation and renewal of industrial architectural heritage.

Materials and Methods: Research methods: A multi-faceted approach was employed, including literature review, stakeholder interviews, and case studies, to gain insight into the relevant knowledge of industrial heritage renovation. Information regarding needs was collected through on-site investigations, stakeholder interviews, and questionnaires. Ultimately, the final renovation plan was determined through group discussions with architects and scholars.

Results: Renovation Methods: The primary renovation methods for the internal space include horizontal segmentation, vertical layering, spatial merging, emphasizing features, and heterogeneous interspersing.

Design Concepts and Effects: At the architectural level, it is essential to preserve and utilize industrial heritage as a representative of material culture in industrial civilization, while also promoting and carrying forward its spiritual attributes. By introducing new life connotations that represent emerging industries and modern civilization, a contrast between the old and the new can be achieved. This facilitates the integration of historical buildings with modern spaces, sites, environments, and urban contexts, thus realizing sustainable development in terms of context, architecture, and ecology.

Conclusion: In the process of protecting and reusing industrial heritage, it is crucial not only to preserve its original historical architectural features but also to adapt to the development of the times, integrating compatible functional requirements. This research provides valuable references and insights for the sustainable development of architecture and the preservation and reuse of industrial heritage in other regions.

Keywords: Industrial Heritage; Renewal Design; Sustainable Development

Introduction

Industrial heritage, as a significant milestone in urban development, not only carries rich historical and cultural values but also plays a crucial role in the context of sustainable urban development. Currently, industrial heritage sites worldwide face threats of neglect, abandonment, destruction, and exploitative development. In China, with the accelerated pace of urbanization, many industrial heritage sites are caught at a crossroads between "demolition" and "preservation." Some cities have resorted to simple and brutal demolition and reconstruction measures for factories, docks, and other sites that have lost their original functions. Although some industrial heritage sites are listed for protection (such as cultural heritage sites), this represents only a small fraction of the industrial heritage that should (or must) be protected. A few cities have initiated surveys and protection planning for industrial heritage, but most cities, especially traditional industrial cities, generally lack awareness and emphasis on the protection of industrial heritage. Against this backdrop, exploring the protection and utilization of industrial heritage becomes particularly important.

Nanjing, as the capital of the Republic of China (1912-1949), retains a wealth of cultural architectural heritage (Chen et al, 2020). Among these, the Nanjing 1865 Creative Industry Park stands out as a typical case of industrial heritage. Located on the banks of the Qinhuai River in southeastern Nanjing, it was formerly the Jinling Machine Manufacturing Bureau, established during the Qing Dynasty's Self-Strengthening Movement. The site has evolved through various phases, including the Jinling Arsenal, the

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East China Armaments Factory, and the Nanjing Morning Light Machinery Factory, playing a pivotal role in China's military and armament industries. Today, the park features over 60 distinctive buildings from different historical periods, including seven cultural relics from the Qing Dynasty and 24 from the Republic of China, documenting the trajectory of China's national industrial development (Gong & Ji, 2010). The cultural and historical landscape within and around the park is rich, and these buildings not only reflect the evolution of China's national industry but also face common challenges encountered by industrial heritage globally, such as neglect, abandonment, and pressures from modern development.

The Nanjing municipal government places great emphasis and support on the protection and utilization of cultural architectural heritage. At the eighth meeting of the Urban and Rural Planning Committee, the government underscored the importance of historical buildings in shaping urban characteristics and preserving historical continuity. They proposed innovative ideas and actively explored new paths, models, and mechanisms for the protection and utilization of historical buildings. This policy backdrop not only demonstrates the Nanjing municipal government's determination to protect industrial heritage but also reflects the contemporary significance of cultural architectural heritage protection amid ongoing urban renewal.

This study will explore the preservation and utilization practices of the Nanjing 1865 Creative Industry Park as an industrial heritage site, analyzing its representativeness and importance in the global context of industrial heritage protection. By comparing the practices of other cities regarding industrial heritage protection, this research will reveal how the Nanjing case aligns with global trends and propose logical strategies to address the challenges of industrial heritage protection.

