

Users' Perceptions and Preferences of Urban Waterfront Open Space Quality: A Comparative Study of Two Regenerated Waterfronts in Hangzhou, China

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Abstract

Waterfront regeneration has played a crucial role in shaping contemporary public open spaces in China, particularly in newly developed areas and in heritage canal districts. However, the comparative study on public perceptions and preferences and their impact on using these two areas' open spaces in future waterfront placemaking practice has never been in the primary research literature. Hence, this study focuses on how users' perceptions and attitudes contribute to improving the quality of urban waterfront open spaces shaped by cultural-heritage-led regeneration.

To achieve this, a research framework, including six key dimensions, 21 sub-factors and a total of 110 measurable variables, has been established to assess the quality of urban waterfront public spaces in Hangzhou, China. It focuses on two sites: the Qiaoxi Heritage Canal District (QHCD) along the Beijing–Hangzhou Grand Canal and the South Bank of the Qiantang River (SBQR). A mixed methods approach, including online questionnaires, semi-structured interviews and direct observation, was adopted to further examine users' perceptions and attitudes, with a focus on the commonalities and differences in urban waterfront open space development. The results were analysed using architectural drawings, means analysis, Importance-Performance (IPA) Analysis and qualitative data derived from semi-structured interviews and field observations. It aims to offer recommendations on design principles based on the users' attitudes and preferences for both types of sites, thereby demonstrating how

urban heritage resources can effectively enhance the quality of urban waterfront open spaces.

The findings reveal that, although the development and management objectives, design principles, and spatial uses vary, the importance ratings of six key dimensions indicate a similar tendency in user perceptions of urban waterfront open space quality across the two sites. Inclusiveness was among the top dimensions for enhancing the quality of urban waterfront open spaces, whereas spatial aesthetics ranked the lowest. Among the variables, elements for supporting people's daily experience and water engagement received high ratings. The traditional canal waterfront, despite its rich cultural heritage resources, has not effectively shaped place identity due to over-commodification and mono-functional land use. The newly developed waterfront demonstrates that intangible legacies of the Asian Games have the potential to create a distinctive and new urban image, even without tangible heritage resources.

Publications

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CHAPTER 1- INTRODUCTION

Urban waterfront regeneration can be understood as a continuous city-building activity that provides an excellent opportunity to reshape the public realm of urban waterfront open spaces in a more sustainable way across social, ecological, economic, cultural and political dimensions (Smith and Ferrari, 2012; Evans et al., 2022). Over the past six decades, urban waterfronts in North America, Britain, Europe, Singapore, Australia, and China, among other countries, have shifted from prioritising industry, manufacturing and transportation to focusing on the creation of high quality public open spaces and the enhancement of public life in waterfront communities (Smith and Ferrari, 2012; Jones, 2017; Zhu, 2023a). Although the spatial transformation of urban waterfronts is a context-specific social spatial practice, the creation of higher quality urban waterfront open spaces plays a vital role in improving physical and mental health, promoting local identity, developing resilient ecosystems and facilitating social encounters in urban waterfront areas worldwide (Carmona, 2019; Evans et al., 2022; Ragheb and El-Ashmawy, 2020).

In the context of China, an integrated cultural heritage-led urban waterfront regeneration strategy has emerged as a new approach to creating new public realm on urban waterfronts, characterised by the establishment of cultural “flagships” to support public life, including the adaptive reuse of existing heritage buildings; balancing public and private interests; the use of public art and design installations;

and the promotion of public participation in the decision-making process (Qian, 2021, Zhu, 2023b; Zhu and Li, 2024). However, primary challenges remain within the Chinese context, including the transition from “quantity” to “quality”, avoiding the repackaging of culture and heritage in a commodified way; and a prevailing lack of understanding of the changing human demands for urban waterfront open spaces (Liu et al., 2021; Rong and Wang, 2021).

In the fields of environmental psychology and urban design in particular, people’s demands are associated with perceptions and attitudes that can be viewed as active processes through which individuals experience the world. Rapoport (1977) highlights the perception of environmental quality as a key factor in shaping urban transformation. In fact, the interpretation of perceptions and attitudes is a process of encoding and decoding information comprising three processes: the cognitive (understand the environment); the affective (emotional respond to the built environment); and the conative (doing, acting or behaving) (Rapoport, 1977). Such an understanding of users’ perceptions and attitudes provides deeper insight into how the physical environment shapes human experience, and how people, in turn, reshape the spatial organisation and social relations.

Although the value and the critical role of urban waterfront open spaces in urban transformation are widely acknowledged, research on perceptions and attitudes towards these spaces within the context of culture- and heritage-led regeneration

remains limited. Given this background, the current study aims to investigate the role of such perceptions and attitudes in improving the public realm on waterfronts shaped by cultural heritage-led regeneration, particularly within the Chinese context. The final part of this chapter will provide a more detailed explanation of the overall thesis framework and organisational structure.

1.1 Research Background and Definition of Problems

1.1.1 Public space: concept and the critiques

The archetypal historical forms of public spaces have differed between Chinese and Western cities throughout history. In the West, public spaces such as the Agora, where people engaged in various activities, including the exchange of ideas on social and political matters, served as central gathering places for public life in ancient Greece from the sixth century BC (Orum and Neal, 2009). During the medieval era, public parks, plazas, streets and coffee houses functioned as the public realm for socialising and leisure activities (Christophersen, 2015). Today, public spaces have expanded to encompass broader outdoor environments that are closely integrated with urban life, aiming to meet the needs of everyday life in terms of access, control, activity patterns and behaviour (Németh and Schmidt, 2011; Peiris and Fayas, 2022).

In contrast, there were few public spaces in ancient China prior to 850 CE. Public life was predominantly confined to enclosed courtyards and private households, while temple courtyards and certain open areas near piers and ports outside city centres

were occasionally used for festivals and celebrations (Xu, 2000). After 850 CE, the “medieval urban revolution” proposed by Elvin (1973) transformed urban spatial organisation from the enclosed Li–Fang system (enclosed residential quarters and controlled enclosed markets) to a more open Fang–Xiang system (freely accessible street market system, scattered shops and stores, broader neighbourhoods, public streets and bridges). This shift contributed to the development of public spaces along the water's edge. According to Xu (2000), this significant revolution first occurred in urban markets during the second half of the eighth century and then rapidly extended to urban residential areas. Many spontaneous marketplaces emerged around urban waterfronts outside the city. Thus, the creation of traditional public spaces in ancient China was characterised by bottom-up processes, rather than being state-led. However, the contemporary production of urban open spaces in China is primarily attributed to postmodern architecture and the Modern Movement originating in Western countries. In this context, it is necessary to understand the definitions of public space within a global framework.

Definitions of public space

The concept of “public space” has been used frequently in recent years across various disciplines, including politics, sociology, urban planning and urban design (Jacobs, 1961; Lefebvre ,1991; Mitchell, 1995; Low and Smith, 2006; Carmona et al., 2010). Considering the political dimension, the term “public space” refers to “a sphere of

public action essential to democratic citizenship" (Goodsell, 2003, p. 362). However, more often, the concept of "public space" is replaced by the term "public sphere" in political discourse. Habermas (1989) uses this term to describe an abstract, non-physical space that provides platforms for exchanging ideas and encouraging debates. Low and Smith (2006) assert that public spaces represent one of the few remaining democratic platforms for ensuring spatial rights and democratic access for all members of the public.

From a sociological perspective, Henri Lefebvre (1991) explains how the social production of space is manifested: it can be interpreted through his conceptual triad of perceived, conceived and lived space. Such spatial practice reflects a close relationship within perceived space, linking "daily reality (daily routines) with urban reality (the routes and networks that connect places designated for work, private life and leisure)" (Lefebvre, 2010, p. 82). In this sense, public space is viewed as the place where we live our public lives and a facilitator of civic order (Orum and Neal, 2009). It provides a stage for our social lives, information exchange, social learning and the development of tolerance and, as a result, the armour of daily life can be partially removed, because the public space serves as an escape from stress and offers the richness of urban life (Carr et al., 1993; Amin, 2008). Moreover, social encounters, such as interactions with friends or strangers in neighbourhood streets or urban waterfront open spaces, can shape distinctive social networks within communities.

In the field of urban design and planning, many scholars conceptualise public space based on the criteria of access, public-private nature of agencies in control, meanings and interest (Benn and Gaus 1983; Carmona, 2014; Varna, 2016). For example, Carr et al. (1992, p.50) define public space as “publicly accessible places where people go for group or individual activities”. Madanipour (1996) views public space as a place where all groups of people have an equal right to access and in which they can engage in activities, and which is controlled and managed by a public agency. According to Kohn (2004), public space can be defined relating to its ownership, accessibility and intersubjectivity (which refers to whether it promotes communication and interaction). He argues that public space can create a shared set of symbols and meanings by “structuring people’s perceptions, interactions and dispositions” (Kohn, 2004, p.6). Carmona et al. (2010) stated that public space could provide free access to all social groups, whether predominantly in residential, commercial and civic uses. It also includes the public access to the semi-public space at least during daylight hours. Furthermore, he uses the term “public realm” to encompass both physical (i.e. spatial) and social (i.e. activity-based) dimensions, aiming to better understand how public space shapes public life (Camara, 2010). The physical dimension refers to settings that facilitate public life and social interaction. The social dimension involves the various activities and events in which people can participate outdoors, such as street theatre and café culture. Similarly, Awwal and Borsi (2020) note that the public realm is associated with “external urban spaces” accessible to all social groups without

restriction. They define the public realm as “the human interaction outside their home in certain places” (Awwal and Borsi, 2020, p. 14). These are the everyday spaces where people live, work and play.

Although each discipline offers specific meanings and definitions dependent on different societies, places, and historical contexts, a common characteristic is that public space encompasses areas that are open and accessible to all members of the public within a civil society (Orum and Neal, 2009). This being the case, the concept of functional public space is understood as a multidimensional space for public life and the pursuit of collective interests, as well as a space for the display of symbols and urban images within society (Carmona et al., 2010; Aelbrecht et al., 2019).

An ideal public space is, therefore, managed by public actors in the public interest, while also being inclusive of all social groups, physically accessible to all members of society, and transparent in terms of information about its development and use. However, as urban restructuring intensifies the fragmentation, homogenisation and excessive commercialisation of public spaces, the development of contemporary versions requires critical examination.

Critiques of public space

As private actors play a crucial role in the design and governance of urban public space, some critical scholars have proclaimed the “end of public space” or its

disappearance, expressing their critique of contemporary developments shaped by privatisation and urbanisation (Low and Smith, 2006; Varna and Tiesdell; 2010; Langstraat and Melik, 2013). Literature critiquing contemporary public space began to emerge in the late twentieth century and can be broadly categorised into two strands: under-managed and over-managed public spaces, both of which are said to have undermined the quality of public space (Carmona, 2010a).

First, there is a growing concern that public spaces are experiencing a physical decline due to under-management. Tibbalds (2001) describes the poor state of public spaces resulting from inadequate management, which includes issues such as the accumulation of rotting rubbish, graffiti-covered surfaces, pollution, traffic congestion and the presence of homeless people at night. Carmona (2010b) argues that the lack of management in public spaces can lead to a “neglected space” and “invaded space”. The term “neglected space” is often used to describe liminal and in-between spaces that lack clear responsibility as to who should be governing and managing them after their design and creation, such as under-bridge space or unused sunken plazas. Additionally, the term “invaded space” primarily refers to the appropriation of pedestrian areas in streets and squares by traffic and parking facilities (Carmona, 2010b). Individuals tend to avoid lingering in such spaces, as most of the social activities that once existed or could potentially take place are no longer present.

Furthermore, pedestrians' freedom of movement within and between these spaces is restricted, as they are often cluttered with cars and equipment.

From the perspective of over-managed aspects, public space is regarded as "a valuable commercial commodity" and has "become increasingly contested and fragmented" due to competition for spatial identities (Carmona, 2010b, p.158). Carmona (2010b) argues that new forms of public spaces linked to the development of mass consumption and recreation attract those in society who can afford to consume by offering a range of amenities and facilities. Mitchell (1995) argues that, as public spaces become over-managed, the increasing commercialisation, privatisation, homogenisation and commodification of these spaces have diminished the "publicness" of contemporary public places, resulting in social-spatial issues, such as spatial fragmentation, gentrification and social exclusion (Punter, 1990; Banerjee, 2001). These spatial issues and social tensions also raise questions about which public spaces are truly "public" and challenge the notion of "publicness" in public space (Akkar, 2005; Madanipour, 2010).

1.1.2 Locating contemporary urban waterfront open spaces in regeneration efforts: concepts and challenges

Under the influence of urban waterfront regeneration, numerous contemporary public spaces have rapidly increased in waterside cities worldwide. Such public spaces on the urban waterfront serve as gateways, reflect a city's urban image, reshape

everyday life and enable people to actively engage with water (Liu et al., 2021). Furthermore, they also act as new battlegrounds of growing tension between public and private interest. Compared to other public spaces, the distinctive character of these urban waterfront spaces lies in their role as unique public places where land meets water, often featuring the highest land values and serving as major hubs of daily activities (Stevens, 2021; Fageir and Poter, 2021). In other words, unlike other public spaces, their uniqueness stems from the blend of two contrasting landscapes, including the urban cityscape and the water landscape. In much of the literature, urban waterfronts have become synonymous with urban waterfront open spaces, and this is why it is necessary to first conceptualise the urban waterfronts.

The concept of the urban waterfront

Urban waterfronts can be understood from various perspectives, including the geographic and the built environment. First, in terms of their categorisation, urban waterfronts are commonly described as parts of a city or town situated adjacent to bays, lakes, rivers, ports, canals or artificial waterbodies (Breen and Rigby, 1996). While many definitions focus on categorising the types of waterbodies, a more comprehensive definition describes the urban waterfront as a unique boundary within urban regions, simultaneously integrated into the city and directly connected to a significant waterbody (Bruttomesso, 1993; Avni & Teschner, 2019).

Dovey (2005, p.24) conceptualises the urban waterfront through the spatial dialectic between land and water, defining it as “a boundary, an edge condition between the stable striations of the city and the smooth flows of the water”, which shapes urban image and identity. He also observes that urban waterfronts often mediate a range of dialectical oppositions, such as “order and chaos, being and becoming, place and space, culture and nature, closed and open, striated and smooth, as well as solid and void”. These mediations significantly enhance the diversity of user experiences in urban waterfronts and form a confluence of flows, such as “water, geology, histories, events, memories, colonies, industries and designs” (Dovey, 2005, p.2). This confluence, in turn, creates flexibility between public and private interests, architecture and planning, culture and consumption, and design and politics. Building on Dovey’s framework, Desfor et al. (2010, p.5) describe the urban waterfront as a dynamic interface “where land and water meet”. They identify a range of “fixities”, such as “built environments, institutional and regulatory structures, and cultural practices”, alongside “fluid elements”, including “processes of capital accumulation, information, labour, financial capital, energy, and knowledge”, to analyse the dynamic relationships driving change. Malone (2013) offers another definition of urban waterfronts: multifunctional spaces that encompass social, cultural, political, and economic significance and are an integral part of urban life. He further proposed the term “waterfront phenomenon”, emphasising the importance of establishing the relationship between cities and water via the creation of “visual connections, leisure activities, amenity enhancements, and

improved public access to waterfront areas" (Malone, 2013, p.3). Carta (2016) points out that urban waterfronts are among the densest and most hybrid locations within cities, serving as key sites for the development of creative urban environments. These areas translate the resources, opportunities, aspirations and ambitions of cities into a new urban metabolism, generating innovative architectural forms and urban landscapes, thereby making them more competitive and dynamic. Üzümcüoğlu and Polay (2022, p.3) state that urban waterfronts "are generally arranged in a belt" along the water's edge, where planners aim to "make these areas more attractive to the public by using water to create a sense of calm and pleasant so that people will use public space on the water 's edge".

Overall, urban waterfronts represent a range of complex spatial typologies at the intersection of land and water within the city. They have become a new frontier for mediating between local and global forces, as well as a battleground for negotiating public and private interests among various stakeholders (Dovey, 2013; Fageir et al., 2015). In this sense, public expectations concern how urban waterfront open spaces should be revitalised in terms of social welfare, economic costs, creativity, and environmental sustainability (Holden et al., 2015).

Urban waterfront open spaces and their challenges

By conceptualising urban waterfronts, it is acknowledged that urban waterfront open spaces represent one of the most complex and distinctive forms of public space,

encompassing the relationship between water bodies and streets, squares, parks and the public realm of cultural landmarks and public infrastructure. Zhang et al. (2002) define urban waterfront open spaces as a specific typology of public space adjacent to the water's edge, extending 500–1000 metres inland, within approximately a 5-to-15-minute walking distance. Similarly, Fu (2020) points out that urban waterfront open spaces consist of open areas extending along the waterways, with their boundaries typically extending from the water's edge to the first street block within the urban hinterland. Such spaces act as dynamic interfaces and new frontiers between water and land within urban waterfronts, where elements of "flows" and "fixities" are integrated to create everyday life patterns and bring about significant social, economic and environmental benefits.

The new contemporary spaces generated by urban waterfront regeneration policies have in recent decades become a primary scene and an urban lab for sustainability transitions in architecture, urban design, planning and urban governance (Den Hartog, 2021). This development has been driven by key factors (Hoyle, 2000; Porfyriou and Sepe, 2016): 1) the decline of industrial activities in urban centres; 2) advances in transportation and information technologies; 3) increasing demand for leisure time; 4) the rise of cultural consumerism; and 5) the influence of neoliberal politics and deregulation. These new public spaces on the urban waterfront serve as sites for

place-making and spatial practices, contributing to the reshaping of urban image and local identity in the process of urban restructuring and regeneration.

In addition, they are characterised by the physical juxtaposition of functions, such as socialising, leisure, tourism, physical exercise, work and commuting. For instance, an increasing number of office buildings and central business districts (CBDs) have been developed along urban waterfronts, including Melbourne's Southbank CBD in Australia; the Lujiazui Financial and Trade Zone in Shanghai, China; and Canary Wharf in London, UK. Moreover, many cultural landmarks have been created in these areas, ranging from "populist" venues, such as casinos, aquariums and movie theatres, to "elitist" establishments, including concert halls, public art installations and museums, particularly in the newly developed areas (Stevens, 2020, p. 17). Since the 2000s, influenced by the development of the creative city concept and heritage conservation approaches, heritage culture-led urban waterfront regeneration has become a widespread trend in the creation of high-quality public spaces along waterways, including natural harbours, riverfront areas and artificial heritage canal districts worldwide (Florida, 2002; Evans, 2005; Porfyriou and Sepe, 2016; Buckman, 2016; El Faouri and Sibley, 2022).

However, most existing literature on urban waterfront open spaces primarily concentrates on natural harbours and riverfront regeneration from a project-oriented perspective, with limited attention given to the perceived quality of public spaces in

both heritage canal districts and newly developed zones, particularly as experienced by end-users in the Chinese context. Although an increasing number of scholars have begun to focus on users' perceptions of public spaces, such as commercial streets and green parks, these studies often lack a quantified and systematic assessment of urban waterfront open spaces, based on a comprehensive research framework, that can directly explain the drivers behind users' decisions.

In China, Hangzhou, an ancient city with over 2,000 years of history, retains traditional spatial forms of waterfront open spaces and canal-related heritage resources along the Beijing–Hangzhou Grand Canal in its old city centres. At the same time, the city has embraced the "Qiantang Era", developing world-class contemporary waterfront open spaces in newly developed zones that are culture-led and driven by sporting mega-events. These places serve as hubs for tourism, leisure, daily life and as key venues for the 2022 Asian Games in Qiantang Newtown (Cao et al., 2023; Liu et al., 2023). In this context, Hangzhou has pursued polycentric spatial development as a "multi-nuclei city", with the aim of creating urban waterfront open spaces for the people and by the people (Hua and Wei, 2012, p. 402; Zhang et al., 2022). Therefore, in-depth comparative studies of waterfront open spaces in the historic canal-based inner city and the newly developed districts, from users' perspectives, are essential to inform future approaches to urban waterfront placemaking.

1.2 Research Gap

The research gap is threefold. Firstly, the quality of urban waterfront open spaces lacks an integrated assessment framework. Currently, most public space quality assessment frameworks lack the specificity to refine sub-indicators and related variables based on the socio-spatial characteristics of urban waterfront open spaces. Therefore, this study contributes to the development of a quality-based research framework that integrates placemaking theories, the concept of everyday heritage, key models of “publicness” and public space quality, and sustainable urban waterfront design principles. The proposed analytical framework is structured across three hierarchical levels, incorporating six key dimensions, 21 sub-factors and a total of 110 measurable variables.

Secondly, this research compares the differences between the public realms of heritage canal districts and newly developed waterfront zones in Hangzhou, China. While most existing literature on urban waterfront open spaces focuses on port cities or riverfront areas, limited attention has been given to public spaces along the Beijing-Hangzhou Grand Canal, which have been shaped by culture- and heritage-led regeneration. Thus, this research has the potential to help balance the conflict between heritage conservation and modernisation in the context of urban waterfront regeneration.

Thirdly, this study attempts to interpret users’ perceptions and attitudes towards urban

waterfront open spaces within the context of the place-making process. Drawing on the theory of the place-shaping continuum, it argues that four key stages in the waterfront development project timeline, design, development, space in use and management, should be integrated into the analysis of users' perceptions and attitudes. These insights can inform designers and urban planners in making policy decisions that reflect users' needs and public values from the perspectives of diverse stakeholders.

1.3 Research Questions

Main research question:

How do users' perceptions and attitudes influence the improvement of urban waterfront open space quality generated through cultural-heritage-led regeneration in both heritage canal districts and newly developed zones?

To address this main question, the thesis investigates the following sub-questions:

Sub-questions:

1) In what ways can urban waterfront regeneration be conceptualised within a framework that incorporates the role of cultural and heritage resources?

2) How does cultural-heritage-led urban waterfront regeneration shape different types of waterfront open space in heritage canal districts and newly developed zones, within the Chines context?

3) What are the key factors affecting urban waterfront open space quality, based on a review of the literature?

4) How do people perceive the differences in the quality of urban waterfront open spaces, as between heritage canal districts and newly developed zones?

5) How can users' perceptions inform the development of design principles, spatial use and management in future urban waterfront regeneration?

1.4 Research Aims and Objectives

The primary aim of this research is to enhance the quality of urban waterfront open spaces by comparing and evaluating the preferences and perceptions of end-users in heritage canal districts (artificial waterfronts) and newly developed areas (natural waterfronts), within the context of cultural-heritage-led regeneration. The resulting recommendations contribute to the global discourse on improving the quality of contemporary urban waterfront open spaces and redefining integrated strategies for urban waterfront regeneration. To achieve this aim, this study intends to accomplish the following objectives:

1) To conduct a comprehensive review of the literature on urban waterfront development and regeneration, with a particular focus on the human–water relationship; the interaction between people and place; the definitions of urban waterfronts and their regeneration; and recent global practices and experiences in urban waterfront regeneration.

2) To investigate the role of cultural and urban heritage resources in shaping different types of urban waterfront open space in heritage canal districts and newly developed areas within the Chinese context.
3) To theorise the quality of urban waterfront open spaces by developing an initial research framework grounded in the place-making approach, key public space quality and "publicness" assessment models and sustainable urban waterfront design principles.
4) To compare and interpret users' perceptions and preferences regarding urban waterfront open spaces in heritage canal districts (artificial waterfronts) and newly built areas (natural waterfronts), based on the established research framework.
5) To enhance the overall quality of urban waterfront spaces by proposing design principles, spatial use, and development objective based on users' everyday experiences.

1.5 Structure and Organisation of Thesis

This thesis comprises eight chapters, with Chapter 1 serving as the Introduction: it outlines the research background, definition of problems, research gap and questions, and identifies the aims and objective. The chapter also provides an overview of the overall structure of the thesis.

Chapter 2 provides an overview of urban waterfront development and its regeneration globally. The first part examines the philosophical relationship between humans and

water, offering a deeper understanding of the interaction between water and cities (place). The definitions of urban waterfronts and urban waterfront regeneration are then conceptualised. This chapter also identifies the key characteristics of their evolution on a global scale, illustrating successful waterfront regeneration projects at each stage since the 1960s. Finally, it discusses the contributions of culture and heritage to urban waterfront regeneration, introducing key concepts, such as the creative city; the three models of cultural regeneration; the Historic Urban Landscape (HUL) approach; and the concept of everyday heritage.

Chapter 3 focuses on the role of culture- and heritage-led regeneration in shaping two types of urban waterfront open space: those in heritage canal districts and those in newly developed areas, within the Chinese context. It also examines the socio-spatial characteristics of the water–street prototype as a traditional form of urban waterfront open space along the Beijing–Hangzhou Grand Canal, followed by an analysis of the development of contemporary urban waterfront spaces along natural waterways in China as a whole.

Chapter 4 re-theorises the quality of urban waterfront open spaces by developing an initial research framework rooted in the placemaking approach; in public space/urban waterfront open space quality and key “publicness” assessment models. Grounded in the prior discussion, the chapter proposes an initial research framework for assessing the quality of urban waterfront open spaces, based on users’ perceptions.

Chapter 5 outlines the research methodology designed to address the previously identified research aims and objectives. It begins by introducing the importance of Mixed Methods Research (MMR), followed by an explanation of the rationale for adopting a concurrent triangulation design. The chapter then explores how this design operates by integrating qualitative and quantitative methods within case studies; and it explains the rationale behind the selection of case study sites. Subsequently, the chapter details the processes of data collection and analysis, based on questionnaire surveys, semi-structured interviews and direct observations by the author. Finally, it discusses sample size considerations, ethical issues and research limitations.

Chapter 6 presents the site analysis of QHCD and SBQR, based on node-based field observations and mapping methods, to establish a urban context for interpreting perception findings in later chapters. It documents each area's urban growth development, spatial sequences, functional organisation and activity patterns through non-participant field observations across selected nodes (A–C in QHCD; D–E in SBQR). By combining spatial configuration with behavioural evidence (activity types, duration and intensity), Chapter 6 outline an empirical fundamental for interpreting users' perception data in Chapters 7 and 8 and for supporting the cross-case synthesis in Chapter 9.

Chapter 7 presents a quantified analysis of 1,540 questionnaire responses collected from two case study areas. The online questionnaire evaluates and ranks users'

perceptions of a range of variables related to urban waterfront open space quality in the two study sites, based on importance and satisfaction levels. The Importance–Performance Analysis (IPA) method is subsequently applied to identify user-perceived priorities, thereby informing future policy and design interventions.

Chapter 8 presents the results of the qualitative analysis derived from semi-structured interview. The first section highlights the similarities and differences in users' perceptions and attitudes towards urban waterfront open spaces, across different stakeholder groups, such as local residents, tourists, designers and management staffs in the two case study areas.

Chapter 9 begins by identifying the differences and similarities between the main findings presented in questionnaire survey results and semi-structured interviews in both heritage canal districts and newly developed areas, followed by an analysis of the reasons behind these findings. Secondly, an overall matrix is reconstructed based on the research framework, considering design, development and management objective, and space in use in both the Heritage Canal district and newly developed areas of Hangzhou, China. Finally, the chapter summarises and concludes the research by revisiting the main research question and sub-questions, highlighting key findings and their significance, acknowledging limitations and proposing directions for future research. Please see below for a visual representation of the research structure (Figure 1-1).

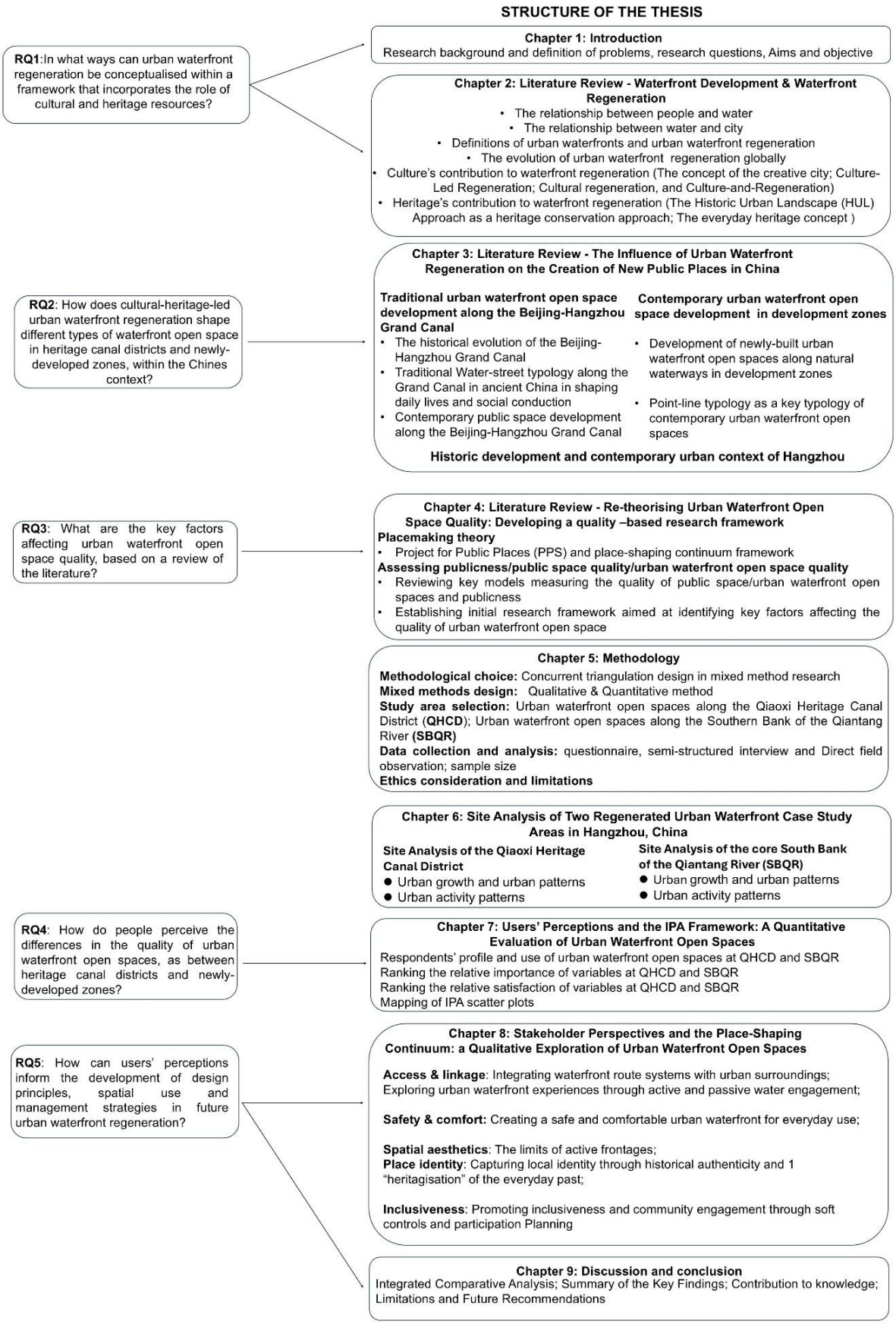


Figure 1-1 Structure of this thesis. (Source: author)

CHAPTER 2- URBAN WATERFRONT DEVELOPMENT & URBAN WATERFRONT REGENERATION

2.1 Introduction

Since the 21st century, urban waterfront areas have undergone large-scale transformation, creating new public places in development zones while also revitalising older inner-city areas, often driven by cultural and urban heritage resources. Given the lack of systematic literature review on the role of cultural and heritage resources and the associated strategies in urban waterfront regeneration globally, this chapter develops a theoretical framework for understanding urban waterfront development and regeneration, with particular attention to the integration of cultural a heritage resources into urban renewal. The first introduces the relationship between people and water, as well as that between water and cities from the philosophical and urban design perspectives. The second part defines the urban waterfront and discusses the different phases of its regeneration globally, followed by an analysis of successful urban waterfront paradigms at each stage. The third part explores the contribution of culture and heritage to urban waterfront regeneration within the key concepts and theoretical frameworks recently. In doing so, it establishes the conceptual foundation for the central argument that culture- and heritage-led urban waterfront regeneration should be operate together as a socio-spatial process that reshapes public space quality.

2.2 Urban Waterfront Development

2.2.1 The relationship between people and water

> "*Without water, we could not live for more than a few days; with it, we can survive, create civilisations, play with it, and make works of art to express the joy of living.*"
>
> (Jellicoe & Jellicoe, 1971, p.14)

Humans' fascination with water has always been present in Western and Eastern philosophy, as well as architectural and urban design theories. In Western philosophical tradition, water is closely associated with life, youth, play, mystery, danger, cleansing and regeneration (Dovey, 2005). One of the earliest Greek philosophers, the Presocratic thinker Thales, claimed that "water is, in some sense, the source of all things" (Macauley, 2010, p.43). He observes that water seems to be nature itself and inhabits all living things. The fluidity of water serves as a source of life, healing, and as a fountain of youth and identity. Dovey (2005) points out that water is closely related to a spiritual dimension and tends to symbolise the dissolution of identity and the process of regeneration. Inspired by psychoanalytic theory, he states "water is symbolic of the unconscious and the unformed potentiality of the human spirit" (Dovey, 2005, p.24). Such unconscious influences evoke positive moods and create a pleasant atmosphere that appeals to people's emotions.

However, the symbolism of water also represents a danger and a darker side of mystery within Western mythology. For example, water has historically been associated with masculine symbols of chaos and danger, exemplified by the untamed god Poseidon and the many-headed Hydra. These implications suggest that water poses a range of threats to humanity, including flood risks, erosion, tsunamis and water pollution (Wheater and Evans, 2009).

In Eastern philosophy, Hindu traditions attribute complex spiritual and metaphysical meanings to water because of its purifying and life-giving qualities (Samant, 2004). This helps explain why temples are often situated near flowing water bodies, which support daily rituals, mindfulness practices, and the pursuit of spiritual peace. Similarly, water is a metaphor and an image in Taoism. According to *Tao Te Ching*, the properties of water are similar to the characteristics of the Tao in terms of fluidity, movement, rhythm and flow (Macauley, 2010). Water is generally colourless, tasteless and odourless. While it lacks a definite shape, it can shape the real, such as a landscape, or illusory, such as a water mist (Wang, 2019). Lao Tzu, who was a philosopher from China's Spring and Autumn Period (770–476 BCE), states:

> *"The supreme good is like that of water. The goodness of water is that it benefits the ten thousand creatures and nourishes all things without trying to, yet it does not scramble but is content with the places that all men disdain. This that makes water so near to the Tao"* (cited in Wang, 2019, p.754).

Regarding architectural and urban design theories, living by water has been regarded as an ideal lifestyle, reflecting humanity's deep connection to nature. Although nomadic, the first prehistoric hunters and gatherers settled around lakes, rivers or coastlines to safeguard drinking, fishing and washing (Hein, 2019). Over time, people realised that water has the potential to change the way we live. For example, on the island of Crete, the Minoan civilisation (ca. 3200 –1100 BCE), the first European civilisation of the Aegean world, invented small water cisterns with a coarse sandy filter to collect and store rainwater (Angelakis and Spyridakis, 2010; Haut et al., 2015). In southern France, people established a large-scale hydraulic engineering project, the Pont du Gard, as a classical Roman aqueduct to transport water in the first century AD to use water for daily life (Deming, 2019). Furthermore, in ancient agricultural societies, people sought to alter the flow of water to increase productivity. Using water for farming has shaped endless artificial patterns in the landscape of the earth, such as water meadows, polders and irrigation zones (Haut et al., 2015). Historically, water has served both urban defence and everyday functions. In ancient China, moats were constructed as part of urban fortification systems to enhance defence (Cao et al., 2023). Furthermore, water-related architectural structures, such as stepwells and riverfront ghats In India, can be viewed as key venues for sacred rituals and day-to-day functions, such as fertility ceremonies, weddings, gathering and strolling (Samant, 2004).

In the context of contemporary urban design and planning, Timur (2013) highlights the influence of water on people’s perception. Firstly, the sound of water symbolises the continuity of life within a place. While stagnant water can evoke a feeling of serenity, moving water brings vibrancy and dynamism for users. Secondly, physically touching water is used in rituals and religious festivals in many belief systems (Caroli and Soriani, 2017). These rituals, such as physical bathing in sacred rivers for spiritual good and to purify one's body, are common in Asia, emphasising the significance of water's spiritual character, in the built environment as elsewhere. Moreover, the effects of water’s visual landscape on relaxation can play a vital role in attracting people to urban waterfronts. Such ripples, eddies, and whirlpools can create a place of escape from “everydayness”, relaxation and leisure on the urban waterfront (Stevens, 2020).

Consequently, water serves multiple functional roles as a fundamental element: it is an essential life-sustaining resource, a critical means of transportation, a component of defence and agricultural development, an important catalyst in the emergence of many civilisations, and, paradoxically, potentially a life-threatening force. Water is highly appealing as an important aspect of daily life. Furthermore, water is related to key aspects of social relations, including exchange, power, circulation and knowledge, and it inspires a deeper understanding of its role in human social lives (Krause and Strang, 2016).

2.2.2 The relationship between water and cities

Water shapes unique urban forms and water-related activities (Alsavada and Karimi, 2023). The relationship between the city and its adjacent water bodies has always been dynamic, with the use of water evolving in response to new demands. Over time, this continual adaptation to changing social, environmental and economic conditions has resulted in an ongoing waterfront development process. Wrenn, Casazza and Smart (1983) point out that the historical evolution of waterfront development includes four periods: emergence of waterfront cities; growth of waterfronts; deterioration of waterfronts; and rediscovery of waterfronts. Based on this concept, Hoyle (1989) further proposed a historical-analytical model to identify five phases of urban waterfront development in Europe and North America, as follows:

a) First phase: primitive urban waterfront establishment

Urban waterfronts have historically been closely linked with water in the early urban settlements of many cities. This is because water served as a fundamental resource to support human survival and meet physiological needs, such as drinking, washing, shelter, and food (Maslow, 1970). Furthermore, the original urban settlements employed water for fortification due to increasing safety and security needs. After that, according to Hoyle (1989), the first period of water-city development was the primitive urban waterfront, from the medieval period to the 19th century, characterised by advances in sailing technology, global expansion and trade in goods. Especially during

the Middle Ages, the primitive city-water relationship was established in the context of acquiring more resources and goods to meet the needs for improving the living environment. In this sense, European colonial expansion facilitated worldwide trading routes, linking mainly urban waterfront areas (Smith and Ferrari, 2012). Water transport routes facilitated the movement of production and people between two or more urban waterfronts. Some buildings, street patterns and large wooden piers usually appeared during this time (Timur, 2013). These settlements' locations were selected around a port area suitable for cargo and passenger ships. Although some scholars show scepticism about what they see as an overemphasis on the advantages of long-distance trade, it laid the foundation for expanding waterborne activities and forming pre-industrial stages (Pomeranz, 2000). Particularly from the 1800s to the mid-19th century, large urban waterfront areas became key hubs for expanding trade in international goods. The movement of goods and raw materials from colonies to imperial countries facilitated industrial growth and economic development (Schubert, 2008). Urban waterfronts also became more integral to the city's structure, incorporating residential areas and zones for handling of goods, storage, offices and commercial functions (Pinder et al., 1988). During this period, accessibility to water is essential in developing trade activity and transportation.

b) Second phase: urban waterfront expansion

The second phase of water-city development, from the 19th century to the early 20th century, was driven by the Industrial Revolution and the expansion of world trade (Smith and Ferrari, 2012). This phase was characterised by technical innovations such as steamships, railways and the optimisation of sailing vessels. These advances resulted in the creation of larger iron ships, expanded docks, the installation of modern transhipment technologies (such as cranes), the deepening of shipping lanes and the construction of railways near city centres to accommodate the growing demands of international trade (Kokot et al., 2008; Schubert, 2011). Furthermore, urban waterfront transformation was shifted in status from being primarily a trade hub to a transport centre. As a result, the intermediate zones between cities and waterfronts required more space to accommodate rapid expansion. Warehouses and storehouses on the water's edge replaced earlier sheds. At the same time, offices moved from the urban waterfront to the city centre, where banks, insurance firms and shipping companies gradually developed. Consequently, the close integration of the urban waterfront with work and residential areas diminished. However, the flow of people, the vibrant life near the docks and the diverse types of work around them fostered a distinct “dockworkers' culture”, thereby increasing a sense of community identity (Schubert, 2011, p.56). During this period, although waterfront areas had been gradually disconnected with daily life, the underlying human need for a sense of belonging had increasingly surfaced.

c) Third phase: modern industrial urban waterfront

The third phase of water-city development can be viewed as the emergence of modern industrial urban waterfront cities from the early- to the mid-20th century. This period saw rapid advances in maritime technologies, including electric full-gantry cranes, welding techniques, the creation of larger vessels and containerisation (Kokot et al., 2008). Many ports around the world were moved to places with deeper water to allow access to larger vessels and containers, which led to the decay of urban waterfront lands from the 1960s (Pinder et al., 1988). At the same time, shipyard construction and the internal combustion engine virtually eliminated waterborne commercial activities by the 1950s, resulting in other businesses and commercial spaces relocating to other areas (White, 1993). The connection between urban waterfront and daily waterfront activities had further diminished.

Additionally, the railway and elevated highways were introduced as new modes of transportation to decrease congestion on the urban waterfront. However, the construction of railways, highways and warehouses created a physical obstacle that reduced opportunities for direct interaction with the water and public access. Consequently, such technological innovations led to spatial separation between the city centre and the urban waterfront and posed significant ecological risks in many coastal cities.

d) Fourth phase: retreat from the industrial urban waterfront (decline of the industrial urban waterfront)

After World War II, the fourth phase was primarily characterised by the retreat from the industrial urban waterfront areas near city centres between the 1960s and 1980s (Schubert, 2017). Marshall (2004) noted that shifts in industrial activity and trading patterns, combined with the emergence of new and complex economic restructuring and market changes, led to the relocation of industrial urban waterfront areas to smaller, deeper sites that no longer required a connection to the city centre. Moreover, new changes in transport infrastructure accelerated the process of deindustrialisation and the transformation of industrial urban waterfront areas. On the one hand, adopting containerisation in urban waterfront cities had made large-scale railway transport obsolete, leading to its abandonment. On the other hand, while the construction of highways along the waterfront weakened the connection between city centres and urban waterfronts, these new transport infrastructures allowed industries to operate with fewer employees in more compact urban waterfront areas, thus releasing inner-urban waterfronts for alternative uses.

e) Fifth phase: redevelopment of urban waterfront

The fifth phase focused on the redevelopment of disused inner urban waterfronts related to abandoned industrial land, beginning in the early 1980s. During this stage, revitalising urban waterfronts and reintegrating them into the urban fabric, both physically and functionally, became primary priorities. Between the 1980s and 1990s,

the redevelopment of these waterfronts aimed to generate economic benefits and enhance international market competitiveness (Smith and Ferrari, 2012). Quasi-public redevelopment agencies with significant planning authority converted centrally-located waterfront brownfield sites into hubs of commerce and luxury residential areas (Taşan-Kok, 2010). Urban waterfronts close to central commercial and cultural districts attracted considerable interest from developers, making the waterfront a valuable resource for urban regeneration. Furthermore, due to the increasing demand for urban competition and cultural branding development, there was a significant rise in the construction of cultural mega-projects, often driven by mega-events such as the Olympic Games, World Expositions and cultural or artistic activities (Tommarchi, 2022). Cultural and sports events have transformed urban waterfronts from production areas into lively centres of consumption, reshaping the city's image and giving these spaces a new identity away from their industrial past globally. For example, driven by mega-event-led waterfront regeneration associated with Lisbon’s 1998 World Exposition, approximately 350 hectares of former industrial riverfront were reconfigured into a new multifunctional district, distinguished by the creation of iconic public spaces that helped shape a renewed urban identity and new typologies (Medeiros et al., 2021). Similar mega-event-led regeneration can also be observed in Chinese cities such as Shanghai and Hangzhou, where the 2010 World Exposition and the 2022 Asian Games, respectively, are viewed as catalysts for the design of public places as new urban landmarks. Thus, urban waterfront development has evolved through several

stages (Figure 2-1), driven by technological advancements, economic growth and societal needs.

