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# Temporal insights into mega-events and waterfront industrial heritage transformation: a case study of Shanghai's Huangpu River industrial zone

Kaixuan Wang<sup>1\*</sup>

## Abstract

This research examines the evolution and renewal of Shanghai's Huangpu River industrial zone after the 2010 Shanghai Expo, with a temporal focus on the profound changes and development philosophies driven by this mega-event. By investigating emblematic case studies along the Huangpu River, such as the transformative 80,000-ton silo, the Shanghai Museum of Contemporary Art, and the Long Museum, this research articulates how mega-events serve as pivotal moments for reimagining and repurposing industrial heritage. In the wake of the 2010 Shanghai Expo, these industrial relics emerged as focal points of urban regeneration, embodying the tensions and synergies between historical preservation and contemporary urban development. This study explores the temporal layers—from the event's catalytic role to enduring legacies—and reveals how time influences the trajectory of urban spaces and the community's connection to them. Through this temporal lens, the paper analyses the redevelopment process, assessing how these initiatives have reconfigured the industrial waterfront into a dynamic cultural landscape. The findings offer a dynamic perspective on the temporal dimensions that underpin the redevelopment of industrial heritage sites, providing insights into how such spaces can be continuously activated and symbiotically integrated into the fabric of the city. This paper aims to contribute to a broader understanding of the complexities involved in harnessing industrial heritage for mega-events, with implications for future urban planning and heritage conservation strategies.

**Keywords** Mega-events, Industrial heritage, Urban regeneration, Urban waterfronts

## 1 Introduction

The burgeoning discourse on urban industrial heritage continues to unravel the complex layers of history etched within the fabric of various cities. As relics of the past, industrial heritage sites serve as portals to past eras, providing a tangible link to the industrial revolutions that

helped propel urban areas into modernity. On this continuum, mega-events such as the Olympics and World Expositions have emerged as transformative forces, wielding unparalleled influence over urban transformation and global city imaging (Jones and Ponzini 2018; Graezer Bideau and Deng 2022). However, this transformative potential has a dichotomous impact on industrial heritage, catalysing its recognition and revitalisation while posing significant risks to its authenticity and continuity (Jones 2020).

Academic investigations into the concepts of urban temporality, heterotopia, and deep cities have illuminated the intersecting narratives of space, time, and culture

\*Correspondence:

Kaixuan Wang  
kaixuan.wang@ucl.ac.uk

<sup>1</sup> Institute for Sustainable Heritage in Bartlett School of Environment, Energy and Resources, University College London, Central House, 14 Upper Woburn Place, London WC1H 0NN, UK



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within the urban landscape. These theoretical constructs highlight the intricate layers of meaning, memory, and experiences bound within urban spaces. However, there is still a gap in research that examines the interplay of mega-events with the temporality of industrial heritage, exploring how these events can either enhance or disrupt the heritage narrative. By bridging this research gap, this paper interrogates the dynamics between the celebration of mega-events and the conservation of urban industrial heritage. Specifically, it examines how the temporalities of such events interact with, influence, and are influenced by existing heritage sites, questioning how these encounters may redefine both heritage conservation practices and urban development agendas.

Employing an interdisciplinary theoretical framework, this study dissects the multilayered temporal experiences cultivated by mega-events within urban industrial heritage contexts. By analysing representative case studies, including 80,000-ton Silo, the Shanghai Museum of Contemporary Art, the Long Museum, Jiangnan Shipyard, Yangpu Gas Factory Wharf, and the Power Station of Art, this study explores how the impact of Shanghai Expo catalysed a city-wide approach to industrial heritage preservation and adaptive use. Although some are located outside the Expo area, all of these sites highlight the broader scope of industrial heritage transformation in Shanghai, whose redevelopment aligns with the mega-event-driven momentum that encourages cities to rejuvenate underutilised industrial areas. In doing so, this study aims to provide pivotal insights into strategies for preserving and leveraging industrial heritage in the face of urban development pressures and global events. This paper unfolds as a series of critical examinations assessing how time-related factors influence conversations about heritage. Specifically, it examines how large-scale events affect the daily life of a city and explores the intricate connections that these events create within urban spaces. The research concludes by providing a comprehensive understanding of urban spaces being shaped by both their historical significance and current factors. In synthesising these perspectives, this paper endeavours to propose a robust theoretical paradigm that informs and elevates heritage conservation practices within the urban sphere, ensuring that industrial heritage sites are not only protected but also dynamically integrated within the temporal landscape of modern cities.

## 2 Background and context

### 2.1 Urban industrial waterfront and mega-events

The revitalisation of urban waterfronts globally often involves the transformation of industrial port functions into spaces that increase urban competitiveness through globalisation. This evolution can greatly enhance

the vibrancy of localities through the establishment of sought-after areas for leisure, business, and residential development. During such transitions, industrial heritage—encompassing relics such as factories, warehouses, and railways—assumes new significance. These structures stand as historical and cultural benchmarks from the era of the Industrial Revolution, encapsulating the story and identity of their respective regions (Roux 2022).

Mega-events such as World Expos play a pivotal role in the regeneration of industrial sites and serve as a fulcrum for blending culture, sports, and entertainment. These large-scale events not only stimulate economic growth but also catalyse extensive infrastructure overhaul and urban development, allowing cities and nations to flaunt their progress and capacity on an international stage (Roche 2017; Evans 2019). Nonetheless, integrating such occasions with the preservation and redevelopment of industrial heritage presents complex challenges. Issues ranging from the displacement of residents to concerns about maintaining cultural genuineness often arise, triggering debates on the social and political ramifications of such vast urban transformations.

In the context of China, particularly Shanghai—a city whose prosperity is intertwined with its port and industrial origins—the growing fascination with its urban industrial heritage is evident (Li 2010; Zhang 2015; Wang et al. 2017; Den Hartog 2021). The transition of the city's industry in the 1990s led to the rise of service sectors and consequently left numerous historic industrial sites, primarily along waterfronts such as the Huangpu River, ripe for redevelopment. When this city hosted the 2010 Shanghai Expo, it reached a significant milestone by demonstrating the potential for such industrial sites to be conserved and creatively repurposed (Yu et al. 2007; Zhang 2009; Zuo 2010; Liu and Li 2011). After the Expo, robust initiatives for adaptive reuse, particularly for cultural purposes, were adopted, with establishments such as museums and cultural clusters revitalising these heritage sites.

The 2010 Shanghai Expo, which was hosted by the riverfront between the Lupu and Nanpu Bridges—an area dense with industrial history—became a prime example of this symbiotic relationship between mega-events and industrial heritage. The Expo served as a showcase, preserving these historical landmarks while imbuing them with new life. Industrial giants of yesteryear, such as shipyards, steel plants, and the historic Nanshi Power Plant, were transformed into novel tourist and community spaces, which made up 17% of the park's construction area and expanded the scope of industrial tourism. This form of tourism facilitated an immersive journey linking the past with the present, merging nostalgia with

modernity, and offering a distinctive exploration of Shanghai's industrial narrative.

## 2.2 Huangpu riverfront: from an industrial corridor to a vibrant waterfront

Historically, the Huangpu River waterfront housed many industrial facilities, including water and power plants, with over a century of history. However, the area is no longer primarily industrial. Many of these old industrial sites have been repurposed or redeveloped into public spaces, cultural venues, and business hubs. The area has undergone significant transformations, shifting from its historical role as an industrial corridor to a dynamic urban space with an emphasis on sustainability and modernisation. Currently, the focus is on high-value industries such as financial services, trade, and the digital fashion industry, as evidenced by the development plans for the Golden Bund and other waterfront projects. In recent years, major efforts have been directed towards urban regeneration, aiming to eliminate polluting industries and repurpose former industrial sites for public, cultural, and commercial use. More than 40 kms of the waterfront have already been redeveloped, with projects aimed at creating open public spaces, enhancing ecological connections, and adding new landmarks.