Objectives

1. To study relevant knowledge about industrial heritage through literature research.
2. To analyze the data collected from field surveys and interviews regarding the building, assessing the needs of relevant stakeholders to develop design concepts.
3. To design a sustainable utilization plan for the A2 factory building in the Nanjing 1865 Creative Industry Park, providing valuable references for the renovation of other industrial heritage sites.

Literature review

Industrial heritage

Industrial heritage, as an essential component of outstanding industrial culture, records the trajectory and achievements of past industrial development. This heritage includes factory buildings, machinery, production processes, and products, serving not only as tangible representations of industrial progress but also as witnesses to history and culture. Through their unique forms and characteristics, these sites reflect the technological levels of the time, the wisdom and creativity of workers, and the socio-economic conditions of society (Gao, 2022). Industrial heritage is a vital cornerstone of our identity and cultural confidence.

Often located in central urban areas and occupying large spaces, industrial heritage sites hold significant development potential. As urban industrial structures undergo adjustment and upgrading, many industrial relics lose their production functions. However, their distinct architectural styles and spatial layouts offer valuable resources for urban renewal and the development of cultural and creative industries (Wang & Mo, 2023). By protecting and reusing industrial heritage, we can effectively utilize urban space, promote sustainable urban economic development, and enhance national pride and cultural confidence.

The reuse models for industrial heritage are diverse, including transformations for public service functions, residential functions, upgraded industrial functions, and mixed-use functionalities. For example, abandoned industrial buildings can be converted into cultural and creative industry parks, museums, or art centers, serving as public spaces; alternatively, they can be transformed into residential spaces or commercial facilities (Zhao et al, 2022). During the reuse process, it is essential to preserve the historical appearance and cultural characteristics of industrial heritage while integrating modern design concepts and technological advancements to achieve a harmonious blend of old and new and foster innovative

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development. The reuse of industrial heritage not only revitalizes these sites but also provides strong support for urban renewal and the growth of cultural and creative industries.

In the process of industrial heritage preservation in China, there are several challenges due to the inadequacy of organizational systems. The division of roles among relevant organizations is often unclear, primarily reflected in the lack of defined stakeholders for industrial heritage protection and the government's absence in these efforts. For example, scholars and experts have yet to establish a theoretical framework for industrial heritage protection, making it difficult for the concepts to be popularized through an authoritative institution. Additionally, financing policies for the protection and development of industrial heritage have not been adequately formed, leading to disagreements among experts about whether the government should provide more funding support or whether private capital should be prioritized (Zhou & Gong, 2011).

Moreover, there are no detailed policy regulations regarding the distribution of profits from the protection and development of industrial heritage, resulting in limited enthusiasm from various sectors of society to participate in these initiatives. Even those who previously worked in industrial heritage buildings rarely engage in preservation efforts. When conflicts arise between the protection of industrial heritage and the interests of different parties, adequate policy coordination is often lacking.

Especially in China, due to significant regional differences, the historical background, cultural values, and socio-economic conditions of industrial heritage vary widely. Therefore, developing location-specific adaptive reuse strategies for industrial heritage is a pressing issue that needs to be addressed in current research.

Adaptive reuse

The term "adaptation" is derived from Darwin's theory of evolution, symbolizing the principles of survival of the fittest and natural selection. In 1930, a British geographer first introduced the concept of "adaptation" into the study of humans and nature, emphasizing humanity's ability to adapt to the natural environment. The publication of the Burra Charter in 1979 marked the application of the concept of "adaptation" in the field of architecture, primarily referring to the modification of existing buildings or spaces to meet new usage needs through changes in function, internal structure, or design.

The core of the theory of adaptive reuse lies in "reuse," which involves fully leveraging the advantages and characteristics of existing buildings and spaces to transform their original functions and achieve new purposes. This theory was effectively practiced in the transformation of the Louvre Museum in Paris during the 1990s. Over time, the application of adaptive reuse has become increasingly widespread, with architects beginning to take a more rational perspective on the traces left by historic buildings, respecting their historical value (Chen, 2023).

The theory of adaptive reuse can be applied to various types of buildings, including industrial, commercial, cultural, and residential structures. By reusing existing buildings or spaces, multiple benefits can be achieved, such as resource conservation, historical heritage protection, and improved utilization efficiency of buildings. Additionally, adaptive reuse presents new design challenges, inspiring designers to unleash their creativity and innovative thinking.