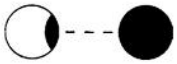
Stage	Symbol ○ city ● port	Period	Characteristics
(I) Primitive cityport		Ancient–medieval to 19th century	Close spatial and functional association between city and port
(II) Expanding cityport		19th–early 20th century	Rapid commercial and industrial growth forces port to develop beyond city confines, with linear quays and break–bulk industries
(III) Modern industrial cityport		mid-20th century	Industrial growth (especially oil refining) and introduction of containers and ro-ro facilities require separation and increased space
(IV) Retreat from tthe waterfront		1960–1980s	Changes in maritime technology induce growth of separate maritime industrial development areas
(V) Redevelopment of the waterfront		1970–1990s	Large-scale modern port consumes large areas of land- and water-space; urban renewal of original core

Figure 2-1 Phases of urban waterfront development based on Hoyle (1988). (Source: Dirk Schubert, 2011)

From the primitive waterfront stage to the phases of industrialisation, deindustrialisation and redevelopment, the functions and form of urban waterfronts have undergone continuous transformation. From a morphological perspective, urban waterfront development has stimulated growth within the city centre and contributed to urban expansion in newly built waterfront areas. These changing spatial and functional demands have given rise to a new wave of waterfront development in the post-industrial era, focused on achieving socio-economic growth. As Sairinen and Kumpulainen (2006) identify four social impacts of urban waterfront regeneration, including: (1) resources and identity; (2) social status; (3) access and activities; and (4) waterfront experience. These social impacts shape the new and different ways of

waterfront experiencing. Consequently, urban waterfront regeneration has been one of the most interesting phenomena in urban transformation during recent decades, bringing “cities on water” worldwide to a new level of prominence (Giovinazzi and Moretti, 2010, p.57).

2.3 Urban Waterfront Regeneration: A Worldwide Phenomenon

2.3.1 The concept of urban waterfront regeneration

Urban waterfront regeneration, as an integral part of the broader urban regeneration process, has been a key academic concern in the fields of urban design and urban planning in recent years. (Breen and Rigby, 1996; Marshall, 2004; Dovey, 2005; Desfor et al., 2010). Such regeneration phenomena started in the 1960s, during which decade many former waterfront areas no longer served the functions of logistics production and international trade due to deindustrialisation, globalisation of trade and manufacturing developments. Urban waterfront areas were regarded as “underutilised parcels, separated from the physical, social and economic activity of the rest of the city” (Marshall, 2004, p.17).

During the 1970s, economic restructuring and changing transportation technologies offered more regeneration opportunities for decayed urban waterfront areas, particularly in North America (Jones, 2017). Such post-industrial urban waterfront areas were being transformed into festival marketplaces and urban waterfront leisure

areas that “support commercial, recreational, mixed-use office and associated retail services”, such as those in Baltimore, Boston, and San Francisco (Hartig and Wallace, 2015, p.6). Such dramatic transformation of urban waterfront areas, from centres of production to centres of consumption, has been driven by key factors (McGuigan, 2005; Porfyriou and Sepe, 2016): 1) the decline of industrial activities in urban centres; 2) advancements in transportation and information technologies; 3) increasing demand for leisure time; 4) the rise of cultural consumerism, 5) and the influence of neoliberal politics and deregulation. In this context, this process of urban waterfront regeneration gradually became a global phenomenon, originating in North America in the 1970s before spreading to the UK, Australia, Hong Kong, China and other countries (Attia and Ibrahim, 2018).

In North America, the initial stage of waterfront regeneration is often viewed as an integral part of the broader urban regeneration process, which is characterised by the creation of festival markets and leisure activities and a luxury accessible to a small elite (Jones, 1998). In contrast, the motivation for waterfront regeneration in Europe has been shaped by advances in maritime technology and transportation. In other words, the need to accommodate larger ships and to develop an extensive interface between land and water promoted their maritime technology. For developing countries in Asia, such as Malaysia and Singapore, the objectives of waterfront redevelopment can be summarised as follows (Stevens, 2020):

- Asserting a new local identity and creating a new city image that moves away from the colonial past.
- Enhancing environmental remediation in formerly industrial waterfront areas. While environmental concerns were not the primary motivation, these efforts aimed to sustain the economic vitality of their cities.
- Prioritising the interests of newly dominant local elites rather than addressing the needs of existing waterfront residents and workers.

Additionally, scholars have used similar terms, such as urban waterfront renewal and urban waterfront regeneration, to describe the city-building process (Gordon, 1996; Shi et al., 2023). For example, Bruttomesso (2001, p.67) identifies three key types of city-building activities associated with urban waterfront regeneration since the 1960s, namely:

i) re-composition: re-joining different parts of the waterfront and giving them a common physical layout and functional integration.

ii): regeneration: re-examining and revitalising urban zones often located a short distance from the city centre.

iii) recovery: restructuring and restoring historic buildings and their urban fabric.

Similarly, Roberts et al. (2016) identify the evolution of regeneration from 1950s to 2000s, including:

a): reconstruction (1950s): reconstruction and expansion of city centre areas are often based on a masterplan and suburban growth.

b): revitalisation (1960s): continuation of the 1950s theme, focusing on suburban and peripheral growth, as well as some early efforts at rehabilitation.

c): renewal (1970s): emphasis on *in situ* renewal and neighbourhood schemes, while still developing at the periphery.

d): redevelopment (1980s): many major schemes of development and redevelopment projects, such as flagship projects and out of town projects.

e): regeneration (1990s): a more comprehensive and integrated vision and action that tends to resolve urban issues and bring about a lasting improvement in the social, environmental, and economic condition of an urban waterfront area.

Nowadays, the contemporary urban waterfront regeneration project can represent an integrated urban policy seeking to reduce social exclusion, enhance economic reintegration, improve urban physical quality and reshape the character of a place (Desfor and Jørgensen, 2004). Urban waterfront regeneration has become a symbol of a new city image and a shift to new forms of urban governance that highlight the people's perception and attitudes towards urban waterfront open space quality by

developing public-private partnerships and public participation (Bassett et al., 2002a; Papatheochari and Coccossis, 2019).

2.3.2 The evolution of urban waterfront regeneration globally

The continuing evolution of urban waterfront regeneration has shaped a successive generation of models, which have accrued a wealth of global social-spatial practice experiences (Smith and Ferrari, 2012). This paradigm shift has the ability to establish an excellent and high-quality public realm of urban waterfront regeneration vision, thereby providing a lesson for exploring a new integrated paradigm of the regeneration model. Indeed, many scholars have identified four paradigms of waterfront regeneration (Jones, 1998; Smith & Ferrari, 2012; Fageir et al., 2021).

The **first wave of waterfront generation** originated in North America in the 1960s, which can be attributed to the following factors: 1) US Federal Government support; 2) the growing amount of leisure time available; 3) the need to preserve historical and architectural heritage; and 4) growing environmental and social concerns (Jones, 1998, p.435). Such regeneration of urban waterfront in the US was characterised by the creation of retail and festival marketplaces based on leisure and tourism and the encouragement of private capital to support public policy, rather than excessive reliance on public spending (Burayidi, 2008). In this context, cultural consumption has replaced manufacturing production and related services in transforming urban waterfronts.

Despite the social and economic challenges that have emerged in Baltimore in recent years, the city's Inner Harbor remains one of the most successful examples of the first wave of urban waterfront regeneration. The American Institute of Architects (AIA) has regarded this waterfront regeneration project as one of the most successful cases in North America (Millspaugh, 2003). This is because it seems to offer "a panacea" for the problems of all redundant and abandoned physical and economic urban waterfront areas throughout the world during this period (Ward, 2004, p.272). In the late 1950s. the successful redevelopment of the Charles Centre encouraged the local authorities to regenerate Baltimore's Inner Harbor and urban waterfronts; and in 1967, *The Inner Harbor Project I Urban Renewal Plan* was implemented, including seven key aspects (Millspaugh, 2003; Wallace, 2004; Del Rio, 2018):

a) To provide high-quality of commercial and office buildings on the water's edge.
b) To build multi-family housing in the eastern and western areas of the inner harbour of Baltimore.
c) To form a mandatory low build-to-cornice line for buildings near the waterfront and commercial uses at street level.
d) Limited tall buildings constructed on the urban waterfront except for a few iconic towers.
e) To increase the urban waterfront open spaces that restore public access to the water, such as parks and a wide promenade.

f) To develop a mix of complementary land uses to generate social, environmental and economic benefits.

g) To establish a multi-layer circulation integrated into the state highway system, including several parking structures, subway and light rail, pedestrian promenades, water taxis and alternative forms of transport.

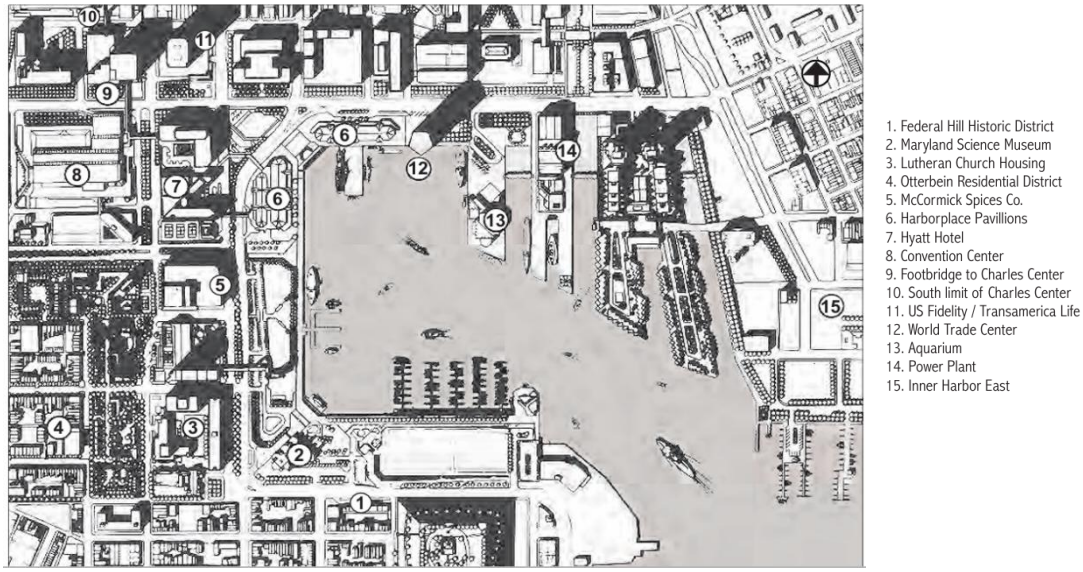


Figure 2-2 Key components of the Baltimore ‘s Inner Harbor Plan in 1980. (Source: del Rio, 2018)

Baltimore’s urban waterfront renewal plan development process includes two key phases. On the one hand, the primary key is to convince the residents and establish business community investors’ trust that Baltimore is a city worth investing and participating in and that the waterfront could provide recreation and open space, thereby promoting public events. On the other hand, the local authorities also recognised relying solely on the private sector would be insufficient to undertake such a large-scale waterfront regeneration project. Therefore, it was recognised that there

was a need to establish an unusually centralised city government approach to approve the extensive use of public funds as seed capital for private investment, while integrating community and economic development into one department. In this context, the Charles Centre Development Corporation was transformed into a quasi-public corporation[1] called Charles Centre–Inner Harbor Management, Inc. Corporation (CC-IHDC); the main task was to encourage public-private cooperation, attract private investors into the inner harbour by relieving them of the considerable startup costs, and recreate the image of a city (Marshall, 2001; del Rio, 2018). Consequently, Baltimore's Inner Harbor became an urban leisure centre on the waterfront, a mix of commercial, leisure, cultural venues and residential use (Figure 2-2). During this period, these newly developed urban waterfront areas were referred to as the new "Central Waterfront."

The Inner Harbor opened up previously private and inaccessible areas through a series of flagship projects, such as the creation of a new aquarium and the high quality of festival marketplace. Furthermore, the first wave of urban waterfront regeneration in Baltimore ensured that the urban design and architecture of the Inner Harbor respected the existing historical structures, while maintaining a strong connection to

[1] Such a quasi-public corporation operated through a special contract supervised by the city: while the corporation managed the development process, the city covered all operating costs, purchased the real estate and received the profits from all sales (del Rio, 2018).

the waterfront. The successful example of the Baltimore model was reproduced in other cities, such as New York, Miami and New Orleans. However, although there was public-private cooperation, public-sector agencies still dominated and developed most waterfront regeneration projects during this stage.

The **second wave of waterfront regeneration** started during the 1980s and was characterised by the development and expansion of the measures implemented in Baltimore, highlighting the significance of cooperation between the public and private sectors and the extensive use of private investment (Smith and Ferrari, 2012). While the second generation of urban waterfront regeneration spread worldwide, some major European cities, such as London, Barcelona and Rotterdam, were to the fore in establishing new organisational models and new public-private partnerships by stimulating private investment.

The redevelopment of London's Docklands embodies the second phase of urban waterfront regeneration models. It was founded in 1980 to address the shortcomings of the top-down, plan-led interventions from 1960 to 1970. In 1981, the London Docklands Development Corporation (LDDC) was established by the first Thatcher administration (see Figure 2-3), and its primary task was to regenerate the large former dock area located to the east of London in response to market issues (Brownill, 2010). The LDDC, as a semi-autonomous agency run by government appointees, tended to privilege the role of the private sector in the decision-making process and reject state

intervention in markets. Their responsibility included making decisions on development proposals, transfer of land from existing port authorities, and tendering for basic public infrastructure and services. Between the establishment of the LDDC in 1981 and its replacement by developers Olympia and York in 1987, two styles of planning, including “leverage” and “opportunistic” planning, were widely adopted for redevelopment of the Isle of Dogs area in London’s Docklands (Brownill, 2010, p.129). As Carmona (2009) states, leverage planning aimed to attract private development at all costs through direct investment in infrastructure, encouraging cheap land or tax breaks, and utilising public sector finance to stimulate investment in otherwise weak markets. In addition, the opportunistic planning was aimed at capturing, rather than controlling, market activity. However, Brownill (2010) argues that such an opportunistic approach to planning resulted in reverse leverage[2], exemplified by costly transport projects.

In 1987, SOM (Skidmore, Owings & Merrill LLP), as a globally renowned architectural company, proposed the master plan for Canary Wharf, encompassing 26 distinct sites, a 50-story tower by Cesar Pelli, known as Canada Square, alongside an enclosed shopping centre and Docklands Light Railway (DLR) station. Additionally, it included a series of meticulously designed open spaces that provide access to the water's edge.

[2] Increased private sector investment resulted in a growing need for public intervention.

This master plan represented a type of private-management planning and a massive private-sector investment in a marginal location to establish a new and marketable sense of place; and although Canary Wharf is a so-called successful example for the LDDC's vision for regeneration, many residents criticised it on the grounds that it failed to meet local needs and there was the failure of benefits to "trickle down" to local communities, which meant it was a great deal for property developers, but very little for the residents. Jones (1998) argues that the second wave of urban waterfront regeneration lacked local community participation and neglected issues related to social inequality and environmental concerns.

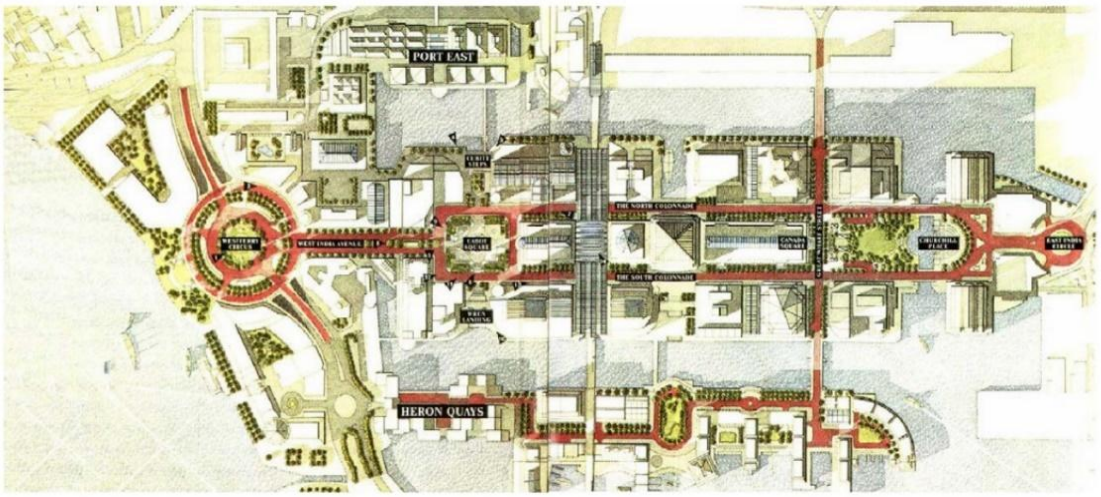


Figure 2-3 The SOM master plan for Canary Wharf. (Source: Carmona, 2009)

The **third wave of waterfront regeneration** was characterised by preserving historic assets as a symbol of community memory (Fageir et al., 2021). It was marked by some European and Asian urban waterfront cities where the elements developed in the previous two waves of generation models were accepted into the mainstream of

waterfront regeneration projects (Smith and Ferrari, 2012): the waterfronts of Vancouver, Amsterdam, Cardiff Bay, Liverpool, Sydney and Shanghai are worldwide examples of cities with a positive conservation approach that encouraged the adaptive reuse of cultural and heritage resources for new purposes. Marshall (2004) highlighted the importance of adding new functions to historic buildings along urban waterfronts, which can adapt to evolving social change without sacrificing the “essence” of a place. During this time, more historic urban waterfront areas use master plans to suggest the preferred direction and establish a framework for an overall vision. For example, Amsterdam's seventeenth-century Canal District is a remarkable example of the preservation of historical centres on the urban waterfront: a European marvel designated a UNESCO World Heritage Site in 2010, with the rest of the historic centre considered a buffer zone (Kloosterman and Pfeffer, 2020; Nijman, 2020). In order to engage with the past of Amsterdam's masterpieces of urban history, hydraulic engineering and historic buildings, the municipality also created urban design regulations learning from the past. During the latter half of the twentieth century, opposition from residents led the local government to reconsider its original large-scale regeneration schemes. Instead, it pursued a series of micro-regeneration initiatives within the Canal District (Pesoa et al., 2020). In this context, many historic buildings were restored and given new uses, such as the Waag in the Nieuwmarkt and the Grachten Museum. Furthermore, the master plan tried to establish diverse land uses with various functions, such as residential, work and amenities, as seen in Figure 2-4

(Kloosterman and Pfeffer, 2020). This mix was designed to foster a continuous 24/7 lifestyle in the Canal District's social venues and workplaces.

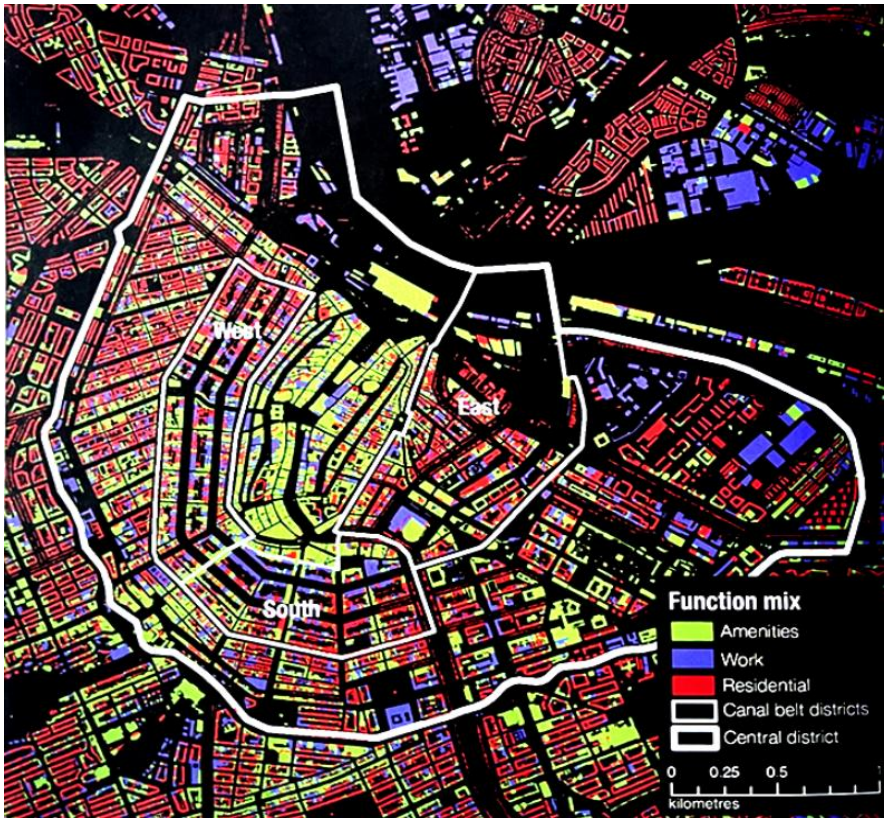


Figure 2-4 Functional mapping in the Amsterdam’s Canal District.
(Source: Kloosterman and Pfeffer, 2020)

However, the urban transformation of the Canal District in Amsterdam was driven by global forces, including the housing market, tourism development and commercial real estate, alongside the sale of public buildings to corporate investors, which collectively displaced the area from the everyday lives of its citizens (Pinkster and Boterman, 2017).

As Fouseki and Nicolau (2018, p.231) state, some conservation-driven regeneration can cause “elitism of heritage, a process by which heritage is used to raise property values and create a distinct, wealthy community while erasing poorer communities”. This issue also highlights a key shortcoming of the third generation of urban waterfront regeneration, namely how to integrate heritage resources into everyday life and establish multifaceted public participation in the decision-making process in terms of bottom-up regeneration.

Economic globalisation and global competition drove **the fourth generation of waterfront regeneration** (Fageir et al., 2021). Shaw (2001) states that Amsterdam and HafenCity (in Hamburg, Germany) have been leading the fourth wave since the 2010s and this trend continuously reflects on the adaptive reuse of historic buildings and their key components, focusing on how they contribute to improving the quality of public life and reshaping everyday life.

Although some authors have attempted to explore this fourth generation, its characteristics, such as forms of governance, competing interests and planning rationales, still require in-depth clarification and definition (Galland and Hansen, 2012). This new model of urban waterfront regeneration that integrates previous planning styles has been crucial in enabling these urban waterfront cities to achieve their regeneration goals, which include social, economic, and environmental needs. For instance, Fageir et al (2021) stated that rebuilding a city's economic attractiveness and

promoting the physical and soft infrastructure could be a new trend that helps waterfronts to attract global capital. As a consequence, the fourth generation of waterfront regeneration aims to address the challenges left by the previous three generations while establishing sustainable lifestyles and long-term urban governance based on a bottom-up approach and encouraging community engagement as its core. It considers the adaptive reuse of cultural and heritage resources not merely as a technical matter but as a socio-cultural practice, aiming to balance the relationship between heritage conservation and waterfront regeneration in ways that respond to new requirements within the broader urban fabric context. Although recent Western heritage and urban regeneration research highlights the empowerment of communities to manage heritage conservation and facilitate citizen participation, it is important to recognise that the bottom-up urban waterfront regeneration trend based on “fourth generation” is not a fixed or universal model globally. In some Asian cities in Japan, the adaptive reuse of informal built heritage driven by architectural scholars and local communities also has also become a key trend (Chen, 2022). Local government and experts should consider the complexity of public participation in the urban waterfront regeneration process due to citizens’ professional shortcomings.

In the Chinese context, contemporary waterfront transformation is still state-led but developer-delivered, often organised through public–private partnerships (PPPs). Although market actors may undertake design and implementation, final decision-

making authority commonly remains with local governments and is exercised within a state-steered governance framework. Although local governments are seeking to strengthen community engagement to enhance more flexible urban governance, such initiatives are combined within and limited by state-steered decision-making processes. This trends in China helps explain why waterfront regeneration programmes in China often display a set of recurring and similar spatial characteristics across cities. For example, guided by the national government's People-Oriented Urban Regeneration Policy 2030, many local governments, such as those in Beijing, Tianjin, Shanghai and Hangzhou, emphasise the creation of iconic public spaces as key components of a people-centred public realm, while also highlighting the integration of everyday routes and daily life into newly created public spaces. A key trend aimed at embedding urban waterfronts into everyday life is that linear ecological corridors are increasingly complemented by a series of publicly accessible Waterfront Public Service Pavilions, which provide basic amenities such as washrooms, lounges, storage lockers, and portable charging stations, particularly along the Huangpu River in Shanghai and the Qiantang River in Hangzhou (Zhu, 2023b). These pavilions, conceived as a network of "waterfront community hubs" and "shared living rooms", are distributed at intervals of roughly 800 metres to one kilometre. As key nodes along the urban waterfront, these service pavilions play a crucial role in facilitating community participation. Overall, these developments align with the "fourth generation" emphasis on developing sustainable lifestyles as a core, although in China such agendas are usually pursued

within a state-led, public space project-based governance framework in waterfront regeneration.

Table 2-1 Summary of four different generations of urban waterfront transformation since the 1960s. (Source: adapted from Fageir et al, 2021)

Items	The first generation	The second generation	The third generation	The fourth generation
Period	From 1960s to 1980s	From 1980s to 2000s	From 2000s to 2010s	From 2010s to present
Characteristics	(1) Creates retail and festival marketplaces (2) Includes a wide range of mix uses, such as residential, commercial, shopping and services (3) Establishes the public-private cooperation, although public sectors still dominated the most of urban waterfront regeneration projects during this time	(1) Establishes a new organisational model based on pubic-private cooperation to head the urban waterfront projects (2) Extensive use of private investment	(1) The elements derived from the first two generations are now integrated into mainstream regeneration projects from small to large cities (2) Recognises the value of old buildings and harbour heritage as a symbol of collective memory	(1) Driven by economic globalisation and global urban competition (2) New creative industries, cultural heritage resources and sustainable lifestyle as keywords for a new wave of urban waterfront regeneration
Paradigmatic example	Baltimore's Inner Harbor; Boston's urban waterfront, etc.	London's Docklands; Barcelona's Ciutat Vella, etc.	Amsterdam's Canal District; Albert Dock in Liverpool, etc.	HafenCity in Hamburg; Hangzhou's urban waterfront in China

2.4 The Contribution of Culture to Urban Waterfront Regeneration

Before the 1960s, the concept of “culture” was primarily associated with high or artistic culture and rarely linked to something as concrete as urban waterfront redevelopment. However, during the 1960s and 1970s, authorities began to express growing awareness that culture, as a key factor, should be integrated with the local economy and social inclusion to enhance urban competitiveness, improve the quality of public life, attract inward investment and address the trends of deindustrialisation and post-industrialisation on the urban waterfront (Liu, 2019). Although culture is closely connected to the built environment and urban life, it was not until the 1980s that it became increasingly incorporated into waterfront regeneration through the adoption of neoliberal and entrepreneurial urban policies (Harvey, 1991). During this period, European cities were more likely to use culture and associated activities as a tool for urban renewal, such as the introduction of the European Capital of Culture (ECoC) competition in 1985 (Evans, 2005). This initiative designates a different European city each year, providing a platform for stimulating the cultural economy through the organisation of various cultural events.

At the beginning of the early 20th century, the emphasis on culture as a catalyst for the shift from a production-based to a service-based economy, combined with the growing demand for cultural amenities in urban waterfront areas, gradually gave rise to the concept of the “creative city” that attracts creative classes and fits contemporary

urban lifestyles (Kostopoulou, 2013). In the meantime, it became more likely that culture-led approaches, including investment in large-scale cultural events and cultural flagships, would be adopted by European city authorities to remake the image of post-industrial urban waterfront areas. Some successful examples include Glasgow, Barcelona and Bilbao, all of which have utilised culture as a catalyst to reimagine their built environments, boost local tourism, improve the urban economy and enhance the quality of life (Evans, 2009; Nedučin and Krklješ, 2022).

In this context, the functional role of culture in urban waterfront regeneration can be defined in terms of three types, according to Bassett et al. (2002b): 1) reusing cultural resources in urban branding strategies; 2) developing creative/cultural quarters and cultural facilities to boost the urban economy; and 3) enhancing social cohesion and new urban identity by encouraging cultural activities and public art. Similarly, Pastak and Kährik (2016) point out that culture-led regeneration can have a positive effect on improving the spatial quality of public spaces by the creation of arenas for socializing and a range of urban public activities.

However, some scholars have criticised this culture-led urban waterfront regeneration, arguing that the replacement of traditional industrial activities with cultural branding, the creation of cultural flagships and the creation of post-industrial spaces for consumption may risk gentrification and the commodification of culture, thereby excluding local communities and disrupting authentic life patterns in urban waterfront

areas (Gunay and Dokmeci, 2012). Therefore, the following section will provide an in-depth analysis of the concept of the “creative city” and three models of regeneration through cultural projects.

2.4.1 The concept of the “Creative City”

The original Creative City idea emerged in the late 1980s, with its philosophy centred on the notion that “there is always more potential in any city than any of us at first sight” and on “liberating individuals’ creativity” (Landry, 2001, p.22). In other words, creativity arises not only from businesspeople, social workers, artists, public administrators and scientists, but also from “ordinary” individuals. Given the opportunity, ordinary people can achieve extraordinary things to resolve urban issues, such as improving the visual environment or addressing social problems resulting from urban transformation and city-making. This idea later influenced bottom-up waterfront regeneration policies driven by public participation. In 1990, Glasgow was designated as the European Capital of Culture, presenting an example of the city as a dynamic hub of creativity across various spheres of life, with a particular emphasis on the arts, design and media (Garcia and Cox, 2013). At the beginning of the 2000s, Landry (2001) highlights that the “Creative City” concept focuses on the potential of cultural industries to make cities unique and support economic vitality in the context of globalisation and urban competition. He also proposed the term of “creative milieu”, to describe a place that

consists of “hard and soft infrastructure”[3] to increase the quality of public life in a city (Stevens, 2015). Such places tend to generate a flow of ideas, interactions and connections between individuals and institutions, thereby creating a more congenial daily life pattern. Later, Florida (2002) introduced the notion of the “creative class”, which has been widely employed in urban policy since the beginning of the millennium. This theory suggests that cities can attract a new creative class by offering high-quality amenities and realising the new creative economy through 3Ts (technology, talent and tolerance) (Borén and Young, 2013). In this context, creative cities can be characterised by establishing creative milieux to attract individuals for living, working and tourism, thereby driving economic growth and improving the quality of public life.

Florida’s and Landry‘s thoughts on creative cities also stimulate two types of creative clusters on the urban waterfront areas: cultural industry clusters; and clusters of events (Sepe, 2014). On the one hand, the development of cultural industry clusters can be categorized into three groups, as identified by Landry (2000, cited in Kostopoulou, 2013, pp. 4585-4586):

a) Performing and visual arts and crafts (e.g. art markets, museums, theatres, operas);

[3] The soft infrastructure includes a system of social networks is denoted (e.g. organisations, business clubs, think tanks, public-private partnerships); while hard infrastructure contains a nexus of buildings (e.g.cultural facilities, research institutions, social meeting places) (Kostopoulos, 2013, p.4584).

b) Media and entertainment (e.g. music, radio/TV, publishing, film industry, multimedia);

c) Creative business services (e.g. design, communication, fashion design).

This phenomenon of industry clusters is further reflected in the growing number of new spatial agglomerations of creative industries in urban waterfront areas and cross-industry knowledge spillovers, such as media parks and science and technology parks. Significant examples include the M50 art district in Shanghai; the Raval Cultural Clusters in Barcelona; Media City in Manchester; and the HafenCity District in Hamburg. These urban waterfront regeneration projects demonstrate the broader social and cultural benefits of creative city theory, which are achieved by attracting a highly skilled workforce to former industrial urban waterfront areas.

On the other hand, hosting significant events, such as the Olympics, Expo, the Venice Biennale, the European Capital of Culture or various recreational and cultural festivals, can attract new creative clusters, generate new urban identities and create new cultural geographies associated with art, communication, cooperation and knowledge (Jones and Ponzini, 2018). Creativity is fundamentally driven by creative people, activities and organisations possessing specific characteristics. When these elements combine within a particular area, they shape a creative milieu. Sepe (2013) emphasizes that the key to achieving sustainable urban waterfront transformation lies in how creative clusters generate new economies themselves, rather than merely

attracting existing external economies to urban waterfront areas through creative clusters. Only when creative clusters possess inherent creativity can sustainable waterfront regeneration be achieved.

The creative city paradigm offers a key model for culture-led regeneration in newly built waterfront areas, but it is also associated with challenges such as gentrification and unequal social outcomes (Peck, 2005; O'Connor and Cooper, 2005; O'Connor and Xin, 2006; Evans, 2009). Thus, it is important to balance cultural production and consumption when local authorities try to attract investments in cultural and creative industries. As Comunian (2011) highlights, while cities can undertake initiatives such as building a new art museum, the relationship between such cultural venues and the local community, including local creative practitioners, should be developed through daily interactions and socialising. Peck (2005) critiques the concept of the creative city, viewing it as a short-term urban policy that lacks commitment to a long-term vision beyond the sole aim of attracting human capital.

2.4.2 Three models of regeneration through cultural project

Incorporating cultural elements into urban waterfront regeneration projects is critical to creating high-quality urban waterfront open spaces. As Gunay and Dokmeci (2012) state, culture has emerged as a significant theme in addressing the socio-spatial decline experienced by urban waterfronts, which could be achieved through the adaptive reuse of abandoned factories and warehouses into cultural infrastructure

(museums, theatre, heritage parks, etc.); the rehabilitation of cultural quarters in the neighbourhood community scale (e.g. Hong Kong West Kowloon Cultural District; Suzhou Creek M50 in Shanghai; London South Bank; Museums Quartier in Vienna, etc.), and the development of cultural events (e.g. European Capital of Culture events, annual festivals, etc.). Evans (2005) identifies three models of regeneration through cultural projects according to cultural activity over this period: the culture and regeneration model; culture-led regeneration; and cultural regeneration. Among these approaches, culture-led regeneration has the most sustainable impact, followed by cultural regeneration, with the culture and regeneration model having the least sustainable effect.

Culture and regeneration

In the culture and regeneration model, culture has a specific role in regeneration but is not fully integrated into the master planning or urban policy stages. This is because cultural and regeneration projects often belong to different sectors. Within this model, cultural activity is treated as an additional element, rather than as an integral part of the overall scheme. Furthermore, Evans (2005) highlights that the failure of this model of regeneration can be attributed to its development without consideration of the needs of local cultural/artist groups, heritage associations and local communities. In other words, it neglects the importance of decision-making processes and public participation at this stage.

Cultural regeneration

In the model of cultural regeneration, cultural activities are integrated with a broader strategy alongside other initiatives in the environmental, social and economic spheres (Evans, 2005). This approach is closely aligned with concepts such as the creative city, urban design, cultural planning and creative quarter initiatives, with culture being prioritised but not a driving force for regeneration (Gunay and Dokmeci, 2012; McCarthy, 2006; Nedučin et al., 2019). This model represents the integration of social aspects with economic objectives, such as inclusiveness, competitiveness and economic growth, achieved through physical redevelopment and the organisation of cultural activities, where cultural uses do not take overall prominence.

Culture-led regeneration

In the context of culture-led regeneration, cultural activity is regarded as a catalyst for culture-led regeneration, often characterised by a high public profile or serving as a symbol of regeneration (Doucet et al., 2011). Such activities include: the creation of cultural flagships; the adaptive reuse of historic buildings for mixed-use purposes; the development of cultural quarters for urban life; and the implementation of smaller public art programs to foster a relationship with local identity (Montgomery, 2003). Particularly in the 1990s, the rise of the cultural, leisure and tourism industries accelerated the development of iconic cultural institutions at the interface between land and water. These cultural flagships are typically defined as significant, high-profile

buildings dedicated to culture (or cultural policy), driven by political and regeneration ambitions (Smith and von Krogh Strand, 2011). This model became the dominant approach to culture-led regeneration projects from the late 1990s to the early 2010s, especially in the establishment of cultural capitals and cultural flagships promoted by municipalities as landmarks on urban waterfronts. Ockman (2004, p.236) observes that such cultural mega-projects are characterised by their “unabashed visibility, a quality often heightened by their tendency to be presented in isolation rather than as part of a cohesive ensemble”. This characteristic helps to explain why cultural flagships are always located on the urban waterfronts. Examples include Hamburg’s Elbphilharmonie, Oslo’s new Opera House, Bilbao’s Guggenheim Museum and Singapore’s Esplanade Theatres on the Bay (Balke et al., 2018). Some scholars relate the new mega-cultural venues to the traditional role played by monuments. Smith and von Krogh Strand (2011) note that such new cultural flagships can give meaning to the landscape and gradually reconfigure local identities by allowing residents and visitors to interpret the value of places as cultural and national symbols, thereby developing mental maps. Moreover, they are often designed to appeal to external audiences, such as tourists, investors or prospective residents. Seven primary goals of cultural flagship projects can be identified, according to Lehrer and Laidley (2008), Doucet et al. (2011) and Zeković and Maričić (2020):

a) Image enhancement: re-launch former industrial urban waterfront areas as

creative, leisure, culture or consumption-based places.

b) Shaping new identity: using public buildings to develop collective identity amongst national citizens.

c) The attraction of further investment and growth: i.e. the expectation that the initial public-sector investment could be replaced by private-sector funding.

d) Improvement of the quality of life: providing better cultural facilities and associated leisure activities.

e) The attraction of tourists and the development of the local tourism industry: ensuring that tourists feel safe and benefit from the increased opportunities for social interaction in urban waterfront open spaces.

f) Climbing the urban hierarchy: cities can reposition themselves within the global economy by integrating into international property, financial markets and socio-cultural networks through the use of mega-projects.

g) Trickling down the profits to all sectors of society: the idea being that all sectors of society can benefit from the increased jobs, investment and exposure generated by cultural flagship projects.

However, cultural mega-projects consume significant amounts of public funding and, therefore, need to generate returns through the sale or rental of the land surrounding these areas. This often results in increased land values through the development of high-end residential properties as part of property-led urban waterfront regeneration,

which remains poorly connected to the rest of the city physically, socially and economically (Miles and Paddison, 2005; Doucet et al., 2011;; Punter, 2007). Furthermore, cultural mega-projects on urban waterfronts continue to be criticised for their effects on gentrification, social exclusion and limited citizens' participation (Lehrer and Laidley, 2008; Pastak and Kährik, 2016). In this way, culture-led regeneration often fails to benefit all residents of the city and can have a negative impact through the displacement of existing communities. Zukin (1995) raises critical questions regarding "whose culture?" and "whose city?", highlighting the role of culture in the conflict between cultural commodification and local identity. García (2004) noted that culture today represents an economic asset, serving as both a commodified entity with market value and a significant driver in the production of marketable urban places. Cultural flagship projects on urban waterfronts are often criticised as soulless, segregated and gentrified spaces, as well as a potentially short-lived fashion.

Therefore, using culture as a driving force in regeneration encompasses not only the use of large-scale cultural events and the creation of cultural flagship projects as a state-led approach, but also the establishment of "smaller public art projects aimed at addressing social exclusion, reinforcing a sense of local identity, increasing public participation in the decision-making process, and promoting concern for design quality in the everyday environment" (Evans, 2005, p. 966). Miles and Paddison (2005) state that, as an integral part of culture-led regeneration, public art is closely tied to shaping

place identity at a neighbourhood scale, which is socially constructed and linked to a city's history and circumstances. In this context, it is acknowledged that cultural policies cannot operate in isolation, but should be closely integrated with bottom-up approaches, actively engaging local urban waterfront communities through measures such as public participation and collaboration between the public and private sectors, in order to enhance the social, environmental and economic outcomes of urban waterfront regeneration (McCarthy, 2006).

2.5 The Contribution of Heritage to Urban Waterfront Regeneration

Heritage is not merely something to be preserved and passed on to future generations; it is also a resource to be fully appreciated and experienced in the present (Masser et al., 2013). During the twentieth century, the modern concept of heritage conservation was associated with the heritage conservation movement, such as the 1931 Athens Charter and the 1964 Venice Charter (Frenda and Valle, 2021). These chapters highlight how the concept of heritage conservation and management has evolved from a focus on physical forms and materials, such as the preservation of historical monuments, to encompass social and intangible aspects within a broader urban context, including historical events, prominent figures, folk memories, mythologies, physical relics and the places themselves as a whole (Ashworth, 2013).

Post-industrial urban waterfront open spaces, as one of the most distinctive types of urban space, often integrate historic buildings and industrial heritage into waterfront

regeneration and related planning processes. Particularly in 2003, the implementation of the Nizhny Tagil Charter for Industrial Heritage enabled urban planners, decision-makers and architects to rethink the role of industrial heritage resources in urban waterfront transformation. According to the charter, industrial heritage is defined as “remains of industrial culture which are of historical, technological, social, architectural or scientific value” (Douet, 2012, p.236). These industrial heritage buildings include factories, mills, mines, warehouses and stores where industrial activities were conducted, and energy was produced and utilised; as well as sites associated with social activities related to the industry concerned, such as residential, religious and educational facilities (Douet, 2012). Many industrial heritage sites along heritage canals have been transformed into hubs for creative industries and cultural tourism in the context of heritage-led regeneration.

In the 2010s, Ellin (2010) proposed the concept of integral urbanism as a live theory by engaging communities to identify associated heritage assets and how to reuse them. The concept highlights three key points: (1) identifying the urban waterfront open space and its inherent DNA as an integral part of the city through community participation; (2) adopting “urban acupuncture” strategies, rather than imposing comprehensive master plans, in order to enhance urban and community well-being; and (3) learning from the past by building upon historical contributions to canal-oriented development, from ancient times to contemporary efforts (Ellin, 2010).

Moreover, Buckman (2016) calls for embracing urban heritage as part of a broader urban waterfront place-making process, one that combines comfort, mobility, a mix of uses and social inclusion as essential components of successful regeneration.

Consequently, heritage-led urban waterfront regeneration rooted in heritage conservation is a global social-spatial practice characterised by the adaptive reuse of abandoned industrial heritage buildings, adding new functions and integrating them into everyday life (Veldpaus et al., 2013). Pendlebury and Porfyriou (2017) noted that, while the close relationship between built heritage as a consumable experience and regeneration as an economic and place-making activity is evident, the diverse motivations and expectations of different stakeholders require further consideration to better support the shaping of everyday life patterns and socio-cultural places. Therefore, the following sub-chapter introduces two key heritage-led approaches widely applied in waterfront place-making. These approaches relate to heritage conservation and management and examine how urban heritage can be managed sustainably and integrated into everyday life.

2.5.1 The historic urban landscape (HUL) approach as a heritage conservation approach

After the concept of heritage expanded from historical monuments to the broader urban context during the 1960s and 1970s, it was further integrated with landscapes as living heritage in the early 21st century (Ginzarly et al., 2019). The European

Landscape Convention in 2000 defines the term “landscape” as “an area perceived by people whose character is the result of the interaction of humans and natural elements” (European Landscape Convention, 2000, cited in Jiang et al., 2022, p.1251). Moreover, the Historic Urban Landscape (HUL), introduced by UNESCO in 2011, provides a new perspective for reinterpreting the values of urban heritage into existing conservation planning and management systems within a historic city (Sharma and Aulakh, 2023). It establishes a sustainable heritage management framework that seeks to balance the legacy of the past and the contemporary demands of the present (Wang and Gu, 2020; Ginzarly et al., 2019). It signifies a shift in urban heritage management, moving from an emphasis on the tangible dimensions of cultural heritage assets to a heritage-led approach that focuses on: intangible heritage values; the involvement of different disciplines; the role of different stakeholders; and community participation in heritage management; all within the ultimate goal of achieving sustainable, inclusive and resilient development (Rey-Pérez and Pereira Roders, 2020). This section highlights three key characteristics of the HUL approach.

Firstly, HUL conceptualises historic landscapes as dynamic and multi-layered entities that encompass both cultural and natural values within a broader urban context. In other words, it highlights the importance of layering due to the entire urban fabric and context and a dynamic continuity that evolves within time and space (Jiang et al., 2022). This urban fabric includes “the topography, geomorphology, hydrology and natural

features of the site, as well as the built environment, both historic and contemporary, its infrastructures above and below ground, its open spaces and gardens, its land use patterns, spatial organisation, perceptions and visual relationships and all other elements of the urban structure" (UNESCO, 2011, cited in Bandarin and Van Oers, 2014, p.200).

Secondly, the HUL approach emphasises that heritage values are no longer limited to tangible urban elements, such as monuments and archaeological sites (Jiang et al., 2022). Instead, they also include intangible aspects of traditions and living expressions inherited from past generations and transmitted to future ones, such as oral traditions, performing arts, social practices, rituals, celebrations and the knowledge and skills necessary for producing traditional crafts (Hafstein, 2008). Some local inhabitants recognise their heritage values, relying on the continuity of collective memories, which is an integral part of the intangible elements associated with these physical surroundings.

Thirdly, this approach emphasises that cultural heritage should incorporate values and perspectives from diverse stakeholders, rather than relying solely on expert opinion. In other words, the main stakeholders, including local citizens, visitors, professionals, managers and local authorities, should participate in the decision-making and practices of the Historic Urban Landscape Plan (Bandarin and Van Oers, 2014). This is because the urban landscape can be viewed "as a lived space, a socio-cultural

construct, and a mental subjective representation of the environment that changes in time and space" (Ginzarly et al., 2019, p.999).

Some scholars have further identified key characteristics of the HUL approach (Rey-Pérez and Pereira Roders, 2020): (1) focusing more on heritage elements rather than merely on physical objective; (2) incorporating community participation in decision-making processes regarding what to protect and why, through participatory planning and stakeholder consultation; (3) addressing vulnerabilities arising from socio-economic pressures and the impacts of climate change; (4) integrating the resulting information – such as heritage values and vulnerability assessments – into broader urban development frameworks; (5) prioritising actions that balance both conservation and development goals; and (6) establishing public–private partnerships supported by microcredit and other flexible financing mechanisms to promote creative, income-generating development rooted in local contexts.