The objective behind these changes is to reposition Shanghai as a leading global city—one that emphasises environmental sustainability, urban vibrancy, and high quality of life. This shift aligns with the broader goals outlined in the Shanghai Master Plan 2017–2035 (Shanghai Municipal Government, 2017), which seeks to transform the city into an 'excellent global city' (卓越的全球城市) by moving away from quantitative expansion towards qualitative improvements. Thus, the Huangpu River waterfront is no longer an industrial corridor but has become an urban lab for sustainability transitions, showcasing innovative urban development practices (Den Hartog 2021). However, the industrial structures and sites serve as tangible links to the region's past, maintaining the historical narrative of Shanghai as an industrial powerhouse. This helps preserve the collective memory and cultural identity of the city, which is integral to its character and appeal, while the preservation of industrial structures and sites serves as a tangible link to the region's past, maintaining the historical narrative of Shanghai as an industrial powerhouse (Cao 2020). Although the Huangpu riverfront is no longer an industrial corridor, its architectural integrity and distinctive aesthetics that reflect its industrial roots are maintained through the preservation of its industrial authenticity and the integration of its industrial past.

## 2.3 Selected cases

Figure 1 illustrates the spatial distributions of six sites in relation to the 2010 Shanghai Expo area. Sites 1, 2, and 3 are situated within a 3-km radius of the Expo site, so this zone is designated as the central mega-event area. Conversely, the remaining three sites are located outside this central zone, but they fall within a 10-km radius and are accessible within a 30-min driving distance. The renovations of Sites 2 and 3, which are located in Expo Park, began during the preparation period for the 2010 Expo. The adaptive reuse projects of the other sites were completed within a decade after the Expo, demonstrating postevent efforts related to industrial zones.

The first three sites provide a basis for examining the direct impact of the Shanghai Expo. In contrast, the latter three sites offer insights into the broader, pervasive influence of the mega-event on the surrounding areas. This dual approach allows for a comprehensive analysis of the spatial and socioeconomic effects engendered both at the epicentre and on the peripheral zones of the Expo activities. Moreover, the time difference between the Expo and these renovation projects helps explain the long-lasting impact of mega-events.

After the Expo, the approach to industrial areas adopted during this mega-event prompted a more extensive wave of urban renewal. The transformation of Shanghai's industrial waterfront into dynamic urban locales has been remarkable, representing some of the city's most profound urban changes. This study explores this complex interplay between significant events such as the Shanghai Expo and the industrial heritage along the Huangpu River, providing insights into the spatial redefinition and identity formation of this specially marked area through the lens of time and transformation.

## 3 Theoretical framework

### 3.1 Temporality and the ongoing discourse with industrial heritage

The term 'temporal' originates from the Latin word 'temporalis', meaning 'of time'. It traditionally refers to worldly affairs as opposed to spiritual affairs and broadly encompasses the concept of time and its passage. In this research, the term takes on a more nuanced meaning and is used to explore how individuals and societies perceive time. In the context of urban heritage, temporal insight refers to the understanding of the historical and ongoing evolution of urban spaces, recognising the significance of past events and structures in shaping the present and future urban environments (Rudokas 2016). This approach emphasises the importance of viewing heritage not as static relics but as dynamic elements that continuously interact with and influence the urban landscape over time (Fouseki et al. 2019).



**Fig. 1** Location map of selected cases. (Source: the author). 1 from <http://www.thelongmuseum.org/west-bund.html>. Accessed 2 July 2024; 2 from [https://m.thepaper.cn/newsDetail\\_forward\\_11937773](https://m.thepaper.cn/newsDetail_forward_11937773). Accessed 2 July 2024; 3 from <https://www.pinterest.co.uk/pin/370280400617743684/>. Accessed 2 July 2024; 4 from <https://sh.sina.com.cn/travel/shbd/2017-07-26/detail-ifyihrit1392611.shtml>. Accessed 2 July 2024; 5 from <https://www.gooood.cn/renovation-of-80000-ton-silos-on-minsheng-wharf-china-by-atelier-deshaus.htm>. Accessed 2 July 2024; 6 from <https://www.archiposit.com/items/6843299215>. Accessed 2 July 2024

Unlike the quantifiable and structured concept of time or chronology, temporality focuses on how individuals perceive and experience a series of events or history they live through. Thus, the progression of time is seen as being shaped by social customs, serving as a framework within which events occur and are understood. Temporality, which is distinct from measurable time, encompasses the physical, emotional, and social dimensions of experiencing time (Gokmenoglu 2022).

Temporal insight integrates several interdisciplinary perspectives, including geography, urban planning, and cultural studies. In geographical studies, temporality is often explored through the spatial-temporal distribution of heritage sites, such as by analysing how the distribution and reuse of industrial sites have evolved over time, which illustrates the dynamic relationship between heritage and urban development (Zhang et al. 2022a, b). In urban planning and architecture, the concept of temporality is crucial for understanding the historical layers of urban landscapes and guiding future development—for example, exploring how urban fragments from different periods contribute to the contemporary urban fabric and heritage management practices (Immonen 2023; Zhu and Hein 2020). In

cultural studies, temporality is examined through the lens of heritage and sustainability, emphasising how the active agency of the past can shape present and future urban development through the integration of historical heritage into sustainable urban strategies (Rudokas 2016; Harvey 2001).

The concept of temporality offers a multifaceted lens through which the evolution of industrial heritage, especially in the context of mega-events, can be understood. In this sense, temporality is a complex interplay of past, present, and future interactions that continuously redefines the heritage's significance (Ponzini 2022). As highlighted by Tuan (1977), our temporal perception deeply influences our engagement with heritage sites, juxtaposing the permanence of historical monuments against the transience of modern life. Temporality in urban heritage involves analysing how time and historical processes shape the identity, functionality, and cultural significance of urban areas.

Moreover, spaces of diverse temporalities, or heterotemporal spaces (Harvey 2001), in heritage sites emerge as a fusion of historical and contemporary urban tempos. This intersection is manipulated by urban developers and heritage curators through strategies aimed at

modulating visitors' time experiences, achieving either historical immersion or a modern pace (Fleming 2007). Through mega-events, such as cultural festivals or the Olympics, these sites become theatres where the city's historical narrative is performed, revealing a narrative that is both conserved and progressive (Jones et al. 2022). Heritage narratives are mutable, transforming alongside societal values and the collective re-evaluation of historical significance. Accordingly, the heritage conversation is expanded to include additional narratives and evolve in perception across generations (Ashworth and Graham 2018).

Overall, the interplay of temporality and mega-events suggests that industrial heritage is a dynamic entity within urban evolution, poised to remain a key element in the cultural dialogue of cities. These insights into temporal dynamics ensure that industrial heritage continues to be a part of a living, breathing urban landscape that is rich in temporal diversity.

### 3.2 Urban dynamics and heritage temporality in the wake of mega-events

Urban rhythms and their influence on heritage sites gain increased significance in the context of mega-events, which serve as critical junctures that can redefine a city's temporal rhythm (Di Vita 2018). Lefebvre et al. (1991) captures the essence of this notion with his rhythm analysis, which is directed through the lens of temporal structures that dictate urban life. These micro- and macrotemporal patterns enacted by mega-events, such as Olympiads or World Expos, often act as catalysts for urban transformation, propelling heritage sites to a prominent place. The overlay of festival cycles and daily urban life imbues heritage sites with an enlivened temporality, in which histories are not merely remembered but actively reconstructed and showcased for global audiences.

These events accelerate the visitation and recontextualisation of heritage sites, offering them as living dioramas that reflect the city's historical background while simultaneously adapting to the demands of spectacle and celebration. Moreover, these rhythmic interjections, as Connerton (1989) observed, can elevate particular historical narratives, influencing their prominence within the urban landscape and shaping the subsequent valuation and memory of heritage sites (Drevon et al. 2020). In contrast, the continual rhythm of urban development—oftentimes spurred by preparations for mega-events—may, in some cases obscure elements of heritage, illustrating the selective nature of temporal visibility within the city's evolution (Jones 2017).

Hence, the rhythmic impact of mega-events serves as both a spotlight and a shadow, with their cyclical

occurrence conferring new meanings onto heritage sites and intertwining the preservation of heritage with contemporary urban identity and memory, as theorised by Halbwachs (2020). Shared memories of these events, places, and practices help groups maintain a sense of continuity and belonging. Relatedly, Halbwachs emphasised the importance of commemoration and sites of memory (*lieux de mémoire*) in sustaining collective memory. Mega-events create experiences that shape and reinforce collective memory and identity, becoming commemorated and integrated into a city or nation's shared consciousness. For example, the 2010 Shanghai Expo revitalised urban spaces and embedded the event in the city's collective memory, reinforcing Shanghai's identity as a global cultural and economic hub. Halbwachs' theory also highlights the integration of past, present, and future in collective memory.