The adaptive reuse of industrial heritage can be categorized into several conversion patterns:

1. Museum Model: For large-span and spacious factory buildings, their unique spatial structures can be transformed into museums or exhibition halls. A notable example is the Zollverein Coal Mine Industrial Complex in Essen, Germany, which successfully converted its industrial characteristics into a museum.

2. Public Leisure Space Model: For larger industrial sites, these areas can be converted into landscape parks, utilizing their distinctive backgrounds. For instance, a stockpile site can be transformed into a sports venue, while broken walls can be upgraded into climbing parks. The Landscape Park Duisburg-Nord serves as a prime example of this model.

3. Commercial Shopping Center Model: For factories that have ceased operations, integrating them with local tourism can lead to their transformation into large shopping centers, effectively boosting economic development and creating job opportunities. The CentrO shopping center in Oberhausen exemplifies this approach.

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The theory of adaptive reuse is a critical component of sustainable building development, focusing on reusing existing structures to reduce construction waste, conserve energy, and lower carbon emissions, aligning with sustainable development principles.

Case study

In 1998, the scholar Atkinson and others proposed that the new economy is the knowledge economy, and the core of the development of this economy is innovation. This shows that the creative industry has officially fallen from concept to event, which can generate huge economic benefits, and its feasibility has been proven. Chinese cultural enterprises need to take the road of industrial alliances, rely on the China Creative Industry Alliance to carry out organizational innovation and cooperation, and improve their competitiveness through the integration of resources. The creative industry park model transforms warehouses and factories into creative industry parks and art exhibition areas. The park is complemented by large-scale installation art and sculptures to set off the cultural and creative atmosphere. Most of these parks have direct traffic lines to the city center; the factory buildings are tall and easy to renovate; the buildings have various forms and appear in the form of building groups, so that the cultural and creative enterprises settled in this way can communicate with each other and form economies of scale. Use it as the main area for art exhibitions and cultural activities to create a good urban atmosphere. There have been many successful cases in the application of cultural and creative models in China, such as Beijing 798 Factory and Shanghai Suzhou Creek Yan'an Creative Industry Park (Chen, 2023)

The British Tate Contemporary Art Museum is located on the south bank of the River Thames in the urban area of London. It is transformed from an abandoned power plant, with an internal area of more than 30,000 square meters. Land use, art management space, lecture hall, bar, creative product store, etc. The annual audience of the Tate Museum reaches more than 4 million, driving the tourism industry of the entire Thames River, and adding thousands of jobs, becoming a key player in the cultural and economic revitalization of London.

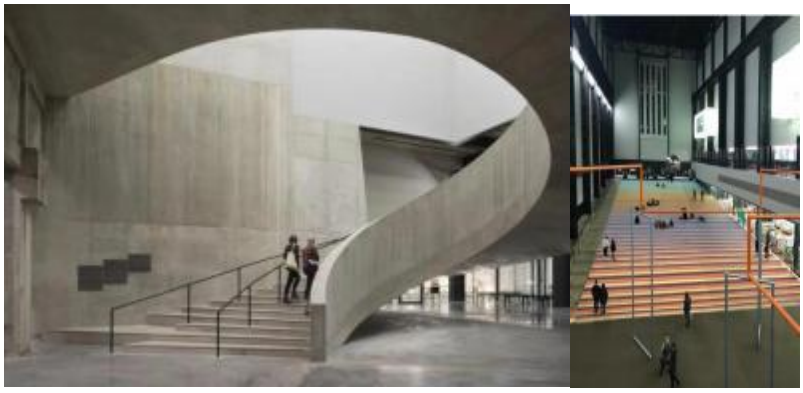

Figure 1 Tate Contemporary, UK
(The picture comes from Zhihu.)

Beijing 798 Factory is an aid project of the former Democratic Germany in the 1950s. It is located in the Dashanzi area in the northeast suburb of Beijing. The aggregated parcels are collectively referred to as 798. The 798 Art Zone covers an area of over 600,000 m2 and was undertaken by relevant experts from the former Democratic Germany (Han, 2010). Therefore, it embodies the design concept of the German " Bauhaus ", and the factory building achieves a perfect combination of practicality and simplicity.