However, despite the HUL Recommendation emphasising citizens' participation and public-private partnership in heritage-led waterfront regeneration projects, the majority of HUL applications remain closely associated with tourism development and economic growth. Indeed, the HUL approach has increasingly focused on the tourism industry in recent years, as heritage tourism is recognised for its ability to attract creative clusters and stimulate the local economy (Mosler, 2019). However, a major concern in relation to HUL approach is the potential creation of "tourist bubbles" that

cater primarily to upper-income inner-city residents (Stevens, 2020). The next section examines the concept of everyday heritage as a response to these challenges.

2.5.2 The everyday heritage concept

The concept of “everyday heritage” was proposed by Saruhan Mosler in 2019 and further developed by Lisa Giombini in 2020, with the ultimate goal of unlocking the potential of urban landscape heritage resources in its everyday life context and improving spatial and temporal connectivity of the urban landscape (Mosler, 2019; Giombini, 2020). The concept is based on the notion of “everydayness” and the “everyday landscape”(Meinig, 1979). On the one hand, everydayness can be seen as a human experience shaped by the essential continuum of mundane activities and people’s everyday routines in their neighbourhoods (Mosler, 2019). Although these regular activities lack special meaning over time due to daily redundancy and repetition, the essence of value lies in the everyday spatiality and rhythms that can form a sense of reality and the “lived space” identified by Lefebvre (1991). Furthermore, Giombini and Kvokačka (2021, p11) point out the relationship between philosophy and everydayness and emphasise that everydayness constitutes both “material reality and subjective consciousness”, which also nourishes our culture and society. They also imply the importance of incorporating aesthetic quality into the ordinary fabric of everyday life, while respecting its intrinsic nature, to capture the extraordinary from the

ordinary. Thus, everydayness can be understood by all social groups as part of a broader focus for the quality of lived experience.

On the other hand, during the 1960s and 1970s, many human geographers and sociologists regarded landscape as a human construct. They analysed the relationship between landscape place-making and the quality of public life, as well as the connection between sensorial quality and place identity (Lee, 2020). In this context, everyday landscape can be understood as nature, human habitat and a metaphor from a temporal and spatial perspective, which combined with the contents of past and future activities and people's interaction to express memory, emotion and morality (Rajendran, 2013). The uniqueness of everyday landscapes could manifest itself as lived experiences and daily life, rather than considering only iconic landscapes as a focal point and the unique value of urban landscapes (Lee, 2020). This is because iconic landscapes can be perceived through visual experience, while everyday landscapes can be perceived through relational experiences. Furthermore, the meaning of everyday landscapes depends on the "emotional relationship between everyday life and surrounding spaces" (Lee, 2020, p.2). In other words, both residents and visitors can have an opportunity to express the meaning of the landscapes surrounding them.

Inspired by these two concepts, Mosler (2019) emphasizes that everyday heritage is the sum of practices, activities and meanings that communities use to strengthen their

connection to places and to each other. It is characterised by shaping new meanings through the creation of the daily routine in time and space and the integration of old and new components of a city. He suggests that heritage tourism can be integrated into the contemporary city's everyday values and social demands, to prevent over-commercialised development (Mosler, 2019). Based on this concept of everyday heritage, Giombini (2020) further suggests that urban heritage acts can be incorporated into present-day urban waterfront open spaces, allowing heritage to evolve organically by changing its original functions, forms or meanings and activating spontaneous interventions. He states that everyday practices generated at the local level, as part of the bottom-up process of heritage creation, have become a symbol of the place-making process (Giombini & Kvokačka, 2021). Importantly, these symbols are not only shaped through official values but are generated through the everyday interaction between place and people.

Consequently, as a place-based and people-led approach to urban heritage conservation and place-making practice, it highlights how urban heritage gains meaning and is incorporated into the broader context of the regeneration process. This can be achieved through the everyday bodily movements of people; the combination of existing public infrastructure that shapes daily routines in both time and space; and the reuse of old and new components of a city (Mosler, 2019).

2.6 Conclusion

This chapter argues that urban waterfront regeneration should not be understood merely as the regeneration of obsolete waterfront land, but as a historically layered and socio-spatial process shaped by changing relationships between people, water, technology, economic restructuring and urban governance. From the discussion, there is no doubt that water plays a significant role in our daily lives, through applications such as drinking, washing, water supply, agriculture, and defence. Human societies have been sustained and served by water throughout history, both physically and spiritually. Building on this enduring people-water relationship, urban waterfront development can be understood as an adaptive process that responds to changing human needs over time. The Industrial Revolution, subsequent technological change and later deindustrialisation shaped this trend through five phases (primitive establishment, expansion, modern industrial development, industrial retreat and redevelopment). Within this longer development trends, the agenda of “waterfront regeneration” can be traced back to the 1960s.

Despite some variations in the motivations and policies for waterfront regeneration across different countries, four dominant global trends have emerged in the evolution of urban waterfront regeneration. The first wave of waterfront regeneration originated in North America in the 1960s, characterised by a commercially oriented approach and state-led city-building activities by creating retail and festival marketplaces (Shaw,

2001). These urban waterfront regeneration projects provided an exemplar that prioritised a diverse range of mixed uses, including residential, retail, recreational, commercial, service and tourist facilities, between the 1960s and the 1980s (Jones, 1998). The second generation took place mainly in European cities and emphasised the cooperation between the public and private sectors with the extensive use of private investment. Such waterfront regeneration at this stage paid more attention to economic development, real estate development, and the use of private investments to drive market funds. However, these interventions treated the waterfront as a separate part of the city, resulting in disconnection from the surrounding urban fabric and its characteristics. With this in mind, the aim of the third trend of the regeneration of urban waterfronts is to facilitate reconnection between a wealthy past and its future that expresses cultural diversity, local identity and new visions (Roberts and Sykes, 1999; Marshall, 2004).

The model of the fourth generation of urban waterfront regeneration remains vague and is still being defined. The flow of capital between cities has increased competition between the global forces of economic interests and the local forces of culture and heritage. The current outcomes of urban waterfront regeneration aim to reconcile the conflicts between culture and consumption, the new and the old, as well as social inclusion and gentrification. However, this chapter reveals a key finding: the integration of culture and heritage into urban waterfront regeneration, as part of an integrated

cultural-heritage-led approach, is becoming an increasingly dominant trend in urban waterfront transformation. This chapter has identified several critical tensions in the literature, including the conflicts between historical conservation and tourism-driven development, spatial homogenisation and urbanisation, local displacement and gentrification, as well as everyday use and overcommercialisation (Cai and Peng, 2019; Kim et al., 2023; Cao et al., 2024). While existing studies have extensively examined regeneration paradigms, cultural heritage-led regeneration strategies, as well as associated flagship projects and mega-event, they have paid less attention to how these transformations are perceived, experienced and negotiated in everyday urban waterfront open spaces in China. For this reason, the next chapter turns to the Chinese context in order to examine how culture- and heritage-led regeneration has reshaped urban waterfront open spaces. By focusing on both heritage canal districts and newly developed waterfront zones, the thesis moves from broad theoretical debates to a more specific area of Hangchou to explain and justify the case study selection.

CHAPTER 3- THE INFLUENCE OF CULTURAL-HERITAGE-LED URBAN WATERFRONT REGENERATION ON THE CREATION OF CONTEMPORARY PUBLIC PLACES IN CHINA

3.1 Introduction

Studying cultural-heritage-led urban waterfront regeneration from the perspective of public space provides a platform for understanding and interpreting changes in user demands within placemaking approach. This chapter points out that in China, cultural-heritage-led regeneration has produced two distinct but comparable types of urban waterfront open space: heritage canal districts and newly developed waterfront zones. Both types have been reconfigured over recent decades as a result of cultural-heritage-led regeneration, aiming to meet evolving public demands and revitalise urban life. Rather than simply describing their development, the chapter examines how their different historical evolution, spatial organisations and social relations have been reshaped through regeneration, and why these differences matter for the subsequent empirical analysis of urban waterfront open space quality. In this context, the chapter first reviews the evolution of culture- and heritage-led waterfront regeneration in China, then analyses the development of urban waterfront open spaces across these two key typologies and finally explains how Hangzhou's historical transformation and polycentric urban development provide the contextual basis for the comparative case study selection.

3.2 Cultural-heritage-led Urban Waterfront Regeneration in China

The phenomenon of urban waterfront regeneration in China emerged later than in Western countries but has undergone rapid development since the beginning of the economic reform period of 1978. However, rather than following a simple delayed model of Western redevelopment, the Chinese trajectory has been shaped by the interaction between state-led urban transformation, market reform and environmental improvement, although many waterfront projects in China have drawn on successful Western waterfront regeneration. Due to rapid urbanisation and deindustrialisation in the 1980s, some port cities, such as Shenzhen and Shanghai, as well as canal cities, such as Hangzhou and Suzhou, have undergone large-scale urban transformation, city expansion and economic restructuring, exemplified by the improvement of water quality and existing public infrastructure in city centres, as well as creation of new urban waterfront open spaces in development zones (Li et al., 2020). At the same time, the national government and local authorities in China have focused increasingly on cleaning up the bodies of water and eliminating polluting industries, relocating heavy industries from inner cities toward the peripheries of the city and supporting the improvement of water quality as a precondition for developing urban waterfront regeneration projects (Vollmer, 2009). During this period, the primary public needs identified for urban waterfront spaces focus on physiological and safety needs, with a limited emphasis on facilitating social interactions.

In 1988, urban land reform and housing privatisation[4] were introduced in China, enabling the national government to retain ownership of urban land, while local authorities lease land-use rights to private developers to raise revenue and secure funding (Ye, 2011). The national government has thus transitioned from being an all-powerful agent to a managerial institution (He and Wu, 2005). In this context, the private sector has been introduced into and involved in the field of urban waterfront redevelopment to provide an effective means of funding accumulation, leading to the development of a housing market and central business districts (CBD) on urban waterfronts, as part of a property-led regeneration boom in China. An economic transformation and urban competition led at this stage to the creation of contemporary open waterfront spaces. In this context, between the 1990s and 2000s, some eastern coastal cities in China, such as Lujiazui Financial District in Shanghai and Futian CBD in Shenzhen, began building skyscrapers, luxury residential housing, office buildings and commercial facilities on their urban waterfront areas near city centres as a means of expressing a new urban identity, attracting foreign and domestic private investment and ambitious pursuit of global city status (Zhu, 2023b). Furthermore, the establishment of development zones on the peripheries of urban waterfront cities has increasingly been embraced by local authorities as a scheme for a “creative city” to

[4] In 1988, the National People’s Congress proposed two significant pieces of legislation: the Amendment to the Constitution (CONSTITUTION 88) and the Land Administrative Law (LAL 88), which formally separated land use rights from land ownership.

develop creative industries, thereby fostering international business collaboration and attracting private investment, examples being Suzhou Industrial Park in Suzhou and Qianjiang New Town in Hangzhou. Urban waterfront regeneration in these development zones has transformed agricultural lands into international headquarters, high-tech factories, higher education institutions and gated urban waterfront communities, adopting an international architectural style to form contemporary urban waterfront open spaces (Chen and Thwaites, 2018). During this period, there was a growing demand for urban waterfront open spaces that provided comfort and amenities for commercial activities, leisure, entertainment, as well as commuting and transportation.

In the early 2000s, the change in economic structure from manufacturing-based model towards a service-oriented model led to the relocation of industrial buildings and factories from city centres to suburban areas (Wu and Liu, 2023). The urban waterfront brownfield sites and associated industrial historic buildings required physical restoration and integration into the development of high-quality public spaces. In this context, the dominant trends in the regeneration of historic urban waterfronts by the late 2010s were the adaptive reuse of urban heritage for new functions and the deployment of the concept of the creative city for the promotion of cultural branding as a key economic commodity (Chen et al., 2016). For example, prior to 2000, 50 Moganshan Road (M50), situated along Suzhou Creek in Shanghai, was formerly an

industrial area known as the Chunming Textile Factory. However, by the mid-2000s, it had been transformed into an artist community through the adoption of an integrated cultural-heritage-led approach, characterised by the reuse of industrial heritage buildings and the attraction of international creative clusters and creative industries. The creative class was drawn by the aesthetic and historical value of the old industrial buildings on the water's edge, as well as the cheap rent (Sepe, 2018). During this time, the abandonment of industrial sites along the water's edge led to an increase in the availability of workshops and warehouses for artists' use. Artist urban waterfront communities were preserved and revitalised through public-private partnerships, aiming to contribute to the regeneration of urban waterfronts. But between 2005 and the 2010s, it was further transformed, from an artist community into a site of cultural consumption. Ning and Chang (2022) argued that such transformation generated a "gentrification aesthetic",[5] which bridges middle-class consumption with the inner urban waterfront regeneration. O'Connor and Gu (2014) point out that, although the M50 project combined elements of the industrial park model with aesthetically restored abandoned factories linked to creative milieux, this model has the potential to shift

[5] The term "gentrification aesthetic" was originally used to explain the upgrading process of Victorian-era houses in Melbourne, Australia, as part of the broader middle-class resurgence in the city during the 1960s (Jager,1986). Now it refers more widely to the aesthetic and experiential qualities of a revitalised historic neighbourhood, most effectively characterised by its architecture, streetscape, urban furniture and the overall environmental atmosphere (Ning and Chang, 2022)

towards a real estate-driven regeneration model, which poses the risk of gentrification and social exclusion.

Compared to the large-scale demolition and reconstruction of the 1990s, urban waterfront regeneration in China since the 2010s has adopted a dual approach, and the open urban waterfront spaces created through regeneration efforts have satisfied people's needs for cognitive and aesthetic improvement. Firstly, the local authorities continued to adopt an integrated cultural-heritage-led regeneration approach. On the one hand, the adaptive reuse of existing heritage buildings has been utilised to create cultural flagships, serving as key nodes along the urban waterfront from the heritage perspective. For example, between 2010 and 2020, museum clusters emerged along the Huangpu riverfront, including the Shanghai Modern Art Museum, the Long Museum, Tanks, MIFA 1862 and the transformed 80,000-ton silo (Wang, 2024) . On the other hand, local authorities also incorporated public art and design installations into the waterfront open spaces surrounding the museum clusters, serving as an urban laboratory for facilitating sustainable waterfront transition. For instance, in 2019, the Shanghai Urban Space Art Season (SUSAS) expanded from indoor spaces to urban waterfront open spaces, exhibiting public art and design installations along the 5.5 km-long Yangpu riverfront to embody three core themes: "publicness", artistry and locality. This cultural event aimed to provide an opportunity for dialogue between artists and the communities, thereby promoting public participation and improving the public

realm of urban waterfront open spaces influenced by cultural-heritage-led regeneration. This combination of reusing industrial buildings as museum clusters and introducing public art and design installations along the Yangpu riverfront in Shanghai tends to enhance the continuity of urban memory while reshaping urban cultural identity. Luo and Cao (2023) proposed that the role of museums is continually expanding from a mere institution to a method of memory interpretation through the integration of public art and design installations, which includes the translation of memory-related information, the renovation of memory carriers and the connection of memory clues.

Additionally, the New-type Urbanisation Plan (2014–2020) set out a people-centred vision for urban regeneration in China, with an emphasis on protecting stakeholder interests, public participation and social justice (Li et al., 2020). In this context, the place-making approach has emerged as a people-centred approach to meet the user's needs in the context of urban waterfront regeneration in China (Zhu, 2023a). Urban waterfront areas are transitioning to stock-based urban planning[6], enabling the place-making approach to become a dominant trend since 2015 (Cao et al., 2018). Furthermore, place-making, based on public participation at the community level, reshapes social supervision during the decision-making process, in which residents

[6] Stock-based urban planning is characteristised by "optimizing and revitalizing existing constructed land while maintaining unchanged construction land and urban space scales" (Jin and Shao, 2024, p.4).

through Residents' Committees (RCs) actively engage with local governance, while Non-Governmental Organisations (NGOs) act as coordinators between residents and the local government.

In historic urban waterfronts, numerous open spaces are located adjacent to communities. These spaces serve as transitional areas, connecting key waterfront nodes with traditional residential areas, and are in urgent need of place-making practices to ensure they meet human needs. For example, in the historical Da Doulu district along the Grand Canal in Hangzhou, shops and commercial streets have long played a crucial role in the development of the Beijing-Hangzhou Grand Canal. Many of these commercial spaces were converted from residential areas and are closely linked to the surrounding residential communities. The everyday activities of residents, such as commuting and shopping, all require passing through these spaces. Therefore, during the design process, the design team, in collaboration with the property owners, considers the needs and perceptions of residents as the most significant design factor in improving public space quality. The restoration is based on the users' perceptions and attitudes towards public space on the urban waterfront, for instance incorporating stone window frames for each newly added door and window in the lane, removing external air conditioning units, organising pipelines, and updating the street surface paving (see Figure 3-1).



Figure 3-1 Physical restoration measures in the Canal District.
(Source, GOOOOD, 2023)

Since 2020, China's 14th Five-Year Plan and the 2023 Progress Report for the 2030 Agenda have highlighted the creation of high-quality public spaces along waterfronts and a people-centred regeneration vision (Zhu and Li, 2024). Based on this vision, goals include: bringing waterfronts back to the people; enhancing urban public life; improving connectivity between fragmented public spaces along the urban waterfront; encouraging mixed and temporary uses; promoting the adaptive reuse of cultural and heritage resources; and integrating top-down urban planning with bottom-up public participation. In this sense, urban waterfront open spaces, as part of the culture-heritage regeneration process, should play a crucial role in shaping daily life and the public realm in waterfront neighbourhoods. The following section focuses on the

development of urban waterfront open spaces in heritage canal districts and development zones within the Chinese context.

Hangzhou is the capital of Zhejiang Province and covers an administrative area of 16,596 km², occupying a strategically significant geographical position. It is located at the Yangtze River Economic Belt and situated at the intersection of China's Eastern Coastal Economic Belt and the Yangtze River Economic Belt (Li and Yue, 2024).

3.3 Traditional Urban Waterfront Open Space Development along the Beijing-Hangzhou Grand Canal

3.3.1 The development of the Beijing-Hangzhou Grand Canal

The 1794 km-long Beijing-Hangzhou Grand Canal, which can be traced back to the 5th century BCE, is recognised by UNESCO as a World Heritage Site and is the oldest and longest canal in the world (Cai and Peng, 2023). It can be seen as the most convenient and practical transport route that connected the interior of the ancient city to rural areas for the exchange of goods, thereby increasing the prosperity of local commercial and trade activities in pre-industrial areas. Its construction occurred in three key historical phases (see Figure 3-2): (a) linking three major west-east natural rivers in central China – the Yangtze River, the Huai River and the Yellow River – between 486 BCE and 580 CE; (b) developing a unified Y-shaped canal system to connect capital cities and core economic regions from north to south between 581 and

1270 CE; and (c) forming a continuous linear -shaped canal system between 1271 and 1703 CE.

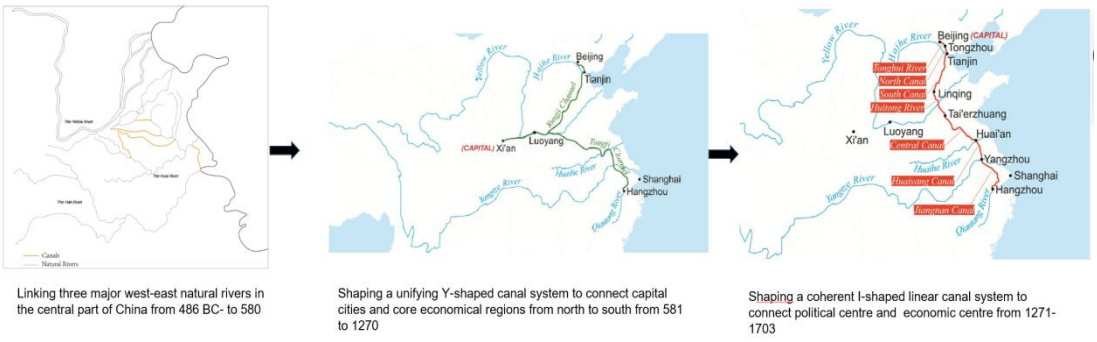


Figure 3-2 Three key historical phases of the Grand Canal construction in China. (Source: drawing by author)

The overall spatial form of this linear Grand Canal has been preserved to the present day and can be divided into seven sections: the Tonghui Canal; the North Canal; the South Canal; the Huitong Canal; the Li Canal; the Jiangnan Canal; and the Zhedong Canal. It flows through 22 cities and connects five major natural river basins: the Hai River; the Yellow River; the Huai River; the Yangtze River; and the Qiantang River (Zhang et al., 2023). In ancient China, the Beijing-Hangzhou Grand Canal's functions included the transportation of grain and strategic resources, taxation, traffic control, management of water resources for irrigation systems and flood control, as well as critical communication, administrative and cultural nodes in the nation's transportation system (Rong and Wang, 2021; Cai and Peng, 2023). It generated substantial social and economic benefits for the cities along its route, thereby ensuring the centralisation of authority and unity across China's various historical dynasties.

Even after more than 2,500 years, the canal network has continued to fulfil its primary original functions, including the transportation of grain and strategic resources. As Rong and Wang (2021, p. 260) state, the living heritage and historic urban landscape along the linear heritage canal has been created through “combination of work that reflects the interactions between humans and nature and possesses the characteristic of organic evolution.” Such heritage canals stand as an outstanding masterpiece of hydraulic engineering, thereby shaping the distinctive water-street typology along the canals (Wei, 2018).

3.3.2 Water-street typology in traditional urban waterfront open spaces in ancient China

This section examines the development of traditional urban waterfront open spaces shaped by the water-street prototype along the Beijing-Hangzhou Grand Canal. In particular, it identifies two types of marketplaces derived from this prototype – bridge marketplaces and canal marketplace and explores their roles in shaping everyday life.

Traditional urban waterfront open spaces dominated by the water-street prototype first emerged along the canal during the mid-Tang and Song dynasties (960–1127). The collapse of the Fang-Shi system drove their proliferation, the old ward-based organisation of urban markets and residences, a process that Elvin (1973, p. 164) described as “the medieval revolution” in market structure and urbanisation. From the 850s onwards, the traditional Chinese urban form gradually shifted from a walled-ward

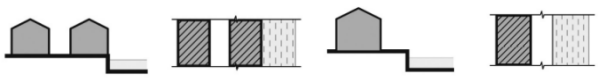
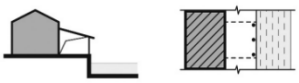
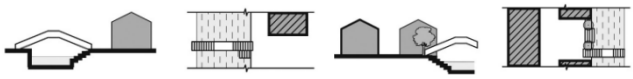
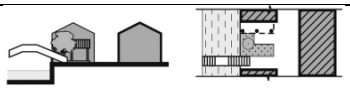
system to a freer street layout that accommodated a wide range of social and economic activities (Xu, 2000). Skinner (1977, cited in Xu (2000), p. 70) further identified five key characteristics of the new urban planning from the second half of the eighth century to the Southern Song Dynasty (1127-1129):

1) The relaxation of the one-market rule requiring location in the county capital.
2) The breakdown and eventual collapse of the official marketing organisation.
3) The disappearance of enclosed marketplaces and the walled-ward system, which were replaced by a much more open street plan with genuinely public spaces along the canals.
4) The rapid expansion of walled cities and the growth of commercial suburbs outside the gates.
5) The emergence of numerous small and intermediate-sized towns with important economic functions.

As a result, this significant transformation of urban planning systems profoundly influenced the formation of traditional urban waterfront open spaces dominated by the water-street prototype, which emphasizes that each individual building should harmoniously blend with other architectural elements and nature in the building complex, such as streets, canals, pedestrian bridges, corridors, green spaces and piers. These elements gave rise to multiple subtypes based on the water-street prototype, which evolved into the dominant form of waterfront public space in ancient canal cities, as shown in Table 3-1.

Table 3-1 Typologies of traditional urban waterfront open space along the Bejing-

Hangzhou Grand Canal. (Source: drawing by author)

Element Type	Typologies of traditional urban waterfront open space
Street-Building-Canal	
Street-Building-Canal-Bridge	
Street-Building-Canal-Pier	
Street-Building-Canal-Corridor	
Street-Building-Canal-Bridge-Pier	
Street-Building-Canal-Greening-Pier-Corridor	

Over time, these various subtypes continued to evolve into the predominant form of waterside public space in ancient Chinese canal cities. They generated informal canal and bridge marketplaces as a linear commercial district.

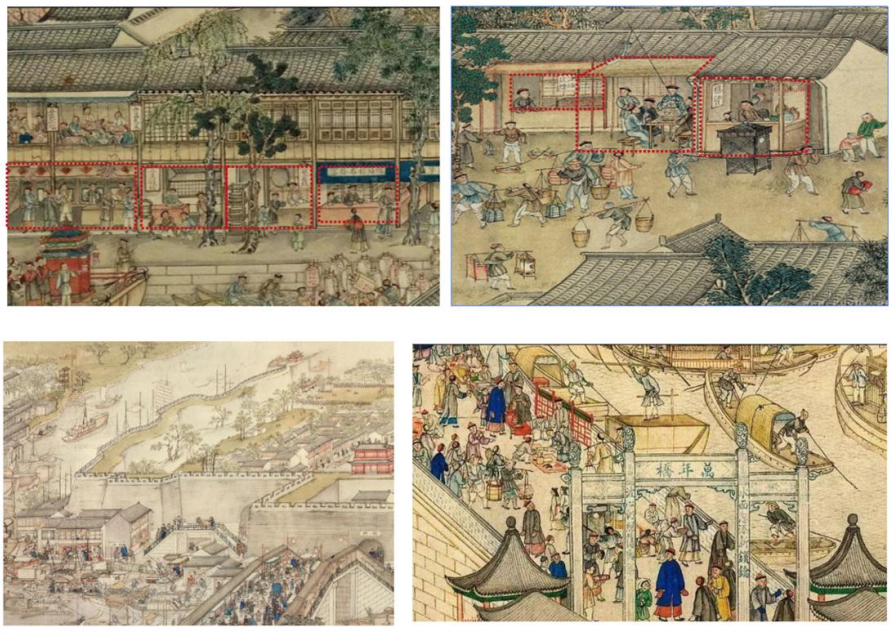


Figure 3-3 Informal marketplaces. (Source: from Qingming Shanghe Tu as above and Gusu Fanhua Tu as below)

Based on the traditional Chinese scroll paintings, such as *Qingming Shanghe Tu* and *Gusu Fanhua Tu* (see Figure 3-3), the key spatial characteristics of canal and bridge marketplaces along the Grand Canal can be summarized as follows:

1) The Grand Canal shaped the phenomenon of encroachment on public streets through a strong spillover effect, resulting from spontaneous urban expansion. The informal marketplace blurred the public–private boundaries between streets, buildings, and water bodies, most visibly through the design of “active” frontages. This allowed flexible and frequent doors and windows or setting some guiding templates for the ground floor to enhance social interaction and communal activities (See Figure 3-4). Some waterfront public buildings, including restaurants, teahouses and opera stages, exhibited a degree of spatial permeability between their indoor and outdoor areas along both the street-facing and waterside facades. As a result, such water-street-led urban waterfront open spaces encouraged a high degree of “publicness” through spontaneous actions and purposeful occupation. Furthermore, everyday lives spilled over into public spaces, giving urban spaces specific meanings through people's daily physical movement. These diverse patterns of action and consumption shaped everyday life around the Grand Canal, in regard to food (eating habits, food production and cooking); consumption (acquisition, usage and disposal of goods); living conditions (the built environment and neighbourhood interaction), transportation (canal systems, bridges and wharfs); and leisure activities.

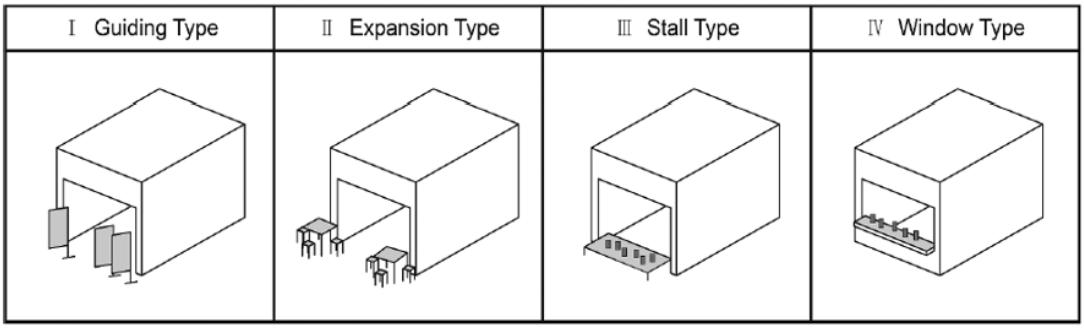


Figure 3-4 Classification of building frontage types along the water-street prototype. (Source: drawing by author)

2) “Shop-houses” surrounding the informal canal and bridge marketplaces embraced a mixed-use approach, serving both commercial and residential purposes. This resulted in two different types of building layouts: one is a one-story structure characterised by commercial spaces at the front, adjacent to the city streets, and residential areas at the back, and the other comprises a two-story structure with a shop on the ground floor and dwelling space on the first floor (Chen, 2013). Both designs incorporated semi-public spaces that blurred the boundary between the interior and exterior, stimulating the unconscious processes of daily life. For example, in many paintings depicting ancient informal canal and bridge marketplaces along the Grand Canal, some waterfront buildings with mixed commercial and residential functions are shown establishing a connection with the canal through platforms or steps. Additionally, open spaces were often left along the canal banks, maintaining a spatial relationship with the water.

In summary, traditional urban waterfront open spaces dominated by the water-street prototype along the Beijing-Hangzhou Grand Canal in ancient China embodied dynamic and diverse everyday life patterns, collectively shaped by water-street

prototypes that allowed users to engage with the water both actively and passively when entering and utilising these public spaces. Although these spaces developed spontaneously through bottom-up innovations without the involvement of professional designers, their spatial configurations facilitated a wide range of everyday life patterns, spontaneous activities and development of marketplaces. This commercialisation of public space along the canal drew people in by creating active frontages, giving space meanings through the creation of the routine and stuff of life in time and space. Therefore, the history and traditions of urban waterfront open spaces along the Beijing-Hangzhou Grand Canal offer valuable insights for the development of contemporary waterfront public spaces through cultural-heritage-led regeneration.

3.3.3 Public courtyards along the canal as traditional urban waterfront open spaces

In addition to the water–street prototype discussed above, small plazas situated outside ancient public courtyards—such as temples and native-place association halls (city clubs) along the canals—also contributed to the formation of canal-side public spaces. Water-based grid patterns primarily characterise these spaces (see Figure 3-5).

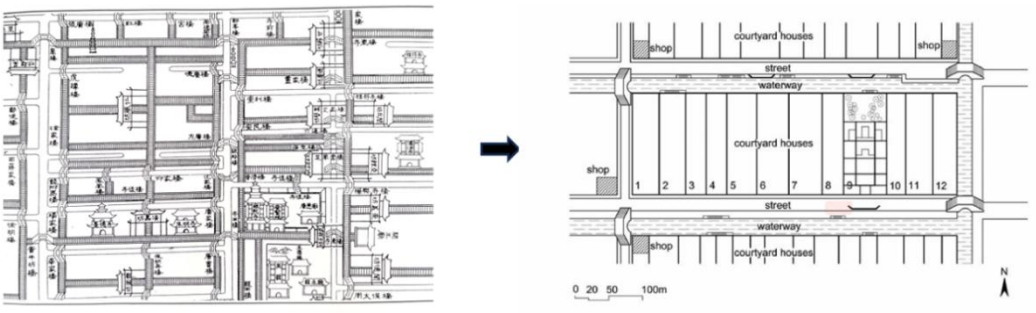


Figure 3-5 The double grid of the water–street spatial layout in 1229.
(Source: adapted from Xu, 2000)

This research focuses mainly on two crucial types of public courtyard found alongside the Grand Canal: native-place association hall public courtyards and temple public courtyards. By examining the historical context, this section highlights how public courtyards were formed and analyses their roles in shaping everyday life and facilitating social interactions.

First, the native-place association hall public courtyards can be viewed as a form of social-cultural public courtyard supported by urban social organisations below the level of formal local government. During the Ming and Qing dynasties (1368–1912), many ancient canal cities in China, such as Suzhou, Hangzhou and Liaocheng, can be viewed as social spaces where outsiders and merchants from all over China intermingled (Chen, 2013). Owing to the significance of the Grand Canal in commercial and transport development during this period, many of these native-place association hall courtyards were built by local merchants. Their original functions included bringing together merchants from the same locality to socialise and communicate, protecting

the common interests of commercial and social networks in the city and providing a sense of belonging, while strengthening local identity. According to historical maps (see Figure 3-6), they were mostly situated in suburbs near the city walls, rather than in the city centre in many canal cities, such as Suzhou and Yuncheng (Xu, 2000).

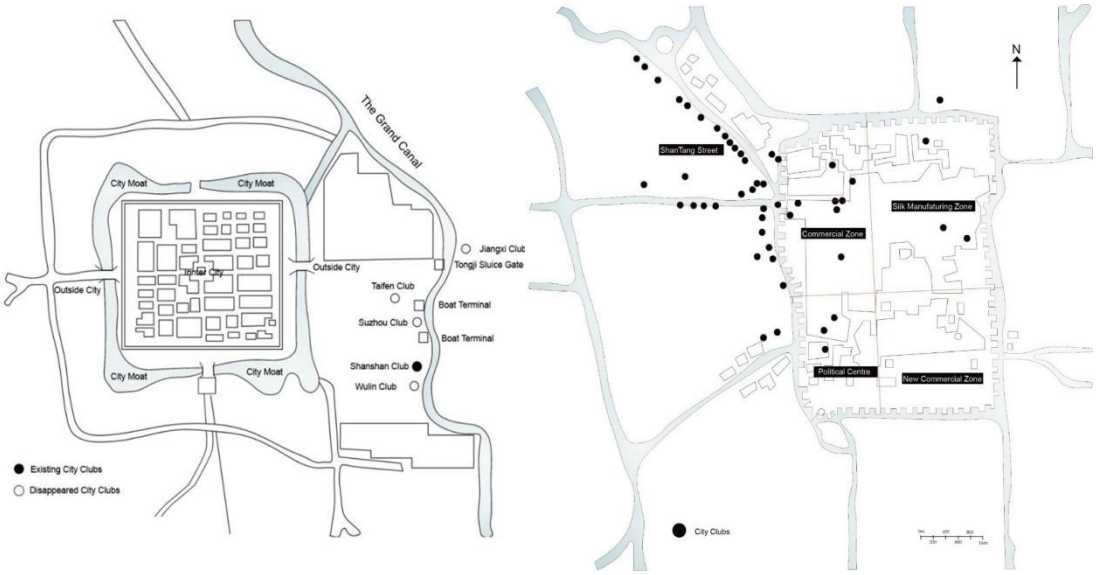


Figure 3-6 Spatial distribution of native-place association halls in canal cities, located away from the city centre: Yuncheng (left) and Suzhou (right). (Source: drawing by author)

In ancient Suzhou, for example, according to Xu (2000), many of these city clubs were situated in the western suburbs near the city walls, especially on Shantang Street and Xu Gate.

The growth of native-place association hall courtyards (city clubs) along the Suzhou Canal actively facilitated more water-related trade activities beyond the city gates, thereby forming the commercial-oriented urban waterfront open spaces along the Shantang Canal (see Figure 3-7). Furthermore, these open spaces along the canals

outside the city centre, concentrated on the edge of plazas surrounding the native-place association halls, became more “vital” and “urban” than other commercial streets in Suzhou’s inner city (Chen, 2013). This is because everyday life (walking, eating, chatting and trading) and sentimental bonds both play a vital role in shaping spatiality and people-place experiences. Consequently, native-place association halls and public courtyards establish everyday landscapes that can provide a sense of belonging, correspond to native-place sentiment and shape people–place experiences.

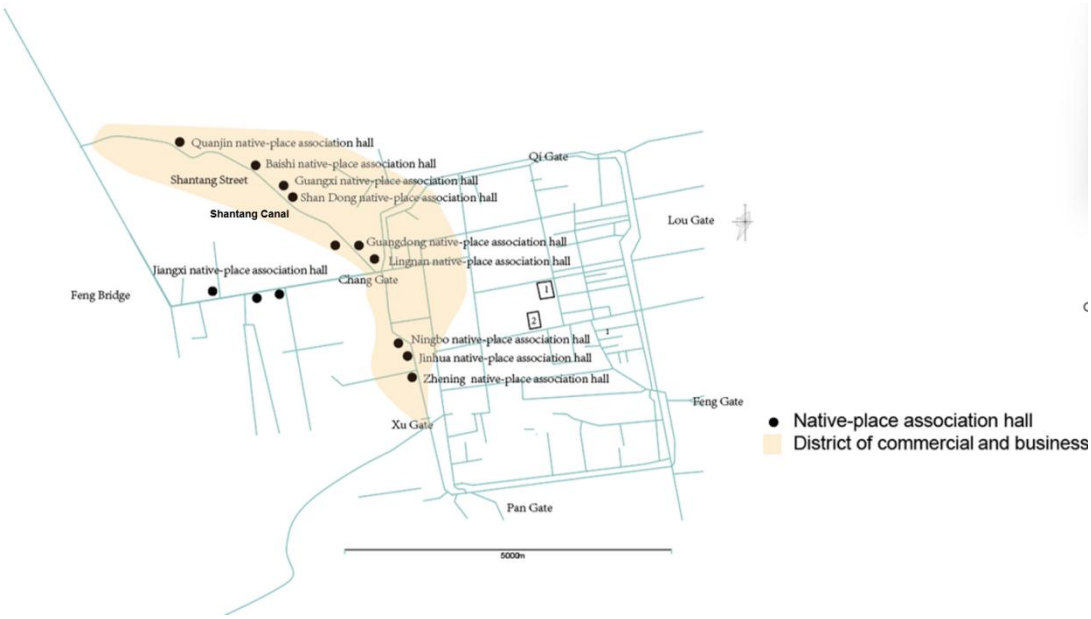


Figure 3-7 The distribution of native-place association hall public courtyards in the Ming and Qing dynasties (1368–1912), according to Suzhou historical mapping. (Source: drawing by author)

In addition to the city-club model, the Temple public courtyards along the canal played a crucial role in promoting the interwoven experiences of social production and everyday life. One example is the Xuanmiao Guan Temple public courtyard, north of

Suzhou's central district, which was built in the early eighth century. During the Ming dynasty (1368–1644), it became not only a place for religious activities and worship, but also a social space and landmark where textile and silk workers gathered in the morning to seek employment opportunities (Xu, 2000). This phenomenon tended to create a daily route and a series of repetitive activities, and it thus affected the development of a family-based textile industry (see Figure 3-8).



Figure 3-8 The distribution of the temple public courtyard in the Ming and Qing dynasties (1368–1912), according to Suzhou historical mapping.
(Source: drawing by author)

In this sense, the temple public courtyard established an everyday landscape and becomes perceived as a landmark. It tends to shape certain social groups' (textile workers') ways of working and living, their everyday experiences, and to promote interactions between the secular and the religious places, aligning with the integration of community life and everyday environmental encounters (Chen and Thwaites, 2018).

Such temple public courtyards gradually shaped people's subconscious and routine life-patterns, thereby enhancing the interaction between people and place.

In summary, such formal public courtyards alongside the Grand Canal should be considered not only as individual buildings, but also as an interconnected narrative of public place and cultural landscape. Their preservation of past forms and functions, as tangible and intangible values, shape the rhythms of community life and social production by adding meaning and collective memories of the Heritage Canal District in time and space (see Table 3-2).

Table 3-2 Summary of functions, local industry linkages, and urban forms of courtyard-based public courtyard derived from the Beijing-Hangzhou Grand Canal. (Source: adapted from Chen, 2013)

Types of Buildings	Native-place association halls Courtyard	Temple Courtyard (Xumiao Guan in Suzhou)
Functions	Gathering merchants away from hometowns, promoting a sense of belonging and cultural identity	Organizing worship, traditional holidays with social activities
Linkage with local industry	Commercial industry	Family-based textile industry
Impact on urban forms	Formation of commercial zoning districts, such as Shantang street.	Formation of textile industry zoning districts

3.3.4 Traditional urban waterfront open space development in contemporary heritage canal districts since the 1950s

Since the 1950s, the development of heavy industries and the discharge of domestic wastewater have led to a significant decline in the water quality of the Beijing-

Hangzhou Grand Canal (Chen, 2013). However, residents have still used the canalside as a backdrop to everyday activities, such as playing chess, chatting and doing laundry. Everyday life is closely interconnected with the canal system, despite the absence of a comprehensive urban planning and regeneration approach.

Between the 1960s and 1980s, urban development focused primarily on urban waterfront open spaces within historical canal cities and towns (Geng, 2012). However, local authorities paid little attention to heritage conservation and management, instead prioritising urban expansion. Many historic buildings, piers, bridges and transitional waterfront streets along the canal were demolished to make space for modern industrial facilities or new functional areas (Zhong, 2023). Particularly after the reform and opening in 1978, some traditional urban waterfront open spaces alongside the canal underwent changes in their traditional water-street scale and evolved through the integration of municipal greenery, existing traffic networks and gated residential buildings, primarily driven by real estate development (Fu, 2020).

From the 1990s to the 2000s, the development of traditional urban waterfront open spaces along the Beijing-Hangzhou Grand Canal was based on the concept of protecting the urban heritage and reusing tourism resources (Jiang et al., 2022). The canal's traditional waterfront streets and key public courtyards have been redeveloped into a world-class tourist destination through cultural and heritage-led regeneration. However, in order to serve commercial and tourism purposes, the main task of physical restoration of urban heritage conservation projects is the production of fake historical facades and structures, while ignoring the real human demands based on daily life (Zhang and Lenzer Jr, 2020). The underlying risk is that the heritage of these

places may lose its ability to respond to changes in contemporary everyday life (Qian, 2021).

However, at the beginning of the 2000s, the Chinese government and local authorities decided to establish urban ecological and heritage corridors that integrated ecological, cultural, recreational and economic functions (Geng, 2012). Thus, regeneration programmes aimed at connecting urban waterfront open spaces were implemented in many cities along the canal, while preserving the original built environment and enhancing the authenticity and accessibility of urban waterfronts (Zhang and Lenzer Jr, 2020). This conservation-led regeneration also emphasised the integration of linear green corridors with parks near residential areas (Jin and Wang, 2015). During the same period, the adaptive reuse of historic and industrial heritage buildings along the canals led to the creation of cultural clusters, such as museum clusters and cultural flagships (Zhang and Yu, 2024). The urban waterfront open spaces surrounding these cultural venues were promoted as tourist destinations, attracting groups of visitors, emerging creative clusters and young urban middle-class residents through the use of cultural branding as a key economic commodity. Nevertheless, although this approach respected the traditional environment and streetscape and attempted to avoid large-scale resettlement of existing property owners and users, it still did not upgrade the functionally obsolete facilities and materials inside the buildings. As a result, it failed to address residents' everyday needs, as many improvements were restricted by the local government's historic district conservation regulations.

By the end of 2010, to pursue the designation of the Grand Canal as a World Heritage Site, the concept of "Suitable for living, travelling and businesses" was proposed as

the canal redevelopment strategy in the Third Development Strategy Forum of Chinese Canal City (Yu and Huang, 2014). Since 2014, following the formal recognition of the Grand Canal as a UNESCO World Heritage Site, the Chinese government has pursued the establishment of a series of distinctive national cultural parks in the cities situated alongside (Tong, 2022). This initiative was reinforced in 2019 through the Construction Plan for the National Cultural Parks of the Great Wall, the Long March and the Grand Canal (Wang et al., 2019). According to this plan, the Grand Canal National Cultural Park is divided into four types of zone: themed exhibition areas; culture-tourism integrated areas; controlled protection zones; and traditional utilization areas (Wang, 2020). Combined with the existing greenways along the Beijing-Hangzhou Grand Canal, the national government is currently promoting three distinct types of urban waterfront open space along the canal, driven by cultural-heritage-led regeneration: (1) the adaptive reuse of heritage canals as world-class tourist destinations; (2) the integration of canal spaces into the urban park system; and (3) the redevelopment of significant historic industrial buildings as key nodes within cultural and creative quarters. Heritage canals have thus evolved from transportation and navigation corridors into focal points for sustainable urban transformation. Canal-related heritage elements – such as ancient city walls, moats, canal-oriented water gates, and towpaths – can be embedded into the urban fabric to connect existing public service facilities, local communities and waterfront promenades. These elements are being adapted to serve diverse social, cultural, physical and economic functions.