### 3.3 Heterotopia and temporality: intersecting mega-events with urban heritage

Within the urban fabric, heterotopias occupy a unique space in which diverse temporal narratives converge and interact. Mega-events transform these heterotopias, creating layers of significance that highlight their role in the contemporary urban milieu (Osman et al. 2016). Foucault's heterotopia (1986) becomes particularly pertinent in the incorporation of heritage sites within mega-events. As these events unfold, they create a heterotopia of plural temporalities, an instance where an ancient site may simultaneously harbour exhibits of its historical essence, present dynamic public engagements, and even futuristic technological displays. These multifaceted temporal experiences spark a dialogue between historical reverence and the need for renewal (Kassens-Noor 2016), which is evident in the tension between conservation imperatives and the transformative impetus of mega-events (Gardner 2019).

Reimagined urban heterotopias, manifested in heritage sites during mega-events, evolve into strategic points for public engagement, facilitating interactions with diverse temporalities in one setting. They encourage the public to traverse time, experiencing layered history not as a static chronology but as an evolving narrative that continues to shape and be shaped by the contemporary moment and its envisioned futures (Calanchini González Cos 2021). Essentially, the rhythm and pulse of mega-events bestow new interpretations upon heritage sites, transforming them into spaces of intricate temporal interaction and securing their place as active nodes in the broader narrative of urban identity and memory.

### 3.4 Deep cities: investigating urban temporal layers amidst mega-events

The concept of deep cities underscores the multilayered composition of urban spaces, with particular relevance when mega-events intersect with industrial heritage. These events serve as temporal milestones that can reveal, reiterate, or revisit the myriad layers of urban heritage. This approach surveys urban spaces similar to archaeological sites, where each stratum corresponds to diverse societal implications and temporal moments, with the added complexity of mega-events adding new layers of engagement, interpretation, and significance to the cityscape (Fouseki et al. 2019).

When applied in the context of mega-events, the methodology of deep cities acknowledges the coexistence of various temporalities. It assesses the sedimented layers of time, the networks of historical narratives, and the emergent dynamics introduced by these landmark events, encouraging an integrative perspective for urban planning and heritage conservation strategies.

The methodology of deep cities facilitates an understanding of evolving urban identities and collective memory, mirroring Nora's (1989) concept of 'lieux de mémoire'. It also explores the interplay of inclusion and exclusion, as mega-events can celebrate certain aspects of heritage while overshadowing others, an idea that echoes Harvey's (2001) discourse on social justice within urban settings.

### 3.5 Synthesising theory

The synthesis of the concepts of urban rhythms, heterotopia, and deep cities presents a theoretical framework for understanding urban heritage amidst mega-events. This framework recognises the complex, evolving nature of time as fundamental in the conservation of the heritage of the urban environment.

This framework illuminates the multifaceted character of urban heritages — not just as sequential moments but as a confluence of diverse temporal experiences. In this approach, the interdisciplinary rhythms that mega-events induce are recognised, and heterotopic spaces are perceived as transformational, capable of redefining their use for divergent individuals or purposes.

Emphasising the palimpsest nature of heritage amid urban evolution, this theoretical framework supports conservation strategies that acknowledge temporal complexity rather than striving for static preservation. It has value in maintaining visibility and context for urban remnants from various epochs, integrating living histories within the evolving urban dynamics brought forth by mega-events.

The implementation of this framework enables urban planners and conservationists to craft pluralistic and adaptive strategies. Such an approach opens up avenues for a dynamic interchange between heritage and contemporary urban narratives, ensuring the development of resilient and vibrant urban spaces that echo across time.

## 4 The temporalities of regenerated waterfront industrial heritage in Shanghai

This paper regards the place making of industrial heritage in the context of mega-events as a complex temporal achievement intersected and organised through the interactions among multiple stratified temporalities. An intricate ecological system of space and time unfolds, characterised not by a singular or homogenous societal time that extends over a consistent space but by a range of varying, and often irregular, temporal networks that expand in multiple and disparate ways across a socially uneven landscape (May and Thrift 2001).

### 4.1 Genetic temporality

#### 4.1.1 Events as landmarks

This kind of temporality refers to the time frame directly associated with the planning, execution, and immediate aftermath of a mega-event, exploring how the advent of a mega-event creates a 'rupture' at the usual development pace, leading to accelerated changes in urban planning and design, shifting from a mega-scope to a more localised microscope in response to the event's needs and legacy.

The industrial area along the Huangpu River in Shanghai has quietly transformed through the arrival and departure of numerous mega-events and their successive planning and implementation. After the 2010 Shanghai World Expo, the industrial heritage of the waterfront region has been continuously discovered and reimagined, leading to the production of new intentions and spaces as time has passed.

During the 2010 Expo, the large-scale reuse of old factory buildings became a highlight and an innovative milestone in the history of World Expos. Under the theme 'Better City, Better Life', the extensively preserved industrial heritage area was prominently emphasised as a symbol of urban identity and cultural coordinates. Notably, the former Nanshi Power Plant was planned to be transformed into a thematic pavilion known as the 'Pavilion of Future'. Established in 1897, the plant provided electricity for industrial and residential use in Shanghai until it stopped operating in 2007, marking a century of industrial development history in the city. In this adaptation and other, similar adaptations, the structural and spatial advantages of large-scale factory buildings were leveraged, transforming them into venues for exhibitions

and performances. This period highlighted the transient yet impactful nature of the Expo, which introduced temporary structures that developed their unique heritage significance, emblematic of the Expo's aspirations. Furthermore, the Expo infrastructure projects extended the life of existing industrial heritage sites, seamlessly integrating them into the urban fabric with renewed purpose post-Expo. This redefinition endowed industrial heritage with a dual identity, combining its historical significance with its new role in the Expo legacy.

In 2012, the century-old power plant was redesigned as the Power Station of Art, marking a significant milestone during the 9th Shanghai Biennale. The theme of 'reactivation' not only symbolised the physical transformation of the space but also metaphorically reflected the rejuvenation of the area. This theme intricately linked the relocation of the Shanghai Biennale and the establishment of the Power Station of Art, harmonising with the renovation and reinvigoration of the original Nanshi Power Plant and the Pavilion of the Future from the Expo (Fig. 2). The transformation of this power plant into a cultural hub may be one of the most significant legacies of the Shanghai Biennale. The century-long history of this site is now juxtaposed with a forwards-looking vision that redefines its role in the urban landscape—not merely as a remnant of the past but as a vibrant centre for contemporary thought and cultural dialogue. This building, once a pivotal source of energy, has transitioned into a dynamic space that fuels the city's cultural and intellectual vitality.

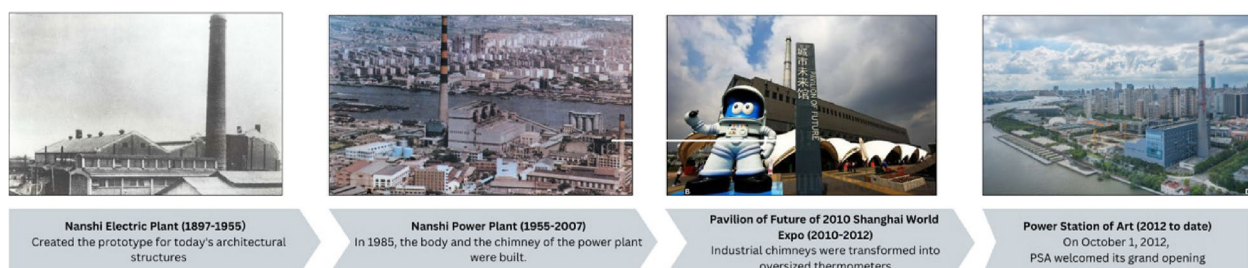
The historical and cultural significance embedded within the structure spans the themes of heritage preservation, innovation, and renewal, highlighting the deep interconnections between Shanghai's industrial past and its cultural renaissance. Today, the building stands as a testament to urban resilience and its ability to repurpose its industrial heritage into a thriving force for artistic expression and public engagement. Specifically, the rich history of Shanghai and the resources of the Expo were utilised to anchor this building firmly within the contemporary cultural and industrial narratives of China,

serving as a beacon of innovation and a symbol of the city's ongoing cultural renaissance.