From the very beginning to the end, the project has a clear position - it must meet the interests of various people and institutions in its related fields: first, the Beijing municipal government hopes to increase the popularity of the area and make it more attractive; second, the land owner Seven Star Group It is necessary to ensure a stable source of income and ensure that the pension funds of retired factory workers can be maintained; thirdly, the international and domestic non -profit cultural institutions investing in the 798 Art District hope that the project will focus on culture itself and retain the uniqueness of the district;

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finally, and nearby residents hope to build more community parks and leisure facilities, as well as get more job opportunities. Under the pressure of rapid development in the adjacent area, preserving the character and spirit of the 798 area and injecting other income-generating development content is the key to the vision plan. The planning takes art as the central theme of the area. On the one hand, it retains the historic industrial aesthetics to make the area more eye-catching; on the other hand, it strengthens the connection with the city and encourages the development of a series of modern functional facilities related to art, ensuring it has become a vibrant area. To achieve this goal, in addition to transforming factory buildings into static museums and galleries, etc., the planning also creatively introduces industries such as media, advertising, architecture, fashion design, animation, and software design to ensure the sustainable and creative development of the area.

Figure 2 Beijing 798 Art District
(The picture comes from Youfang)

Conceptual Framework

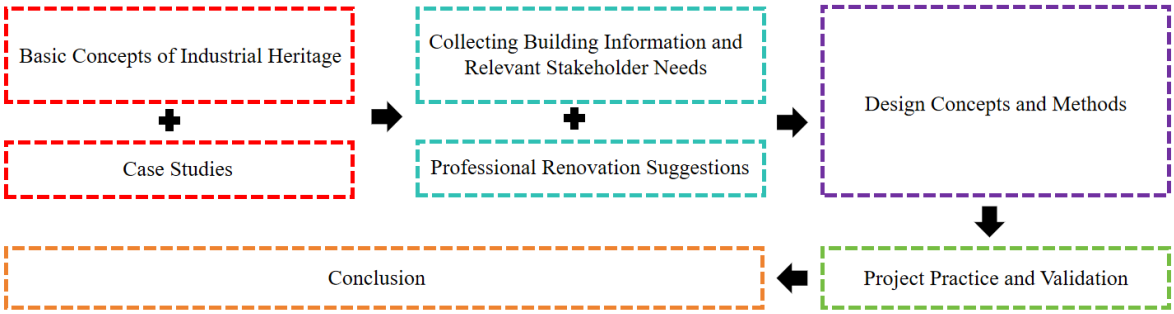

Figure 3 Conceptual Framework
(The picture comes from self-drawing)

Methodology

The Nanjing 1865 Factory is renowned for its linear structure and typical Bauhaus style, featuring a framework of two to four stories with a roof covered in wooden trusses and black corrugated tiles. The façade design combines glass and concrete plinths, with green bricks filling the spaces between the columns. The exposed parts of the beams and columns are decorated with cement mortar, giving the overall structure a solid appearance. The effective use of the original load-bearing structure allows for efficient spatial division within the area, providing significant potential for future renovations.

In terms of research design, this study employed various methods to systematically collect and analyze relevant information. First, through a literature review, we explored theories and case studies related to the renovation of industrial buildings, particularly those similar to the historical renovation projects of the Nanjing 1865 Factory. When selecting cases, we prioritized their representativeness, success,

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and alignment with our research objectives, ensuring that the information gathered was directly relevant to our study.

Next, we conducted field research, including interviews and surveys with stakeholders such as local community members and users. To ensure the data's breadth and representativeness, we established clear criteria for selecting participants and survey subjects, considering factors such as age, occupation, and their connection to the factory. During the interviews, we employed thematic analysis to delve deeply into the qualitative data collected, extracting key information and viewpoints. For the survey results, we utilized statistical methods for quantitative analysis to uncover more general trends and patterns.