3.4 Contemporary Urban Waterfront Open Spaces in Development Zones

3.4.1 Development of newly built urban waterfront open spaces along natural waterways in development zones

The emergence of development zones along natural waterfronts in the early 1980s was primarily a result of the economic reforms and the then-new open-door policy in China. Since then, rapid urbanisation has become a pivotal force in promoting waterfront spatial transformation. At the same time, to address the shortage of green space and limited public access in these newly developed areas, many local governments reserved a designated width of land on both sides of the canal for use as greenbelts and urban ecological corridors (Fu, 2020). From the 1990s to the early 21st century, under the influence of the market economy and real estate-led urban development, ambitious large-scale construction of Central Business Districts (CBDs) was carried out along the waterfronts of the locally initiated development zones. These areas, essential to urban waterfront expansion, were characterised by the emergence of mixed-use waterfront communities, including administrative and office districts, business and financial zones, industrial parks and high-end commercial and residential areas.

Since the 2000s, the national government has adopted an anchor-firm strategy to generate positive externalities through leading enterprises, aiming to attract further investment and industry to newly developed waterfront zones (Yang et al., 2023).

Unlike traditional new urban districts, these zones often evolve into new central urban areas rather than remaining on the periphery, forming a spatial and temporal dialogue with the core historic district, such as in the Pudong New District of Shanghai and the Qianjiang New Town CBD in Hangzhou.



Figure 3-9 Clear visual and spatial axes in China's newly built waterfront areas. (Source: GOOOOD, 2021)

Since 2010, many former vacant greenfield sites and sizable lots of derelict agricultural land have been progressively developed, and transportation networks have gradually taken shape within them. In numerous waterfront districts in Chinese cities, the organisation of public spaces around clear visual and spatial axes has become the prevalent trend in planning, as exemplified by the Zhujiang New Waterfront zones in Guangzhou, the Wuhan New Waterfront District and the Qianjiang New Waterfront Town in Hangzhou (Figure 3-9).

Additionally, in response to evolving demands for new forms of waterside public space, the newly developed zones have increasingly prioritised two core dimensions: ecological restoration, and the development of infrastructure for day-to-day life (Zhang, 2023). From an ecological perspective, many fragmented waterfront green spaces and urban wetland parks have been systematically connected to form a continuous urban ecological network aimed at habitat conservation and environmental restoration (Guo et al., 2018). To progress the integration of urban waterfronts into everyday life, the Ministry of Housing and Urban-Rural Development (MOHURD) issued in 2017 the *Guiding Opinions on Strengthening Ecological Restoration and Urban Repair*, which emphasised the improvement of the living environment and overall quality of life in urban waterfront areas. In this context, many green spaces are gradually being combined with publicly accessible waterfront public service pavilions, accommodating facilities such as washrooms, lounges, storage lockers and portable charging devices. For example, since 2017, 22 Wangjiang Yi (Waterfront Public Service Pavilions) along the eastern bank of the Huangpu River in Shanghai have been established at approximately one-kilometre intervals, each with a footprint of around 100 to 200 square metres (see Figure 3-10). Their roles include serving the basic demands of daily life and enriching waterfront experiences by constructing a spatial narrative (Zhang et al., 2023).



Figure 3-10 Urban waterfront public service pavilions distribution along the Yangpu River in Shanghai, China. (Source: GOOOOD, 2022)

In addition, to enhance competitiveness, culture and creativity play a key role in waterfront regeneration in new development zones of China. As newly developed zones in China lack tangible cultural heritage resources, such as historical buildings and industrial heritage sites, one approach has been to reshape the city's image through hosting international mega-events and cultivating cultural branding. In this context, culture is increasingly being used in the shape of new place-brands through long term waterfront regeneration vision, slogans, civic ceremonies, cultural and sports events, as well as public art. These activities tend to use culture as a resource rather than a consumable production in shaping contemporary urban waterfront open spaces, which associated with urban's distinctive economic geography. In this context, an increasing number of creative classes are drawn to living in the newly waterfront developed areas, even though housing prices and rental costs remain higher than other places. It is important to highlight that the definition of the creative class in China

not only encompasses traditional talented individuals and cultural producers working within the creative industries but also extends to the large number of online short-video creators attracted by the scarcity of urban waterfront resources and the rapid development of the internet media industry. They are emerging as new residents in the waterfront zones of newly developed districts, while simultaneously shaping new urban place-brands through digital media platforms. Although the creative class has become involved in place branding within newly developed waterfront areas, the extent to which their cultural practices express locality and strengthen place identity requires critical examination.

In summary, the changing daily needs and demands of urban dwellers result in the emerging new typologies of public spaces in newly development zones in China (Qi et al., 2024). These new open spaces are being integrated into public social life, at the same time, shaping linear inclusive and attractive waterfront public spaces by promoting cultural branding and developing ecological corridors (Aelbrecht and Stevens, 2019). While they have the potential to meet social justice goals, such as enhancing waterfront community social bonds, they may lead to gentrification and detrimentally affect local housing costs (Avni and Fischler, 2020). The following sub-section provides a detailed classification of newly built waterfront open space typologies based on their spatial forms.

3.4.2 Point-line typology as a key typology of contemporary urban waterfront open spaces

In newly developed waterfront areas in China, extensive green spaces were initially planned along the water's edge due to the presence of large tracts of vacant farmland. Over the past decade, the development of ecological corridors and the implementation of urban waterfront public space renewal programmes have facilitated the gradual transformation of these green spaces into multifunctional waterfront leisure precincts (Fu, 2020). This spatial transformation has given rise to a point–line typology, in which the "points" comprise key nodes at the water's edge, such as parks, squares or cultural flagships, while the "lines" refer to linear waterfront promenades and green belts along both sides of the water and its adjacent areas. This point-line way of organising public space on the waterfront can be further categorised into five sub-types.

Sub-type A-1 comprises the body of water itself, linear waterfront green parks, waterfront promenades, and adjacent buildings that are primarily composed of gated residential communities (see Figure 3-11). Characterised by a pedestrian-friendly environment and the exclusion of motor vehicles, it encourages a wide range of social activities and behaviours. However, the accessibility and visibility of the body of water are low, as the placement of entrances and exits is constrained by the length and enclosure of the surrounding residential blocks. Such privatisation of the waterfront environment is problematic, as it leads to inaccessible public places.

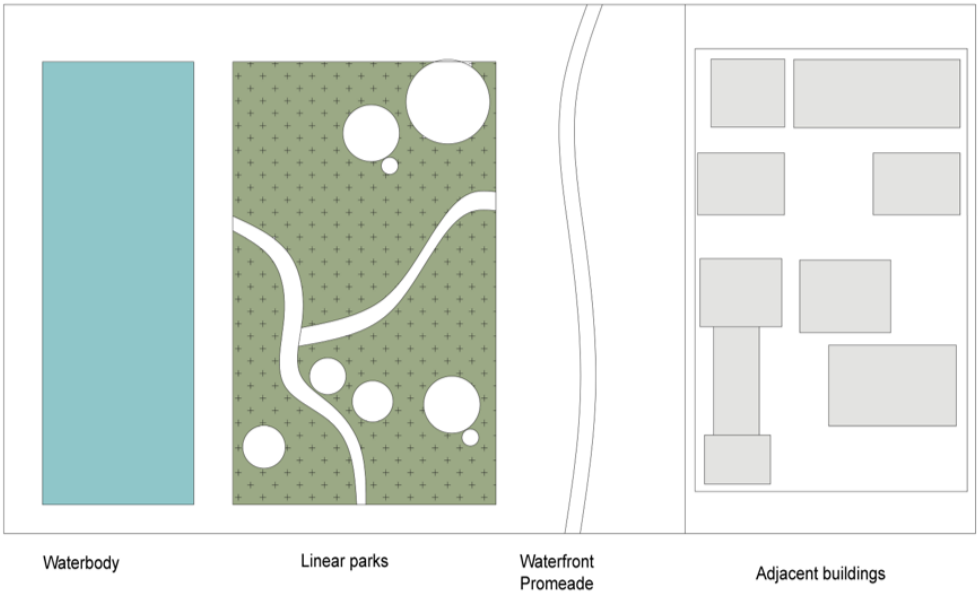


Figure 3-11 Sub-type A-1. (Source: Drawing by author)

Except for the location of waterfront promenades (or canal paths), **Sub-type A-2** is consistent in every spatial element with A-1 (see Figure 3-12). The waterfront promenades in this sub-type are located close to the water. Their width ranges from approximately 25 to 50 metres, which provides good opportunities for access to the water. Such promenades also support diverse activities and accommodate various functions via adding urban waterfront public service pavilions. Such pavilion could undergo functional transformation in response to changing social needs, such as commercial venues, exhibition areas, or teahouses.



Figure 3-12 Sub-type A-2. (Source: Drawing by author)

Sub-type A-3 consists of a body of water, narrow strips of green space and high-speed roads (see Figure 3-13). The creation of such public infrastructure, which includes elevated expressways and high-speed roads, presents physical and visual barriers for users, which obstructs the link between the waterfront open space and its hinterland. As a result, these strips of green space primarily function as passive landscape features, offering visual relief rather than facilitating meaningful public engagement or social encounters.

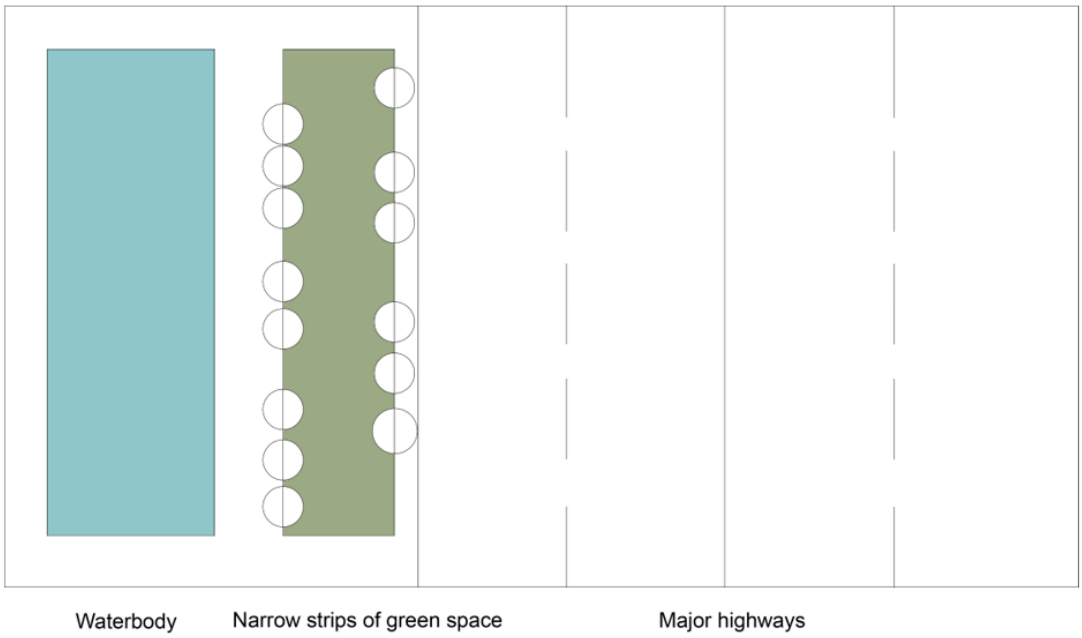


Figure 3-13 Sub-type A-3. (Source: Drawing by author)

Sub-type A-4 encompasses a body of water, waterside promenade or path, green spaces and a high-speed road (see Figure 3-14). Compared to Sub-type A-3, although high-speed roads still act as physical barriers separating urban waterfront public spaces from their hinterlands, there is waterfront public space in this sub-type to allow daily life to go on to a certain degree.



Figure 3-14 Sub-type A-4. (Source: Drawing by author)

Sub-type A-5 represents a social public space manifested by a waterfront park, in which the body of water forms an integral component of the overall landscape (see Figure 3-15). Unlike the linear forms described in Subtypes A-1 to A-4, this type is characterised by its larger, consolidated spatial layout that manifests social ideals and zeitgeist. These social public spaces on waterfronts are usually carried out by local governments, which function as political achievement projects, while also drawing on local history and culture to express symbolic meanings. However, in such social public spaces, certain behaviours were frequently limited and subjected to vigilant monitoring.

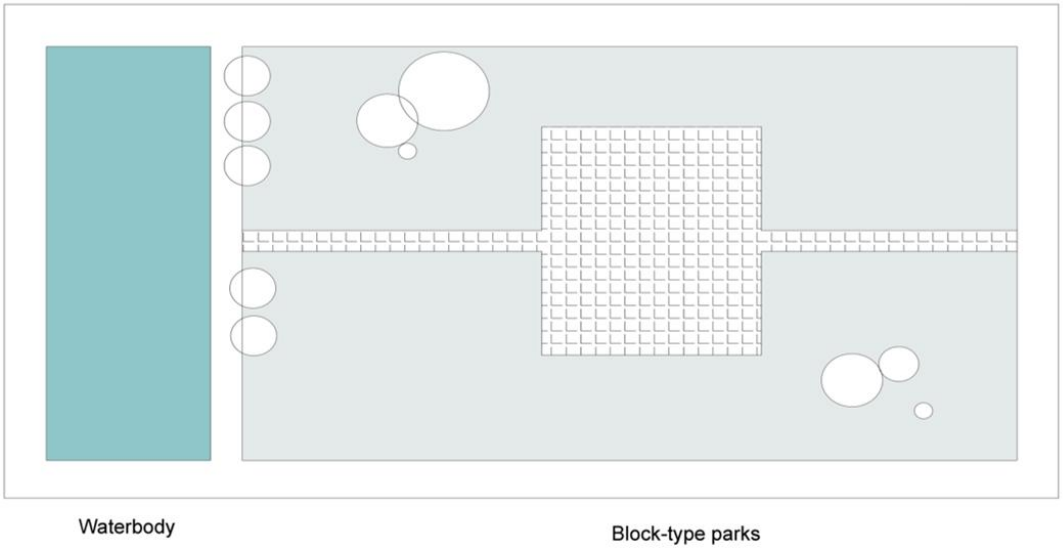


Figure 3-15 Sub-type A-5. (Source: Drawing by author)

It can be observed from the five main sub-types discussed above that the development of waterfront public spaces in newly developed areas in China is primarily organised around the link between the waterfront and urban green space as an integral linear ecological corridor. These promenades were redesigned and have been repurposed for reducing the isolation of habitat fragments and increasing the connection between the urban waterfront and hinterland (Chen et al., 2024). Furthermore, since 2015, the place-making approach to newly-developed waterfront zones plays a vital role in regeneration, with a focus on landscape and aesthetic design, the integration of daily life into public infrastructure, enhancement of urban identity of the waterfront and the revitalisation of cultural and heritage resources (Shi et al., 2018). For instance, municipal planning authorities tend to employ cultural flagships and waterfront public service stations as strategic nodes to stimulate daily life along the urban waterfront. In

addition, linear urban green space systems and bodies of water have been linked to enhance accessibility and ecological continuity (Liu et al., 2021). Although the cultural heritage resources in newly developed waterfront zones are generally less abundant than those in historic canal districts, mega-event-driven initiatives have sought to uncover and reinterpret historical elements from different periods of urban development, integrating them with contemporary local characteristics. This heritage-led regeneration strategy is rooted in local cultural identity. It is often combined with contemporary public art and design installations, transforming linear waterfront public spaces into outside stages for exhibition and art display, a prominent example being the Shanghai Urban Space Art Season (SUSAS). It remains necessary to assess whether these newly developed urban waterfront open spaces are capable of expressing symbolic meanings, shaping new social identities, and integrating into the daily routines.

3.5 Historic Development and Contemporary Urban Context of Hangzhou

Hangzhou represents a representative urban waterfront development interweaving of an ancient capital and a contemporary metropolis. Since 1949, particularly following the reform era, Hangzhou has experienced extensive urban expansion, making it a representative Chinese example of polycentric spatial development. This section examines Hangzhou’s historic urban transformation and contemporary urban

waterfront development within an increasingly polycentric spatial structure and thus considers the implications for the selection of two comparative case study areas.

3.5.1 Historic urban formation and socio-spatial transformation of Hangzhou (222 BC–1949)

First established during the Qin Dynasty (222 BC), Hangzhou's early urban development was fundamentally influenced by its strategic location within regional water networks. The construction of the Beijing–Hangzhou Grand Canal during the Sui Dynasty (AD 610) transformed the city into a major trade, transport, commercial and cultural hub.

Hangzhou's historical prominence reached its peak during the Southern Song Dynasty (AD 1138–1279). During this period, the Hangzhou city, then known as Lin'an, served as the national capital and experienced its first major urban transformation, moving from the "enclosed Li–Fang system" to a more open "Fang–Xiang system" (Cao et al., 2023, p. 5). As spatial organisation evolved from enclosed marketplaces and walled residential wards to a more open public realm, urban space came to accommodate scattered shops and stores, broader neighbourhoods, streets and lanes, bridges, and waterfront open spaces along the canals. Even though the canal corridor was not yet fully incorporated within the city's urban boundary at that time (Figure 3-16), it underpinned a peak of commercial prosperity and established a traditional waterfront

open space functioning as integral components of public life rather than purely transport infrastructure.

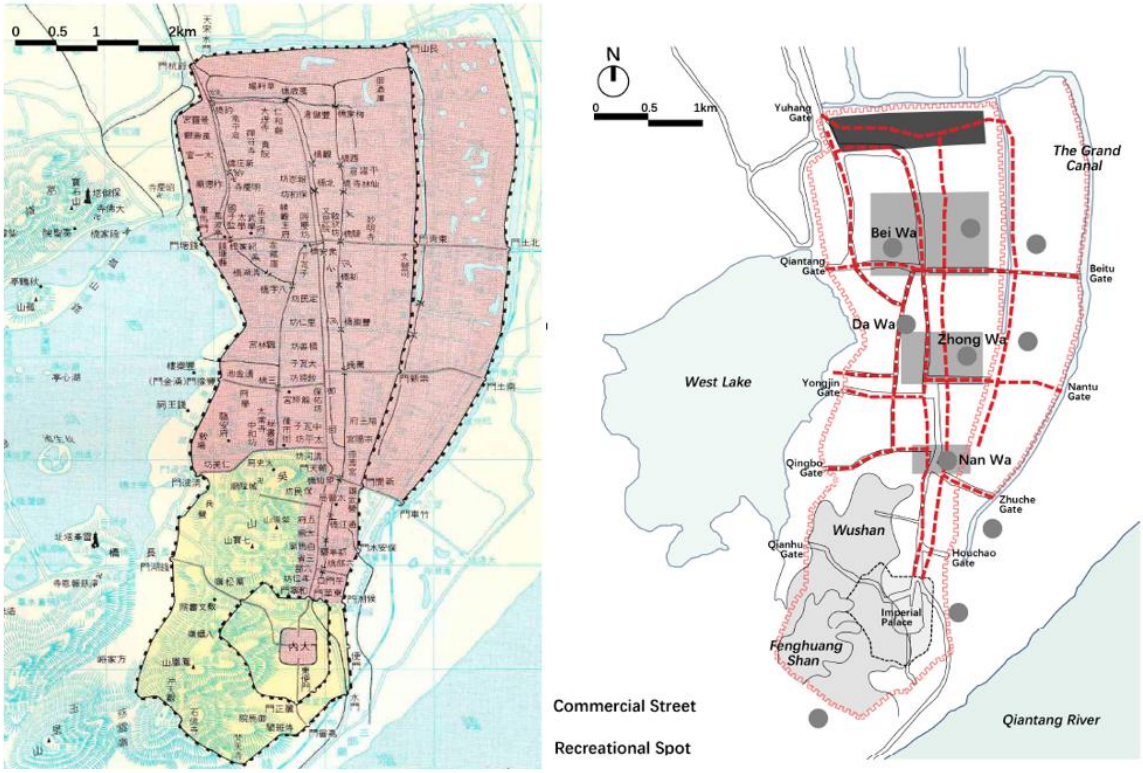


Figure 3-16 Mapping of Southern Song Lin'an as the first phase of city transformation. (adapted from Cheng et al., 1980)

From the Ming Dynasty through the Republican era (1368–1949), Hangzhou underwent a further phase of socio-spatial restructuring as it transitioned from a political capital to a regional centre of commerce, handicraft production and early contemporary industrial development. As the provincial capital of Zhejiang, the city's silk and tea cultures played a key role in shaping its urban identity and spatial organisation. Particularly in late Qing dynasty (1850–1911), private and state-run silk industries were distributed across different areas of the city, forming a complex

production and trade network closely aligned with the canal system (Figure 3-17). These industrial and commercial activities strengthened the role of canal-side districts as public places where production, mobility and daily routines intersected.

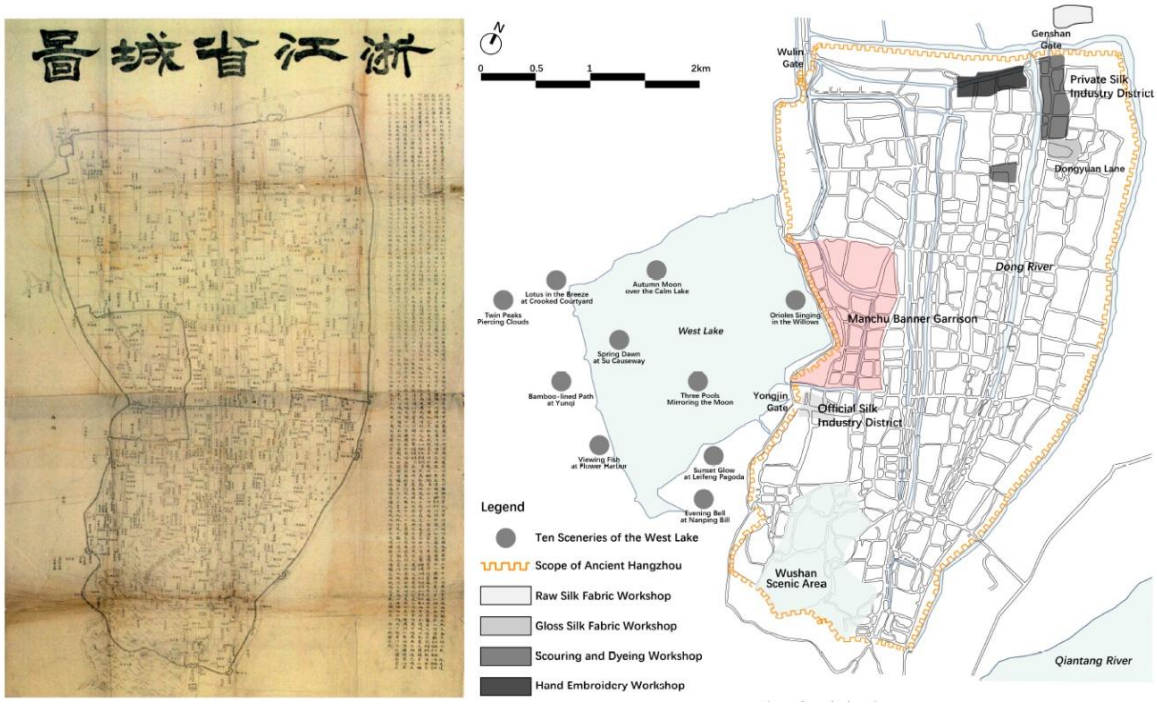


Figure 3-17 Spatial distribution of private and state-run silk industries in Hangzhou (late Qing period). (adapted from Cheng et al., 1980)

In this period，external forces associated with the opening of Hangzhou as a treaty port in 1896 introduced new institutional and spatial interventions that reshaped Hangzhou's urban transformation. Areas around Gongchen Bridge became focal points for modern national capitalist industries, including cotton mills and silk-reeling factories, thereby being reconfigured into a strategic industrial and logistical node (Figure 3-18). Although Shanghai gradually replaced Hangzhou as the dominant economic centre of the Yangtze River Delta, Hangzhou retained its significance as a

regional industrial and commercial node. Throughout this period, urban space continued to be shaped by everyday routines of labour, trade and movement, rather than by monumental or centrally planned urban forms.

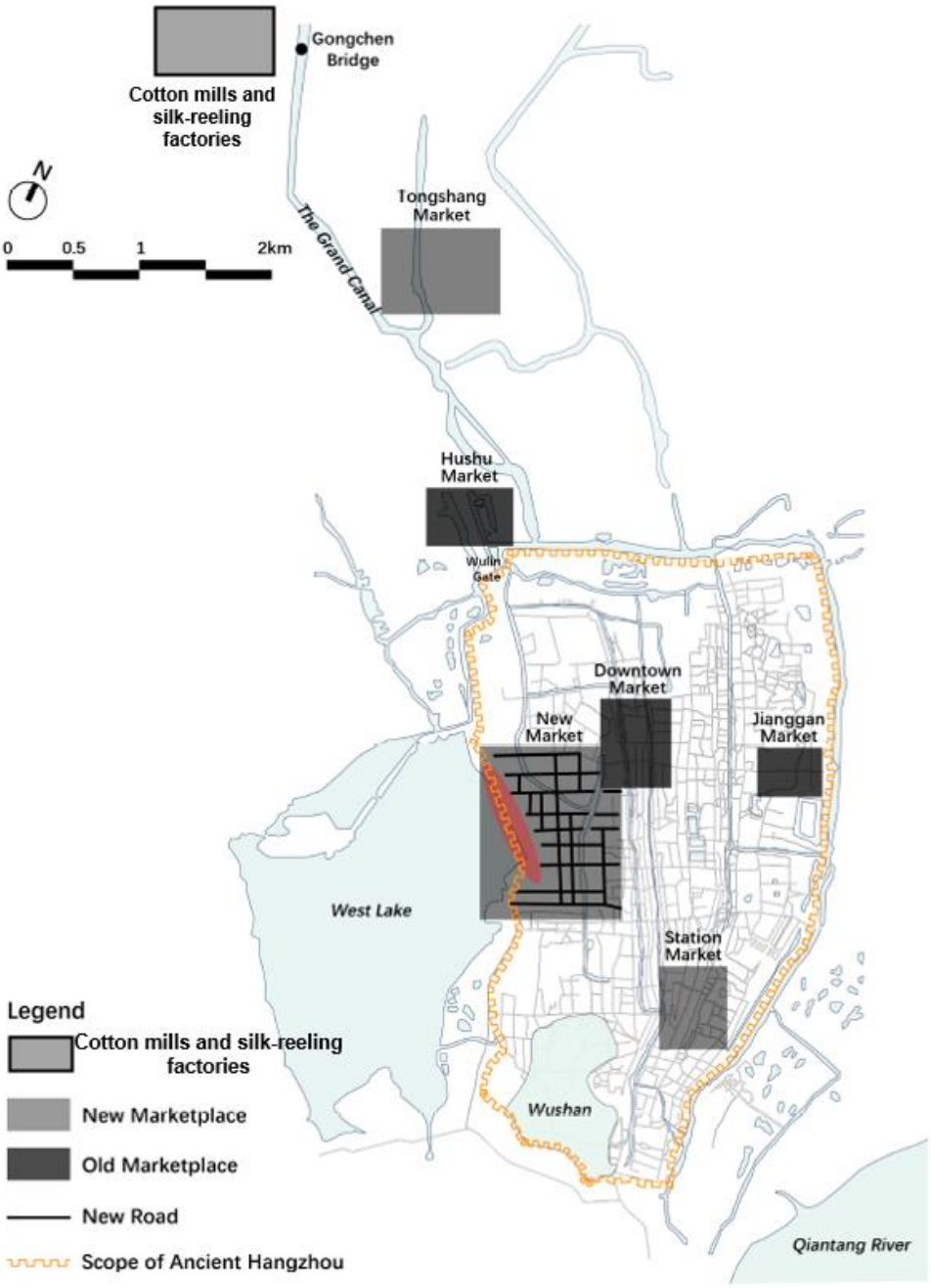


Figure 3-18 Second phase of city transformation in Hangzhou from 1896 to 1949. (adapted from Cheng et al., 1980)

3.5.2 Socialist industrialisation, reform-era expansion and polycentric urban development in Hangzhou (1949–Present)

Following the Chinese Communist Party's takeover of Hangzhou in 1949, Hangzhou entered a new phase of state-led development shaped by socialist industrialisation. Between 1949 and 1978, Hangzhou developed as a typical socialist industrial city, with industrial production prioritised as a central policy objective, and many of the historical sites along the canals were destroyed due to the impact of "feudalistic heritages and symbols of capitalism" (Hua and Wei, 2012, p.398). Particularly in the Qiaoxi area, located along the Hangzhou section of the Beijing–Hangzhou Grand Canal, the area was transformed into a major industrial hub, characterised by state-owned textile, dyeing, and papermaking factories. (Fu, 2016). This transformation was underpinned by the socialist restructuring of ownership, through which private enterprises were converted into state-run factories after 1949 (Cao et al., 2024).

From the 1950s to the late 1970s, Hangzhou developed as a typical socialist industrial city. By 1980, the city's built-up area remained limited to 53 km², while per capita living space was as low as 4.1 m² and per capita residential land stood at 22.59 m² (Wei and Fang, 2003).Urban transformation during this period was primarily driven by heavy and light industrial development, accompanied by the provision of worker housing and transport infrastructure, resulting in a shortage of urban services and underdeveloped public amenities.

The reform and opening-up policies initiated in 1978 marked a critical turning point in Hangzhou's urban development. Rapid population growth, land-use restructuring and economic reforms facilitated extensive urban expansion and a gradual shift towards a polycentric spatial structure, supported by accelerated urbanism and the emergence of non-state enterprises (Liu, 2010). Furthermore, the 1981 Master Plan of Hangzhou emphasised the ambition of developing the city into a world-class tourism destination, proposing the strategic mobilisation of key waterfront landscapes, including West Lake, the Grand Canal system and the Qiantang River, as assets for tourism development and city branding. During the 1980s and 1990s, this strategy reinforced Hangzhou's emerging polycentric structure while repositioning its waterfronts within a broader urban development agenda.

In the late 1990s and early 2000s, intensifying global competition for talent and high-tech industries further shaped Hangzhou's spatial restructuring. In response, the municipal government increasingly prioritised high-tech and creative industries as part of its effort to position Hangzhou as a "creative city". From the early 2000s onwards, in order to remain competitive and consolidate its polycentric spatial structure, Hangzhou pursued a dual-track strategy. On the one hand, the culture-led regeneration of Qiantang New Town was proposed as a newly built central business district and a new symbolic urban core. On the other hand, the Hangzhou section of the Beijing–Hangzhou Grand Canal became the focus of heritage-led regeneration, a

trajectory reinforced by the canal's successful inscription as a UNESCO World Heritage Site in 2014.

Within this framework, the Grand Canal corridor in Hangzhou illustrates a long-term transformation from a production-oriented industrial zone to a site of post-industrial transition. The restructuring of state-owned enterprises during the 1980s and 1990s contributed to industrial decline and widespread unemployment among textile workers. In the 1990s and 2000s, regeneration initiatives involved large-scale physical restoration, which resulted in the relocation of a substantial proportion of original residents and local stakeholders outside the conservation district. While conservation planning aimed at preserving the original built environment and retaining native residents has been adopted for historic sites along the Grand Canal since the early 2000s, this process has nonetheless raised concerns about social displacement and gentrification issues. This trajectory provides essential context for understanding subsequent heritage conservation–based interventions along the Grand Canal.

In parallel, the development of the Qiantang New Town illustrates Hangzhou's spatial shift from the "West Lake Era" to the "Qiantang River Era" (Liu et al., 2023). While urban development between 2000 and 2010 prioritised the construction of a new urban core and a symbolic waterfront axis along the northern bank of the Qiantang River, the southern bank remained comparatively underdeveloped, characterised by low-density land use and fragmented waterfront spaces (Figure 3-19).



Figure 3-19 Historical stages of waterfront construction in Hangzhou's newly waterfront areas. (Source: drawing by author)

This uneven north–south development laid the foundation for a subsequent phase of urban waterfront regeneration, in which planning priorities gradually shifted from large-scale urban form making towards the creation of people-oriented waterfront open spaces.

These dual trajectories provide the contextual rationale for selecting two case study areas selection (Figure 3-20): Qiaoxi Heritage Canal District (QHCD) along the Hangzhou section of the Beijing–Hangzhou Grand Canal, and newly built riverfronts along the core South Bank of Qiantang River (SBQR) in the Qiantang New Town. Overall, Hangzhou has been at the forefront of urban waterfront regeneration in China. Although their morphology and historical background varied, both case studies tend

to develop a people-oriented and quality-driven approach to creating a public realm on urban waterfronts.

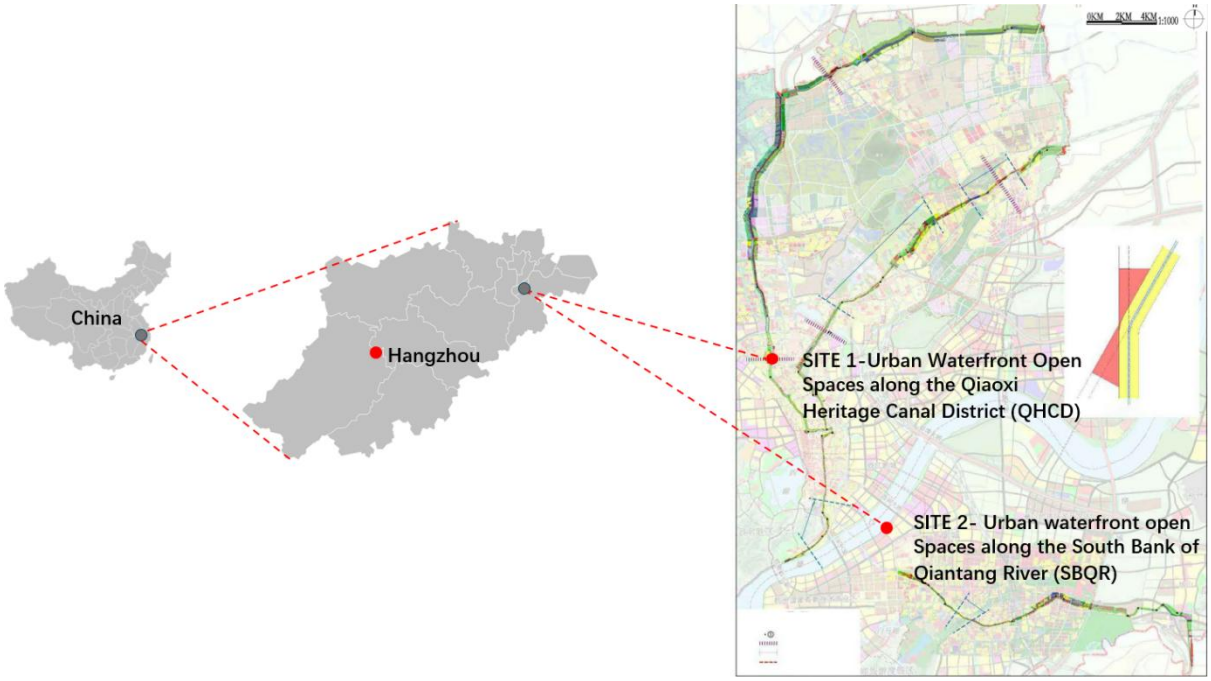


Figure 3-20 Two representative areas of historical and contemporary urban waterfront open space in Hangzhou. (Source: drawing by author)

3.6 Conclusion

This chapter examines how cultural-heritage-led waterfront regeneration has influenced the public spaces of both traditional canal districts and contemporary, newly-developed waterfront areas in the Chinese context. Through comparative analysis, it becomes evident that these two typologies differ in terms of spatial configuration, public use and social management. Historically, due to the rapid development of canal-based commerce and trade activities, the earliest forms of the “water-street” typology, as traditional Chinese canalside public spaces were developed

spontaneously and informally. Key public courtyards along the canals, such as guild halls and temple courtyards, played a crucial role in shaping social ties and local industry development (Xu, 2000). In addition, the spatial form of traditional waterfront public spaces in ancient China were often characterised by a wide range of active frontages, facilitating spontaneous social interactions and informal activities, and are deeply embedded in the collective memory of the city. From 1980 to present, under the influence of urbanisation and cultural-heritage-led regeneration, a comprehensive canal protection program and physical restoration has been implemented on a national scale along the Beijing-Hangzhou Grand Canal, which aims to respect the traditional environment and canalscape and stimulate tourism by playing up canal heritage while focusing less on “maintaining the city’s canal culture” (Zhang and Lenzer Jr, 2020, p. 112). In particular, between 2000 to 2010 these physical restoration efforts tended to reconstruct ancient building styles for façade protection rather than reflect the local past and everyday life (Qian, 2021). Local regeneration strategies often failed to upgrade functionally obsolete facilities and internal materials of historic buildings at that time. Furthermore, local residents and institutional property owners were always forced to relocate to areas outside the heritage canal districts, resulting in spatial similarity and social homogeneity. Such relocation and displacement also reduced diversity and disrupted the social ties between shop owners and residents. Although national authorities proposed strategic changes to adopt participatory regeneration and community engagment in response to public controversy and scholars’ criticisms

at the end of the 2010s, users' perceptions of urban waterfront open spaces still require further evaluation. These interventions and policies need to be updated to meet the contemporary everyday needs of users.

By contrast, newly developed waterfront areas in China were initially established between the 1980s and 1990s and were gradually refined between 2000 and 2010. Since then, in response to emerging issues such as gentrification, cultural identity, social inclusion and ecological protection, a wave of waterfront regeneration has been undertaken to improve overall "publicness" in these areas. These contemporary waterfront spaces are typically characterised by the integration of green spaces and water bodies, which had been relatively disconnected from the historical urban fabric and were often shaped by top-down planning policies. Although the current regeneration initiatives consider spatial aesthetics, ecological design and flood control infrastructure, they may fail to encourage a strong sense of local memory and community identity. Thus, the Chinese government is actively promoting cultural heritage initiatives, such as, at a micro level, the implementation of waterfront public service stations and, at a macro level, the creation of cultural flagships, to strengthen the interaction between local communities and open spaces in contemporary, newly-developed waterfront districts (Zhu, 2023a). Overall, cultural-heritage-led urban regeneration has become the prevalent trend in both traditional canal districts and the newly developed waterfront zones, continuously shaping high quality urban waterfront

open spaces that encourage everyday activities and stakeholders' interactions in managing public and private interest conflicts. More importantly, while implementing cultural heritage-led regeneration policies, collaborative governance can provide a solution to enhance institutional capacity and create public value by analysing HUL approach and everyday heritage concept.

As a southern hub of the Yangtze River Delta and a representative example of polycentric urban development in China, Hangzhou provides an appropriate context for assessing urban waterfront open spaces based on users' perception. The next chapter discusses the key factors that affect the quality of waterfront public spaces and establishes the research framework based on a review of approaches to place-making.

CHAPTER 4- RE-THEORISING THE QUALITY OF URBAN WATERFRONT OPEN SPACE: DEVELOPING A QUALITY-BASED RESEARCH FRAMEWORK

4.1 Introduction

Improving the quality of public space plays a key role in developing people-oriented urban transformation along waterfronts in the Chinese context. This chapter aims to develop a quality-based research framework for assessing urban waterfront open spaces from the users' perspective. This chapter begins by analysing placemaking approaches, followed by an investigation of key models for evaluating "publicness" and public space quality. It then discusses key urban waterfront design and planning principles to help identify the specific characteristics of urban waterfront open spaces. These contemporary theories and concepts addressing the quality of public space provide a theoretical grounding for re-theorising the quality of urban waterfront open spaces by identifying key factors, sub-factors and variables. In summary, it synthesises key theoretical framework on placemaking, publicness and waterfront design principles in order to identify the main dimensions and variables shaping urban waterfront open space quality.

4.2 Placemaking Approaches

This sub-section first introduces placemaking fundamentals and associated assessment framework based on users' perception, followed by an exploration of the

place-shaping continuum, which encompasses the processes of design, development, management and use of space to support higher quality urban design solutions.

4.2.1 Placemaking fundamentals

The emergence of the placemaking approach was driven by urban design scholars who, since the 1960s, have criticised the lack of attention given to public space in the planning of new towns and city centres (Carmona, 2010a; Madanipour, 1999). For example, in the 1960s, Jane Jacobs (1961) advocated designing cities with a focus on people, rather than on cars and shopping centres. Furthermore, Edward Relph's book *Place and Placelessness* (1976), one of the earliest scholarly works to mention place-making, maintains that space should not be viewed as a void, an isometric plane or a mere container for places. Instead, transforming space into place involves the attribution of meaning and value by the people who engage with it, as well as an exploration of how they experience and interact with the space itself (Seamon and Sowers, 2008). Such an approach means that people could find themselves experiencing, living, understanding, interpreting and finding meanings based on the human experience. Thus, Relph (1976) emphasises the significance of place in everyday human life and how it is manifested through shaping the identity of place. The persistent identity of place he describes includes three key aspects: (1) the physical setting of the place; (2) activities, events and situations; and (3) the individual and collective meanings created by people's everyday experiences and attitudes

toward that place. Based on Relph's theory, Montgomery (1998) further elaborates on three essential elements that comprise the sense of place, as seen in Figure 4-1.

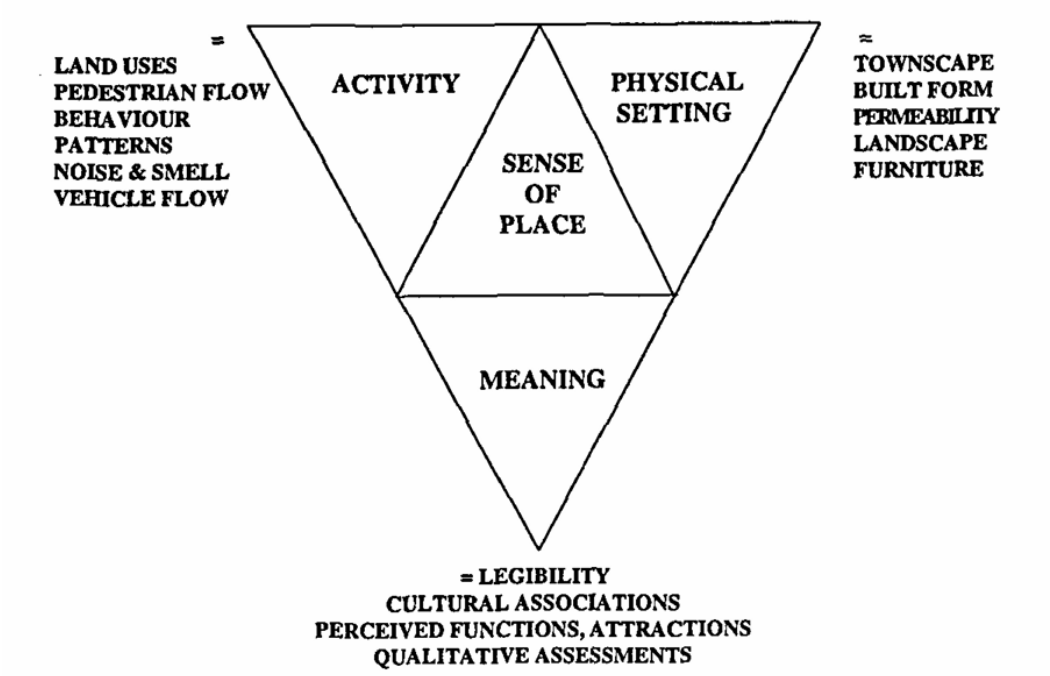


Figure 4-1 Sense of place as the interaction between activity, physical setting, and meaning. (Source: Montgomery, 1998)

Such aspects reveal that placemaking approach has shifted from merely constructing a "space" focused on physical transformation to remaking a successful "place" by putting people and adding meaning at its core (Friedmann, 2016). Since 1975, inspired by the placemaking approach, the Project for Public Spaces (PPS, as seen in Figure 4-2) has been proposed as a tool to address the privatisation of public space and enhance its quality for public use (Toolis, 2017). It aims to improve the quality of life, balance the interests between the public and private sectors and foster meaningful

links between people and the places they share (Buckman, 2016). PPS identifies the following criteria for a successful public space (PPS, 2008):

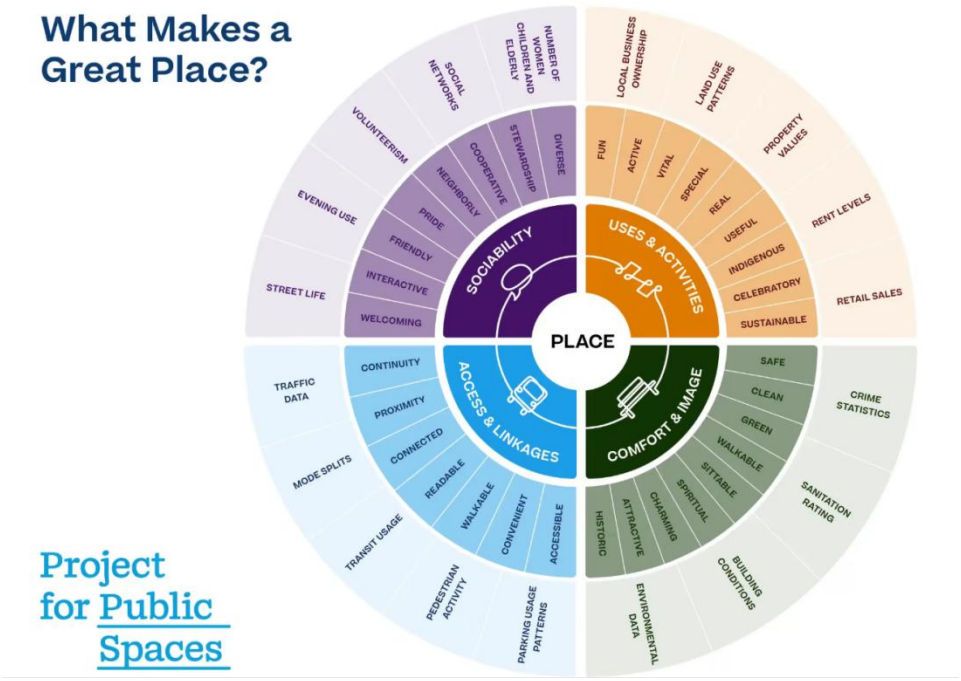


Figure 4-2 Dimensions of Successful Public Spaces.
(Source: Project for Public Spaces, 2008)

- **Access and linkages**: a successful public place is easy to access, navigate and get through. It should have good connections to the surroundings, including the visual links. Additionally, design elements include edges that promote permeability and flow, as the edges of a public space play a crucial role in ensuring accessibility.
- **Comfort and image**: a comfortable place is one where people feel at ease spending time and where a sense of comfort and a positive image are evoked.