However, while mega-events such as the Expo can enhance the visibility and utility of industrial heritage, they can also create areas of exclusion. These events often necessitate extensive modifications to site layouts and infrastructure, which can isolate heritage sites (Beriato and Gospodini 2004; Ponzini and Jones 2021; Purchla 2022; Tommarchi and Bianchini 2022). The focus on showcasing specific heritage sites that align with the narrative of the mega-event can lead to selective preservation, in which only certain parts of the industrial heritage, often those that can be more easily commercialised or aesthetically integrated into the new urban landscape, are maintained. When this selective approach is employed, other historically significant sites that might not fit the event's theme or commercial potential are neglected. In Shanghai, these impacts were mitigated by a post-Expo emphasis on preservation and adaptive reuse rather than wholesale redevelopment. Nevertheless, the selective focus on certain prominent structures sometimes overshadowed the broader historical context, leading to a fragmented urban narrative. This selective preservation has sparked efforts to integrate and reconnect the industrial heritage along Shanghai's riverfront more holistically, addressing the spatial and narrative discontinuities created by past developments. These efforts underscore the complex interplay between preserving historical integrity and accommodating contemporary urban needs, a dynamic that continues to shape Shanghai's riverfront landscape.

#### 4.1.2 Industrial fragments as historic genes

In the planning of public spaces along the Huangpu River, a deep reverence for the 'original ethos' was emphasised. Determining how to preserve the site's distinct industrial ambiance and defining its historical and cultural lineage became central to the planning discourse. Throughout this process, temporality manifested as historical and cultural characteristics that empowered the space—traits often strengthened over time through sedimentation,



**Fig. 2** The transformation history of the Nanshi Power Plant. (Source: <https://www.powerstationofart.com/about-psa>. Accessed 2 July 2024)

acting as anchors in urban renewal to solidify local identity and cultural memory. Looking back, Shanghai has continually evolved, with its charm enduring through a distinctive urban landscape composed of authentically preserved, seamlessly interconnected fragments of different eras (Chang 2017). For the industrial zones along the Huangpu River, which were given special consideration in the planning of the Shanghai World Expo, a century of industrial history is ingrained as the locality's deep-seated genetic code.

A significant example is the regeneration project of the Riverside Passage, which was launched in 2019 and is located in the Yangpu Gas Factory Wharf, which has witnessed prosperous industrial activities in Shanghai over the past half century. The designer of this regeneration project—Yichun Liu—used two words to express the different understanding of this site: 'ruins' and 'marks'. This specific site could be understood as either a ruin or a kind of mark. When ruins have been transformed into new constructions, they become a kind of mark on the original site, solidifying it in a new way. Relatedly, time can be understood in one of two ways: 'ruins' seem to denote disappearance, while 'marks' seem to denote preservation. Therefore, in the design of regeneration, understanding 'ruins' and 'marks' may consciously

take a starting point that is different from the previous architecture.

The design concept of the Riverside Passage clearly shows a process of finding and anchoring the gene of this space. The core component of this space is a long wall existing here in some manner on the dock. Fragments of buildings remained after demolition, and the soil entered the gap with seeds and plants, all of which together formed a whole landscape (Fig. 3). This landscape, although desolate, conveys a sense of time from the thick history from the industrial age as well as the geographical characteristics of the Yangpu riverfront. To a great extent, the isolated barren scene from urban life was retained, as it was originally an attempt to conserve the gene of this site.

Originally, this wall marked the boundary between the pier and the riverfront; over time, it differentiated nature and artificial urban areas, which are lonely and quiet and always seem to be waiting for something. They remain powerful and continue to be silent, maintaining their independence as once fragments that can still be merged into a new whole, or rather, it is they who determine and give rise to this new whole (Liu 2019). This project is only an epitome of genetic temporality, representing the witness of the Huangpu Riverfront once it propelled the



**Fig. 3** The site of the Riverside Passage. (Sources: <http://www.deshaus.com/En/Index/projectDetail/id/29.html?url/aHR0covL3d3dy5kZXNoYXVzLmNvbS9Fbi9JbmRleC9pbmRleC90eXBILzguaHRtbCNwYWdIMA==>. Accessed 2 July 2024)



early industrialisation process of Shanghai, serving as a transportation belt and a congregation point for warehouses, factories, and docks.

#### 4.2 Layered temporality

This temporality encompasses the reshaping and reinterpretation of the historical memories carried by industrial heritage against the backdrop of and in conjunction with large-scale events. It underscores the multilayered interaction between history and modernity in the construction of memory.

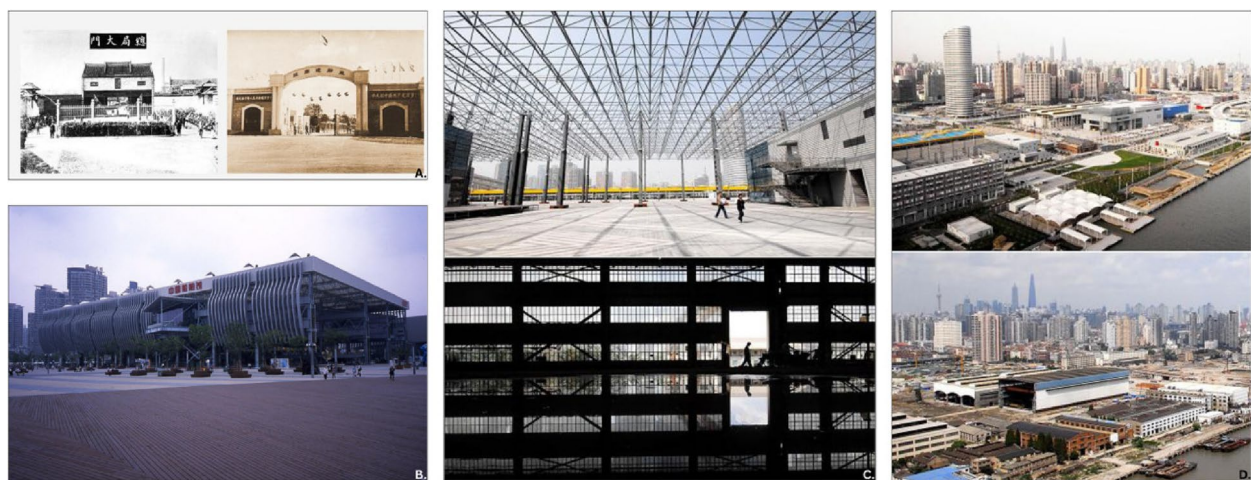
##### 4.2.1 Memory stratification

The concept of ‘memory stratification’ employs the metaphor of stratification from geology to describe the various levels of memory within physical space and their interrelations. Its application in the transformation of industrial heritage and urban renewal highlights how time, history, and social change manifest within a spatial context. In the same way that geological strata reflect changes from different eras, spaces transformed from industrial heritage also retain their historical and cultural traces on multiple levels.

In the transformation of the Huangpu River waterfront area in Shanghai, memory stratification can be viewed as the preservation and display of different historical stages from the industrial age to contemporary urban life. Each period leaves its temporal marks on the heritage entity, and these stratified memories collectively narrate a continuous story of urban development.

For example, the Chinese Ship Corporate Pavilion was renovated and reconstructed from the Fitting and Welding Workshop of the Jiangnan Shipyard. Perched on the banks of the Huangpu River for more than a hundred years, the Jiangnan Shipyard has witnessed Shanghai’s urbanisation process. During the Expo, it was rejuvenated, providing a solid architectural frame and pure historical lineage for new technological dialogues and material innovation. The Jiangnan Shipyard, which was established in the 1860s, represents a significant chapter in China’s industrial history. Over the centuries, it witnessed China’s journey through colonial struggles and its quest for prosperity, as well as its rise as an industrial power. The shipyard’s physical remnants—dry docks, warehouses, and equipment—are tangible markers of these historical periods, retaining the imprints of technological and cultural shifts.

The shipyard’s narrative is interwoven with stories of labour and innovation. It was a place where craftsmanship met modern engineering. During the 2010 Shanghai Expo, these aspects were highlighted through exhibitions and interactive displays, allowing visitors to engage with the biography of the industrial age. This involvement facilitated a deeper understanding of the social and technological fabric of past eras, preserving memories of industrial progress and the workers who propelled it. The CSSC Pavilion at the 2010 Expo was built on the original site of the Jiangnan Shipyard (Fig. 4) and showcased the future of urban life on the water and the close relationships among people, ships, and cities, respecting and reinterpreting its industrial heritage.