Additionally, we organized group discussions with architects and scholars to further refine the final renovation plan. These discussions took the form of workshops, inviting several experienced and knowledgeable architects and scholars to participate. During these discussions, we carefully considered their opinions and suggestions. We filtered out renovation proposals that might conflict with structural, policy, or funding constraints. For instance, if a policy mandates the preservation of the main structural elements, any suggestions to alter these structures would be disregarded. We documented feasible and consensus-driven suggestions and integrated them into the renovation plan to ensure the scientific validity and practicality of the proposal.

However, this research method does have certain limitations. For example, the results of the interviews and surveys may be influenced by the subjective factors of the respondents, potentially introducing bias. Additionally, as this study focuses on a single building, the generalizability of the findings may be limited. Future research could incorporate data triangulation by collecting information from multiple sources to ensure the accuracy and reliability of the research outcomes.

Results

Stakeholder Needs Analysis

During the on-site investigation and interviews at the Nanjing 1865 Creative Industry Park, we summarized and analysed the core needs of various stakeholders. These needs will guide the generation of design concepts and subsequent design practices. The details are as follows:

Table 1 Analysis of Stakeholder Needs for Nanjing 1865 Creative Industry Park

Park Enterprises	Infrastructure Improvement	Enterprises hope the park can further enhance the completeness of supporting facilities such as transportation, dining, and accommodation to meet the daily operational and living needs of employees, creating an all-in-one service environment for leisure and entertainment.
	Promotion and Marketing	Enterprises wish for the park to increase its promotional efforts, forming synergies with nearby attractions to enhance the park's visibility and influence, thereby attracting more customers and visitors.
Park Visitors	Cultural Experience	Visitors expect to deeply engage with the rich historical and cultural resources within the park, gaining insights into the development of Chinese ethnic industries.
	Leisure and Entertainment	Visitors hope the park can offer diverse leisure and entertainment facilities and services, such as dining, accommodation, and shopping, to enhance their overall experience.
	Interactive Participation	Visitors anticipate more interactive and enjoyable activities in the park, such as cultural lectures and craft experiences, to strengthen their sense of participation and belonging.
Park Management	Enterprise Attraction	The management hopes to attract more high-quality enterprises that align with the park's cultural and creative themes, enhancing the overall strength of the park.

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	Rent and Revenue	The management expects to maintain stable rental levels and increase rent and property income by improving service quality and the park environment, attracting more enterprises and visitors.
Government	Industry Upgrade	The government hopes the park can promote industry upgrades and foster the integration of the cultural and creative industries with other sectors, contributing to the region's economic transformation.
	Social Benefits	The government wishes for the park to fulfill its role in cultural transmission and social education, providing citizens with rich cultural activities and recreational spaces to enhance the city's image and cultural soft power.
	Economic Benefits	The government expects the park to generate more economic benefits, increasing tax revenue and employment opportunities, thus making a positive contribution to local economic development.
Surrounding Residents	Beautiful Environment	Residents hope the park can maintain good sanitation and greening standards, providing them with a livable environment.
	Cultural Interaction	Residents wish for more opportunities to interact with the park, such as cultural exhibitions and community activities, to enhance community cohesion and the cultural atmosphere.

Transformation methods: At present, the main transformation methods for the interior of the space include horizontal division, vertical layering, space merging, emphasizing characteristics, and interspersing with heterogeneity. It's unique industrial, architectural and cultural characteristics.

Concept of design: On the architectural level, industrial heritage, as the material culture representative of industrial civilization, should be fully preserved and utilized. For the spiritual attributes of its industrial culture, it should continue to be publicized and carried forward. Architecture is an ever-growing living body. The original functional attributes of the interior of the building can no longer meet the requirements of people today. Therefore, it is necessary to introduce new life connotations into the building, that is, public spaces that represent emerging industries and modern civilization. Finally, after overall planning and design, the contrast between the old and the new is realized, resulting in the integration of historical buildings with modern space, site, environment, and city, to deeply realize the sustainable development of context, architecture, and ecology.