Creating a sense of comfort involves perceptions of safety, cleanliness, provision of good climatic conditions and the availability of seating.

- **Uses and activities**: something to do gives people a reason to come to a place, and to return. Essential elements include an inviting and open design that allows for a seamless connection and flow between the public and private spaces, encouraging people to visit and stay in the area. The mixed-use function and diversity of activities foster an inclusive public realm.
- **Sociability**: refers to how to build a favourite public place that supports social interaction, such as meeting friends and neighbours and interacting with strangers. These are also the fundamental elements of a public space where people feel included, represented and welcomed in fully expressing themselves, which are also essential in shaping an inclusive public realm.

From its initial conceptualisation in the 1970s to the present day, the placemaking approach encourages individuals to reimagine and reshape public spaces collectively, positioning them as the core of every community (Kent, 2004). Indeed, it has remained a continuous, bottom-up and people-centred process of shaping and experiencing places, which has the potential to boost public participation and collaboration with stakeholders. Habibah et al. (2013) suggest that placemaking aims to reconcile public, private and community interests. They define placemaking as the process of creating a sense of place based on the stakeholders' vision. It refers to a collaborative process

through which the public realm is shaped to maximise shared value for different stakeholders; and it has been embraced by various groups, including local residents, developers and entrepreneurial local government, despite each having different purposes in mind (Keidar et al., 2024). For example, developers tend to perceive placemaking approach as the physical transformation of a location, considering it the end product of a project driven by economic interests. However, for local residents and visitors, placemaking should be connected to the historical fabric, local communities and their collective memory. Urban designers and entrepreneurial local governments play a critical coordinating role in balancing public and private interests by adopting bottom-up placemaking approaches that incorporate informal, tactical, temporary, low-cost, small-scale, and spontaneous interventions. Such approaches can serve as an important step in promoting collaborative placemaking (Akbar and Edelenbos, 2021).

Overall, the purpose of placemaking approach can be summarised as follows (Habibah et al., 2013; Othman et al., 2013; Thomas, 2016; Akba and Edelenbos, 2021)

- **Encouraging community participation** in government decision-making processes. Urban planners and designers should involve end-users in the decision-making process to minimise uncertainty as much as possible.

- **Ensuring the continuity of past forms** through both tangible and intangible cultural and spatial qualities.

- **Establishing a sense of place** in which people live, work and identify themselves as part of the place-making process.

- **Balancing public and private interests** to benefit both communities and a wide range of stakeholders.

- **Strengthening the connection** between people and the places they share.

Drawing from placemaking theory rooted in a people-centred approach, Jan Gehl points out that high quality public spaces tend to deliver protection, comfort and enjoyment/delight based on the perception theories (Gehl, 2010). He subsequently developed a tool based on 12 key criteria for evaluating good public space (Gehl, 2012). Their indicators were selected based on people's perceptions of the built environment and the hierarchy of human needs (Figure 4-3).

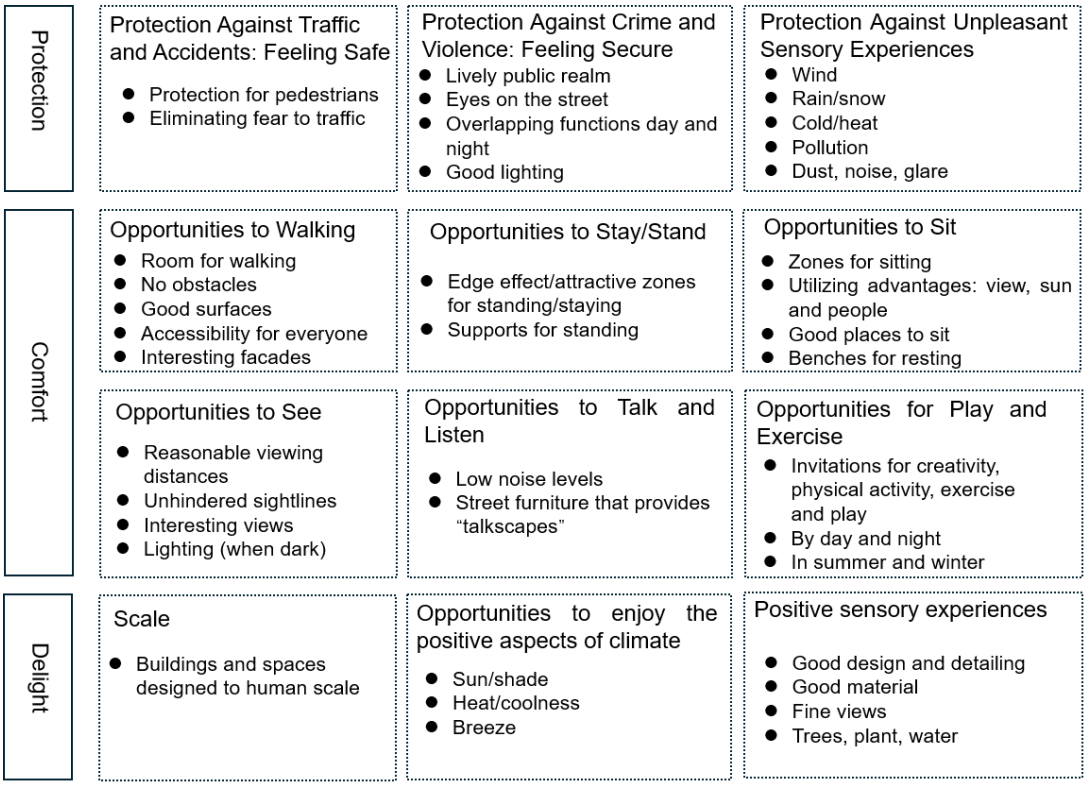


Figure 4-3 Gehl's 12 Quality Criteria in Cities for People.

(Source: Adapted from Gehl, 2011)

Building upon the literature review on Gehl' 12 Quality Criteria, safety, comfort and human scale spatial layout constitute three critical factors of public space quality based on users' perspective. Safety primarily relates to protection against traffic, crime and unpleasant sensory experiences. Comfort refers to users' bodily and sensory experiences, including opportunities to sit, walk, stay, see and talk, while considering climatic responsiveness and the provision of proper physical configuration. Meanwhile, spatial layouts designed to a human scale play a key role in shaping users' sense of orientation, enclosure and spatial rhythm. Such a perception-based assessment framework provides a theoretical foundation for the development of evaluation

indicators.

4.2.2 Place-shaping continuum

As places and the process of placemaking become increasingly complex, a long-term placemaking approach should be considered across different stages. This framework should emphasise how public spaces are shaped and reshaped over time in relation to the design process, development, space in use and management. In this context, Carmona (2014) proposed the concept of the place-shaping continuum, which identifies four key aspects of the place-shaping process:

Design

In terms of design, Carmona (2014) points out that the first step is to establish a vision that reflects the ultimate purpose of public space design processes. Urban designers and architects should work together in the design process and be responsive to the local context.

Development

Leadership and coordination are crucial in the development process. Carmona (2014) suggests that a strong project champion – someone who is committed and capable of coordinating diverse interests amid contrasting views on how a place should be shaped – is essential. Furthermore, coordination involves balancing public and private investments that underpin regeneration projects. To achieve this, a range of regulatory

instruments – such as planning controls, highway orders or listed building consents – can be negotiated to realise a shared vision that places the public interest at its core.

Space in use

Through the preceding processes of design and development, public spaces are continually shaped and reshaped according to their use. As Carmona (2014, p.22) noted: “use gives meaning to space and decisively shapes the experience of it”. People’s activities and behaviour at different times of the day should be considered at two previous stages. Furthermore, diverse public amenities need to be provided to accommodate different social groups and to adapt to changing needs over time.

Management

Carmona (2014) identifies key characteristics for shaping the high-quality public realm through management. The first is ensuring long-term investment in the public sector, as private developers often prioritise speculative development processes. Second, it is necessary to consider how place curation contributes to the management process, particularly in relation to the organisation of activities and their practical feasibility. Third, the control of space tend to be designed to reduce crime and discourage undesirable behaviour, which may range from more rigid to relatively flexible approaches (Varna, 2014). Hard controls include the use of CCTV cameras, the presence of public and private security guards and similar interventions; while soft controls are commonly employed to discourage undesirable behaviours and to design

out certain activities. These measures include the implementation of “sadistic” street furniture and the application of natural surveillance design principles (Varna, 2014).

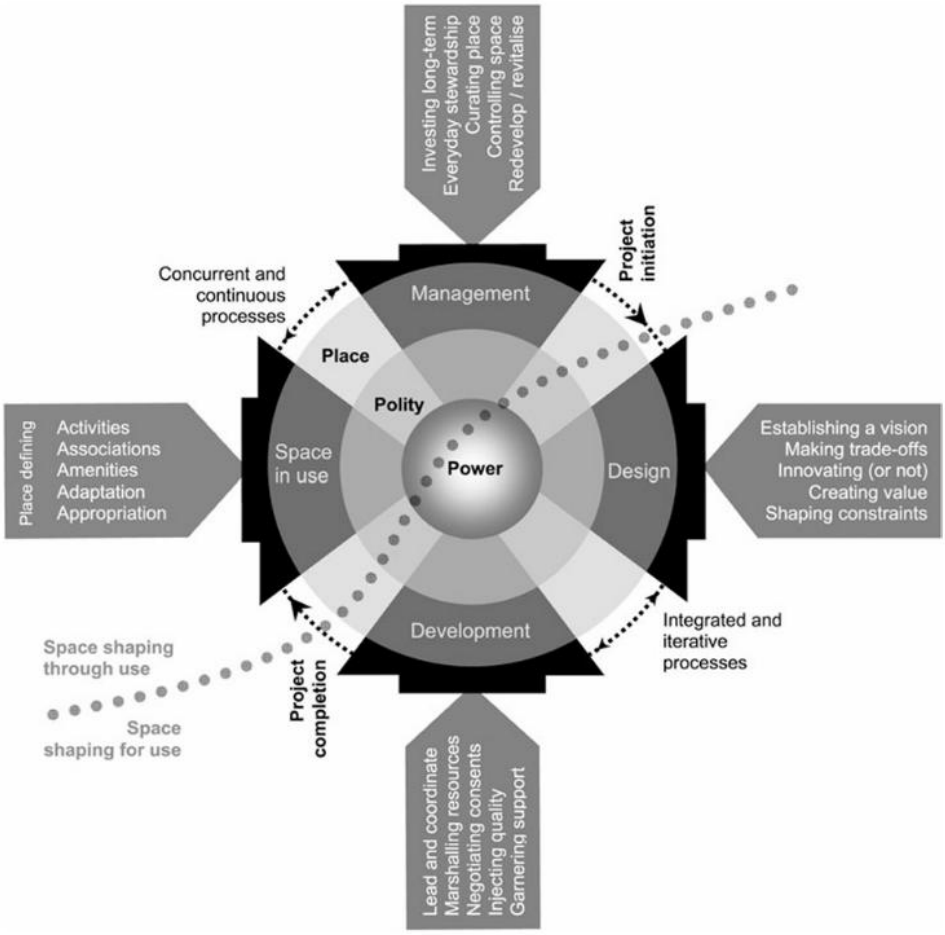


Figure 4-4 Urban design process: a place-shaping continuum.
(Source: Carmona, 2014)

The model of place-shaping continuum (Figure 4-4) presents a continuous model of urban design that refers to the “self-conscious development of four-dimensional project vision” (Lang, 2014, p. 41). It helps to understand and explain the nature of urban evolution and city form, while also highlighting the role of designers in maximising benefits for different stakeholders. Anderson and Law (2015) argue that the place-shaping continuum represents a circular process through which urban

places are shaped by both knowing and unknowing actions within self-conscious and unselfconscious design practice. The term *knowing* relates to planning consultants, architects, and urban designers who are self-consciously involved in the urban design process, while the term *unknowing* refers to virtually every other member of the community, including the business community, investors, public servants and householders, who shape the city unselfconsciously, without a deliberate urban design agenda (Carmona, 2014). This model serves to integrate key stakeholders in order to explain the functioning of the urban design process.

4.3 Assessment Framework of the Quality of Public Spaces

In parallel with the growing emphasis on the placemaking approach in shaping and reshaping contemporary public space, the quotation above highlights another key academic concern: assessing “publicness” and identifying the key factors that affect public space quality. In this context, this section discusses key models for measuring publicness and evaluating the quality of public spaces. Its aims to identify shared attributes to both public space and waterfront open space were derived from established public space quality/publicness models.

4.3.1 Key models to measuring the “publicness” of a public space

In recent public space literature, numerous scholars have identified key dimensions of “publicness”. This growing interest stems from the recognition that publicness is a

crucial prerequisite for defining an ideal public space—understood as “the essential quality that defines the public characteristics of a public space” (Li et al., 2022, p. 480).

Some researchers have defined the publicness based on the distinction between public and private types. For example, Benn and Gaus (1983) identified three factors for measuring the publicness of public space: access, agency and interest. The dimension of “access” comprises four elements: physical access to spaces; access to activities and interactions; access to information; and access to resources. “Agency” refers to whether control over access is public or private, leading to the question of “interest”, which examines the motivations of agents who act either in their own interests or for the public benefit (Li et al., 2022). Young (2000) identified three essential factors affecting “publicness”: accessibility, inclusion, and tolerance of difference. Based on these dimensions of publicness, Madanipour (2003) defines it as the condition of being free from individual or small-group control and being used collectively for a range of functional and symbolic purposes. Likewise, Langstraat and Van Melik (2013, p. 431) define it as the degree to which an area is public, also raising the question of “to whom a space belongs”.

Drawing on the above discussion, many scholars have attempted to establish models to measure “publicness” over the past two decades. For instance, Van Melik et al. (2007) identify two types of public space, ranging from themed public spaces to secured public spaces. They further developed the cobweb diagram (Figure 4-5) to

assess the publicness of public space across six dimensions, based on the two elements of fear and fantasy. The dimensions associated with “fear” include surveillance, restraints on loitering, and regulation; while those linked to “fantasy” encompass events, leisure shopping (as opposed to shopping for essentials) and pavement cafés. Although this model was the first to evaluate “publicness” using a cobweb diagram to indicate low, medium and high levels, it does not directly assess the overall quality of public space. Furthermore, the sequence in which the dimensions extend outward from the core affects the overall shape and interpretation of the diagram.

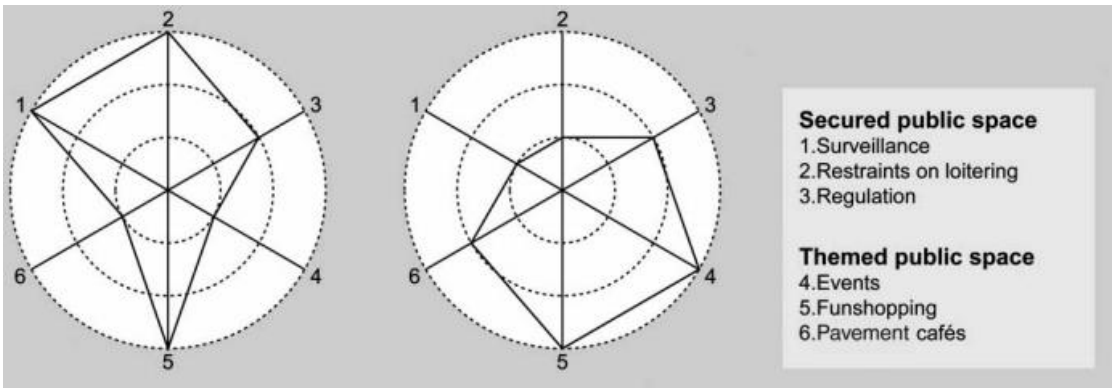


Figure 4-5 Cobweb model.
(Source: Van Melik, Van Aalst and Van Weesep, 2007)

In addition, CABE (2007) proposed the Spier diagram to assess publicness, incorporating eight dimensions to represent the results of a questionnaire on improvement of publicness. Each dimension and its explanation can be shown as seen in Table 4-1:

Table 4-1 Cabe model- Dimensions of defining components publicness. (Source: adapted from Cabe 2007)

Dimensions	Interpretations
Access	Finding your way (routes) and getting about.
Use	The range of activities and opportunities available within the space.
Other people	How the space accommodates diverse needs.
Maintenance	How cleanness and well-maintained the space is.
Environment	How safe and comfortable the space is.
Design and appearance	The appearance of the space and the materials from which it is constructed.
Community	The significance of the space to local residents.
You	How the space makes you feel.

Furthermore, Varna and Tiesdell (2010) established a “star” model to assess the publicness of public space that consists of five dimensions: ownership, civility, control, physical configuration and animation. The axis can form a star shape representing the level of publicness. A fully-formed star indicates high publicness, while greater erosion corresponds to lower levels. Indicators for each meta-dimension can be seen in Table 4-2 (Varna and Tiesdell, 2010).

Table 4-2 A” star” model to assess the publicness. (Source: adapted from Varna and Tiesdell, 2010)

Dimensions of publicness	Defining components
Ownership	Publicly owned space with public use(such as public, public-private partnership and private Headline’ function
Control	Purpose of control (protecting the freedoms and liberties of citizens) Control ordinance- ‘any additional site-specific rules and regulations that exist are enacted in the wider public/collective/community interest’ (Varna and Tiesdell, 2010, p.590) Control presence (such as overt control presence or covert security guards)

Civility	Control technology (such as CCTV cameras evident) Physical maintenance and cleansing regime (such as emptying of bins; cleaning of graffiti; repairs; well-maintained green spaces) Provision of facilities for basic needs (such as toilets; shelter, food vendors; seats; lighting, etc.)
Physical configuration	Centrality and connectedness (such as being well integrated into the overall movement network, with desire lines from the surrounding area extending into and through the space). Visual permeability (visual connection with external public realm) Thresholds and gateways (physical accessibility of a place via micro-design)
Animation	Opportunities/potential for passive engagement (such as varied formal and informal seating opportunities, moveable as well as fixed seating, good views from the space, etc.) Opportunities/potential for active engagement (such as proportion of active frontages, diversity of events and activities, occurring spontaneously or through programming, etc.) Opportunities for discovery and display

Although this model allows for a relatively quick evaluation of spatial quality and the degree of bias across different vectors, it does not incorporate any weighting designs. Later, Nemeth and Schmidt (2011) conceptualised publicness through three key measurable dimensions: ownership, management and use/users (see Figure 4-6). Their focus is primarily on the publicness of privately-owned spaces, and their models can be evaluated using intersecting axes, with each axis extending outward from the centre to represent increasing levels of publicness.

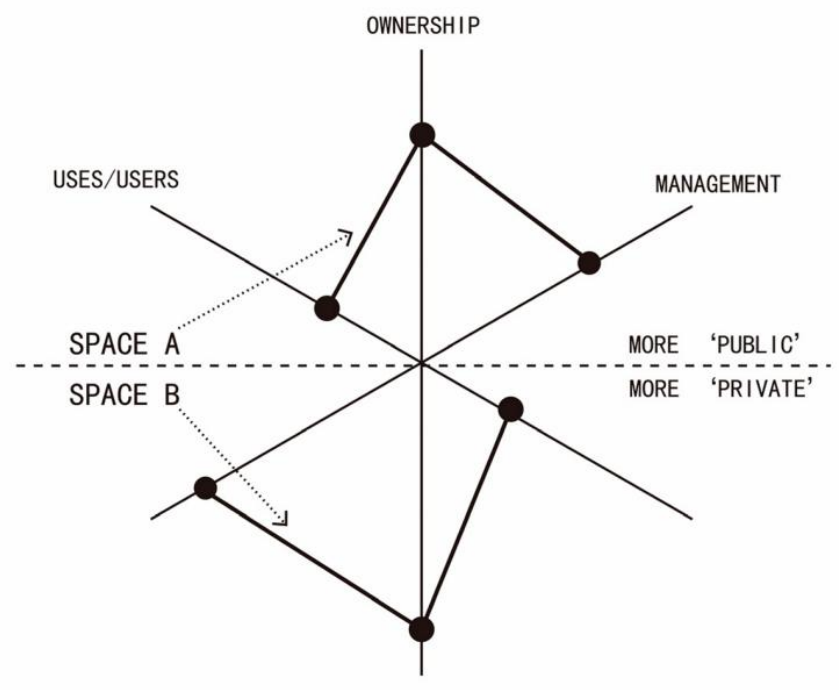


Figure 4-6 Publicness Model to assess the public-private relationship.
(Source: Nemeth and Schmidt, 2011)

Furthermore, Langstraat and Van Melik (2013) proposed the OMAI model, which comprises four key dimensions: ownership, management, accessibility and inclusiveness (Table 4-3). According to them, their model assesses the impact of design and can be used to compare different types of public space, including fully-private, partly-public, partly-private and fully-public spaces (see Figure 4-7).

Table 4-3 The dimensions of OMAI model (Source: adapted from Langstraat and Van Melik, 2013

Dimensions	**Defining components**
Ownership	Legal status
	Public accountability
Management	Day-to-day maintenance
	Security and control
Accessibility	Physical and legal barriers to access
	visual access and obstacles through design
Inclusiveness	Diversity of uses and users
	Welcoming ambience

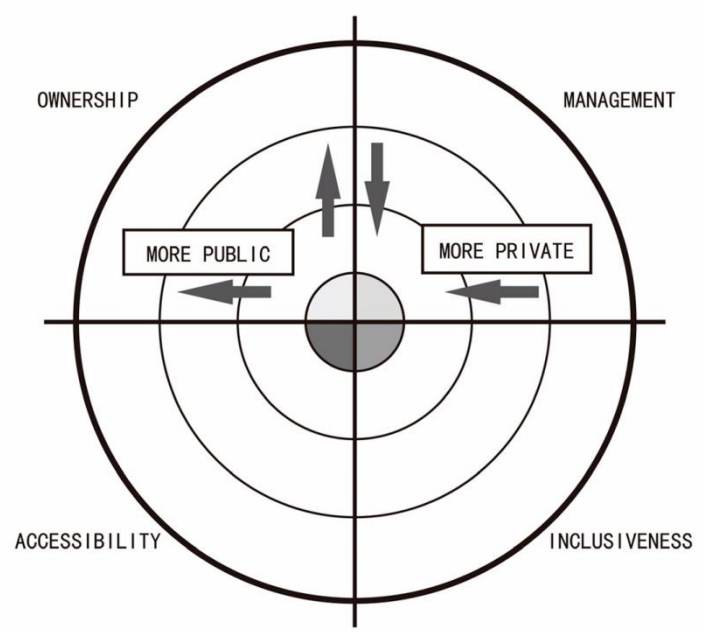


Figure 4-7 The OMAI model. (Source: Langstraat and Van Melik, 2013)

Based on the OMAI model, Mehta (2014) proposed the Public Space Index to assess the publicness based on subjective factors (Table 4-4). Although this model is established based on users' experiences, equal weighting is assigned to each indicator, which may lead to potential bias when applied in empirical practice.

Table 4-4 Public Space Index. (adapted from Mehta, 2014)

Dimensions	Defining components
Inclusiveness	Presence of community-gathering third places
	Range of activities and behaviours
	Space flexibility to meet user requirement
	Availability of food within or at the edges of the space
	Variety of businesses and other uses at the edges of the space
	Perceived suitability of the space layout and design to activities and behaviours
	Perceived usefulness of businesses and other uses
	Presence of people of diverse ages
	Presence of people of different genders
	Presence of people of diverse classes
	Presence of people of diverse races
	Presence of people with diverse physical abilities
	Control of entrance to public space
	Opening hours of public space

	Range of activities and behaviours
	Presence of posted signs to exclude certain people or behaviours
	Presence of surveillance of cameras, security guards
	Perceived openness and accessibility
	Perceived ability to conduct and participate in activities and events in space
Meaningful Activities	Presence of community-gathering third places
	Range of activities and behaviours
	Space flexibility to meet user requirement
	Availability of food within or at the edges of the space
	Variety of businesses and other uses at the edges of the space
	Perceived suitability of the space layout and design to activities and behaviours
	Perceived usefulness of businesses and other uses
Comfort	Places to sit without paying for goods and services
	Seating provided by businesses
	Other furniture and artifacts in the space
	Climatic comfort of the space-shade and shelter
	Design elements discouraging use of space
	Perceived physical condition and maintenance appropriate for the space
	Perceived nuisance noise from traffic or otherwise
Safety	Visual and physical connection and openness to adjacent street
	Physical condition and maintenance appropriate for the space
	Lighting quality in space after dark
	Perceived safety from presence of surveillance cameras, security, guards, guides, ushers, etc.
	Perceived safety from crime during daytime
	Perceived safety from crime after dark
	Perceived safety from traffic
Pleasurability	Presence of memorable architectural or landscape features
	Sense of enclosure
	Permeability of building facades on the street
	Personalization of the building on the street
	Articulation and variety in architectural features of building facades on the street
	Density of elements of sidewalk providing sensory complexity
	Variety of elements on sidewalk
	Perceived attractiveness of space
	Perceived interestingness of space

Overall, building upon the literature review in relation to publicness assessment framework, safety, comfort, and inclusiveness most frequently emerged as key

perception-based attributes and were therefore prioritised as pre-selected factors in this study.

4.3.2 Key models measuring the quality of public space

Many assessment tools for measuring the quality of public space have emerged during the past few years. They highlight the value of public space, delivering a range of benefits economically, to human health, socially, and environmentally (Carmona et al., 2008). Furthermore, some scholars also point out that such perceptual qualities could capture the overall perceptions of urban waterfront open space environment, which should be further evaluated by physical features.

For instance, Whyte's (1980) focus on the plazas of Midtown Manhattan aims to identify which plaza works and which do not. The essence of his work is to look for the various positive and negative factors that affect the quality of the public space in New York squares. Based on extensive observation in New York, Whyte has found that the physical quality of the environment and outdoor activity are interconnected, as fundamental to developing "environmental determinism".

Lynch's book "Theory of Good City Form" (1981) suggests that public places should offer efficiency and justice to meet the distribution of environmental benefits. He identifies five dimensions of urban design to improve the quality of public space, including vitality, sense, fit, access and control and highlights the importance of access

rights in particular. Bentley et al. (1985, p.9) argued that a good quality of place tends to provide a democratic built environment to enrich opportunities by “maximising the degree of choices for users”. They further noted that a high-quality place should score highly for permeability, variety, legibility, robustness (resilience), visual appropriateness, richness and personalisation. Jacobs and Appleyard (1987) suggested seven goals to improve the quality of the urban environment in the future, including liveability, identity, control, access to opportunities, authenticity, community and public life, urban self-reliance and an environment for all. Tibbalds (1992) developed a sophisticated framework to consider the quality of contemporary public places based on a place-making framework. These principles include: 1) consider places before buildings; 2) have the humility to learn from the past and respect your context; 3) encourage the mixing of uses in towns and cities; 4) design on a human scale.; 5) encourage the freedom to walk about; 6) cater for all sections of the community and consult with them; 7) build legible environments; 8) build to last and adapt; 9) avoid change on too great a scale at the same time; 10) with all the means available; 11) promote intricacy; 12) joy and visual delight in the built environment (cited in Carmona, 2021, p.20).

Regarding people’s use of public space, Carr et al. (1992) suggest that responsiveness, democratisation and meaning are three critical aspects to developing

the human qualities of public space. Table 4-5 shows the key qualities of public space developed by Carr et al. (1992).

Table 4-5 The key qualities of public space developed by Carr et al. (1992).

Dimensions	Indicators	Explanation
Responsive	Comfort	Some physical and psychological comfort can be achieved by provision of physical service facilities (shade and exposure to sun, sitting space, the need for toilets, etc.), healthy natural environment, and safe.
	Passive engagement	The possibility to observe people and surrounding environment.
	Active engagement	The possibility for social interaction and active uses
	Discovery	Creation of observation opportunities through diverse physical urban design.
Democratic	Right of access	Includes physical access, visual access and symbolic access.
	Right of change	The ability of a place permanently or temporarily evolves and change over time (Lynch, 1972).
	Right of claim	It refers to a special control.
	Freedom of action	Public spaces should provide people with the chance to engage in their desired activities, and ensure no particular group feels a sense of exclusion.
Meaningful	Place identity	It refers to place memory, historical and cultural resources, and people-place connection.
	Activities	Necessary activities, optional activities and social activities can take place on public space

Ewing and Handy (2009) proposed a perception-based approach to assess overall public space quality related to walkability. They argue that the "perception is the process of attaining awareness or understanding of sensory information" (Ewing and Handy, 2009, p.67). The result of perception towards public space quality relies on the

relationship between past experiences, individual's culture and the interpretation of the perceived. Based on this understanding, they reconsidered the role of perceptions as mediating between the physical features of the public space environment and individuals' sensitivities. The main factors include urban design perceptual qualities (imageability, legibility, enclosure, human scale, linkage, complexity and coherence) and individual reactions (safety, comfort and level of interest). However, this assessment framework pays less attention to place identity as a factor affecting public space quality.

Furthermore, Cho, Trivic and Nasution (2015) proposed an integrated Urban Space Framework for evaluating urban space performance. These attributes include accessibility (pedestrian), connectivity, mobility means, legibility (edges), spatial variety, environmentally friendly design, user comfort, diversity, social activities, identity, safety and management (Figure4-8). Compared with earlier publicness frameworks, this model adds the attributes of accessibility, connectivity, and identity (Figure 4-8). However, the framework also shows conceptual overlap. For instance, the "management" factor may significantly shape perceptions of "safety and security". At the same time, it lacks second- and third-level indicators that would allow attributes, particularly "safety and security" and "identity" to be examined in a more fine-grained manner.



Figure 4-8 Urban space framework: factors and sub-factors.
(Source: Cho et al., 2016)

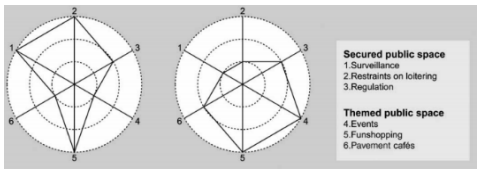
In summary, the urban design and environmental psychology field identifies a wide range of perceptual qualities that may affect public space quality.

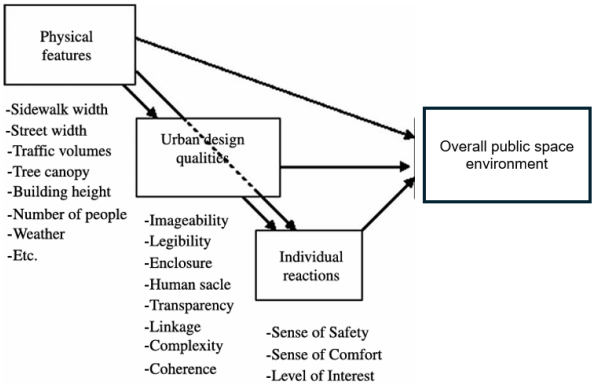
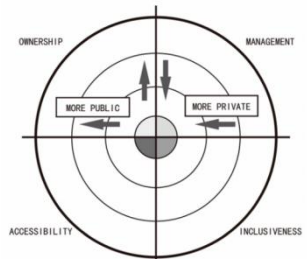
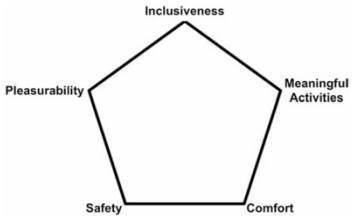
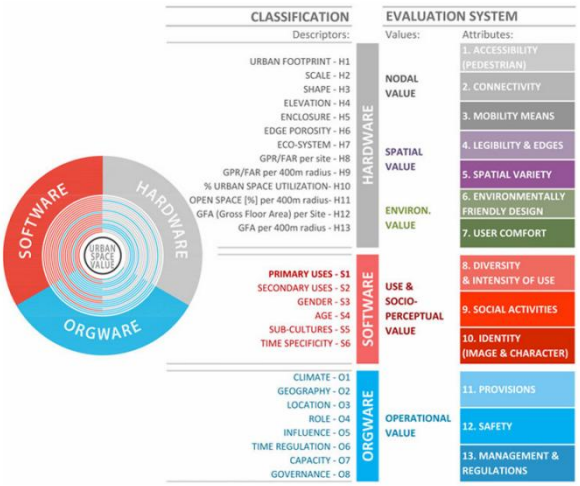
Key perceptual qualities and individual reaction can impact the way an individual feels about the public space as a place to social, having a rest and gathering. A literature produced a list of perceptual qualities (Table 4-6). In this context, this study selects and refines the most frequently cited perceptual qualities from key literature review to

construct the assessment framework: access and linkage, safety, comfort, spatial aesthetics, place identity and inclusiveness.

As for sub-factors and sub-sub factors, in addition to the elements shared by both public space and waterfront open space, waterfront-specific indicators should be considered as second- or third-level sub-indicators. This would better capture the distinctive socio-spatial characteristics of waterfront environments, drawing on the literature on successful urban waterfront design and planning. The next section therefore synthesises key urban waterfront design and planning principles to identify and refine these waterfront-specific indicators related to physical features.

Table 4-6 Key models for assessing publicness/public space quality.

Key models and their references	Key perceptual qualities	Model Interpretation and Limitations
 Van Melik, Van Aalst, and Van Weesep's Cobweb Model (2007)	Safety	This cobweb-based "fear–fantasy" model innovatively visualises degrees of publicness across six dimensions, but it does not consider cultural influences or physical configuration and is sensitive to axis ordering, which can affect interpretation.

 Ewing and Handy's Urban Design Qualities (2009)	Human scale (proportion, rhythm and openness) Imageability (distinctiveness and identifiability) Enclosure Linkage Complexity Coherence Safey Comfort	Although the framework advances perception-based urban design assessment, its conceptual focus on walkability limits.
 Langstraat and Van Melik' OMAI model (2013)	Ownership Management Accessibility Inclusiveness	This model assesses publicness and can be used to compare different types of public space, including fully private, partly public, partly private, and fully public spaces; however, it gives limited attention to place attachment and users' perceptions of spatial character.
 Mehta's five dimensions of public space (2014)	Inclusiveness Safety Comfort Pleasurability	This model is established based on users' experiences, but subjective factors cannot be fully quantified through objective sub-factors.
 Cho, Trivic & Nasution's Integrated Urban Space Framework (2016)	Accessibility (pedestrian) Connectivity Mobility means Legibility & edges Spatial aesthetics (variety) User comfort Safety Diversity &intensity of use Social activities Identity Management & Regulations	This model conceptualises urban space quality through three interdependent components, including HARDware (design/physical configuration attributes), SOFTware (use and socio-perceptual values) and ORGware (operational and management values). However, it lacks a sufficiently fine-grained set of indicators to assess attributes related to user comfort, safety, place identity, and other experiential dimensions.

4.3.3 Key urban waterfront design and planning affecting the quality of urban waterfront open space

Given the distinction between public spaces and urban waterfront open spaces, this subsection reviews key urban waterfront design and planning principles to identify elements that reveal the specific spatial characteristics of urban waterfronts.

Gordon (1996) emphasises the importance of enhancing public accessibility and connectivity, fostering users' engagement with the water, and integrating waterfronts with both their urban surroundings and the water itself through the establishment of pedestrian route systems (Gordon, 1996).

In addition, the 10 Principles for Sustainable Development of Urban Waterfront Areas were proposed at the Global Conference on Urban Future (URBAN 21) held in Berlin in July 2000 (Sepe, 2013). Such guidelines highlight the most vital elements in urban waterfront transformation in terms of social, environmental and economic sustainability. Based on Sepe's analysis, such principles include: (1) securing water quality and the environment; (2) recognising that waterfronts are an integral part of the existing urban fabric and the city; (3) preserving and reusing urban historical and cultural resources to give character and meaning; (4) encouraging mixed use by offering a diversity of cultural, commercial, and housing functions, both functionally and socially; (5) ensuring public access (physical, visual, and symbolic) as a prerequisite for various groups; (6) establishing public–private partnerships; (7) developing public participation;

(8) recognising that waterfronts are long-term projects that ensure benefits for the whole city; (9) encouraging flexible and adaptable waterfront regeneration strategies and policies; and (10) acknowledging that the complex process of waterfront regeneration involves many disciplines in order to construct an international network of economically profitable waterfronts.

Hermida et al. (2019) evaluated the connectivity and comfort of urban rivers across four dimensions: (1) spatial and visual accessibility, (2) continuity of the green corridor, (3) condition of public space, and (4) condition of the first built line. These indicators highlight the importance of establishing continuous and well-connected waterways, ensuring that key basic public facilities along the urban waterfront provide both physical and visual access. However, their study focused only on two key dimensions of urban waterfronts and did not consider the social and economic aspects.

Liu et al. (2021) developed an index of environmental factors that included site design characteristics, surrounding population, service facility accessibility and traffic access in the context of waterfront open spaces. They employed a structural equation model to evaluate the vitality of urban waterfront open spaces and to examine the correlations between vitality and the dimensions mentioned above. The results revealed that traffic access had a negative impact on the vitality of open space, whereas the other three factors were positive.

Fan et al., (2021) selected five dimensions and nine sub-indicators to represent built environment variables, including: building density; floor area ratio; road intersections; functional density; land-use mix; distance to public transportation stations; distance to the shoreline; and the Normalized Difference Vegetation Index (NDVI). However, these do not consider the cultural and history value or indeed users' perception.

Üzümcüoğlu and Polay (2022) investigated a measurement framework for creative waterfront development by establishing the "Creative Waterfront Model." The evaluation variables include "public awareness, promotion of entrepreneurship, creative spatial arrangements, creative activities, innovation and technology, tolerance, open-mindedness, quality of life and physical comfort, social cohesion, functional diversity, the creative economy and its economic contribution, and the protection of cultural heritage" (Üzümcüoğlu & Polay, 2022, p. 21). However, this focus tends to overlook other types and functions of urban waterfront that are not explicitly oriented toward creativity and cultural production.

Chen et al., (2023) established an urban layer system to assess the current and expected value of Beijing's urban waterfront. They divided it into four sub-systems and 29 urban elements, including urban, spatial, demand and cultural sub-systems. They identify key ecological related elements of urban waterfronts to enhance floral and faunal diversity and overall biodiversity, while also emphasising flood-related

ecological resilience measures, such as integrating waterfront greenways with flood-control systems.

Overall, these waterfront design principles and planning provide a foundation for establishing an integrated assessment framework for the quality of urban waterfront open spaces, particularly by highlighting the distinction between public spaces and urban waterfront open spaces, such as establishing continuous waterfront walkways, ensuring water quality, integrating urban waterfront open spaces into their hinterlands, opportunities for direct human water interaction, developing slow mobility systems (walking, cycling and jogging routes), materials with water-repellent properties and the incorporating flood-control and hydrological management into their design process.

4.4 Establishing Integrated Urban Waterfront Open Space Quality Assessment Framework

Based on key models of public space quality and publicness identified in recent review studies, this study develops an assessment framework focusing on the most frequently cited factors, including access and linkage, safety, comfort, spatial aesthetics, place identity and inclusiveness.

Sub-factors and sub-sub-factors were then developed through a structured two-stream literature synthesis. First, this study identifying shared physical features to both public space and waterfront open space were derived from established public space quality/publicness models. Second, waterfront-specific indicators, such as waterfront

promenades, accessibility of water, protection against flooding, biodiversity and sea level rise adaptation measures were added based on the established theoretical frameworks on urban waterfront design and planning. Potential overlaps among sub-factors were assessed, and highly similar items were removed to minimise redundancy and maintain relative independent across the selected indicators. Framework development process can be seen on Figure 4-9.

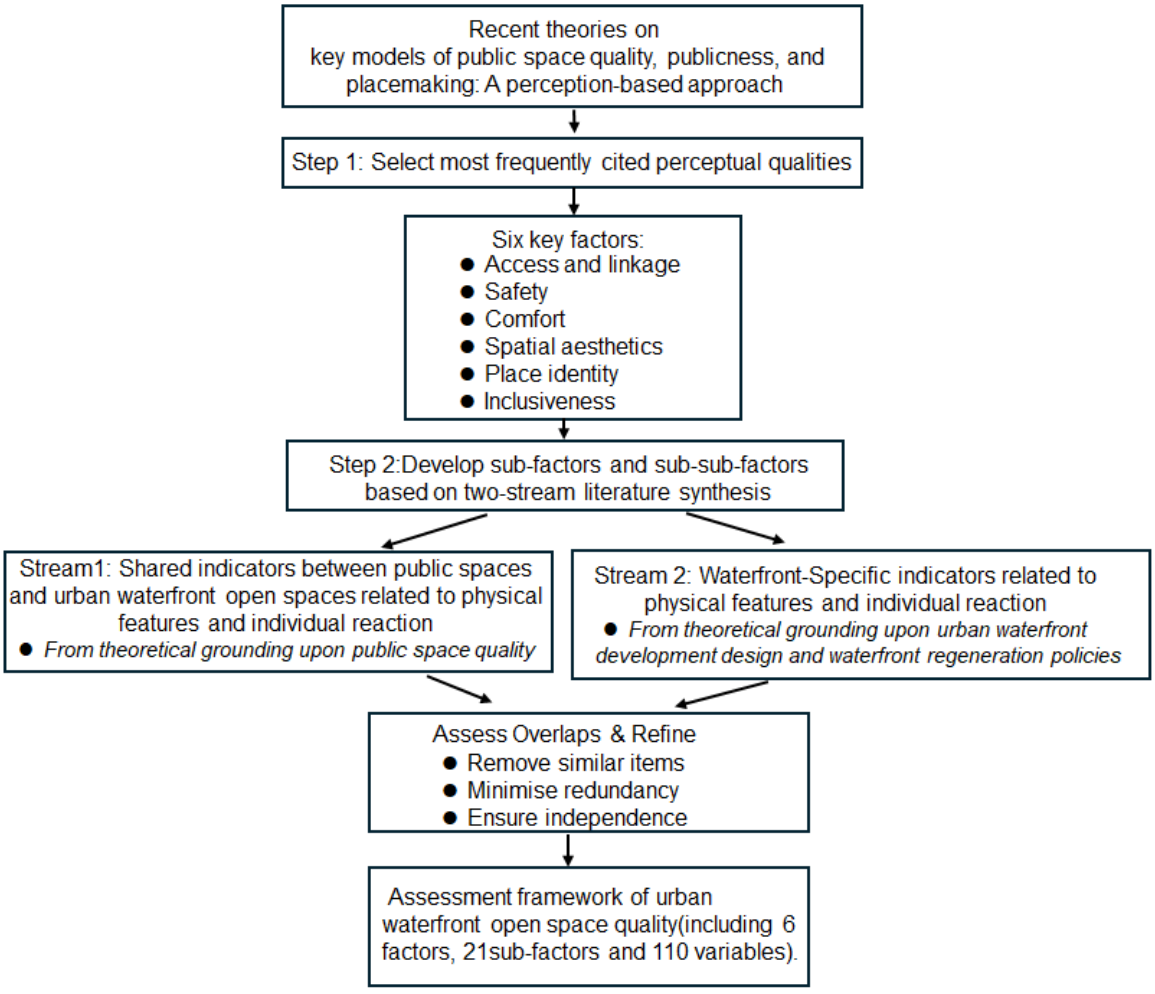


Figure 4-9 Two-stream literature synthesis for developing integrated assessment framework. (Source: author)

Overall, this research identifies six key factors, 21 sub-factors and 110 variables to evaluate the quality of urban waterfront open spaces based on users' perspectives (Figure 4-10).