**Fig. 4** The century-old Jiangnan Shipyard has undergone great historical change. **A** Historical Jiangnan Shipyard. **B** 2010 Expo China CSSC Pavilion (China Shipbuilding Industry Corporation Pavilion). **C** The Expo Museum and Variety Hall converted from the former Jiangnan Shipyard workshop. **D** Panoramic view of Expo Park in Puxi, transformed from the former Jiangnan Shipyard district. (Source: A from <https://sgservices.shobserver.com/html/toutiao/2020/04/23/173374.html>. Accessed 2 July 2024; B from <https://aloss.biz/en/8862/>. Accessed 2 July 2024; C & D from [https://www.gov.cn/jrzq/2010-04/05/content\\_1573570.htm](https://www.gov.cn/jrzq/2010-04/05/content_1573570.htm). Accessed 2 July 2024)

The pavilion, which was redesigned with an arc frame resembling both a ship's keel and a dragon's backbone, highlights both the ship hall's corporate image and the robust spirit of China's national industry. The transformation of the Jiangnan Shipyard exemplifies the balance between heritage preservation and innovation. The Expo serves as a cultural reflection, demonstrating how historical memories can inspire contemporary creativity. Through the conversion of an industrial relic into a modern art space, the Expo emphasised the importance of adapting historical narratives to contemporary contexts, ensuring that they remain relevant and impactful.

The strategy of memory stratification not only offers a reference for urban residents' identities and memories but also adds a vital dimension to the management of a city's cultural heritage. Memory stratification demands that in planning and development, the diachronic nature of space is considered; this involves how spaces evolve over time and how each period's sociocultural characteristics are presented and preserved. This approach ensures continuity and sustainability in urban renewal and reaffirms a city's history and identity.

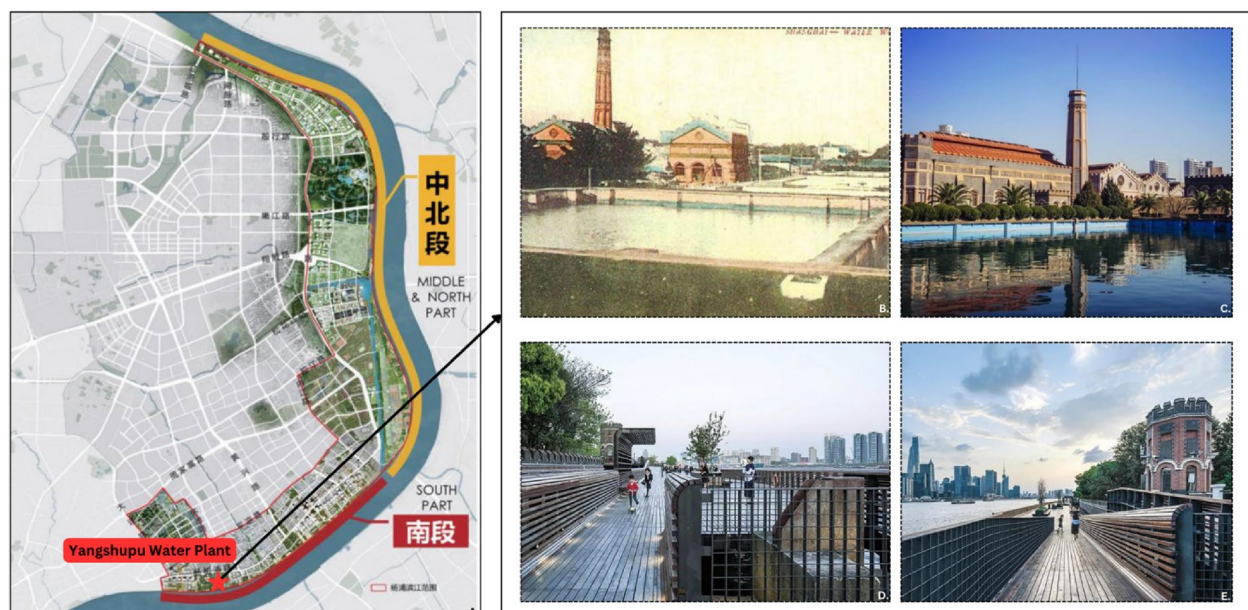
#### 4.2.2 Cultural weaving

Like memory stratification, cultural weaving focuses on integrating new cultural elements into industrial heritage while preserving its historical narrative, thereby fostering

cross-era cultural fusion. This concept describes the evolution of industrial heritage identities amidst the interweaving of old and new cultures, with the goal of creating new forms of cultural expression while maintaining their distinctiveness. In the context of the transformation of industrial heritage in the Huangpu River waterfront area of Shanghai, cultural weaving is concretely manifested in the protection, reuse, and reshaping of urban renewal in old industrial areas.

Industrial heritage not only is preserved in its physical form but also often, through exhibitions or other cultural activities, combines the original industrial spirit with contemporary culture, injecting new cultural vitality into the region. The Yangshupu Water Plant represents a breakpoint in the connectivity projects, but in terms of its life significance, it is a continuous flow. For over a century, it has operated to provide water to citizens. Between 2016 and 2017, from the construction of public shorelines to piers, physical spatial ruptures were bridged, and the Yangpu waterfront area was comprehensively connected, allowing space to flow continuously like time (Fig. 5). In 2020, its extensive processing transformation project was fully launched, with new structures and technologies merging with the old facade and core of the industrial heritage, achieving a leap from parasitism to symbiosis.

Similarly, various activities held in this area, such as Fashion Week and design exhibitions, not only provide



**Fig. 5** Historic and contemporary Yangshupu Water Plant. **A** Location map of the Yangshupu water plant. **B** Historical photo. **C, D** Retained Concrete Mooring Bollards and U-shaped Jetty. **E** Ramp integrated with the water plant building. (Source: A from <http://sh.people.com.cn/n2/2024/0221/c134768-40751959.html>. Accessed 2 July 2024; B from <http://www.dili360.com/ch/article/p5afe81134304c00.htm>. Accessed 2 July 2024; C from <https://kknews.cc/zh-sg/news/8km52xe.html>. Accessed 2 July 2024; others from Zhang et al. 2019)

the public with opportunities to experience the combination of contemporary art and industrial history but also further drive the integration of the creative industry with traditional industrial heritage. This reflects the practice of cultural weaving in event planning and spatial design. Through a series of industrial heritage transformation practices in the Shanghai Huangpu River waterfront area, cultural weaving not only interlaces elements from different eras and cultures but also captures the continuity of urban memory and the coexistence of cultural diversity amid the transition of old and new functions. It highlights a proactive pathway to cultural regeneration and urban spatial restructuring.

#### 4.3 Dynamic temporality: interaction and connection

Over time, the concept of the renewal and transformation of the industrial areas along the Huangpu River has been fluid, and the shaping of space has also exhibited fluidity. For example, today's West Bund is recognised by the public as a city subcentre and art corridor, but in its initial construction phase, the concept of the 'West Bund' was not widely accepted. At that time, the area was home to cement factories and aircraft factories, which were far removed from the realm of everyday life and nearly inaccessible. From a longitudinal temporal perspective, we can view the shaping of space as an accomplishment over time, observing the varying outcomes brought about by policy shifts and differing approaches across various periods.

##### 4.3.1 *Interactive symbiosis and functional metamorphosis*

In the renewal and transformation of the waterfront area of Shanghai, the preservation of original industrial architectural features and the shaping of public spaces have been carried out almost simultaneously. Industrial buildings along the river, such as the Long Museum West Bund, West Bund Art Centre, and the 80,000-ton Silo, have adopted a museum approach to handling industrial heritage (Luo and Cao 2023). This method encourages the symbiotic interaction of the external environment and internal activities, such as the integration of outdoor landscapes with indoor exhibitions and public spaces.