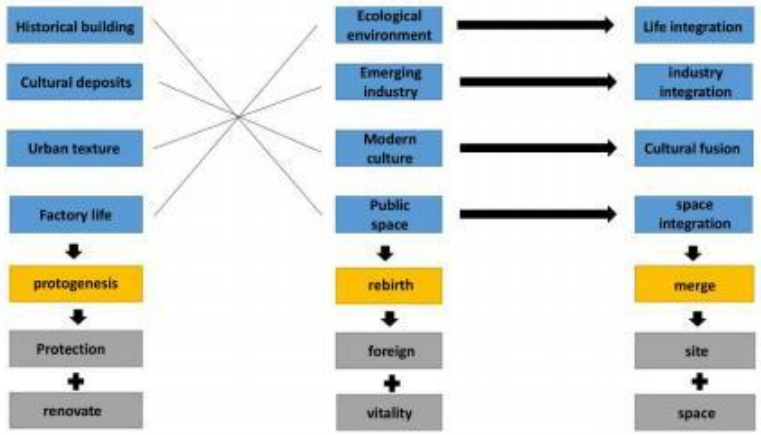

Figure 4 Nanjing 1865 Creative Industry Park A2 Architectural design and renovation concept (The picture comes from self-drawing)

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Horizontal split

The A2 Factory measures 92.8 meters in length and 93.8 meters in width, primarily constructed with a steel frame structure. Unlike the commercial complexes developed today, the factory features a column grid layout, free from the constraints of original walls, which facilitates flexible spatial division. Through interviews and on-site research, we gathered information on the usage requirements from relevant stakeholders to inform our design decisions.

We discovered that stakeholders prefer open and flexible spatial arrangements, which directly influenced our horizontal segmentation strategy. In terms of spatial planning, we can allocate areas for various functions, such as dining, exhibition, and sales zones, according to design requirements. Different functional areas will be assigned based on their respective space needs, creating a distinct spatial rhythm. Each area remains relatively independent while maintaining connections within the overall design.

Add layers vertically

The height of the A2 factory building is 9.17 meters. The original factory building was set up with one floor for large-scale mechanical operations. Now the large-scale machinery has been removed. The interior is wide, and the floor height is sufficient, which can be remodeled in the facade dimension of the space. The vertically increased mezzanine not only nearly doubles the original area, but also adds more space utilization options, and improves the richness of the space. This design decision is based on our in-depth analysis of the building's current condition, as well as the careful selection of optimal solutions after comparing various renovation proposals.

Figure 5 Schematic diagram of vertical addition of building A2 in Nanjing 1865 Creative Industry Park (The picture comes from self-drawing)

Space merge

Vertical merging is a common operation method for space merging. It can also be understood as inserting several cavities in the existing building entity and adding vertical floors. The design will inevitably bring about changes in the facade space. The first and second floors are relatively independent and lack space. Contact is also relatively monotonous. An appropriate area can be selected between the first and second floors to remove the floor's lab for a hollow design to form a space through the upper and lower floors. For example, the hollow in the foyer can make people feel suddenly open at the entrance to reduce the feeling of depression caused by the mezzanine.

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Figure 6 Schematic diagram of the merger of A2 building space in Nanjing 1865 Creative Industry Park
(The picture comes from self-drawing)

Emphasize traits

Emphasis on characteristics means that, in terms of spatial form, it focuses on expressing architectural forms or building components that are different from ordinary ones. The difference between the strip-shaped factory building and ordinary civil buildings lies in its wide spatial structure and special industrial devices. When renovating the space, avoid completely copying the design techniques of non - non-industrial spaces, such as large-scale gypsum board partition walls and ceilings, and retain, enlarge, and exaggerate the original characteristics that are different from other spaces. Make full use of the advantage of the story height of the factory building to carry out appropriate hollow design, and also focus on expressing the crane rails left over from the original factory building, to form a patchwork space and highlight the bright spots. It is also possible to retain the characteristics of the original factory building.

Figure 7 Schematic diagram of building A2 in Nanjing 1865 Creative Industry Park, emphasizing characteristics
(The picture comes from self-drawing)

Heterogeneous interspersed

The original factory building has a strong industrial atmosphere, and the overall atmosphere is heavy. The material characteristics of the blue brick and steel beam make the site too rough. During the transformation process, we can do the opposite. When using building materials, we can consider using glass, metal, ceramics, and other materials for decoration, and compare them with the original rough impression to achieve roughness and fineness. In terms of color, some bold colors can be used for embellishment, or new wall decoration elements such as murals and inkjet can be used to activate the

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internal atmosphere. For the straight-line factory building frame, some arc shapes or even spiral stairs can be used inside to intersperse the space heterogeneously.