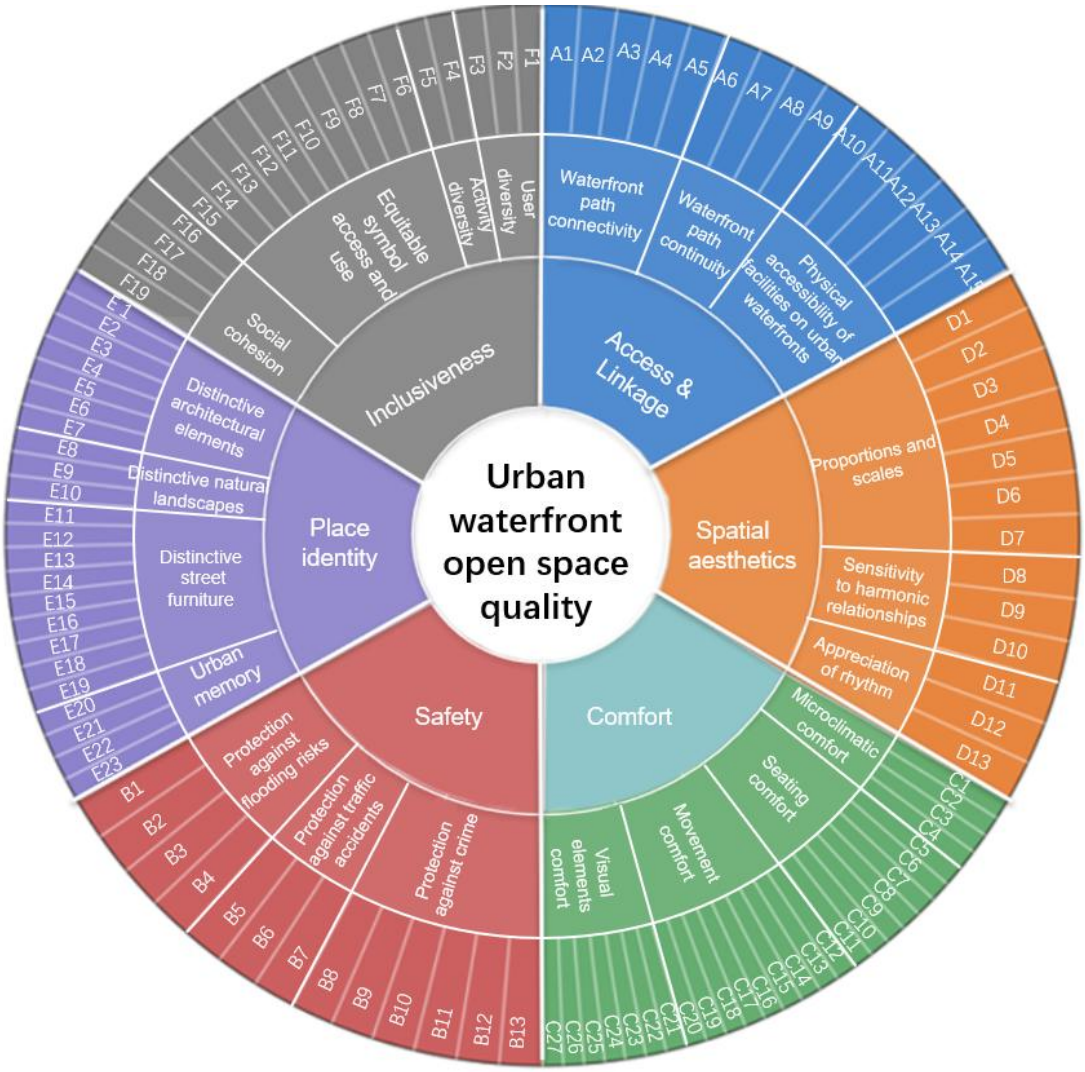


Figure 4-10 Assessment framework of urban waterfront open space quality. (Source: author)

4.4.1 Access & Linkage

Access and linkage are critical factors in assessing the quality of urban waterfront open spaces. According to place-making theory and the Project for Public Spaces

(PPS), access and linkage can be evaluated by examining these spaces' connection to their surrounding areas, as well as how easily they can be reached, entered and navigated (Buckman, 2016). Their spatial configuration should enable users to access and participate in the majority of activities taking place within them, whether from a distance or in close proximity (Mohamed et al., 2020). In this study, **access and linkage are defined as the extent to which users can reach and enter urban waterfront open spaces through well-integrated connections and physical access with their surrounding context** (Carmona et al., 2010; Buckman, 2016; Mohamed et al., 2020). This factor is further categorised into three sub-factors based on the distinctive characteristics of the urban waterfront setting.

Connectivity of waterfront path systems

This refers to the connections between public spaces and their surrounding context along the water's edge, as well as to broader circulation and routes within the urban waterfront area, which have the potential to bring together diverse social groups across both space and time (Varna and Tiesdell, 2010). In other words, the connection of waterfront path systems is defined as the well-connected network of pathways that lead to key nodes along urban waterfronts and to important destinations frequently visited by the public. Dovey (2005) emphasise that a continuous and well-connected waterfront promenade can contribute to a high-quality public realm by linking existing high-frequency activity patterns and key nodes along the urban waterfront. Awwal and

Boris (2020) highlight that movement patterns in urban waterfront open spaces, containing the core pedestrian circuit routes, cycling paths and public transport routes, can significantly enhance permeability between circulation networks and key nodes along the urban waterfront. Furthermore, pedestrian bridges, as a new pathway system and a critical link between the city's hinterland and the water, are increasingly recognised as a key element of urban landscape in waterfront regeneration projects (Giovinazzi and Moretti, 2010). These new iconic structures enable both horizontal and vertical pedestrian connections to be integrated into the urban fabric. They also facilitate the flow of people and create social meeting points, thereby enhancing connectivity and encouraging active and passive everyday experiences on urban waterfronts (Stevens, 2020). The sub-indicator of connectivity of waterfront path systems comprises five variables: The sub-indicator of waterfront path systems comprises five variables: (1): the effective connection between pedestrian bridges and key nodes along urban waterfront open spaces (Giovinazzi and Moretti, 2009; Stevens, 2020); (2) the effective connection between the waterfront promenade route and key nodes (Eckstut,1986; Dovey, 2005; Macdonald, 2017; Awwal & Boris, 2020); (3) the effective connection between the cycling route and the nodes (Salama, 2022); (4) the effective connection between the vehicular route and the key nodes (Stevens, 2020); and (5) the effective connection between the waterborne transportation route and the nodes (Awwal & Boris, 2020).

Continuity of waterfront path systems

Ensuring the continuity of routes provides the physical foundation for supporting human mobility and enhancing the attractiveness of spaces for the range of users (Mohamed et al., 2020). Indeed, route continuity refers to aligning the spatial structure and key nodes of urban waterfront open spaces with coherent traffic networks (Gehl, 2010). Given that linearity is a key spatial characteristic of such spaces, it is crucial to establish a continuous circulation system and network of pathways without physical barriers (Zieliński, 2018). Avni and Teschner (2019) note that, while physical barriers such as fences, highways and railroads have largely been removed from both newly developed and historic urban waterfronts, the presence of enclosed luxury housing, tourist attractions and high-end retail spaces continues to restrict the continuity of pathways. Such physical barriers risk producing what Stevens (2020b) describes as a “tourist and luxury bubble,” that tends to meet only the demands of upper-income residents and visitors, which is detrimental to the development of inclusive waterfront open space (Stevens, 2020b). In contrast, the continuity of public waterfront routes such as promenades, cycling paths, streets and boulevards can function as narrative linear spaces that support movement at the human scale and accommodate a diverse range of everyday activities. In this study, the sub-factor, continuity of waterfront path systmes focuses on four key variables: (1) the continuity of the waterfront promenade route (Giovinazzi and Moretti, 2009; Evans et al., 2022); (2) the continuity of cycling

routes (Kwiatkowski and Karbowiński, 2023); (3) the continuity of vehicular routes (Salama 2022; Secmen and Türkoğlu, 2022); and (4) the continuity of water transport routes (Cheng et al., 2020).

Physical accessibility of facilities on urban waterfronts

In the urban design literature, the term “accessibility” has been interpreted in diverse ways, leading to a variety of measurement approaches across different studies. For example, Hillsdon et al. (2006) and Ardeshiri et al. (2018) both emphasise proximity or a nearness within proper walking distance to urban public service facilities. In addition, Liu et al. (2023) suggest that the provision of barrier-free facilities, such as ramps and lifts, is crucial for people with disabilities. Furthermore, Carr et al. (1992) argue that accessibility encompasses physical, visual and symbolic aspects. Firstly, physical accessibility refers to the ease with which people can physically navigate, access and reach a key destination within a appropriate walking distance and clear wayfinding systems (Gehl, 2011; Ikudayisi and Taiwo, 2022; Salama, 2022); visual accessibility emphasises the importance of a space being visible from both a distance and at close range (Pasaogullari and Doratli, 2004); and symbolic accessibility concerns the presence of cues that may either invite or deter entry, depending on whether they are perceived as welcoming or exclusionary within the context of inclusive design (Varna, 2014).

However, limited scholarly attention has been given to accessibility in other categories of public amenities and facilities on urban waterfronts, such as healthcare services and basic public service infrastructure (e.g. bus stations, public restrooms, etc.). Therefore, this research conceptualises accessibility as a combination of physical and visual access, aimed at assessing the accessibility of public amenities and facilities on the urban waterfront. Symbolic access, on the other hand, is examined separately under the dimension of inclusiveness, due to its close relationship with social inclusion/exclusion. The variables of physical accessibility of facilities on urban waterfronts can thus be examined through six variables: (1) accessibility of water's edge (Silva, 2019); (2) accessibility of basic public service facilities (such as parking areas, toilets, public transit stops, waste bins, etc.) (Wang et al., 2021); (3) accessibility of sport amenities (such as children's playgrounds, outdoor skateboard parks, etc.) (Higgs et al., 2015); (4) accessibility of healthcare services (Khan, 1992); (5) accessibility of cultural venues (Brook, 2016); (6) Accessibility of commercial amenities (Poldma et al., 2014).

4.4.2 Safety

Although a sense of safety is inherently linked to a sense of comfort, much research has sought to identify it as a distinct indicator, and has cited it as a primary consideration in assessing the quality of urban waterfront public spaces (Mehta, 2014). This is because safety serves as a fundamental prerequisite for ensuring users' well-

being. When engaging with urban waterfront open spaces, people may face three major safety challenges: crime prevention, flood risk and traffic safety (Carmona a, 2010; Carmona b, 2010; Gehl, 2010).

Protection against flooding risks

Urban waterfront open spaces can serve as the first line of defence in protecting cities from sea-level rise and flood risks in the context of climate change. With this being the case, the ability to respond to flooding risks plays a crucial role in enhancing safety (Aerts et al., 2018). Traditional methods to tackle flood risks in urban waterfronts include building dams, seawalls, flood-proofing plinths, embankments and revetments (Rubinato et al., 2020). However, some creative and new design-based methods associated with the development of the Sponge City concept can provide citizens with a safe and resilient built environment along the urban waterfront, such as artificial pond and wetlands, creation of bio-swales and vegetation buffers (Chan et al., 2018). These new interventions should be combined with national planning and land use policy that aims to enhance the biodiversity and ecological functions (Chan et al., 2018). Thus, protection against flooding risks includes four variables: (1) use of traditional grey infrastructure; (2) use of temporary flood defences (White, 2008); (3) the integration of waterfront greenways with flood control systems (Zhao and Yu, 2010); and (4) raising the plinths for buildings within creation of different elevations (Samant and Brears, 2017; Stevens, 2020).

Protection against crime

Protection against crime has been discussed in recent decades by numerous scholars in various approaches in the design of the public realm. Firstly, a sense of safety can be achieved through both artificial and natural (or soft) surveillance. On the one hand, artificial surveillance includes the presence of police officers, security guards and CCTV systems (Németh and Schmidt, 2011). On the other hand, natural or soft surveillance is based on the approach that “eyes on the street” belong to the street ‘s “natural proprietors”, proposed by Jacobs, who argued that the public realm should be self-policing rather than overly securitised (Jacobs, 1961, p. 32). Newman (1973) suggests that natural surveillance could be developed through combining environmental design into spaces for crime prevention, for instance designing routes that encourage public use and ensuring that property within public spaces is oriented to promote visibility. Additionally, he advocates avoiding cul-de-sacs in road layouts to reduce criminal behaviour. Perkins et al. (1992) also recognised that the presence of policing and over-securitisation can make the public space perceptibly uncomfortable. They highlighted the importance of personalising property, through the presence of streetlights, private plantings and yard decorations, in shaping a sense of safety. Furthermore, users perceive public spaces as safer when active retail stores and non-residential properties are present, as these contribute to increased footfall, people moving and natural surveillance. In addition, safer spaces should be maintained, well-

kept and cared for rather than marked by litter and decay (Madanipour, 2004). Tibbalds (1992) states that a lack of maintenance or poor upkeep of a space can significantly affect people's perception of safety in that place. Indeed, a poorly maintained public space discourages the degree of use and creates a “no-go area”. In this context, the sub-sub-factors of protection against crime includes: (1) a well-designed street layout without cul-de-sacs (Carmona et al., 2020; Stevens, 2020); (2) provision of personalising property (streetlights, block watch signs, decorations, private plantings) on the urban waterfront promenade (Perkins et al., 1992; Mehta, 2014); (3) sufficient artificial lighting after dark (Mehta, 2014; Praliya and Grag, 2019); (4) the appropriate number of surveillance cameras (Németh and Schmidt, 2011); (5) the appropriate number of public/private guards or police (Perkins et al., 1992); and (6) good maintenance and cleanliness (Tibbalds,1992; Madanipour, 2004).

Protection against traffic accidents

Since the introduction of automobiles into urban life, the fear of traffic accidents has increased in recent decades, as it negatively affects pedestrians, joggers and cyclists as they move and engage in activities within urban waterfront open spaces (Gehl, 2010). In some Chinese waterfront cities, the road network design places bicycle lanes next to high-speed vehicular traffic or lacks clear signage and public infrastructure to mark the lanes’ boundaries. Since the 2010s, the Chinese government has gradually

recognised the importance of promoting pedestrian and bicycle safety to enhance the quality of waterfront open spaces.

Due to the spatially isolated of vehicular movement between origins and destinations on urban waterfronts, prioritising the pedestrian in mixed traffic is essential for enhancing safety and preventing traffic accidents (Niemann and Werner, 2015). This is because pedestrian movement in urban waterfront open spaces facilitates circulation while also enabling economic, social and cultural exchanges (Carmona, et al., 2010). Consequently, public spaces on the urban waterfront, with a high level of pedestrian-friendly design, serve as streets that integrate the richest natural environments and are perceived as safe within the city (Sun et al., 2024). Control of fast-moving vehicles and creation of traffic barrier zones also plays a significant role in enhancing safety (Ragheb et al., 2024). Thus, protection against traffic accidents contains three key variables: (1) priority for pedestrians in mixed traffic (Mehta, 2014); (2) control of fast-moving vehicles (Carmona et al., 2010); and (3) creation of traffic barrier zones (Gehl, 2010; Chen et al., 2022; Salama, 2022).

4.4.3 Comfort

Making people comfortable in urban settings is crucial for successful urban waterfront open spaces. Carmona et al. (2003, p. 165) point out that “the length of time and people stay in a public space is a criterion of its comfort”. As Gehl (2010) notes, a

sense of comfort encourages users to engage in the most important activities that underpin their use of public space, such as walking, standing, sitting, observing, listening and self-expression. It is acknowledged that the feeling of comfort can be influenced by environmental physical and psychological factors, including: the provision of sufficient and comfortable seating; the physical condition of routes and roads; the familiarity of the setting and people; convenience; climatic comfort; and perceived levels of safety (Mehta, 2014). In this research, since the factors of safety has been independently addressed within other dimensions, comfort is only manifested into four sub-factors, as shown below:

Climatic comfort

When considering the distinctive role of urban waterfront open spaces in influencing the climate, these spaces should provide a high level of comfort, allowing users to enjoy the positive aspects of the regional climate. The creation of desirable microclimatic conditions – such as shade and sunlight, wind chill, air temperature, water surface humidity and water quality – is crucial for supporting outdoor activities in these environments (Whyte, 1980; Bosselmann et al., 1995; Gehl, 2010; Mehta, 2014). Building on that, the comfort of microclimate is divided into four variables: (1) good air quality (Salama, 2022); (2) provision of artificial shelter from the wind, rain and a certain amount of sun (Gehl, 2010; Mehta, 2014); (3) appropriate water surface

humidity (Chen et al., 2022); (4) presence of temperature-regulating shade provided by natural vegetation (Gehl, 2010; Stevens, 2020).

The comfort of seating

Regarding seating comfort, an attractive seating area should have appropriately spaced arrangements, with good placement directed towards the waterfront; a suitably low noise level to facilitate conversation; a sufficient number of seating options; and materials with insulating and water-repellent properties (Gehl, 2010; Mehta, 2014; Zamanifard et al., 2019; Salama, 2022). Furthermore, a variety of formal and informal seating options can be provided through the integration of primary and secondary seating (Gehl, 2010; Stevens, 2020). Primary seating types include urban furniture with backs and armrests, such as city benches, freestanding chairs or café chairs. Secondary seating refers to informal and spontaneous seating opportunities, where users can sit and rest on elements such as pedestals, steps, stones or the ground itself. More spontaneous activities can take place on the waterfront when there is a combination of primary and secondary seating for all age groups. Furthermore, Loo and Fan (2023) suggest that combinations of fixed and flexible seating tend to enhance social interaction and create more engaging urban waterfront open spaces.

From the above points, we can deduce that the comfort of seating includes seven variables: (1) appropriate size of seating areas (Carmona, 2010); (2) adequate number

of seating options (Varna and Tiesdell, 2010); (3) low noise level during seating and resting (Mehta, 2014); (4) arrangement of movable/flexible seats (Gehl, 2010; Stevens, 2020); (5) good placement, preferably with good views (Zamanifard et al., 2019); (6) a variety of formal and informal seating options, combining primary and secondary seating (Marcus and Francis, 1997; Gehl, 2010); and (7): materials for seats with insulating and water-repellent properties (Salama, 2022).

The comfort of movement

Designing for walking, cycling and car-dominated experiences while maintaining comfort and pleasure is an integral part of developing urban waterfront open spaces. This is because these daily life activities, taking place along the water's edge as part of everyday life, contribute to increased fitness, stress reduction and enhanced social interaction (Forsyth, 2015). In this research, comfort in movement mainly concerns the physical condition of routes that impact on movement speed for a comfortable and pleasurable movement experience. Nine variables are identified: (1) the surface condition of waterfront pedestrian promenades (Gehl, 2010); (2) the appropriate promenade width (Mehta, 2014); (3) the material of waterfront pedestrian routes (Salama, 2022); (4) the surface condition of cycling routes (Mezoued et al., 2022); (5) cycling route width (Giovinazzi and Moretti, 2009); (6) the material used for cycling routes (Zamanifard et al., 2019; Salama, 2022); (7) the surface condition of vehicular

routes (Wang et al., 2020); (8) the appropriate vehicular route width (Mehta, 2014); and (9) the material used for the vehicular route (Zhou et al., 2022).

The comfort of visual elements

This sub-factor is essential to address the needs of “readability” in a place and provide engaging elements for discovery at eye level in the scale of micro-design (Gehl, 2010). Readability and discovery in a place refer to spaces that are visible to users and to the ability of users to explore the area extensively without becoming disoriented (Kaplan and Kaplan, 1982). As a result, urban social life can unfold more comfortably on the waterfront by considering visual convenience.

In this research, the comfort of visual elements mainly includes seven variables: (1) view of clear information boards and maps (Gibson, 2009); (2) view of water quality monitors (Chen et al., 2023); (3) the readability of digital transport schedule screens (Carmona et al., 2010); (4) view of a clear visual axis (Salama, 2022); (5) view of rich flora (Beer and Higgins, 2000); (6) view of rich fauna (Beer and Higgins, 2000; and; (7) view of good skyline (Salama, 2022).

4.4.4 Spatial aesthetics

Spatial aesthetics comprises spatial (volumetric) and aesthetic effects of the urban environment, emphasising aesthetic order and the intuitive capacity for aesthetic appreciation (Carmona et al., 2010). Within this framework, Gestalt psychologists

argue that the built environment can achieve more significant order, coherence and harmony through the application of design principles, thereby improving its spatial-visual aesthetic qualities. For example, Meiss (1990) identifies key factors affecting spatial organisation and coherence, drawing on Gestalt principles, such as similarity, proximity, common ground, orientation and closure.

Additionally, the kinaesthetic experience is an integral part of spatial aesthetics. The elements involved include the width of streets, the degree of enclosure, and the scale and massing. Gordon Cullen (1961) also proposed the concept of “serial vision”, in which “pictorial sequence” and “rhythmic spacing” could shape dynamic environmental aesthetics. In this context, this research identifies three elements of spatial aesthetics.

Proportions and scale

Proportions and scale can be manipulated by urban designers and architects to shape effective spatial organization for aesthetic appreciation. “Proportions” here refers to “the relationship between the different parts of a building”, while scale pertains to “the perception of that object relative to other objects around it and to our perceptions of those objects” (Carmona et al., 2010, p. 189). With this in mind, this research identifies seven sub-elements: (1) the appropriate scale of commercial areas (Hermosilla et al., 2012); (2) the appropriate scale of residential blocks/plots (Hermosilla et al., 2012; Zhang, et al., 2022); (3) the appropriate scale of cultural venues (Stevens, 2021); (4) the appropriate scale of leisure blocks (Bašová and Štefancová, 2017); (5) the

appropriate scale of office blocks/plots (Gordon, 1996); (6) the appropriate proportion of waterfront-street width to building height (Üzümcüoğlu and Polay, 2022); and (7) a sense of enclosure [7] (Sitte, 1889; Hakim and von Meiss, 1994; Carmona et al., 2010).

Appreciation of rhythm

This perhaps unexpected element relates to the arrangement of the constituent parts of a building's facade, emphasising strict repetition. Smith (1980, p.78) claims that a sense of rhythm can be achieved through "simple binary patterns or more complex repeated subsystems". It is produced by grouping elements to create emphasis, intervals, accents or direction (Carmona et al., 2010). To avoid monotony, contrast and variety are essential to achieving an appreciation of rhythm. In this research, the appreciation of rhythm encompasses three key sub-elements: (1) the rhythm of facades (Alkhresheh, 2012); (2) the rhythm of active frontages[8] at the ground floor, reflecting social interaction (Heffernan et al., 2014); and (3) the rhythm of colonnades in semi-public and private realms (accommodating a range of activities) (Carmona et al., 2010).

Sensitivity to harmonic relationships

[7] "Sense of enclosure" means creating a sense of spatial containment by enclosing "the space with an encircling wall of building facades" (Carmona et al., 2010, p.178)

[8] "Active frontages" refers to building facades and how buildings address the street at ground level, characterised by frequent doors and windows, detailed articulation and visible internal activities, as opposed to blank walls, fences or garages (Heffernan et al., 2014).

This refers to the harmonic and coherent spatial organisation between different parts of a building (such as facades) and their urban fabric (Smith, 1980; Carmona et al., 2010). In other words, the development of contemporary urban waterfront open spaces should be harmoniously integrated with existing structures to create a cohesive context, with the consideration of the balance between order and complexity in built environments. In this sense**, sensitivity to harmonic relationships** comprises the following three variables: (1) the articulation of historical and contemporary building styles (Mehta, 2014); (2) harmonic spatial hierarchy and organisation (Atasoy et al., 2018); and (3) richness and coordination of building facade styles (Lee and Ostwald, 2023).

4.4.5 Place identity

Over the past decades, there has been growing academic interest in the notion of place identity, particularly in exploring the relationship between people and place across disciplines such as urban design, environmental psychology, sociology and geography (Relph, 1976; Proshansky et al., 1983; Montgomery, 1998; Ujang and Zakariya, 2015). The term “place identity” was first used by environmental psychologist Harold M. Proshansky to conceptualise the relationship between people and a place or territory as a self-identify (Low, 2023). Inspired by Proshansky’s concept, Relph (1976) proposed that, while the meanings of places are influenced by their physical settings and activities, places are fundamentally centres of meaning shaped by

everyday experience. He emphasised that urban environments are experienced and understood through daily interactions and the human experiences of those places.

Later, Montgomery (1998) points out that the construction of place identity should consider three aspects, including physical settings, activities and meaning. This suggests that place identity is rooted not only in the distinctiveness of the physical environment, but also in individuals' internal psychological and social processes that construct cultural meaning and symbolic value. Such meaning and symbolism can be conceptualised as perceptual knowledge about how the physical form may be perceived, as "memorable or forgettable, liked or disliked, meaningful or not" (Carmona, 2010a, p. 116). Indeed, all urban environments, such as architectural elements, natural landscapes, or urban furniture, can be viewed as repositories of systems of signs (Knox, 1987). Likewise, Von Wirth et al. (2016, p. 68) define place identity as the "degree of meaning given to specific environments". This concept encompasses both the tangible and intangible dimensions of place. On the one hand, the specific environment refers to distinctive geographical features, architectural elements, spatial compositions and natural characteristics that may function as iconic signs (Carmona et al., 2010). On the other hand, the cultural and symbol meanings attributed to these environments are shaped by lived experiences, ideology, socio-cultural and collective memory. In addition, place identity is also defined by Ujang (2012) as an emotional bond with place, emphasising the profound relationship

between people and places. It also underscores how meanings are generated through the physical characteristics of a place and the social construction of place (Jackson, 1994).

To further clarify the perceptual and experiential nature of place identity, it is necessary to draw on the conceptual meanings of authenticity. Drawing on Wang's *Rethinking Authenticity in Tourism Experience*, authenticity is conceptualised as a socially constructed and experience-based notion rather than a purely objective attribute and can be divided into three aspects based on the perspectives of different user groups: objective, constructive and existential authenticity.

Objective authenticity emphasises the preservation of physical objects grounded in historical evidence and expert knowledge and is often prioritised by designers, heritage professionals and serious heritage tourists. Such groups suggest that places dominated by educational purposes can be designed to reflect objective authenticity (Wang, 1999).

Constructive authenticity refers to "a projection by tourists on to sought-after objects in light of their expectations, imagery, preferences, beliefs, and so forth" (Yi et al., 2023, p. 802). Constructive authenticity refers to "a projection by tourists on to sought-after objects in light of their expectations, imagery, preferences, beliefs, and so forth" (Yi et al., 2023, p. 802). In other words, constructive authenticity refers to "a projection by

tourists on to sought-after objects in light of their expectations, imagery, preferences, beliefs, and so forth" (Yi et al., 2023, p. 802). In other words, an authentic presentation of a city's traditional social relations and daily life is more valued than the preservation of physical objects.

Existential authenticity is more commonly associated with casual tourists looking for a heritage leisure experience, who perceive authenticity as stemming from a subjective emotional engagement; interacting with families, friends and strangers; and self-exploration derived from non-routine experiences and multi-sensory perspectives while engaged in tourism activity (Wang, 1999; Yi et al., 2017). As postmodern tourists tend to prioritise enjoyment and leisure over the pursuit of authenticity, some tourists may overlook the actual destination, focusing instead on entertainment and spectacle by engaging with digital technologies (Gao et al., 2022). Wang (1999) suggests that the authenticity sought in tourism cannot be fully explained by the authenticity of toured objects alone. Instead, he introduces existential authenticity as an alternative source of authentic experience, emphasising that in many forms of tourism, what is sought is not the object itself but a sense of self-authenticity and shared experience. This perspective broadens the explanatory authenticity by repositioning it as an experiential foundation of waterfront tourist motivation rather than a property inherent in physical objects.

Consequently, these different interpretations of authenticity based on various users suggest that shaping place identity in urban waterfront open spaces is not fixed, but negotiated through diverse user perceptions, experiences and practices. This provides an important theoretical foundation for understanding why place identity should be assessed via urban memory and perceptual experience, rather than solely through material or physical setting attributes.

In this study, place identity includes four sub-factors: the distinctiveness of architectural elements (Hayden, 1995); the distinctiveness of natural landscapes (Ruan and Prominski, 2023); the distinctiveness of street furniture (Matsuoka and Kaplan, 2008); and place memory (Rishbeth and Powell, 2013). Before examining each sub-factor and its associated variables, it is important to first clarify the concept of *distinctiveness*, which is defined by Carmona et al. (2010, p. 123) as the quality of being a distinctive and meaningful place. It refers to the unique interplay between physical characteristics, historic fabrics and symbolic values embedded in the original form of a settlement – qualities that are further shaped and reinforced through ongoing human intervention over time.

Distinctiveness of architectural elements

Within this overall context, the distinctiveness of architectural elements involves the use of local materials, facades, and the structure of traditional architecture (Abusaada and Elshater, 2021). In addition, personalisation contributes to the expression of

distinctiveness within transitional zones between the public and private realms, as reflected in architectural elements such as decorative features, external balconies and the design of front doors (Carmona et al., 2010). In particular, historical architectural elements enhance the distinctiveness of waterfront open spaces, owing to their symbolic meanings and historical continuity (Airas et al., 2015). Drawing on this, the sub-indicator for the distinctiveness of architectural elements comprises seven variables: (1) roofscapes (Lindal and Hartig, 2013); (2) facades (Prieto and Oldenhave, 2021); (3) local structure of buildings (Ching et al., 2009); (4) balconies/verandas (Carmona et al.,2010); (5) local materials (Erickson and Roberts, 1997); (6) outdoor elevated walkways (Villani and Talamini, 2020); and (7) decorative elements (Ahani et al., 2017).

Distinctiveness of natural assets

Natural assets, as key elements of the natural resource surrounding urban waterfront areas, are easily perceived and appreciated by both residents and visitors (Fincham, 2010). Zhang, Sun and Qiu (2024) argue that the integration of physical landmarks and the local natural landscapes formed by unique geographical characteristics could strengthen locality. Crang (1998) observed that, in the absence of unique natural assets, individuals are less likely to experience a sense of belonging and, as a result, may become disengaged from caring for their environment. In this study, the distinctiveness of natural assets is categorised into three primary variables, based on

the physical characteristics of urban waterfront open spaces: (1) distinctiveness of shoreline forms (Liu et al., 2021); (2) distinctiveness of local planting (Carmona et al., 2010); and (3) distinctiveness of the body of water (Hradilová, 2012).

Distinctiveness of urban furniture

Miranda (2019) points out that the history of urban furniture in public spaces reflects the traditions and collective memory of the society. However, the increasing homogenisation of urban furniture could erode the cultural identities of cities. El-Ghonaimy (2020) highlights the role of street furniture in reflecting local heritage and reinforcing the historical character of urban spaces. Indeed, as street furniture serves as a medium between users and the urban environment, its design and placement should be sensitive to cultural diversity, local traditions and historical heritage rather than focusing on design modern styles (Miranda, 2019). By integrating the characteristics of urban waterfront open space, the sub-indicator for the distinctiveness of urban furniture includes nine variables in this study: (1) fountains (Hynynen et al., 2012); (2) water-related design installations (Mikkelsen et al., 2018); (3) digital billboard (Lee, 2004); (4) monuments (Johnson, 2002); (5) lamppost (Carmona, et al., 2010); (6) artificial terraces leading towards water (Wei et al., 2016); (7) transit shelters (Carmona et al., 2010) (8) benches (Sepe, 2021); and (9) bins (Wang, 2022).

Place Memory

Place memory includes both personal (individual-based) and collective (community-based) memories. According to Mowla (2004), individuals tend to recall place images, such as sights, sounds, smells, events, people and conversations, all of which serve as personal memory triggers and contribute to the formation of personal memory. These triggers may also lead to changes in lifestyle and everyday spatial routines, thereby influencing individuals' memory of place and the social construction relating to the built environment (Åkerlund and Sandberg, 2015).

Sociologists and social psychologists use the term "collective memory" to refer to the shared memories held by groups or societies. As Lewicka (2008) observes, place memory is shaped not only by individual experience, but also by an individual's embeddedness within broader social structures – such as family, ethnic community or national identity. In other words, collective memory serves as a signifier of place, and can be transmitted and assigned common meaning through local oral traditions, cultural transmissions, ethnic group and state narratives (Lewicka, 2008). In particular, Loughran et al. (2015) demonstrate the relationship between collective memory and urban transformation. They point out that, when older buildings and their surrounding public spaces are replaced by new structures intended to better address contemporary human needs, a sense of recognition of what once existed often endures, and the past is - at times – nostalgically longed for. In this context, the historic preservation of

heritage buildings and the adaptive reuse of existing buildings' form that together embody collective memory play a crucial role in reinforcing shared spatial meanings through socio-spatial practice (Gordon, 1996; Bélanger, 2002; Milligan, 2007). For instance, in Cardiff Bay (in Wales, UK), some abandoned industrial sites that extended the city towards the water were adaptively reused as flagship projects to express urban identity (Punter, 2007). In particular, the historical significance of such industrial heritage buildings along waterfronts lies in their association with historically important events and figures connected to the site (Milligan, 2007).

Moreover, symbolic values could be manifested through place names to link both their past and present (Hull IV et al., 1994). Jordan (2012) highlights the significance of place names in shaping the symbolic landscape associated with public realm from a cultural-geographical perspective. He further suggests that place names serve as links to the past, acting as reflective mirrors that celebrate historical events and heritage activities (Jordan, 2012). Certain place names represent one of the most distinctive elements of human cultural heritage, as many are associated with historical events recorded in written documents, or with notable figures remembered through oral tradition (Helleland, 2012).

In addition, recent advances in digital technologies and media communications have enabled innovative approaches to the interpretation and presentation of cultural heritage (Liu and Lin, 2021). These technologies help establish systematic platforms

for the construction of place memory in the public space, within the unique experiences of cultural heritage (Smaniotto Costa et al., 2018). In particular, digital heritage interpretation and presentation place greater emphasis on engaging people with the historic built environment in ways that foster continued understanding and immersion. UNESCO (2003) defines “digital heritage” as “unique resources of human knowledge and expression created digitally or converted into digital form from existing analogue resources” (cited in Rahaman, 2018, p. 208). Digital heritage displays may include texts, images, motion graphics and two-dimensional and three-dimensional objects, as well as virtual environments related to virtual reality (VR) and urban heritage (Rahaman, 2018). Through Human–Computer Interaction (HCI) applied in urban spaces, co-experience and meaning-making can be facilitated by the narrative structures embedded within digital heritage storytelling and supported by local cultural and creative industries (Caspani et al., 2017).

Overall, the sub-indicator of place identity primarily includes four variables: (1) lifestyle evolution shaped by embodied personal memory (Mowla, 2004; Åkerlund and Sandberg, 2015); (2) historic preservation and adaptively re-using existing built form as an embodiment of collective memory (Gordon, 1996; Milligan, 2007; Lewicka, 2008; Loughran et al., 2015); (3) place names and symbolic references (Jordan, 2012; Helleland, 2012); and (4) cultural and digital heritage interpretation and presentation (Caspani et al., 2017; Smaniotto Costa et al., 2018; Liu and Lin, 2021).

4.4.6 Inclusiveness

According to the *Oxford English Dictionary*, inclusiveness is defined as “something containing a specified element of a whole or not excluding any section of society or any party” (Landman, 2020, p.211). Based on this definition, Mehta (2014) suggests that an ideal inclusive public space should accommodate a wide range of activities and enable diverse groups of people to access and utilise the space in support of their daily lives, despite a recognition that public spaces have never been entirely inclusive. Franck and Stevens (2007) argue that an inclusive public space should be able to change and accommodate new activities in response to user demand. In this context, social cohesion is regarded as a fundamental component of societal stability and interdependence, representing shared loyalties, mutual support and a sense of solidarity and participation among members of a community. Schreiber and Carius (2016) emphasise that social cohesion is one of the most important elements in achieving an inclusive city, highlighting the role of community building, cooperation and social relations among different stakeholders and ethnic groups.

As urban waterfront open spaces continue to be redeveloped, they attract increasingly diverse new user groups (Mehta and Mahato, 2021). This trend has the potential to foster a more inclusive public realm. However, these newly-created spaces can also lead to social exclusion, gentrification and spatial fragmentation driven by culture- and heritage-led regeneration and urban competition. Thus, it is necessary to evaluate the

inclusiveness of urban waterfront open spaces through four key sub-indicators: (1) diversity of users; (2) diversity of activities; (3) equitable access and use; and (4) social cohesion within urban waterfront communities. The following part provides a detailed elaboration.

Diversity of users

This refers to the assertion that all types of users, regardless of age, race, ethnicity, gender or disability, can have the right to be in a space and use it (Verna, 2014). Carmona et al. (2010, p. 158) suggest that the creation of equitable and inclusive environments, intended to create better places for people, should consider their diversity, including “the old and the young, the rich and the poor, men and women, the able-bodied and people with disabilities, as well as both ethnic majorities and minorities”. A high-quality urban waterfront open space should provide an inclusive environment that can accommodate various individuals and groups and encourage culturally- and socially-diverse groups to live harmoniously together (Attia & Ibrahim, 2018). Furthermore, user diversity could also reflect the level of gentrification and spatial segregation of users, which are often driven by the interests of global elites (Evans et al., 2022). In addition, Lawton (2013) suggests that socially-mixed neighbourhoods can foster a deeper understanding of urban daily life, reducing the risk of involuntary segregation associated with the waterfront neighbourhood context. Bruns-Berentelg (2011) argues that, to prevent the gentrification of urban waterfront

areas, a particular form of socially-mixed neighbourhood is required – one that emphasises social interaction among diverse households.

In light of the above discussion, this study has categorised the element of diversity of users into three sub-elements: (1) variety in age range (Üzümcüoğlu and Polay, 2024); (2) variety in gender (Huang and Napawan, 2021); and (3) the degree of socially-mixed waterfront neighbourhoods (Lawton, 2013).

Diverse user-activity pattern

The diversity of user-activity patterns plays a vital role in the creation of inclusive, diverse and equitable urban waterfront open spaces (Ikudayisi and Taiwo, 2022). Gehl (2011) proposed that outdoor activities can be divided into three types:

- Necessary activities: including commuting to work or walking to study, waiting for a bus, etc. These activities are characterised by people have no choice, and their incidence is only slightly influenced by the physical setting (Carmona, 2021).
- Optional activities: these include skateboarding, taking a stroll, eating and drinking in leisure spaces, enjoying the Kunqu Opera, people-watching, etc. Such activities can take place when time is available, the weather and setting invite them, and people have a wish to do so where the quality of the environment is high.
- Social (resultant activities): these occur spontaneously as a consequence of people moving about and being in the same spaces, such as passive contacts

(simply seeing and hearing). The occurrence of social activities is highly dependent on the presence of the first two types of activities and the quality of the physical environment. This requirement necessitates designing for unpredictability, rather than fixing on known outcomes, to allow for flexible and multifunctional use.

To facilitate these activities within urban waterfront open spaces, land-use diversity, which refers to the effective functional patterns of land use and mixed-use development, can significantly affect users' activities and behaviours (Bordoloi et al., 2013). Kotharkar and Bahadure (2012) point out that land-use diversity can be conceptualised as the effective integration of multiple land-use functions within a given area, enabling a range of daily activities – such as living, working, shopping and leisure – to occur in close proximity. The development of land-use diversity has been shown to enhance "walkability" and foster social inclusion (Schiavina et al., 2022). Lens and Monkkonen (2016) believe that mixed land use on urban waterfronts can enrich public social life for social interaction. An effective mixed-use approach can promote inclusive, rather than exclusive, zoning, thereby reducing the likelihood of a highly segregated physical and social environment.

In addition, urban waterfront open spaces, recognised as one of the most significant forms of investment – are expected to serve both local communities and visitors equitably (Jian et al., 2020). To achieve this, it is essential to incorporate a range of trade- and community-led public services, supported by a public licence, which can

foster spontaneous social interaction and contribute to economic revitalisation (Grodach, 2010). O'Hare (2010) suggests that these diverse legal trade and community services facilitate public engagement and encourage a wider range of optional and social activities on urban waterfronts. He further argues that they help realise the regeneration vision by placing communities at the heart of users' needs. Consequently, by creating land-use diversity (cultural, commercial, leisure, work, residential, etc.) and providing a variety of trade and community-led public services, diverse activities in inclusive waterfront open spaces can be stimulated.

As mentioned above, this study adopts the indicator of diverse user-activity patterns, which comprises two key variables: (1) land-use diversity (Kotharkar and Bahadure (2012; Lens and Monkkonen, 2016); and (2) a range of trade- and community-led public services (Johnson and Glover, 2013).

Equitable access and use

The creation of an inclusive urban waterfront open space should ensure that all individuals have equal and free access to and use of the space (Jian et al., 2020). Lynch (1984) and Carr et al. (1992) suggest that spatial rights involve freedom of action, equitable access, ownership and disposition for all social groups. Lefebvre (1996) proposed the slogan of “the right to the city”, which refers to the right to access urban spaces as it relates to spatial rights and social justice. Harvey (2003) and Soja

(2010) argue that spatial rights and social justice should not only focus on the right to access and use basic public services and urban resources, but also on the involvement of users in the spatial production process. Such participation in the process of urban space production can be triggered by “creating a qualitatively different form of urban sociality”, where people can live in harmony with their own creations (Harvey, 2003, p.939). Urban waterfront open space, as a medium for social relations, thus gains its vitality through everyday interactions and neighbourhood ties that are activated by particular interventions. For example, encouraging the use of flexible spaces and movable urban furniture is one of the most crucial design measures to reinforce the connection between urban space production and the reshaping of community life and spontaneous activities (Schreiber and Carius, 2016). In addition, the creation of a barrier-free environment in the public realm of urban waterfronts for vulnerable groups contributes to the advancement of social and spatial justice.

In summary, the sub-factor of equitable access and use includes ten variables, namely: (1) equitable access to the key tourist destination of urban waterfront open spaces for all social groups (Attia and Ibrahim, 2018); (2) equitable access to the water’s edge for all social groups (Evans et al., 2022); (3) equitable access to cultural events for all social groups (Sepe, 2013); (4) equitable access to play areas on the urban waterside for all social groups (Tunstall et al., 2004); (5) presence of accessible lifts on the urban

waterside for people with disabilities (Attia and Ibrahim, 2018); (6) presence of accessible ramps on the urban waterside for vulnerable groups (Xue et al., 2024); (7) free use of flexible spaces for all social groups (Stevens, 2020); (8) free use of movable benches for all social groups (Sieber, 1991); (9) 24/7 operational availability of outdoor waterfront public space (Tan and Klaasen, 2007); (10) free use of Internet service (WiFi) for all social groups (Hampton, Livio and Goulet, 2010).

Social cohesion

Social cohesion refers to the “interdependence among members of society, as well as their shared loyalties and solidarity”, all of which are key attributes of a well-functioning society (Qi et al., 2024, p. 156). Schreiber and Carius (2016, p. 322) conceptualise social cohesion as “an important component of the inclusive city, based on the notions of community building, cooperation and social relations among people from different socioeconomic and ethnic backgrounds”. It is believed that newly-emerging urban waterfront open spaces serve both as a hub of community and as essential tools for achieving social cohesion (Aelbrecht et al., 2019).

Carmona (2019) argues that social cohesion is closely related to **good cooperation between public and private enterprises, civil society organisations and waterfront communities,** which can reduce social stratification and promote greater inclusion of social groups and broader local social networks, thereby strengthening

social support. Establishing new organisational and institutional frameworks can strengthen collaboration between a wide range of stakeholders, including national and local governments, the third sector and communities (Desfor and Jørgensen, 2004). Quan and Solheim (2023) note that public-private partnerships tend to address new forms of cooperation at the local-government level. These emerging governance mechanisms can already be observed in waterfront regeneration processes. They include a shift towards more entrepreneurial approaches, which are often influenced by local democratic traditions and welfare policies (Harvey, 1989; Andersen and van Kempen, 2001).

Furthermore, Forrest and Kearns (2001) emphasised the neighbourhood contributes to the formation of social mixing. An effective community-participation mechanism is needed to support the development of socially-mixed neighbourhoods and social networks within social cohesion (Schreiber & Carius, 2016). Therefore, **good community engagement in decision-making processes and planning** is needed to support the development of socially mixed neighbourhoods and to foster social cohesion. Citizen participation in decision-making processes for urban waterfront regeneration has become an increasingly common global trend aimed at securing public benefits. Attia and Ibrahim (2018) argue that public participation in the decision-making process should be responsive to varying contextual conditions and underlying power dynamics. This is particularly relevant in the context of waterfront regeneration,

where initiatives are often led by stakeholders with significant interests, whether public-sector, private-sector or newly-established port authorities formed through public-private partnership (Chen, 2022). An effective collaboration between local government and waterfront communities can create a communicative platform to attract more investors for the development of waterfront infrastructure (Attia and Ibrahim, 2018)

Furthermore, Qi et al. (2024) point out that **the length of social interactions** could shape social ties through engaging with social encounters and daily lives within urban waterfront public spaces.