During the construction of the Long Museum West Bund from 2011 to 2014, the fusion of various temporalities was meticulously orchestrated. The building, formerly a coal unloading dock, retains the original coal-hopper-unloading-bridge. The museum's design incorporates advanced exposed concrete technology, which sharply contrasts with the weathered, robust exterior of the coal hopper. Beyond mere material use, structural analogies drawn from contemporary architectural techniques reflect the site's industrial past and historical context. The design features an 'umbrella-vaulted' structure

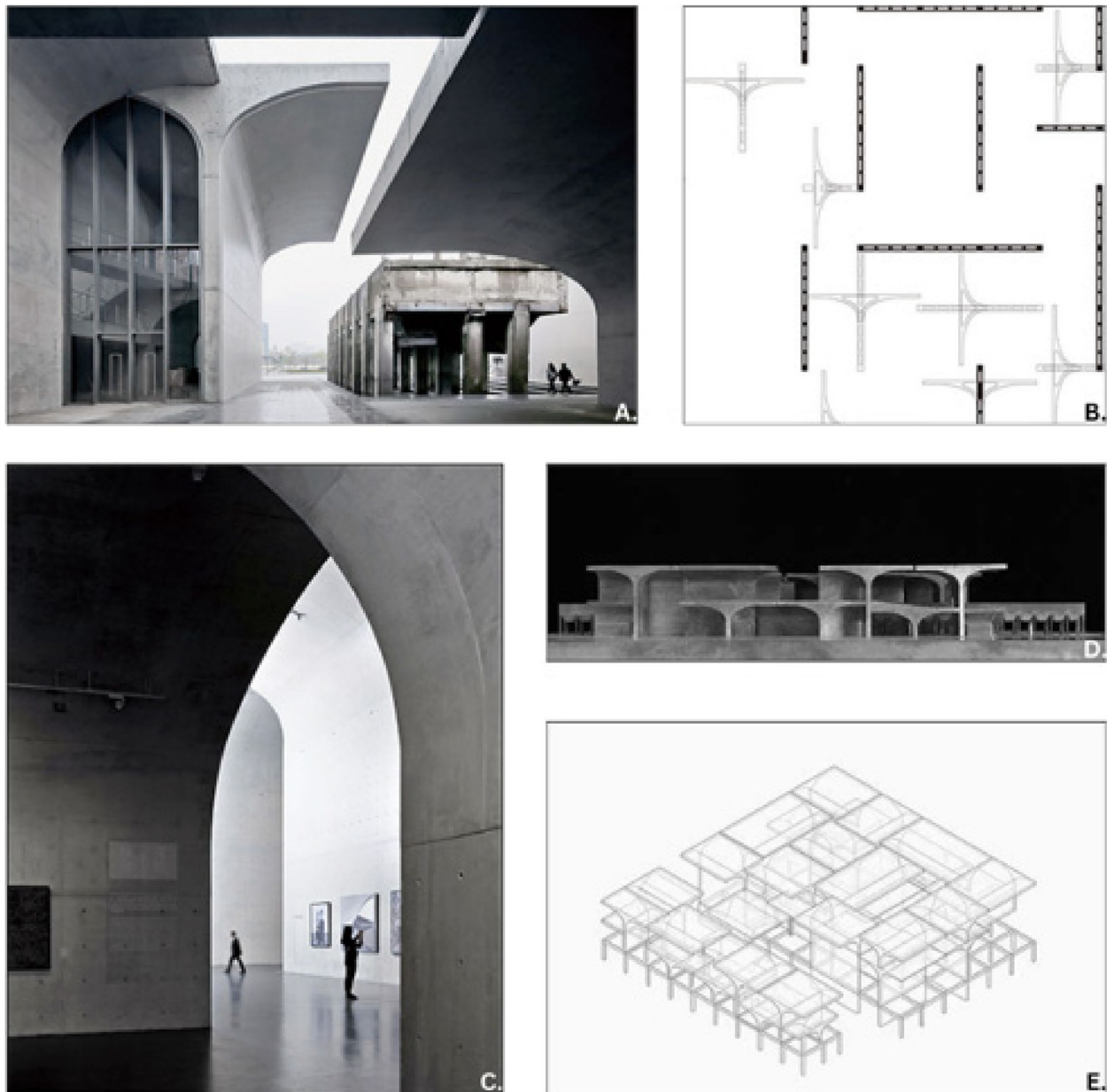
with independent walls that metaphorically echoes the original coal yard's structure, aligning with the forms and functions of historical industrial machinery (Fig. 6). This architectural choice introduces visual dynamism and suggests the kinetic energy of coal unloading. New shear walls were integrated into the existing basement framework, thus enhancing structural stability and transforming previous utility areas into vibrant exhibition spaces. This adaptation reflects the site's original role in energy storage and transformation, now repurposed for cultural and artistic engagement. The 'umbrella arches,' arrayed in various configurations, create a multifaceted interior that recalls the complex systems of the former coal yard. Just as coal once moved through elaborate machinery, visitors now traverse intricate pathways to engage with art, integrating mechanical and electrical systems within the architectural framework to optimise space and maintain aesthetic coherence. Ultimately, this architectural renewal not only satisfies the functional demands of a contemporary art museum but also maintains a dialogue with the site's industrial heritage. This synthesis of the past and present in architectural form allows for a dynamic exploration of space and time, enhancing both the utility and the historical narrative of the site.

However, the process of functional evolution is not without its challenges of balancing preservation, development, and inclusivity (He 2014). Transforming industrial areas into art venues excludes the very people who were once integral to these spaces—the working class. The specific positioning of contemporary art often implies a middle-class bias, establishing a class barrier for potential audiences. Middle-class gentrification leads to increased property values, the displacement of original residents, and the creation of exclusive cultural enclaves. Therefore, balancing preservation, development, and inclusivity is crucial. Effective heritage strategies must include a recognition of the different temporal layers of the site while addressing legal, economic, and community needs to ensure equitable and sustainable urban development (Zhu and Hein 2020).

##### 4.3.2 *Continuous activation*

Industrial heritage sites, catalysed by large-scale events, enter a state of continuous transformation and regeneration, outlining sustained vitality and functional adaptability. Regular exhibitions and cultural events held in the Shanghai Riverfront area ensure that these historic industrial locations maintain ongoing vibrancy.

The Shanghai Urban Space Art Season (SUSAS), adhering to the World Expo's spirit of 'Better City, Better Life,' aims to 'urbanise art and vitalise art in everyday life.' The decade following the 2010 Shanghai Expo marked a significant transition for Shanghai, shifting from city



**Fig. 6** The design and structures of Long Museum. (Sources: <http://www.deshaus.com/Cn/Index/projectDetail/id/4.html>. Accessed 2 July 2024)

construction to urban regeneration. In Shanghai, this process began with the Expo, particularly with the transformation of the industrial waterfront along the Huangpu River, which has experienced the most dramatic changes in the city. The SUSAS continues the cultural and artistic momentum generated by the Expo by showcasing site-specific installations and performances that engage with Shanghai's industrial heritage and urban landscape. This initiative promotes the adaptive reuse of industrial spaces, integrating art into the urban fabric. Additionally, as discussed by Graeme Evans, mega-events such as the

Shanghai Expo have long-term urban impacts, catalysing ongoing investment and cultural activities in the city (Evans 2019). The SUSAS exemplifies this dynamic, perpetuating the Expo's cultural and creative energy to drive continuous urban transformation. Through the SUSAS, the legacy of the Expo is kept alive, ensuring that the event's influence extends well beyond its conclusion. This close relationship underscores how the SUSAS not only maintains but also amplifies the Expo's impact, using art as a catalyst for ongoing urban renewal and cultural vitality in Shanghai.

The inaugural exhibition in 2015, themed ‘Urban Renewal’, opened at the West Bund Art Centre, a site that was then ripe for development. To prepare for the Art Season, the surrounding roads and environment were rapidly improved. After the Art Season, the venue continued to host many cultural events, gradually cementing its status as a cultural and artistic landmark in Shanghai. The 2017 event themed ‘this CONNECTION: Sharing Future Public Spaces’ took place at the 80,000-ton Silo at the Minsheng Wharf on the Pudong side and surrounding areas, focusing on enhancing connectivity across both sides of the Huangpu River and improving urban space quality and continuing to explore the relationship between urban spaces and people (Fig. 7). The 2019 theme, ‘Encounters’, featured the 5.5-km riverfront public space in the southern section of Yangpu as the main venue, with the old Shanghai Shipyard area (including the docks and cotton warehouses) serving as the primary exhibition zone. With the opening of the exhibition, the industrial belts on both sides of Yangpu Bridge were interconnected and opened to the public for the first time. ‘Encounters’ is a term that embraces the past and looks to the future, positioning Shanghai as a meeting place for China and the world and viewing the riverfront industrial belt as a context for the meeting of history and modernity.