Figure 8 Schematic diagram of heterogeneous interspersed buildings in Nanjing 1865 Creative Industry Park A2
(The picture comes from self-drawing)

Discussion

Assessment of the Renovated Space

In selecting strategies such as horizontal zoning, vertical layering, and spatial integration, we conducted relevant simulations using architectural technology software. By comparing the advantages and disadvantages of different methods, we found that spatial integration and vertical layering were more suited to the characteristics of Building A2. These approaches not only improved spatial utilization but also enhanced the overall integrity and aesthetic appeal of the building.

Through presentations and workshops, the renovated space received widespread recognition from the local community and experts, contributing to the cultural revitalization of the area. We collected feedback from residents and users of the space, revealing their satisfaction with the renovated environment, and their willingness to engage with the building has also increased compared to before the renovation.

Flexibility and Multifunctional Design

In future architectural practices, we plan to incorporate modular and removable design elements, allowing spaces to be easily adjusted based on future needs. For example, exhibition and sales areas can be flexibly divided using movable partitions or collapsible walls to accommodate various sizes and types of events. Considering potential future changes in functionality, we will also design sufficient electrical and communication interfaces, as well as easily upgradable facility systems, to enable quick adaptation to new usage scenarios when necessary.

Durable Materials and Long-Term Maintenance Strategies

In selecting materials, we will prioritize those that are durable and require low maintenance, such as high-quality flooring, wear-resistant paints, and easy-to-clean surface treatments, to reduce costs associated with frequent replacements due to wear and tear. Additionally, we will establish a long-term maintenance plan that includes regular inspections, preventive maintenance, and necessary renovation measures to ensure that the building and its facilities remain in good condition over the long term.

Energy Efficiency and Resource Recycling

We need to focus on enhancing the energy efficiency of the building, for instance, by optimizing the lighting system, installing energy-efficient windows, and adopting efficient heating, ventilation, and air conditioning systems to reduce energy consumption. Whenever possible, we should also consider resource recycling, such as repurposing old materials or incorporating recyclable materials into the design to lessen the demand for new resources.

Adaptive and Expandable Planning

Taking into account the potential future expansion needs of the building, we will reserve space in the design for possible future extensions or functional upgrades, such as adding floors, expanding exhibition halls, or incorporating new service areas, ensuring that the building can grow flexibly along with business developments. Furthermore, we will simulate and predict future usage scenarios to develop renovation plans

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that adapt to different stages of growth, ensuring that the building retains its value and functionality over the long term.

Conclusion

In Nanjing 1865 Creative Industry Park, from the Qing Dynasty, the Republic of China period to the founding of New China, more than 40 buildings have witnessed the construction style and level of different periods, and witnessed the style changes of the architectural complex under urban renewal, providing urban diversification and the continuation of the urban context has left an indelible mark. In the process of protection and reuse of industrial heritage, not only should it retain its original historical architectural features, but it should also adapt to the development of the times and incorporate matching functional requirements to achieve the goal of sustainable building development, so that different groups of people can be full of creativity Concerns about industrial heritage are explored and formed in the space.

Recommendation

1. It is essential to maintain the authenticity and integrity of historical and cultural features during the renovation process. By preserving original architectural elements such as steel beams, blue bricks, and crane tracks, we can fully showcase the unique industrial aesthetic.

2. Public participation and communication with stakeholders are crucial to the successful implementation of renovation projects. By gathering feedback from the surrounding community and users, we can gain a more comprehensive understanding of their needs and expectations, allowing us to incorporate these elements into the design concept.

3. Relevant policies and regulations should be established to support the protection and reuse of industrial heritage. Government agencies should strengthen their oversight and guidance roles to ensure that renovation projects adhere to principles of historical and cultural conservation while promoting sustainable development.

4. Suggestions for enhancing the long-term monitoring and evaluation of sustainable development in the area include establishing a framework to regularly assess the impact of renovations on heritage preservation and economic growth, which can guide future adjustments. It is essential to include a detailed plan that ensures the ongoing operation of cultural and commercial activities within the renovated space while remaining aligned with Sustainable Development Goals.

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