Urban waterfront regeneration projects may be grounded in urban entrepreneurial governance and local boosterism, both of which involve the rational and transparent allocation of public funds and the equitable provision of infrastructure services (Hermelin and Jonsson, 2021). Within this context, the public sector is generally better positioned than private actors to pursue the long-term social well-being of citizens, and to ensure benefits are in the interests of all stakeholders (Papatheochari and Coccossis, 2019).

Drawing on the above discussion, the sub-factor of social cohesion includes four variables: (1) cooperation of public and private enterprises, civil society organisations and waterfront communities (Andersen and van Kempen, 2001; Desfor and Jørgensen,

2004; Quan and Solheim, 2023); (2) an effective community engagement in decision-making processes and planning (Smith and Ferrari, 2012; Attia and Ibrahim, 2018; Chen, 2022); (3)the length of social interactions (Priest et al., 2014; Qi et al., 2024); and (4) rational and transparent distribution of public funds and waterfront infrastructure services (Doucet, 2013; Papatheochari and Coccossis, 2019; Hermelin and Jonsson, 2021). Overall, the research framework can be seen in Table 4-6.

Table 4-7 Research framework. (Source: author)

Factors	Sub-factors	Variables
Linkage & Access	Connectivity of waterfront path systems	● A1 The effective connection between pedestrian bridges and key nodes along urban waterfront open spaces ● A2 The effective connection between the waterfront promenade route and key nodes along urban waterfront open spaces ● A3 The effective connection between the cycling route and key nodes along urban waterfront open spaces ● A4 The effective connection between the vehicular route and key nodes along urban waterfront open spaces ● A5 The effective connection between the waterborne transportation route and key nodes along waterfront open spaces
	Continuity of waterfront path systems	● A6 The continuity of waterfront promenade routes ● A7 The continuity of cycling routes ● A8 The continuity of vehicular routes ● A9 The continuity of water transport routes
	Physical accessibility of facilities on urban waterfronts	● A10 Accessibility of water’s edge ● A11Accessibility of basic public service facilities (such as parking areas, public transit stops, public service points, waste bins, toilets, etc.)

		● A12 Accessibility of sport amenities (such as children's playgrounds, outdoor skateboard parks, etc) ● A13 Accessibility of healthcare services ● A14 Accessibility of cultural venues ● A15 Accessibility of commercial amenities
Safety	Protection against flooding risks	● B1 Use of temporary flood defences ● B2 Raising the plinths for buildings within creation of different elevations (Longitudinal Design) ● B3 Use of traditional shoreline infrastructure (such as bulkheads, seawalls, and revetements, embankments) ● B4 The integration of waterfront greenways with flood control systems
	Protection against traffic accidents	● B5 Creation of traffic segregation or barrier zones ● B6 Priority for pedestrians in mixed traffic ● B7 Control of fast-moving vehicles
	Protection against crime	● B8 A well-designed urban waterfront street spatial layout without cul-de-sacs ● B9 The appropriate number of surveillance cameras ● B10 The appropriate number of public/private guards and police ● B11 Sufficient artificial lighting quality after dark ● B12 Provision of personalising property (streetlights, block watch signs, yard decorations, private plantings) on the urban waterfront promenade ● B13 Good maintenance and condition
Comfort	Microclimatic comfortability	● C1 Good air quality ● C2 Appropriate water surface humidity ● C3 Presence of temperature-regulating shade provided by natural vegetation (tree planting, shrubs, etc.)

		• C4 Provision of artificial shelter from the wind, rain and some sun (such as bus shelters, water taxi shelters, etc.
	The comfort of seating	• C5 A variety of formal and informal seating options, combining primary and secondary seating • C6 An adequate number of sitting arrangements • C7 Low noise level during seating and resting • C8 Good seating placement, preferably with good views • C9 Appropriate size of seating areas • C10 Arrangement of movable/flexible seats • C11 Materials for seats with insulating and water-repellent properties
	The comfort of movement	• C12 The material of the cycle route • C13 The appropriate cycle route width • C14 The material of the urban waterfront promenade route • C15 The surface condition of the cycle route • C16 The appropriate waterfront promenade route width • C17 The surface condition of the waterfront pedestrian route • C18 The surface condition of the vehicular route • C19 The appropriate vehicular route width • C20 The material of the vehicular route

	The comfort of visual elements	● C21 View of rich fauna ● C22 View of clear visual axis ● C23 View of clean water body ● C24 View of rich flora ● C25 View of good skyline ● C26 View of clear information board and wayfinding ● C27 Readability of digital transport schedule screens
Spatial aesthetics	Proportions and scales	● D1 The appropriate scale of leisure areas ● D2 The appropriate scale of commercial areas ● D3 The appropriate scale of cultural venues ● D4 The appropriate scale of residential blocks ● D5 The appropriate scale of office areas ● D6 The appropriate ratio of waterfront street width to building height ● D7 Sense of enclosure (such as space formed around a centre)
	Sensitivity to harmonic relationships	● D8 Harmonic spatial hierarchy and organisation ● D9 Richness and coordination of building façade styles ● D10 Articulation of the historical and contemporary building styles
	Appreciation of rhythm	● D11 The rhythm of facades (ratio of solid to void in facades) above ground floor ● D12 The rhythm of colonnades in semi-public realms ● D13 The rhythm of active frontages at the ground floor level (interaction with the place)
Place identity	Distinctiveness of architectural elements	● E1 Distinctiveness of facades ● E2 Distinctiveness of decorative elements ● E3 Distinctiveness of balconies ● E4 Distinctiveness of roofscapes ● E5 Distinctiveness of local materials ● E6 Distinctiveness of local structure of buildings ● E7 Distinctiveness of outdoor elevated walkway

	Distinctiveness of nature landscapes	● E8 Distinctiveness of local plants ● E9 Distinctiveness of shoreline forms ● E10 Distinctiveness of water body shapes
	Distinctiveness of street furniture	● E11 Distinctiveness of transit shelter ● E12 Distinctiveness of banners/digital billboards ● E13 Distinctiveness of bins ● E14 Distinctiveness of lampposts ● E15 Distinctiveness of fountains ● E16 Distinctiveness of water-related design installations ● E17 Distinctiveness of monuments ● E18 Distinctiveness of benches ● E19 Distinctiveness of artificial terraces leading towards water
	Urban memory	● E20 Place names and symbolic references ● E21 Lifestyle evolution shaped by embodied personal memory ● E22 Historic preservation of and adaptively re-using existing built form as an embodiment of collective memory ● E23 Cultural and digital heritage interpretation and presentation
Inclusiveness	Diversity of users	● F1 Variety in age range ● F2 Variety in gender ● F3 Mix of diverse community groups
	Diverse user-activity pattern	● F4 Range of activities (if granted a public licence) ● F5 Land-use diversity
	Equitable access and use	● F6 Equitable free use water's edge for all social group ● F7 Equitable free use sports ground along waterfronts ● F8 Equitable free use Internet service (Wi-Fi) for all social groups ● F9 Equitable free use children's play areas on the urban waterside for all social groups ● F10 Equitable free use accessible ramps on the urban waterside ● F11 Equitable free use of accessible lifts on the urban waterside ● F12 Equitable access to community-led formal/seasonal events/activities

		• F13 Equitable free use of movable benches for all social groups • F14 24/7 operational availability of outdoor waterfront public space • F15 Equitable free use flexible spaces for all social groups
	Social cohesion	• F16 The length of social interactions • F17 Rational and transparent distribution of public funds and waterfront infrastructure services • F18 An effective community engagement in decision-making processes and planning • F19 Cooperation of public and private partnership

4.5 Conclusion

The research framework has been established based on the previous literature review, which re-theorises urban waterfront open space generated by cultural-heritage-led regeneration. This approach considers users' perspectives, placemaking principles, publicness, public space quality and associated urban waterfront open space design principles. Such an established research framework examines how physical configuration and the social construction of place associated with users' perceptions affect the quality of urban waterfront open spaces. The perception and experience of urban waterfront open spaces is an important part of improving the quality of the public realm. In this context, the established research framework will be applied to the following mixed-method study, thereby evaluating the selected case studies based on place differentiation and morphology.

CHAPTER 5- METHODOLOGY

5.1 Introduction

This chapter presents the research methodology and the mixed-method approach employed to address the research questions and objectives outlined in Chapter One. It begins by explaining the rationale for adopting a concurrent triangulation design within a Mixed Methods Research (MMR) framework, aimed at developing a holistic understanding of users' attitudes towards and perceptions of the quality of urban waterfront open spaces shaped by culture-heritage-led regeneration efforts. The second section focuses on mixed-method design, incorporating both qualitative and quantitative approaches. The third discusses why the selection of case studies fits into my research. The chapter then presents the data collection processes, sampling strategies and data analysis methods employed for the quantitative online questionnaire, semi-structured interviews and direct field observations. Research ethical considerations are also considered. The chapter concludes by discussing the scope and limitations of the research methods applied.

5.2 Methodological Choice

5.2.1 Mixed Method Research (MMR)

Existing research on users' perceptions of and attitudes towards public space on urban waterfronts focuses primarily on quantitative and mixed-method research (MMR). Purely qualitative approaches are less frequently employed, despite the fact that the

social sciences are fundamentally concerned with understanding qualitative aspects of human experience (Webber, 2017). This is partly due to the time-intensive nature of qualitative research, limited funding opportunities and its perceived lower publication impact in high-ranking academic journals (Denzin, 2017).

In the social sciences, many scholars have applied statistical methods to investigate users' perceptions and attitudes to improvements in the quality of urban waterfront open spaces. For instance, Li et al. (2023) use virtual-reality technology combined with questionnaire interviews as a quantitative method to explore how different elements in urban waterfront green park spaces influence public psychology and behaviour. Ouyang and Wu (2023), on the other hand, proposed a quantitative method that combines Point of Interest (POI) data with questionnaire surveys to analyse the service capacity performance along Suzhou Creek in Shanghai. Meanwhile, Tian et al. (2024) employed social data sourced from the Dianping social media platform, alongside spatial data representing distances from water bodies, roads and attractions, as quantitative methods to assess public perceptions of cultural ecosystem services along urban waterfronts, also in Shanghai. However, although such typical quantitative methods primarily focus on building theoretical frameworks and ranking factors and sub-factors, they still lack the capacity to provide an in-depth understanding of people's attitudes, perceptions, activities and behaviours. Therefore, mixed-methods research (MMR) in studies of urban waterfront open space quality represents an ideal

research paradigm, as it can “transcend the traditional dichotomy between quantitative (positivist) and qualitative (interpretivist) research” (Baškarada and Koronios, 2018, p. 4). Wide use of MMR can be found in literature published over the past decade (Lo and Jim, 2012; Lee et al., 2017; Ramlee et al., 2018; Operto, 2019; Zhou and Tan, 2024). For example, Wang et al. (2020) utilise the mixed methods of field observation and questionnaire survey to assess the social performance of urban waterfront open spaces in Hanghzou’s Qiantang riverside walkway. Zhou and Tan (2024) investigate how public perceptions of urban green space (UGS) qualities influence people’s decisions that combines qualitative analysis (structured interviews) with a quantitative survey (questionnaire).

From the examples above, Mixed Method Research (MMR) can be applied in the field of social science, where researchers combine quantitative and qualitative method to address their research questions (Cotton et al., 1998). Johnson et al. (2007, p. 123) claim that MMR tends to use qualitative and quantitative data collection and analysis to provide both “breadth and depth of understanding and corroboration”. Creswell and Clark (2017, p.38) identified three key components in the design and conduct of MMR, including:

- rigorously collecting and analysing both qualitative and quantitative data to address research questions.
- integrating both forms of data along with their logic, results, and procedures for

conducting the study; and

- framing these procedures within theory or philosophy.

These core characteristics of MMR provide the foundation for developing various categories of MMR design; and the effective integration of qualitative and quantitative methods has been widely discussed by MMR scholars. Johnson and Onwuegbuzie (2004) introduce several mixed-model designs, although they neglect to provide an explanation for the basis of their classification. Subsequently, Leech and Onwuegbuzie (2009) have identified key factors that help to classify MMR typologies, including: time orientation (concurrent vs. sequential); emphasis of approaches (equal vs. unequal); and the level of mixing (partial vs. full). Based on the above analysis, Creswell and Clark (2017) proposed five mixed-model designs, including: concurrent triangulation; concurrent nested; sequential explanatory; sequential exploratory; and sequential embedded, as shown in Table 5-1.

Table 5-1 Five methods in relation to mixed method research. (Creswell and Clark, 2017)

Concurrent triangulation	Use of QUAN + QUAL methods to address the same question Concurrent collection of quantitative and qualitative data Preferably equal (QUAN = QUAL), in practice could be unequal.
Concurrent nested	Use of QUAN + QUAL methods to answer different research questions and serve a variety of purposes Concurrent collection of quantitative and qualitative data Generally quantitative data set provides a more supportive, secondary role to the qualitative data set

	Predominant method (quantitative or qualitative) given less priority with quantitative or qualitative methods embedded)
Sequential explanatory	Quantitative followed by qualitative (Qualitative data and results help to explain or build upon initial quantitative data and results) QUAN > qual Particularly appropriate when qualitative data is required to explain significant findings, patterns, anomalies or unexpected outcomes
Sequential exploratory	Qualitative followed by quantitative (the initial qualitative method can help develop or inform the second quantitative method) Generally collected and analysed separately QUAL > quan Appropriate to test aspects of an emergent theory
Sequential embedded	Embed one type of data within a larger design using the other type of data The main quantitative data collection is central, with qualitative being supportive Involves collecting qualitative data before an intervention begins Generally qual > QUAN > qual

5.2.2 Concurrent triangulation design in MMR

This research adopts the first of these designs, i.e. concurrent triangulation, as it is one of the most-utilised MMR approaches that use qualitative and quantitative methods to confirm, cross-validate or corroborate research findings (Morse, 1991;Tashakkori and Teddlie, 2015). Turner et al. (2017) claim that current triangulation design reflects the perspective that employing multiple methods yields more valid results, as the strengths of one method can mitigate the limitations of

another. This design tends to separate quantitative and qualitative methods as a means to answer the research questions. Each type of data can be collected and analysed independently with the empirical results illustrated in a complementary manner (Morse, 1991). While quantitative and qualitative methods tend to be equal, in reality researchers could pay more attention to either the quantitative or qualitative approach relying on the research objective (Creswell et al., 2003). Consequently, by employing the concurrent triangulation design in MMR, the findings from one data set can be used to cross-validate, or corroborate, those from the other.

As mentioned above, in this study, the concurrent triangulation design method enables the researcher to obtain an overview of how users perceive the qualities of urban waterfront open spaces through a questionnaire survey (quantitative results), while also providing, through semi-structured interviews and direct field observation (qualitative results), a deeper understanding of why different users hold these perceptions and attitudes. In other words, the quantitative methods collect perceptions and attitudes towards the quality of urban waterfront open spaces across end-users, while the qualitative approach helps to compare different perceptions and preferences of the four target groups: local residents, visitors, designers and management staff or managers. Furthermore, the qualitative approach can help explain the underlying reasons behind questionnaire responses and serve to validate the findings. Thus, this research adopts a concurrent triangulation design in MMR to investigate how users'

perceptions and preferences affect the improvement of urban waterfront open space quality driven by culture-heritage-led regeneration in heritage canal districts and newly developed zones of the natural watersheds in Hangzhou, China. The flowchart of a concurrent triangulation design in MMR can be seen in Figure 5-1.

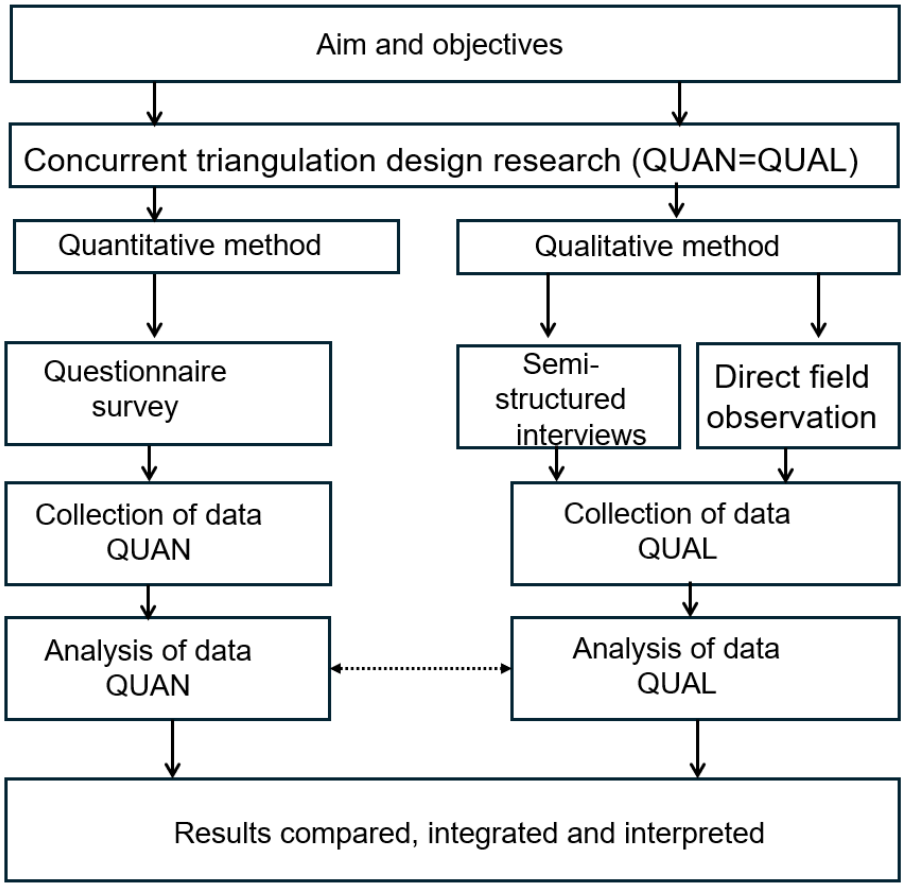


Figure 5-1 Methodological framework. (Source: author)

5.3 Mixed Methods Design

5.3.1 Quantitative method

Regarding the quantitative approach adopted in this study, the questionnaire-based method enables the collection of information on participant attitudes, opinions and

behaviours, all of which constitute first-hand data for empirical research (Lu et al., 2021). Researchers identified various sub-factors and variables based on literature review and associated theories when designing their questionnaire questions. Although some subjective factors relating to the quality of public space cannot be directly measured, they can be associated with specific and quantifiable design elements, which can then be assessed through quantified questionnaire data (Clifton et al., 2008). In this thesis, the quantitative method includes the use of mean ranking, percentages, standard deviation and Importance-Performance Analysis (IPA) based on two types of questionnaire survey, including importance-focused (Set 1 & Set 3) and satisfaction-focused (Set 2 & Set 4). These online surveys provide insights into end-users' evaluations of urban waterfront open space quality and their individual preferences. Yin (2013) argues that the use of questionnaire surveys enables the efficient collection of large volumes of data while reducing the risk of interviewer bias.

The online questionnaire survey design consists of a total of four sets of self-administered questionnaires across two urban-waterfront open-space study areas in Hangzhou: the Qiaoxi Heritage Canal District (QHCD) of Hangzhou and the core section of the South Bank of the Qiantang River (SBQR). Eligible participants were individuals aged 18 or older who had visited at least once. This included local residents, visitors, key experts involved in waterfront improvement projects and managers or staff

working in the areas. The online questionnaire was administered between June and September 2024, after participants had completed the consent form.

Four sets of questionnaires all used a five-point Likert scale to measure each item. Such Likert scales are widely employed as psychometric tools in social and applied sciences to assess individuals' attitudes, levels of knowledge, perceptions, values and behaviours (Ramlee et al., 2018). It is particularly useful for quantifying abstract constructs, such as perceptual quality in urban design, that would otherwise be difficult to measure using conventional techniques (Alabi and Jelili, 2022). Considering Likert scale construction principles, each sub-sub-factor was phrased as a Likert-type statement and rated on five-point importance and performance scales to assess perceived quality. Furthermore, a five-point Likert scale was used instead of a seven-point scale, because it is commonly employed in Importance–Performance Analysis (Sever, 2015). This format not only facilitates respondents' understanding but also ensures comparability with previous research.

Sets 1 (QHCD, old city) and 3 (SBQR, newly developed area) measured the importance of each item using a five-point Likert scale (1 = "not at all important", 5 = "very important"). By contrast, Sets 2 (QHCD, old city) and 4 (SBQR, newly developed area) measured performance/satisfaction with each corresponding item using a five-point Likert scale (1 = "very dissatisfied", 5 = "very satisfied") (Nasution and Zahrah,

2014). Despite these differences, the four questionnaire sets shared a common structure, including:

(1) **Demographic information**, including gender, age range and current status (e.g. residents; visitors; experts/designers involved in improvement projects in the selected area; managers responsible for this area; or others). These sociodemographic characteristics can be treated as variables for analysing the potential reasons behind high standard-deviation values (Lee et al., 2017).

(2) **Basic usage-related questions**, covering frequency of visits, number of visits and duration of stay. These variables not only shape evaluations of urban waterfront open space performance but also help explain the higher standard deviations observed for some items (Ouyang & Wu, 2023).

Within each study area, two questionnaire sets were conducted as a pair (Set 1–Set 2 for QHCD and Set 3–Set 4 for SBQR), targeting the same eligible population. However, each participant completed only one version, either the importance-based or the satisfaction-based survey, to minimise cognitive fatigue and potential response bias at each site.

In this study, both types of questionnaires were designed to gather descriptive statistical data from users of urban waterfront open spaces in selected locations. The collected data are subsequently subjected to reliability and validity analyses, as well

as being further examined using both the Analysis of Means (ANOM) and the Importance–Performance Analysis (IPA) methods. Further exploration of these two data collection and data analysis approaches can be found in Section 5.5.

5.3.2 Qualitative method

Turning to the qualitative approach adopted in this study, it focuses on understanding meanings and how people make sense of places, as well as interpret different activities (Robson, 2011). Mason (2002) suggests that qualitative research can examine various dimensions of the social world, including the everyday experiences, understanding the meanings they generate, and the imaginations of research participants. Adeoye-Olatunde and Olenik (2021, p.1358) believe qualitative research "is the empirical collection of narrative data from individuals or groups, producing an in-depth knowledge of the phenomena of interest". For this study, two key approaches were selected as qualitative methods: semi-structured interviews and direct observation. Semi-structured interviews were selected for the following reasons:

- Flexibility: semi-structured interviews include mostly closed questions, but also some that are open-ended. The main questions and procedures are not "set in stone" in advance and can be adjusted or added to during the study (Adams, 2015).
- Comprehensively identifying the perceptions and attitudes of different target groups towards the urban waterfront open spaces: semi-structured interviews provide different groups of respondents with more opportunities to express their

perceptions, views and experiences, thereby enabling the collection of comprehensive and therefore more detailed qualitative data.

- A deeper exploration of the underlying reasons behind the results: through semi-structured interviews, researchers can gain a deeper insight into the understanding and perspectives of a range of stakeholders regarding the main theme and sub-theme and provide a solid qualitative explanation of the reasons behind the findings. It can be viewed as an effective method to enable users decode both cognitively (knowing something) and affectively (feeling something) (Rapoport, 1977).

In this context, semi-structured interviews were carried out to reveal the perceptions, attitudes, expectations and suggestions of different stakeholders regarding the quality of urban waterfront open space (Zhu, 2023b). Regarding the semi-structured interview design method, the four groups targeted for these interviews included: (1) individual residents living in the selected areas; (2) visitors who had previously experienced these urban waterfront open spaces; (3) designers involved in public space improvement projects at each location; and (4) managers/staff responsible for management and operations at each selected site. To strengthen the qualitative support for discussions of inclusiveness, the interviews also incorporated age diversity within the two main user groups, residents and visitors. In addition, interviews with designers and managers were guided by questions focusing on how design and

governance could improve waterfront experiences for vulnerable or marginalised groups, including design of barrier-free facilities, issues of accessibility, comfort, safety, and community engagement particularly for vulnerable people. Although the interview question design varied slightly for different stakeholders, each semi-structured interview focused primarily on two types of question: basic questions for selected study location and essential questions for the quality of urban waterfront open spaces. Please see Appendix D for more information on the consent and the questions asked in the semi-structured interview.

Secondly, direct field observation is a qualitative research method used to understand how people interact with and use a given space by systematically tracking their behaviours in time and space (Ciesielska et al., 2018). William H. Whyte (1980) was one of the most important urbanists to use the direct observation method. He used a 16mm film camera to document what users did in a Manhattan public space, perceiving their surroundings and gathering impressions in a physical setting. The results of this direct observation influenced public policy and shaped recommendations for future public realm design strategies in New York City. Indeed, this direct field observation approach laid the foundation for understanding how cities work in affecting the everyday lives of local people, rather than how designers and urban scholars anticipate or imagine it should be used. Meanwhile, Bechtel et al. (1990) highlighted observation as a method encompassing five key dimensions: behaviour,

physical setting, time, the observer and the recording of observations. Marušić (2015) has since proposed that the direct field observation method could be combined with behaviour mapping, in which all users' activity types, activity duration and age categories, plus the weather conditions are recorded during the observation process, using corresponding symbols on a detailed map. An essential element is to record and take notes of what people do at specific times, and there are two types: direct participant observation and direct non-participant observation (Ciesielska et al., 2018). The former refers to observation from an insider perspective as an active participant and being immersed in the field study; the latter refers to researchers positioning themselves closer to the field of study, while maintaining the role of an outsider or guest. As non-participant observation can minimise interference with users' activities and behaviours, this study adopted direct non-participant observation.

In addition, because of the large scale of the selected case studies, observations were undertaken in two stages, beginning with grand-tour observations and followed by mini-tour observations. (Zhu, 2023b). In the first stage, grand-tour observations were conducted in two areas corresponding to the online survey sites: the Qiaoxi Heritage Canal District (QHCD) in old cites and the Core South Bank of the Qiantang River (SBQR) in newly developed areas. This stage aimed to identify high-intensity activity nodes in each area and to document their physical settings, including architectural facades, urban furniture, active frontages and natural landscapes. In the second stage,

mini-tour observations were used to select representative nodes at the micro (node) scale for in-depth qualitative investigation. Further details of the qualitative data collection process and associated data analysis, including the timeline and analysis procedures, are provided in Section 5.7.

5.4 Study Area Selection

After justifying the selection of Hangzhou as a relevant study context characterised by a polycentric urban structure in Section 3.5, this section identifies two representative waterfront areas for comparative analysis. They include the Qiaoxi Heritage Canal District (QHCD) along the Beijing–Hangzhou Grand Canal and the core nodes along the Southern Bank of the Qiantang River (SBQR). The reason for selecting these two areas as a whole case study selection is that one represents historic canal-based urban waterfronts shaped by long-term industrial heritage and canal culture resources, while the other represents newly developed riverfront spaces driven by culture-led planning, including mega-event-led initiatives. Furthermore, both areas underwent waterfront regeneration initiatives from 2010s to the present that have played significant roles in reshaping Hangzhou's contemporary public realm (Wang et al., 2020).

In addition, both case study areas (QHCD and the core SBQR) were examined using a dual-scale case study approach to illustrate the relationship between the study areas and their key node-scale sites. At the macro (corridor) scale, the QHCD and core

SBQR waterfront sections are defined as the overall study areas for the online questionnaire survey, which assesses users' overall perceptions of urban waterfront open spaces at the corridor level. At the micro scale, based on grand-tour observations identifying high-intensity activity nodes in terms of activity intensity and functional diversity, key representative nodes within each area were selected for in-depth qualitative investigation, including behavioural observation and semi-structured interviews. The selected nodes were selected based on four criteria: (1) high intensity and diversity of social activities observed on site based on grand-tour observations; (2) diverse functions with representative typologies; (3) comparability in development timing, delivery conditions and design governance (4) newly built urban waterfront open spaces tend to facilitate community participation and promote social integration. A detailed site analysis of the selected case study areas, including their spatial analysis and behaviour mappings, is presented in Chapter 6.

5.5 Data Collection and Analysis of the Questionnaire

5.5.1 Data collection of online questionnaires

Regarding online questionnaire data collection, recruitment for the questionnaire survey employed a "snowball" sampling method (Etikan, 2016), which involved four steps. The first was to create an online questionnaire via Wenjuanxing (Questionnaire Star), a web-based online survey platform (accessed on 15 October 2024) that generates a live link for accessing the survey.

Subsequently, an email was sent to representatives of the communities along the QHCD and SBQR, inviting them to participate. These potential participants (representatives of community members) were asked to forward a “call for participants” letter to others who had visited the selected areas. The letter explained the purpose of the research, the estimated completion time and the relevant policies, and provided an access link (for both the questionnaire and interview). The live link was also sent to the research team’s colleagues, friends and relatives who had previously visited the area via WeChat. If individuals wished to participate, they were asked to sign a consent form before taking part in the research.

Furthermore, the access link was also shared on site as one key alternative recruitment channel to reduce potential sampling bias associated with snowball-style dissemination. Prior to starting each questionnaire, an online informed-consent form was provided. Survey participants could proceed only after confirming their agreement with the consent statements.

The final questionnaire was then distributed to end-users in the two study areas of Hangzhou. Please see Appendix A for more information on the ethical approval and Appendix B for consent and the questions asked in the questionnaire survey. Overall, for online questionnaire data collection, QQ Email and WeChat were used to distribute recruitment emails and messages, while Wenjuanxing was employed to create, distribute and collect all questionnaire responses.

5.5.2 Sample size of questionnaire

Selecting an appropriate survey sample size for questionnaires was an academic concern: how to ensure valid and reliable results for users of urban waterfront open spaces in the selected areas? Cochran's (1963) sample size formula is commonly used and is most suitable for a large population. The equation proposed by Cochran is shown below:

$$n_0 = \frac{Z^2 \times P \times (1 - P)}{E^2}$$

Where:

n_0= initial sample size (for an infinite population)

Z^2= the area under the acceptance region in a normal distribution. It is commonly set at 1.96 (Z) for a 95% confidence level, as this confidence level is frequently used within the specified margin of error.

P= estimated proportion of the population with the characteristic of interest (commonly set at 0.5 if unknown, as it maximizes the required sample size)

E= the preferred level of precision (researchers usually set the level of acceptable error at 5%).

Based on this formula, a modified Cochran Formula for small population was proposed as the population correction; it can be adjusted as follows (Morse, 2000):

$$n = \frac{n_0}{1 + \left[\frac{(n_0 - 1)}{N}\right]}$$

Where:

n= sample size

N= population size

n_0= Initial sample size

Sample size of questionnaire in QHCD (Study Area 1)

All end-users, including residents, visitors, experts and managers, were required to have visited the district at least once. By consulting: the 2024 Work Report of the Hangzhou Municipal Bureau of Culture and Tourism to estimate the number of annual visitors (9.6 million visits); the Municipal Bureau of Statistics of the Qiaoxi Historical Street District for the resident population of the area (2,520 people); and the number of planners and managers involved in the district urban waterfront open space improvement project (around 200 people); the potential total for responses from end-users was approximately 9.6 million. In this context, due to the large sample size, the first Cochran formula is more appropriate for this study.

By carrying out the equation: N = 1.96^2 0.5 (1-0.5) / $(0.05)^2$ = 384.16

Therefore, in Study Area 1, the minimum sample size for each questionnaire was determined to be 385, with a confidence level of 95% and standard error of 5%.

Sample size of questionnaire in SBQR (Study Area 2)

For Study Area 2, the participant groups were consistent with those in Study Area 1, in other words local residents, visitors, designers/planners involved in the redevelopment of public waterfront spaces in the area, and relevant management staff, all of whom had visited the area at least once. According to data published by the Hangzhou Municipal Bureau of Statistics (2024), the resident population of the Bingjiang District along the south bank is approximately 18,000 people, with around 900 planners and managers working in the area. Additionally, with an estimated annual visitor count of approximately 14.96 million, this area also required Cochran's (1963) sample size formula for large populations. By carrying out the equation: $N = 1.96^2\ 0.5\ (1-0.5) / (0.05)^2 = 384.16$.

Therefore, a sample size of at least 385 people would be necessary for each of questionnaire Sets 3 and 4.

5.5.3 Data analysis approach for questionnaires

IBM SPSS Statistics (version 30.0) was employed to conduct data analysis, to comprehensively investigate the impact of users' perceptions and preferences on the improvement of urban waterfront open spaces in heritage canal districts and newly-

developed zones along natural waterfronts, and to redefine integrated regeneration strategies based on these perceptions and insights from all stakeholders, building upon the initial research framework derived from existing literature. This study uses two approaches for questionnaire data analysis: the Analysis of Means (ANOM), standard deviation approach and the Importance–Performance Analysis (IPA) approach.

The ANOM approach, including the mean values within a Likert scale, was used in the questionnaire for construct validation (Yin et al., 2016). The mean values for each criterion in the research framework were calculated based on the responses from the two areas selected. These mean values were compared across the two sites and used to analyse how perceptions vary between heritage canal districts and newly-developed waterfront areas.

The Importance-Performance Analysis (IPA) method was first proposed by Martilla and James; it is an effective method that graphically represents the relationship between importance and performance for a set of attributes and items in a plot, and interprets the results of user experience questionnaires (Hinderks et al., 2019). The level of perceived importance of each item influencing the quality of urban waterfront open spaces and the spaces' performance level are displayed in an IPA plot (Figure 5-22), and are classified into four quadrants or categories (Sever, 2015)

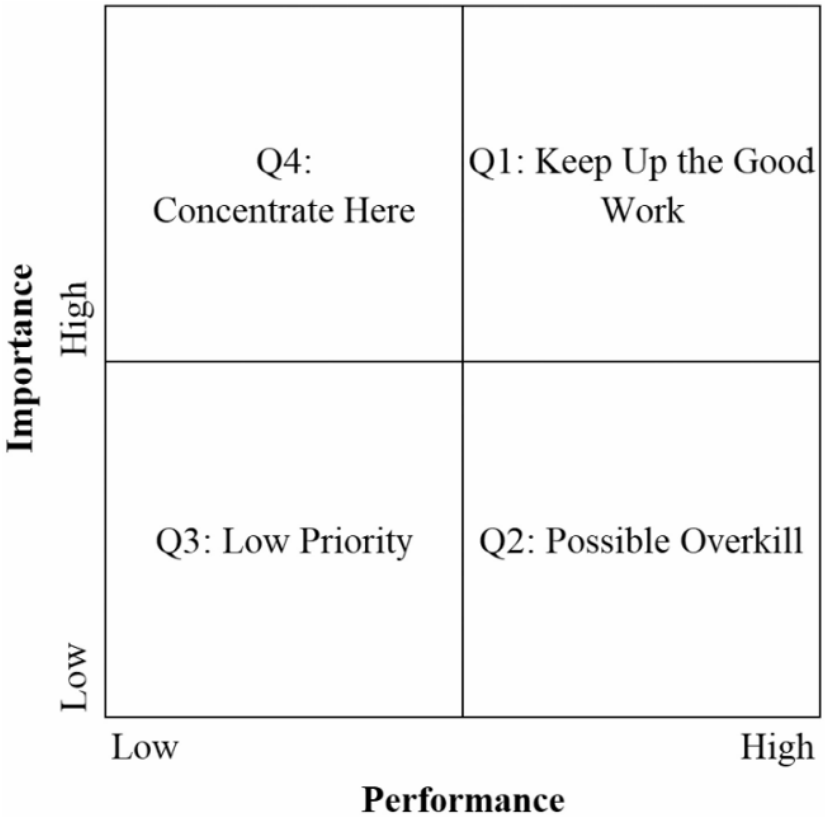


Figure 5-2 Classical representation of importance–performance plot. (Source: Sever, 2015)

- **Quadrant 1(Q1)**: Q1 is entitled “Keep up the good work”, which reflects both higher performance and higher importance for the attributes/items (Feng et al., 2014). Therefore, attributes/items positioned in Q1 can be viewed as the major strengths and potential competitive advantages of the selected area. This would suggest there is no need to improve these attributes, and the current action strategies should be maintained (Padlee et al., 2020).
- **Quadrant 2 (Q2)**: Q2 is labelled “possible overkill”. Attributes/items in Q2 display a higher performance within a lower importance, which suggests focusing on them may waste limited resources (Matzler et al., 2003).

- **Quadrant 3 (Q3):** Q3, referred to as “Low Priority”. Attributes/items positioned in Q3 have lower importance and lower performance, reflecting minor weaknesses in the qualities of urban waterfront open spaces (Deng et al., 2008).
- **Quadrant 4 (Q4):** Q4 is termed “Concentrate Here”. Attributes/items positioned in Q4 was characterised by higher importance with relatively lower performance, identifying the priority for improving the quality of urban waterfront open space (Bacon, 2003).

In this study, the mean importance score and mean satisfaction (performance) score were calculated across all valid respondents for each sub-sub factor *j* by applying a five-point Likert scale.

$$I_j = \frac{1}{n}\sum_{i=1}^{n} I_{ij}$$

$$P_j = \frac{1}{n}\sum_{i=1}^{n} P_{ij}$$

After that, the IPA crosshairs were then defined using the grand means of importance and performance across all sub-sub factors at the same factor level.

$$\bar{I} = \frac{1}{m}\sum_{j=1}^{m} I_j$$

$$\bar{P} = \frac{1}{m}\sum_{j=1}^{m} P_j$$

where *n* is the number of respondents and *m* is the number of sub-sub factors. After that, the IPA crosshairs were then defined using the grand means of importance and performance across all sub-sub factors at the same factor level. Finally, each sub-sub

factor was then assigned to one of the four quadrants based on its position relative to $\bar{I}$ and $\bar{P}$: (1) Concentrate here ($I_j \geq \bar{I}$, $P_j < \bar{P}$); (2) Keep up the good work ($I_j \geq \bar{I}$, $P_j \geq \bar{P}$); (3) Low priority ($I_j < \bar{I}$, $P_j < \bar{P}$); and (4) Possible overkill ($I_j < \bar{I}$, $P_j \geq \bar{P}$). IPA results were reported by listing and counting which sub-sub factors fall into each quadrant, rather than aggregating scores to higher-level factors.

5.6 Data Collection and Analysis of the Semi-structured interview

5.6.1 Data collection of semi-structured interview

In terms of data collection of semi-structured interview, semi-structured interviews were conducted with four target groups in Hangzhou via phone, Tencent Meeting, WeChat and in person and were intended to last approximately one hour, depending on participants' availability. The interviews began once consent forms had been completed. In accordance with ethical approval, identifying information (such as names and positions) was anonymised. This was achieved by disguising any details from the interviews that could potentially reveal the identity or position of the interviewees.

To help with recruitment, individuals were presented with an invitation to participate in a semi-structured interview at the end of the online questionnaire. Those who showed interest were given the opportunity to provide their contact details. After that, the researcher contacted the willing participants and attached a document with details of the expected duration of their participation, and an ethics consent form via email or

phone to arrange and conduct the in-depth interviews. After potential participants for interviews signed the consent form, the researcher contacted them via phone or email to confirm the specific time and mode of the interview. On the day of the interview, each registered participant in the semi-structured interview, designed for each target group of the selected location, received an envelope containing two components: an explanation of the key terms used in the semi-structured interview and key questions. To analyse the interview data, the following collection tools were used to collect semi-structured interview data in Table 5-2.

Table 5-2 Data collection tools for semi-structured interview.

Tools for the semi-structured interview	Actions for semi-structured interviews
Laptop	To store the electronic data (such as recording)
Notebook or digital voice recorder	To record the content and transcript of interview
WeChat, phone, and QQ Email	To communicate potential participants for recruitment participation

5.6.2 Sample size of the semi-structured interview

Many qualitative research methodologists have discussed the appropriate sample size for interviews. Based on grounded theory studies, Creswell (2003) proposed that a total of 20 to 30 interviews is appropriate for a research study. Morse (2000) similarly suggests conducting interviews with 20 to 30 participants, with each participant however being interviewed twice or three times. For case studies, Yin (1994) recommends using at least six sources of evidence. Later, Creswell (2007) suggested

including at least three to five interviewees per case study. Therefore, the researcher's original plan was to interview four individuals from each of the four stakeholder groups at each site, resulting in a total of 32 potential interviewees across the two case study sites. In the end, owing to time limitation, a total of 30 interviewees were interviewed between July and December 2024.

5.6.3 Data analysis for the semi-structured interview

To gain a deeper understanding of the perceptions of various stakeholders, This research conducted a theme-based analysis to analyse various qualitative data sets. The analysis of the semi-structured interview data was divided into five stages. The first step involved transcribing the data and translating it into English. The second treated the participants, categorised into the four stakeholder groups, as distinct cases, enabling a comparative analysis of the differing perspectives on the quality of urban waterfront open spaces influenced by cultural-heritage regeneration. The third stage entailed manually coding the interview transcripts by breaking the data into segments, such as sentences and paragraphs, and subsequently classifying them into different themes, sub-themes and sub-sub-themes based on the established research framework. The fourth summarised and examined the perspectives of different stakeholder groups on the same themes, sub-themes and sub-sub-themes. The fifth stage synthesises the findings from the previous four stages to develop the core arguments. During this stage, a case comparison table was created to facilitate the

comparison of perspectives across the different groups. Additionally, individual quotes, with each sentence or paragraph labelled as a “thematic code”, were identified to support the core arguments derived from the questionnaire survey.

5.7 Data Collection and Analysis of the Direct Observation

5.7.1 Data collection of non-participant direct field observation

Regarding data collection of a dual-scale direct field observation, the grand-tour observations were used to document the general characteristics of the physical settings in the two spaces, as such observations are helpful in studying large-scale areas. This stage involved taking photographs and recording observations of the physical surroundings (architectural facades, urban furniture, active frontages, natural landscapes, etc.) during the walk-observation process over two weeks. These aspects were also examined by combining official land-use documents obtained from the Hangzhou Urban Planning & Design Institute (HUPDI) with the first stage of grand tour observations. Afterwards, the photos and videos were reviewed to help verify and organise the observed content and to inform the selection of key nodes of urban waterfront open spaces with high concentrations of human activity, ready for the next stage.

In this second phase, each site observed was divided into key nodes, based on the frequency of use and the number of users. The activity types, duration of stay, users’ basic information and the duration of activities were recorded, and on-site mapping

was used for analysis. The time for each stage of direct observation can be seen in Table 5-3.

Table 5-3 Observation timetable.

Two selected case study areas	NODE	Weekday observation time	Weekend observation time
Qiaoxi Heritage Canal District in Hangzhbou	Node A	3 July 2024 (Wednesday)	1 September 2024 (Sunday)
	Node B	8 July 2024 (Monday)	21 July (Sunday)
	Node C	9 July 2024 (Tuesday)	20 July 2024 (Saturday)
South Bank of the Qiantang River in Hangzhou	Node D	1 July 2024 (Monday)	31 August 2024 (Saturday)
	Node E	2 July 2024 (Tuesday)	24 August 2024 (Saturday)

Each observation day covered three periods of time: 7:00–11:00, 13:30–15:00, and 17:00–22:00, thereby reflecting both weekday and weekend usage patterns. Additionally, the following tools have been used for direct observations, as seen in Table 5-4.

Table 5-4 Tools for direct observations.

Tools for direct observations	Actions for semi-structured interviews
Notebook	To record who is using the space, the type of activity, how long people stay, and the duration of the activity.
Cameras and phones	To record activities and behaviours on the urban waterfront open spaces at a specific time.

5.7.2 Data Analysis for direct field observations

Based on the data obtained from direct field observations, behaviour mapping technique was used for data analysis of the relationship between activity patterns and spatial configuration of key zones in both selected areas (Michie et al., 2008). Such behaviour mapping involves documenting and recording user activities on a base map, enabling a visual analysis of where and how the spaces are used.

This study focuses on four key aspects of information collected through direct observation: user characteristics; typical daily patterns of waterfront usage; the duration of activities; and the intensity and frequency of activities. (Table 5-5). These observational data can then be incorporated into graphic maps to enhance the understanding of users' behaviours in urban waterfront open spaces. It also reveals movement patterns and helps identify both underused areas and zones of high activity within each selected location.

Table 5-5 The observation study contents. (Source: adapted from Low, 2023)

Theme	**Questions**	**Notes and graphical annotations**
User's descriptions	Who are the primary users of these urban waterfront open spaces—for example, are they predominantly children, young people, or elderly individuals	Notes
	Gender	Notes
Typical daily patterns of waterfront usage	Necessary activities (such as commuting to work, shopping, walking to bus, etc.)	Notes and photographs, draft drawing

	Optional activities (such as skateboarding, taking a stroll, sitting, eating and drinking, relaxing, etc.)	Notes and photographs, draft drawing
	Spontaneous social activities (such as chatting, children playing, passive contact, etc.)	Notes and photographs, draft drawing
	Where are the activities?	Notes and photographs, draft drawing
The duration of activities	How long do people stay in a certain space?	On-site observation and notes
	How long did the activity last?	On-site observation and notes
The intensity and frequency of activities	What is the average number of people?	On-site observation and accounting

5.8 Ethics Considerations

Ethical considerations are essential in research as they avoid harm, encourage good practice, protect peoples' right to privacy and ensure research integrity (Israel and Hay, 2006). Sieber emphasises that research ethical considerations should reflect high moral values. Similarly, Bryman and Bell (2007) argue that researchers should obtain informed consent from participants before commencing a study. This includes ensuring that participants fully understand the research objectives; protecting their privacy and anonymity; and providing information about the expected research outcomes and the anticipated publication timeline. In light of these principles, the research process deployed in this study has been approved by the Research Committee of the University of Nottingham (see Appendix A).