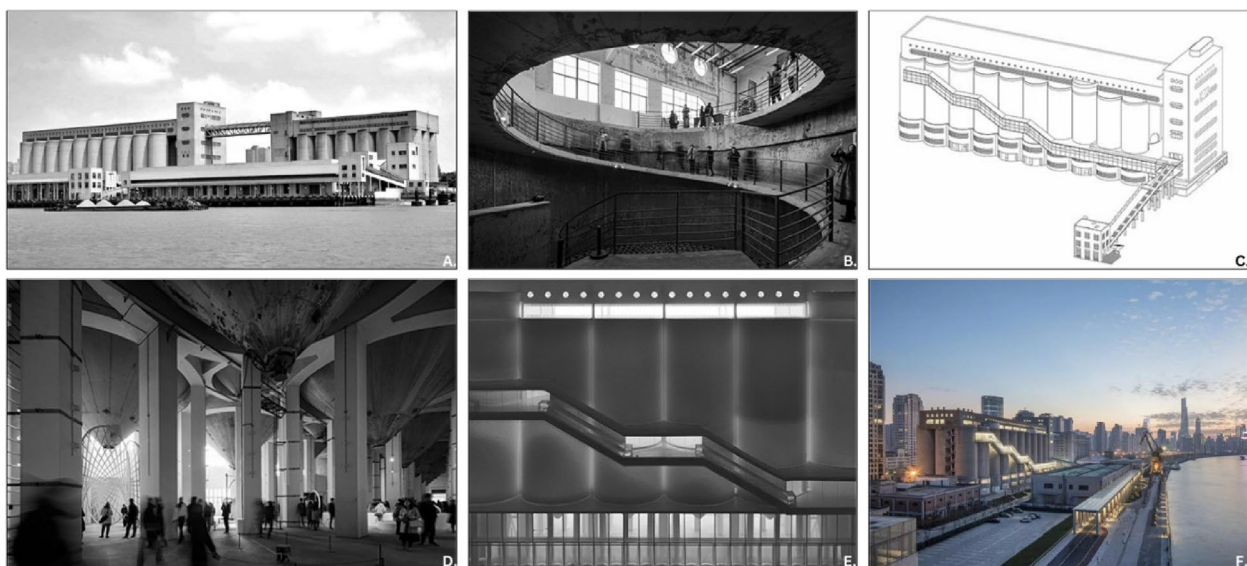
The 2021 theme was ‘15-min Community Life Circle—People’s City’, focusing on the community as the exhibition venue and shifting the focus to everyday life, exploring the relationship between community and art on a smaller scale. The Colombia Circle, as the main

thematic performance exhibition zone, aimed to create an international and vibrant cultural and artistic life circle, interpreting the transformation from industrial heritage to production, living, and ecology, enabling the original site to play a diversified and dynamic spatial role. In 2023, the Art Season opened at the West Bund Dome art centre. With the theme of ‘Coexistence’, this Art Season explored new strategies and methods for urban creation, presenting the value of humans and nature as a community of life.

As evidenced by the series of efforts made during the Urban Art Season, the concepts of planning and development of Shanghai’s industrial heritage have substantially developed and grown. These efforts include enhancing connectivity, increasing accessibility, achieving spatial equity, focusing on community development, and promoting green sustainability. These events have not only refreshed the functions of these places in a timely manner but also maintained the continuity of these industrial heritages as active urban spaces. These spaces have become vibrant with the arrival of artists’ studios, galleries, and cafes, injecting new social functions and cultural dynamism into the area and making it an integral part of the city’s cultural life.

## 5 Discussion

Exploring the shifts surrounding the industrial heritage along the Huangpu River’s riverfront in Shanghai, the discussion unravels several deeper considerations, as outlined in the following sections.



**Fig. 7** Historic and temporary 80,000-ton Silo. (Source: A & F from <http://www.archcollege.com/archcollege/2019/02/43429.html>. Accessed 2 July 2024; others from <http://www.deshaus.com/Cn/Index/projectDetail/id/22.html>. Accessed 2 July 2024)

### 5.1 Sustainable shift: harnessing mega-events for industrial heritage revitalisation

The regeneration of industrial heritage along Shanghai's Huangpu River through mega-events presents an evolving narrative that weaves the past into the fabric of the present (Zhang et al. 2022a, b). The 2010 Expo was seamlessly incorporated into the broader urban development strategy, helping to implement Shanghai's master plan. This plan supports the modern need to build sustainable, efficient, and equitable cities. Key needs include sustainability, equity and inclusivity, strategic urban planning, adaptation, and resilience.

The municipal government granted the event political significance and went all out to leverage the 2010 Expo to enhance the city's image and strengthen its competitiveness. In this scenario, the dilapidated industrial site, which had great potential due to its prime central location, significantly propelled Shanghai on its path to becoming a global city. Hence, it is reasonable to view the 2010 Expo project as a key example of using urban planning for city transformation (Li 2018). The Expo site's iconography illustrates a shift from a chaotic industrial waterfront to a contemporary, well-planned urban space. This reflects a unified framework aimed at developing a harmonised strategy that integrates various urban plans, ensuring that they align with a shared vision and strategic objectives. The success of the Expo's sustainable initiatives influenced Shanghai's long-term urban planning and policy. The city's commitment to sustainability was reinforced, leading to the adoption of more stringent environmental regulations, green building codes, and the promotion of public transportation. The Expo served as a model for post-Expo urban development projects, highlighting the importance of integrating industrial heritage with modern sustainable practices to create resilient, liveable cities.

Mega-events serve as pivotal junctions where cultural sustainability is paramount, transcending the mere revival of structures and symbolising a commitment to the enduring cultural context of the urban landscape. Shanghai's Expo aimed to have a lasting impact on the city's urban development. The plan included sustainable infrastructure and green spaces to support long-term urban resilience, echoing the sustainability themes from the transformations described in other port cities (Meyer 1999). Through the introduction of contemporary cultural vitality into historical industrial sites, the city's narrative was not only preserved but also enriched, facilitating the emergence of a tapestry of stories, each layered with historical significance (Luo and Cao 2023). This revitalisation encourages stakeholder engagement, transforming spaces into social epicentres that foster inclusivity and cohesion. The emergence of community-centric

spaces allows industrial heritage to evolve into lively platforms that foster dynamic synergy, enhancing equity and inclusivity within the local fabric.

Functional adaptability is another key approach, showcasing Shanghai's capacity to reinvent its historic sites to meet modern-day roles. This demonstrates the city's agility in adapting to rapid urban and social shifts, ensuring the continued relevance of its industrial past (Zhou 2017). An ongoing dialogue between history and modernity is maintained through each phase of transformation, ensuring a balance between preservation and present-day demands. This negotiation allows the identity of industrial heritage to remain active and relevant, consistently contributing to the city's cultural dynamics (Huang and Wang 2023). Continuity and change are essential elements in this narrative, with temporal analysis highlighting the importance of continuous cultural dynamism to sustain the spirit of industrial heritage. Cultural events serve as enduring catalysts that breathe life into the urban environment, fostering ongoing cultural renaissance (Zhu and González Martínez 2022).

As a significant catalyst for the large-scale redevelopment of Shanghai's industrial areas, the Expo repurposed former industrial sites into cultural, commercial, and public spaces with an emphasis on sustainable development by integrating green spaces and eco-friendly technologies. The theme of the Expo, 'Better City, Better Life', highlighted the importance of sustainable urban living. This was reflected in the redevelopment of industrial heritage sites, where green building practices were adopted. For example, many buildings were retrofitted to improve energy efficiency, and public spaces were designed to include green areas that help reduce the urban heat island effect and improve air quality. The Expo also showcased innovative approaches to water management, waste reduction, and renewable energy use, all of which were incorporated into the redevelopment of former industrial zones. These efforts not only improved the environmental quality of these areas but also contributed to the overall ecological health of the city.

In conclusion, the World Expo played a pivotal role in heritage conservation by catalysing urban restructuring and revitalisation, particularly along the Huangpu River waterfront. Through the Expo, the industrial landscape of Shanghai was transformed, inspiring the relocation of state-owned enterprises and promoting a new urban vision, integrating cultural, residential, and recreational functions (Chen 2018). The 2010 Expo and its post-event activities led to significant urban redevelopment, transforming former industrial areas into cultural and recreational spaces (Chen et al. 2014). This not only preserves the architectural and historical value of these sites but also reinvents them as hubs of cultural and social

activities. By enhancing the visibility and attractiveness of cities on a global scale (Deng and Poon 2012), the Expo helps brand Shanghai's Huangpu River industrial space as a cultural destination, drawing attention to its journey from industrial decline to urban regeneration. Additionally, the Expo provides opportunities to incorporate sustainability into the redevelopment of industrial heritage sites in Shanghai. This includes restoring environmentally damaged industrial areas and integrating green technologies. The narrative of sustainable development often justifies the large-scale investments needed for such transformations (Jones and Ponzini 2018).

## 5.2 Heritage at the crossroads: navigating the complexities of mega-event transformations

The incorporation of a temporal perspective into the discussion of the exclusivity of mega-events and the regeneration of industrial heritage, as in the case of Shanghai Huangpu Riverfront, highlights the transition from a past centred on the industrial workforce to a present in which commercial and cultural functions prevail, often sidelining the historical narratives of workers. The significance and contribution of the workforce, which has traditionally been the core of industrial activity, seems to have been overshadowed by the rise of urban redevelopment (Lin and Xu 2019; Lu et al. 2019).

The loss of authenticity and original purpose is inevitable. Industrial buildings were repurposed for tourism, often being stripped of their original industrial functions. For example, former industrial pavilions were turned into exhibition centres and cultural hubs. This shift changed the nature and purpose of these structures from functional industrial sites to tourist attractions. Additionally, the preservation efforts generated by mega-events focused more on aesthetics and visitor appeal than on maintaining the original industrial processes and machinery. This approach dilutes the historical and educational value of heritage sites, making it difficult for visitors to grasp their true industrial history (Jones and Zhang 2024). In addition, the redevelopment and gentrification of these areas can represent a rupture in the historical continuity of urban heritage sites (Wang 2023), not only reshaping the physical landscape but also disrupting the continuity of community narratives and sense of place that were once defined by the industrial working class. With respect to the displacement of original industries and residents, the connections that original residents had with the industrial heritage of the area were severed, as their personal histories and memories were tied to these sites (Chen et al. 2014). The new developments catering to tourists and higher-income groups create socioeconomic divides, eroding the social fabric that once characterised the industrial neighbourhoods (Lamberti et al.

2011). The transformation inevitably involves a shift from an industrial landscape, which serves as a testament to workers' contributions, to a regenerated urban space where traces of labour are obscured or recontextualised for contemporary uses. Mega-events such as the Shanghai Expo have been identified as pivotal moments in urban transformation strategies, remaking cities as global spectacles (Gruneau and Horne 2015) but at the risk of decontextualising and resignifying heritage in ways that may alienate the very communities that have built and sustained these industrial spaces (Arkaraprasertkul 2018).

Regeneration often redefines these industrial spaces with new cultural and commercial narratives that may overshadow the historical significance and memories of workers, leading to a type of cultural exclusivity where the past is commodified and its authenticity is at risk (Liang and Wang 2020). Updated narratives support the total transformation of the environment of these spaces and appreciate its gentrifying effect, embracing the positive view of urban renewal prevalent in developing economies (Appadurai 2000), as it has helped shape Shanghai into the desired 'Excellent Global City' (Den Hartog and González Martínez 2022). This raises questions about who benefits from regeneration and at what cost to the sociohistorical fabric of the community (Evans 2005). The diverse expectations of stakeholders in industrial land redevelopment, including those related to the cultural and economic dimensions, reflect the changing positions of groups over time (Gustafsson and Ripp 2022), with the interests of former industrial workers often marginalised in favour of new urban growth models (He et al. 2019). In this paper, an analysis of several cases reveals that the Expo and post-Expo strategies present a relatively integrated approach to the industrial area, with the goal of preserving authenticity and integrity as much as possible. However, retaining the cultural vitality and local character of the industrial area remains an important challenge after the renewal of the Huangpu Riverfront.

To organise the 2010 Shanghai World Expo, in 2003, Shanghai designated the old industrial areas on both sides of the Huangpu River between Nanpu Bridge and Lupu Bridge for redevelopment. This area was chosen as the site for the World Expo, which involves the construction of expo venues. Following the principle of 'a hundred years of planning to achieve a century of excellence', the project led to the relocation of Jiangnan Shipyard, Shanghai Iron and Steel Plant 3, and several other century-old enterprises. Hundreds of thousands of residents were moved, and many old residential buildings were demolished to make way for large-scale construction and renovation. This effort aimed not only to ensure a 'wonderful and unforgettable World Expo' but also to

promote ‘innovation-driven development, economic restructuring, and upgrading’ in Shanghai. Official narratives downplayed any potential conflicts regarding the relocation of former residents and new gentrification. In this process, regional functions and positioning shifted from low-end to high-end, resulting in a reduction in affordable housing units. Redeveloped neighbourhoods were emptied, and original low-income residents were forced to move to more remote areas. As land value increased, traditional market players, such as workshop artisans, could no longer afford the expensive rents and gradually disappeared from the streets. Additionally, local community services became sparser, and the cost of living rose. Most available services and products now come from industrialised and globalised production networks, erasing the unique way of life that once characterised the industrial areas.

Overall, the temporal analysis critically examines the role of mega-events in urban regeneration and industrial heritage conservation by reviewing what remained and what changed at different sites. Through the lenses of layered temporality and dynamic temporality, both their potential for economic and cultural revitalisation and their risk of erasing valuable historical and social narratives are recognised. Although holistically considered, the 2010 Shanghai Expo brought several challenges, including the loss of authenticity and the original purpose of heritage, the selective preservation of industrial heritage while neglecting other historic significances, the loss of community connections, overshadowing the need for ongoing preservation, and issues of space function and accessibility. This analysis also reveals the complexities of balancing the valorisation of industrial heritage with the dynamism of urban development, illuminating the need for sensitive approaches that consider the long-term implications for communities and the authenticity of the industrial heritage itself (Wang and Wang 2018).

## 6 Conclusions

In conclusion, this study offers a comprehensive analysis of the transformation of several cases along Shanghai’s Huangpu River industrial zone, investigating the profound impacts of post-Expo developments. By exploring emblematic case studies, this research reveals the diverse temporalities of regenerated waterfront industrial heritage in Shanghai, including genetic, layered, and dynamic temporalities. Through a temporal perspective that encompasses the physical, emotional, and social dimensions of experiencing time, this research examines the role of the 2010 Shanghai Expo as a pivotal mega-event in shaping industrial heritage. The 2010 Expo not only served as a catalyst for immediate urban renewal but also established

a long-term framework for integrating Shanghai’s industrial heritage into its evolving cityscape. Over time, this has facilitated a dynamic interplay between the city’s past and its future, ensuring that the legacy of its industrial roots remains a vibrant part of its modern identity. This process has harmonised heritage preservation through adaptive reuse and integrated planning with modern urban development needs such as economic transformation, infrastructure development, environmental sustainability, social liveability, and cultural innovation.

Moreover, this research discusses the opportunities and challenges posed by the transformation of industrial heritage through mega-events, offering valuable insights for urban planners and heritage conservationists. On the one hand, mega-events catalyse infrastructure improvement, cultural integration, sustainability initiatives, global profile enhancement and adaptive reuse of industrial structures. On the other hand, challenges include the potential loss of affordable housing, erosion of historical and cultural characteristics, insufficient integration of historical elements, and a lack of inclusive planning. This paper advocates for a dynamic temporal approach to managing industrial heritage sites, viewing them not merely as relics but also as vital, evolving elements of the urban fabric, capable of ongoing adaptation and innovation. Looking forward, the temporal analysis of Shanghai’s Huangpu River industrial zone provides a microperspective on the impact of mega-events on industrial heritage, offering insights into urban planning that highlight specific, tailored approaches to respecting and integrating the unique character of Shanghai’s urban industrial landscape. This study highlights the importance of navigating the complexities introduced by mega-events and suggests strategies for fostering resilient and vibrant urban landscapes.

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