5.9 Limitations and Conclusion

There are certain challenges and concerns associated with this research project. Owing to time constraints, the sample size for the semi-structured interviews conducted as part of the case study did not reach the initially intended number of 32 participants. Due to time constraints, although this study considered four different participant groups, the inclusion of vulnerable populations was limited, in line with research ethics requirements concerning informed consent, potential risk, and the protection of participants who may require additional safeguards. To partially compensate for this, the designer interviews explicitly explored ageing-related design considerations, such as barrier-free access, resting opportunities, shading, walkability and the accommodation of older adults' everyday spatial needs. Although inclusiveness was regarded as one of the six key dimensions in this study, it was not the sole focus of this study. Accordingly, future research could examine this dimension in more detail through targeted engagement with vulnerable groups, such as elderly users, children and people with disabilities.

Additionally, the limitations of the online survey are clarified below:

(1) Online survey methods may partially underrepresent individuals who are less familiar with or have limited access to digital technologies, which may affect the social representativeness of the sample, although this concern was partly mitigated by administering a proportion of the questionnaires on-site via QR-code access.

(2) Respondents may interpret questions and Likert-scale descriptors differently based on their individual backgrounds and experiences, even though this questionnaire provided simplified and easy-to-understand explanations of key academic terms before respondents started the main questions.

(3) Online surveys may be affected by self-reporting and recall bias because respondents often answer away from the study site and rely on memory rather than immediate on-site experience.

As a result, online questionnaire data should be interpreted as indicating patterns and tendencies, and this is why the survey findings need to be contextualised and triangulated with semi-structured interviews and direct observations. Reflecting on the research design, some empirical findings indicate that additional methods could have strengthened the study. For instance, the underuse of semi-public seating observed at key nodes in both sites suggests that more detailed behaviour mapping or time-based observation may have better captured the relationship between spatial configuration, governance and everyday use. Similarly, in the newly developed waterfront, more targeted interviews with long-term residents and younger users could have helped explore how the unrecognised Asian Games legacy contributes to the formation of collective memory.

Overall, this research combines quantitative and qualitative methods to explore how users' perceptions and preferences contribute to improving the quality of urban

waterfront open spaces in the context of culture-heritage-led regeneration in China. The next part of the thesis presents the site analysis in the two selected locations.

CHAPTER 6- SITE ANALYSIS OF TWO REGENERATED URBAN WATERFRONT CASE STUDY AREAS IN HANGZHOU, CHINA

6.1 Introduction

This chapter aims to provide a comprehensive development context and spatial analysis of the two case study waterfronts prior to the perceptual exploration presented in the following chapters. The site analysis includes urban growth context, spatial sequences, functional organisation, activity distribution and high intensity activity nodes across the case study areas based on the direct field observations.

6.2 Site Analysis of the Qiaoxi Heritage Canal District (QHCD)

6.2.1 Urban growth and urban patterns across key nodes of QHCD

Drawing on the node-based selection criteria established in Section 5.4, the urban waterfront open spaces within the Qiaoxi Heritage Canal District (QHCD), encompassing key Nodes A, B and C, were selected as one of the case study areas to demonstrate the spatial diversity of canal-oriented public spaces shaped by heritage-led regeneration. Node A represents the traditional water–street typology within the Qiaoxi Conservation Area, which forms part of the World Heritage Site . By contrast, Node B (Xiaohe Park) and Node C (Grand Canal Square) are not located within the inscribed World Heritage Site. However, they were selected as case studies as the waterfront connectivity programme, initiated in 2022, has integrated these three

nodes into a continuous slow-mobility system functionally and spatially across the QHCD.



Figure 6-1 Three primary nodes in Qiaoxi Heritage Canal District.
(Source: drawing by author)

Historically, urban waterfront open spaces within the Qiaoxi Heritage Canal District, located along the Hangzhou section of the Beijing–Hangzhou Grand Canal, have evolved through multiple phases of transformation shaped by changing roles in

production, transportation, economic reform and urban life. The place name Qiaoxi, literally “west of the bridge”, refers to its location on the western bank of Gongchen Bridge, first constructed in 1631. Between the 1631 and 1644, this canal section became a critical economic lifeline, underpinning the production, exchange of silk and tea and reinforcing the integration between waterfront space and everyday economic activities (Cao et al., 2023). This close relationship between social production and social ties along the canal corridor became even more intertwined during the Qing Dynasty (1644–1912). The expansion of family-based textile industries generated a dense pattern of residential blocks interwoven with commercial streets along the canal, primarily accommodating middle- and lower-class textile workers (Qian, 2021). Rather than functioning as monumental or representational spaces, canal-side open spaces during this period served as everyday environments shaped by labour, mobility (daily routines) and social encounters. In 1896, following the signing of the Treaty of Shimonoseki by the Qing government, the area surrounding Gongchen Bridge came under Japanese occupation, during which a customs office was established. Capitalising on the resulting policy conditions, the former Tongyi Gong Cotton Mill, an important national industrial enterprise (later renamed Hangzhou No. 1 Cotton Textile Factory in 1956), was completed and began operations in 1897, with the majority of its workers living and working in the surrounding area (Fu, 2020). From 1911 to 1949, despite increasing Westernisation during the Republican era, traditional Chinese industries, courtyard housing and alley-based neighbourhoods largely persisted,

continuing to accommodate middle- and lower-class residents (Wu and Li, 2021). As a result, Qiaoxi's urban waterfront open spaces retained the characteristic water-street spatial configuration of Jiangnan water towns, while the area simultaneously emerged as a cradle of China's early modern industrialisation, preserving intact residential fabric and industrial heritage assets dating to the late Qing dynasty (Cao et al., 2024).

Following the Chinese Communist Party's takeover of Hangzhou in 1949, the Qiaoxi area was transformed into the city's primary industrial zone, accounting for approximately 60% of Hangzhou's industrial output (Qian, 2021). This period marked a fundamental shift in the socio-spatial organisation of the canal waterfront, as state-led industrialisation reconfigured the area into an integrated system of production, residence and transport. Light chemical and textile industries were deliberately located along the Grand Canal, combined with adjacent workers' residential neighbourhoods and heavily reliant on water-based transport networks (Weng and Wu, 2014).

Between 1980 and 1990, the restructuring of state-owned enterprises to a market-oriented economy led to the decline of traditional industries and widespread unemployment among textile workers in the Qiaoxi area (Cao et al., 2024). This process of deindustrialisation, along with the relocation of industrial facilities, disrupted the previously integrated system of production, residence and canal-based daily routine movement. As a result, Zone A entered a period of spatial deterioration,

characterised by neglect, informal settlements and slum-like living conditions along the QHCD (Figure 6-2).



Figure 6-2 The slum-like conditions of QHCD in 1990. (Source: Zhong, 2013)

During the 1990s and 2000s, the transition from labour-intensive industries to service- and tourism-oriented development triggered extensive economic restructuring and spatial reconfiguration in Hangzhou (Zhang and Lenzer Jr, 2020). Prior to large-scale regeneration, the QHCD in Gongshu District was predominantly inhabited by lower-income residents and migrant populations, and canal-side spaces had undergone physical and social deterioration. These conditions lay the foundational for developing culture-heritage-led waterfront regeneration that reactivated canal culture to enable functional reconfiguration.

In response, the Hangzhou Municipal Government initiated the Old City Renovation Project between 2000 and 2010, with a particular focus on Node A (Cao et al., 2024). As part of this early regeneration programme, major canal-front public spaces were also upgraded, including the completion of Canal Square (Node C) in late 2006 (see Figure 6-3). Between 2009 and 2011, a themed museum clusters have been established in Node A, including the China Knives, Scissors and Swords Museum, the China Fan Museum, the China Umbrella Museum, the Hangzhou Arts and Crafts Museum, and the Exhibition Hall of Living Handicraft Traditions (Figure 6-3).

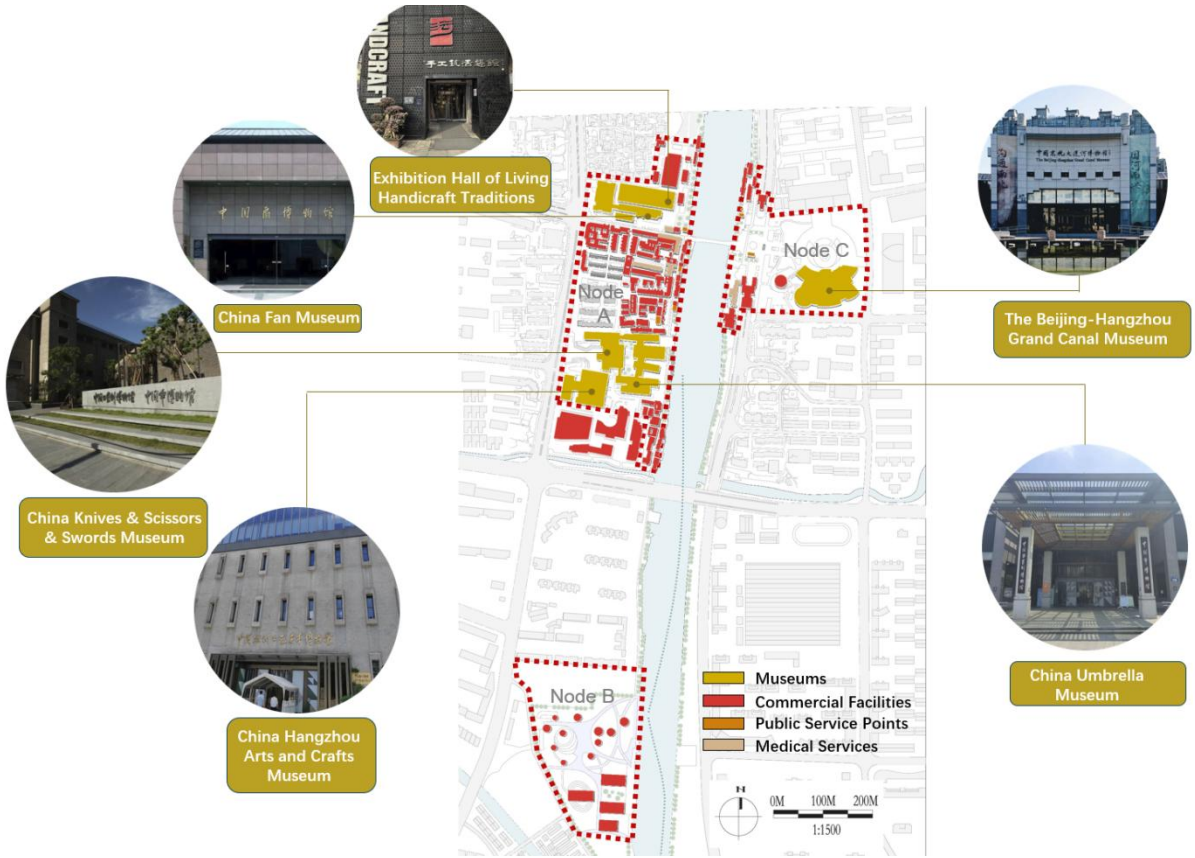


Figure 6-3 Spatial distribution of museum clusters in QHCD.
(Source: drawn by the author).

However, these initial interventions between 2000 and 2010 paid more attention to facade restoration along the canal. In other words, revitalisation projects sought to “restore an architectural style typical of buildings in the Jiangnan region of China”, characterised by three main colours (black, white, and grey), while leaving functionally obsolete interiors and building services largely unaddressed (Zhang and Lenzer, 2019, p. 114). The local government also promoted antique-style commercial streets to attract visitors, often privileging an “ancient Chinese” aesthetic over an authentic representation of local history. Moreover, many local residents and property owners were relocated outside the conservation districts between 2000 and 2006. Although the 2007 Qiaoxi Conservation Project aimed to resettle 316 original households and improve the canal-street frontage, its implementation ultimately reinforced a tourism- and consumption-oriented regeneration tendency.

Following the inscription of Node A within the Grand Canal as part of a UNESCO World Heritage Site in 2014, regeneration in the Qiaoxi Conservation Area increasingly shifted towards culture-heritage-led governance frameworks that sought to balance heritage conservation, tourism development and community engagement. In early 2019, the Hangzhou authorities introduced the Street Planner System in the Qiaoxi Historic District as a means of encouraging public participation in local decision-making (Li et al., 2024). Rather than being appointed bureaucrats, the street planners were drawn from front-line professionals, including urban designers from the

Hangzhou Municipal Planning Bureau and the Hangzhou Urban Planning and Design Institute. Their primary responsibility includes:

- Organising community-level meetings once a month for public engagement;
- Understanding and collating the daily needs of local residents, which in turn will inform future design and policies;
- Offering professional recommendations and ensuring sufficient explanation of planning and design outcomes for waterfront communities;
- Collecting feedback during the planning process and reporting relevant issues to the appropriate departments;
- Balancing public and private interests among various stakeholders;

Building on this participatory governance arrangement, the canal-side regeneration agenda began to move from heritage display and tourism-oriented programming towards people-oriented spatial interventions. From 2022 onwards, a new round of people oriented waterfront regeneration was initiated at Node B (Xiaohe Park), where adaptive reuse of heritage assets was implemented alongside a dedicated waterfront connectivity programme.

From 2022 onwards, a new round waterfront regeneration was initiated at Node B (Xiaohe Park). Node B was transformed from a former oil depot into an open waterfront park, designed by Kengo Kuma and Associates between 2023 and 2024 (Figure 6-4).



Figure 6-4 Xiaohe Park project completed in 2023, designed by Kengo Kuma and Associates. (Source: Archiposition, 2024)

The project retained four warehouses and seven oil tanks, repurposing them as a theatre, event venues, retail spaces and canal-side pedestrian routes along the Grand Canal. Despite the extensive physical restoration of industrial structures, the site's dual historical significance, first as Zhejiang Province's earliest oil depot (established in 1950) and later as a chick-incubation centre during the 1960s, was largely erased in the regeneration process, resulting in a landscape that foregrounds aestheticised "heritage" resources while offering limited interpretation of the place's local history and character (Cao et al., 2024).

Furthermore, a new round of waterfront connection program was initiated around Node B (Xiaohe Park) between 2022 and 2024, placing particular emphasis on improving waterfront connectivity. Given that Node B lies approximately 1,000 metres south of the Qiaoxi Conservation Area (Node A), the waterfront corridor had long remained discontinuous. In this context, the QHCD waterfront connectivity programme was not developed on a tabula rasa; rather, it functioned as a finishing touch that linked a series of public spaces, many already completed or nearing completion, across Nodes A, B and C, thereby forming a continuous slow-mobility system centred on canal-side strolling routes (see Figure 6-5).

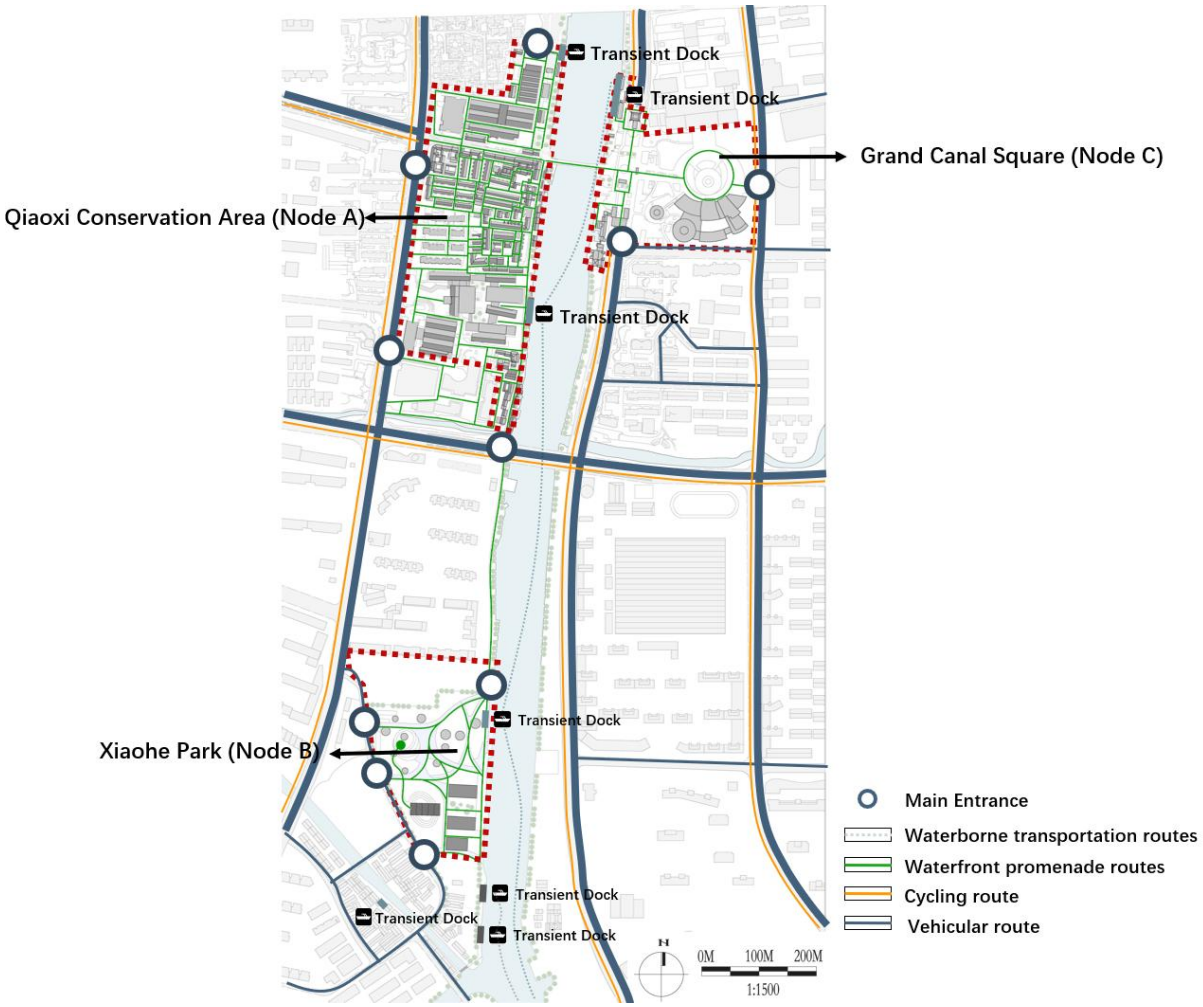


Figure 6-5 The 2022 waterfront connectivity intervention: integrating Nodes A–C into a continuous pedestrian corridor in QHCD. (Source: drawn by the author).

To summarise the current spatial configuration by the end of 2025, Figures 6-6 and 6-7 illustrate the functional distribution and development phases of Nodes A–C in the QHCD. Figure 6-6 indicates that the district's primary functions are concentrated along the canal-front corridor, dominated by commercial uses (e.g., shops and restaurants) and museum clusters. Figure 6-7 shows that only a limited proportion of the built fabric within Nodes A–C was in place before 2000, while the majority had been completed by 2010. With ongoing micro-regeneration since 2010, the canal-side commercial

street in Node A approached saturation by around 2015. Since 2020, a new phase has been driven by the adaptive reuse of heritage resources at Node B, which has also functioned as an integrative layer linking Nodes A, B and C into a more coherent whole through the waterfront connectivity programme.

The next section examines how this connectivity programme is manifested in the activity patterns across Nodes A to C in QHCD.

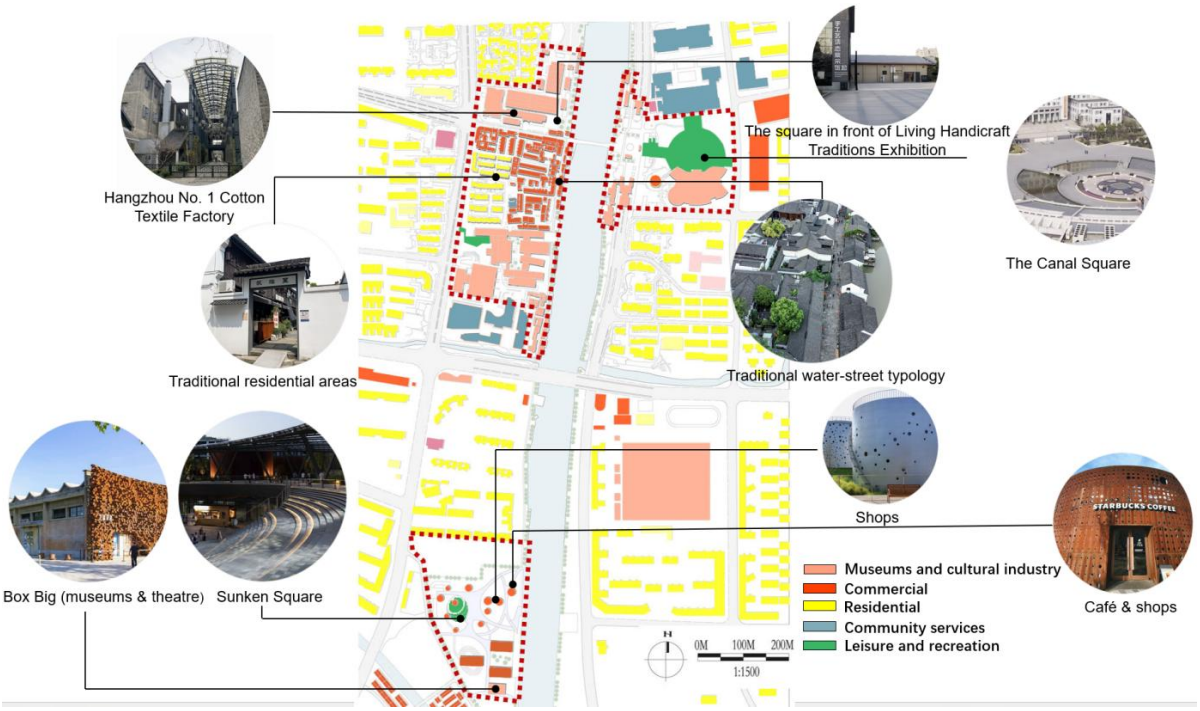


Figure 6-6 Land use distribution in QHCD. (Source: drawn by the author).



Figure 6-7 Urban growth in QHCD (Source: drawn by the author)

6.2.2 Urban activity patterns across key nodes of QHCD

Urban activity patterns in the Qiaoxi Heritage Canal District (QHCD) were examined through non-participant direct observations across three different nodes: Node A (Qiaoxi Conservation Area), Node B (Xiaohe Park) and Node C (Grand Canal Square). These nodes were selected represent a wide range of canal-oriented public realm generated by heritage-led regeneration. Following the observation method described

in Chapter 5, the urban activity patterns analysis compares user characteristics, activity types (necessary/optional/social), activity duration (dwell time and activity length) and activity intensity (instantaneous headcounts recorded during peak time).

User characteristics

Direct observations indicate that the three nodes play different roles within the heritage canal district in terms of user characteristics. Nodes A and C were used by a mix of tourists/visitors, educational/study tour groups and nearby residents, which is consistent with their more specific destination-like character and the presence of heritage/cultural attractions that they draw people from beyond the neighbourhood. By contrast, Node B was used mainly by nearby residents, functioning as a public realm for everyday physical exercise and social encounters. Across Nodes A-C, the age composition across the three nodes indicate an inclusive pattern of user characteristics during most observation periods, including older adults (60+), middle-aged users (40–59) and younger groups (25–39 and 18–24).One notable shift occurred after around 21:30, when the remaining users across the three selected nodes were mainly in the 18–24 age group, indicating a younger user profile in the late evening period.

Activity types

Activities were classified following Gehl's categories of necessary, optional, and social activities. Direct observations show that, strolling, enjoying the natural/waterside

scenery and jogging, as optional activities, were the most frequently observed activities across Nodes A–C. However, such three selected nodes also exhibited distinct activity patterns within the heritage canal district. Firstly, Node A (Qiaoxi Conservation Area) displayed a mixed pattern in which necessary activities were largely associated with through movement and daily routine (e.g., walking to transit stops or piers), while optional activities related to heritage consumption and leisure, such as sitting, taking photos while wearing traditional costumes, eating, drinking and visiting marketplaces/museums (Figure 6-8). Due to its direct linkage to Node A via Gongchen Bridge, although Node C shared similar necessary activities (through-movement, including walking to bus stops and piers) and optional activities (strolling and square dancing) along the canal corridor children's play and interaction with the water feature were more frequently observed in this area (Figure 6-8). Additionally, Node B was primarily used by nearby residents and functioned as a neighbourhood-level public space. Its activity pattern was dominated by optional activities (walking/strolling, practising Tai Chi) and social activities (children's play, informal conversations and square dancing) (Figure 6-9). Visitor presence at Node B was relatively limited (around one quarter of observed users) and was mainly associated with optional activities such as taking photos and gathering around the theatre/performance space (e.g., watching performances or using the waterfront theatre setting).

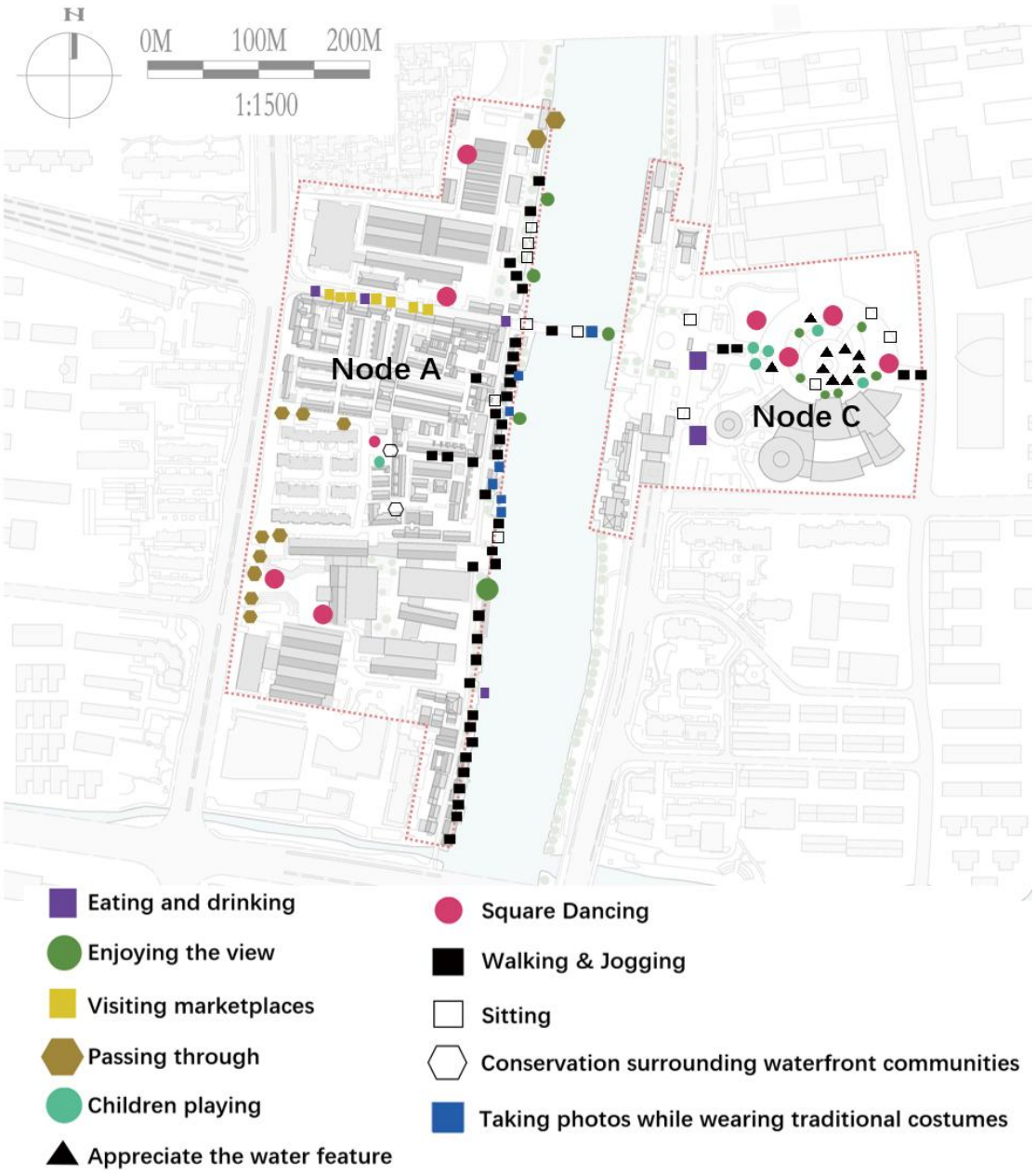


Figure 6-8 Mapping of activities based on direct observations in Node A and C. (Source: drawn by the author)

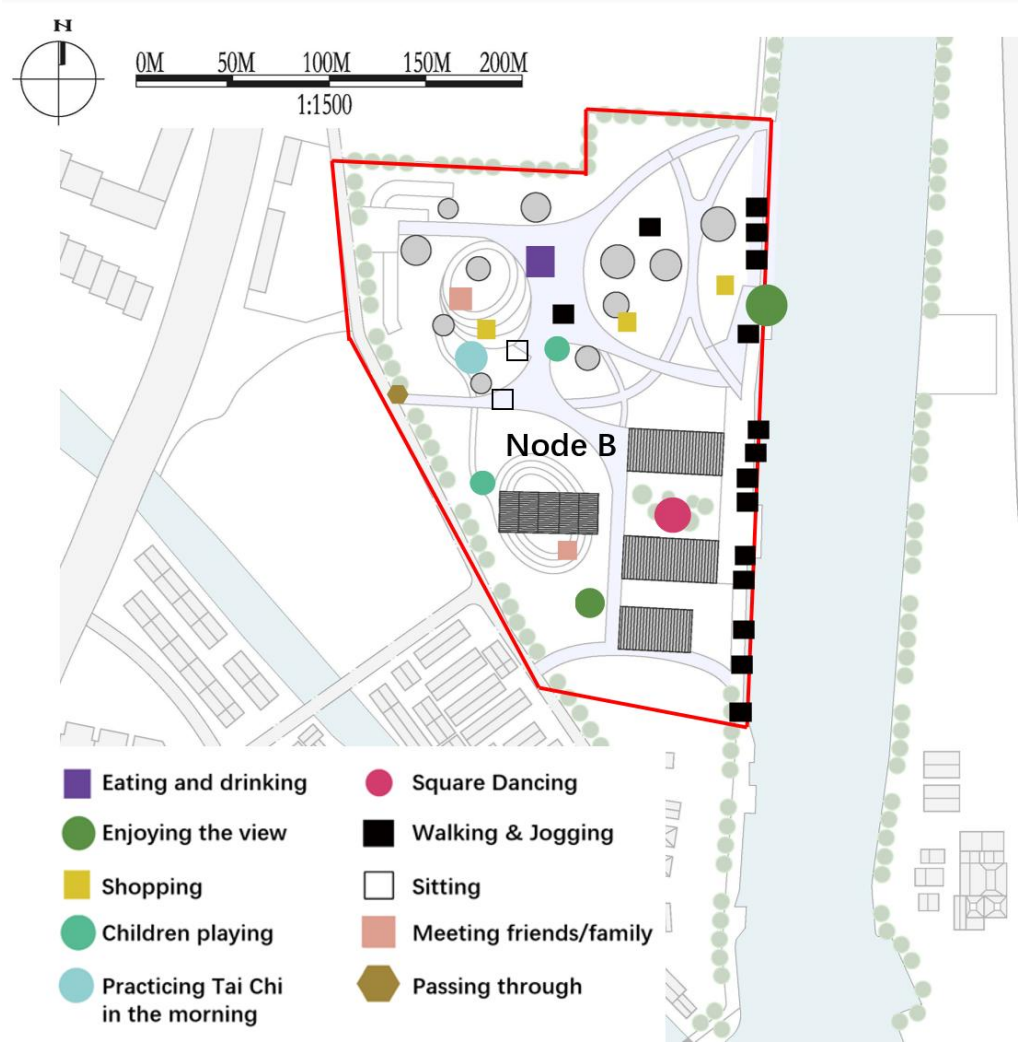


Figure 6-9 Mapping of activities based on direct observations in Node B. (Source: drawn by the author).

Activity duration

Based on direct observation results, Nodes A and C exhibited similar activity duration patterns for square dancing and walking, with these activities usually lasting around one to two hours. Focusing on Node A, however, stay durations varied across the day by visitors. At Node A, short stays were common among tourists along the main commercial street in the morning, often lasting under 10 minutes. By contrast, during the 13:30 to 15:00 period, users, particularly visitors tended to stay longer, averaging

around 40 minutes. Longer durations were associated with organised study tour activities. These study tour groups were observed staying for approximately 1 hours. Additionally, evening photo taking in traditional costumes often extended to approximately 1 to 2 hours (Figure 6-10).



Figure 6-10 Examples of traditional costume photography activities at Node A. (Source: Author).

In comparison, Node B (weekday) showed a more neighbourhood-oriented activity duration, with typical dwell time concentrated within around 30 minutes to 1 hour. For example, many residents combined strolling with brief visits to nearby shops, with a typical visit lasting around 30 minutes. Furthermore, weekday and weekend stay duration patterns were similar. However, on weekends, family visits, especially those involving adults accompanying children, tended to spend longer on site (approximately 1.5 hours), with peak use occurring between 17:00 and 20:30.

Activity intensity

Direct observations indicate that Nodes A–C shared a common evening peak. User numbers increased and peaked between 18:00 and 21:30, then declined after about 21:30 on weekdays and around 22:00 on weekends. Thus, mean peak period activity counts were calculated from instantaneous headcounts recorded at 30-minute intervals across the evening peak period (18:00–21:30; eight time points) over two observation days at each node (see Figures 6-8 to 6-10). Because activity categories were mutually exclusive, each observed user was assigned to a single primary activity type at each time point.

At Node A, peak-period activity intensity was dominated by walking (weekday mean = 80; weekend mean = 102), followed by square dancing (18; 32), sitting (15; 23), and photography in traditional costumes (9; 16) (Figure 6-11). High-intensity use was concentrated around Gongchen Bridge and the adjacent canal-side commercial street.

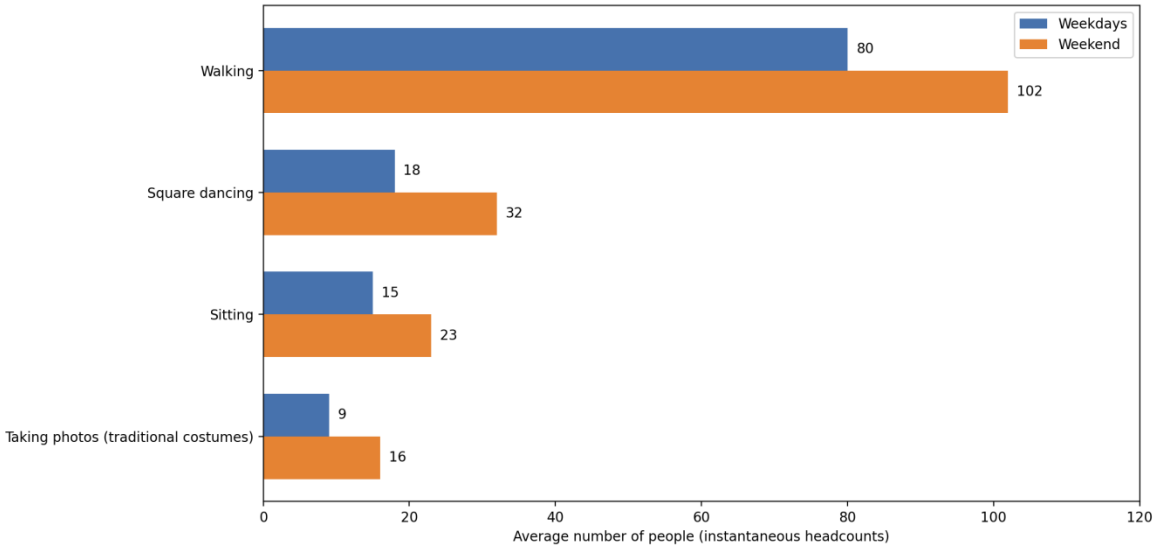


Figure 6-11 The average number of visitors' activities at Node A (Counts were

derived from instantaneous headcounts recorded at 30 min intervals during 18:00–21:30).

At Node B, activity intensity was lower than that in Node A. Walking remained the dominant peak-period activity at Node B (weekday/weekend mean = 37/52). Children's play (7/15) and square dancing (12/12) were the next most visible uses, whereas shopping and scenic viewing were observed at lower levels (6/9 for each) (Figure 6-12). High intensity use in Node B was spatially concentrated along the waterfront promenade.

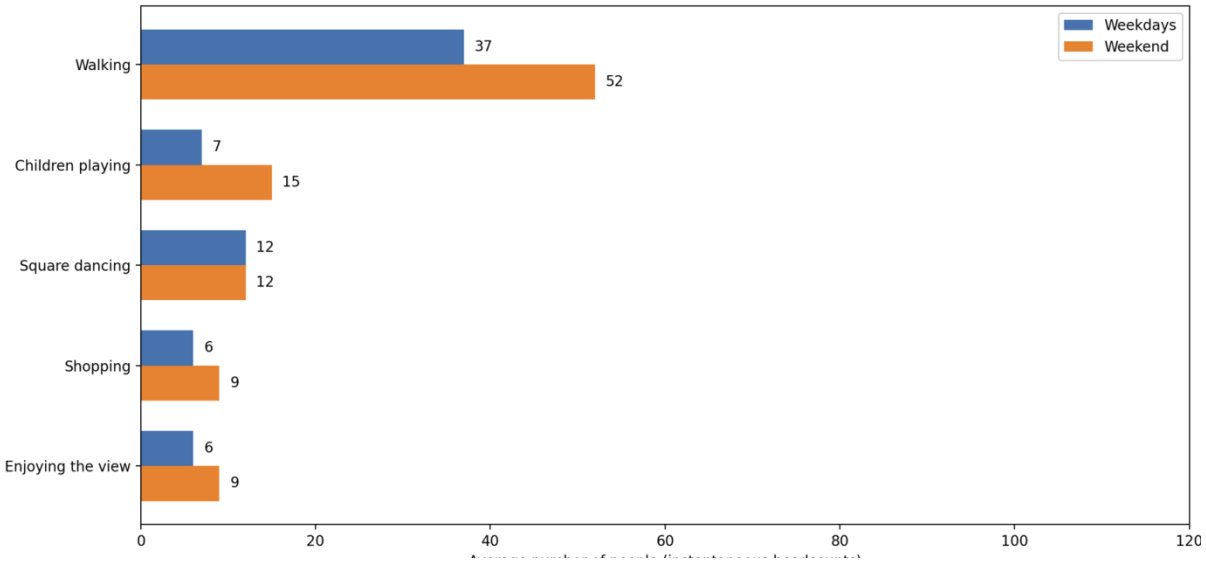


Figure 6-12 The average number of visitor's activities at Node B (Counts were derived from instantaneous headcounts recorded at 30 min intervals during 18:00–21:30).

Node C showed high activity intensity during peak time. Based on direct observation, walking (78/84) and square dancing (32/43) were most prominent, followed by children's play (19/30), scenic viewing (16/24) and sitting (9/14) (Figure 6-13). Activity

clustering was concentrated on the water feature, which supported longer stays (stays of around 1–2 hours) during the evening peak.

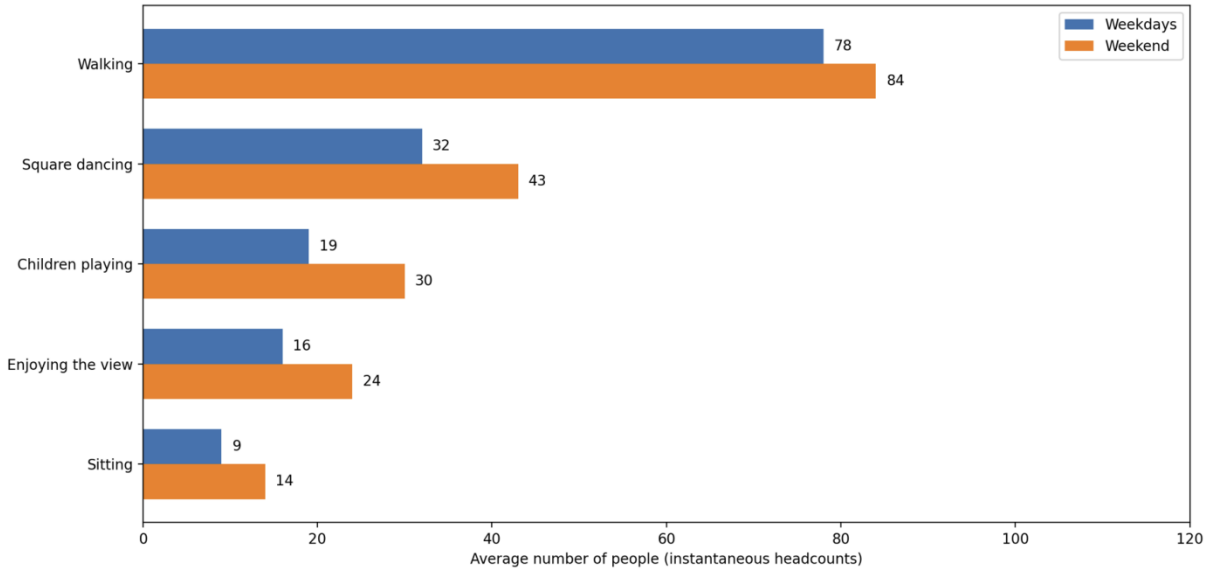


Figure 6-13 The average number of visitors' activities at Node C (Counts were derived from instantaneous headcounts recorded at 30 min intervals during 18:00–21:30).

Overall, peak-period activity intensity in QHCD was higher at Nodes A and C than at Node B, with weekends generally elevating activity levels across most categories, especially social and family-related uses.

6.3 Site Analysis of the South Bank of the Qiantang River (SBQR)

6.3.1 Urban growth and urban patterns across key nodes of SBQR

As the southern hub of the Yangtze River Delta and a representative example of the polycentric spatial development pattern of Chinese cities, Hangzhou has been seeking sustainable regeneration strategies to stimulate economic and urban growth and to

remain competitive with Shanghai. Particularly after China's economic reforms in 1978, Hangzhou experienced a rapid land use change and a spatial transition from the "West Lake Era" to the "Qiantang River Era" (Liu et al., 2023). Indeed, from the mid-1980s onward, Hangzhou has experienced significant urban expansion to the east along the Qiantang River in the Binjiang development zones, which fundamentally challenged Hangzhou's traditional "West Lake-centred" urban city centre development paradigm (Qian, 2011). Municipal planning policies advanced this shift by offering incentives for suburban urban growth and by moving manufacturing industries into the former satellite towns. In this sense, these towns have since been absorbed into Hangzhou's urban fabric along the South Bank of the Qiantang River (SBQR) and have contributed to spatial and economic restructuring of Hangzhou (Feng and Zhou, 2005). This process also laid the foundation for the development of a new city centre along the Qiantang River.

Between 2000 and 2010, the Hangzhou Municipal Government proposed the Qiantang New City Centre development, prioritising the establishment of both a new urban core and a key waterfront axis along the northern bank of the Qiantang River. This development comprised three major components: Central Park; the Civic Centre (including relocated municipal government offices); and the City Balcony, in response to the broader development vision of "Embracing the Qiantang River". While the core area of the Central Business District (CBD) on the northern bank was largely completed in this period, the surrounding urban waterfront open spaces on the

southern bank remained relatively low in density, with large areas of still-vacant land. This uneven cross-river development created potential opportunities for urban waterfront open space development due to substantial land reserves.

Since 2010, the development of urban green infrastructure, the construction of an ecological corridor and the encouragement of public participatory governance in SBQR have been critical to Hangzhou's waterfront transformation, catalysed by mega-events such as the 2016 G20 Summit (Liu et al., 2023). Subsequently, driven by the 2022 Asian Games, the development of world-class urban waterfront open spaces along the Qiantang River (SBQR) as a continuous waterfront promenade network has become a core urban regeneration initiative in Hangzhou's newly developed riverside districts (Zhang et al., 2022). Given the long linear spatial extent of the Qiantang River, the local government in 2021 designated a 3 km waterfront public space connectivity programme as the core development section along the South Bank of the Qiantang River, which was selected as one of the case studies in this research (Figure 6-14). Such regeneration initiative aims to shape a continuous and coherent spatial sequence along the core section of SBQR, serving as key social spaces for and by the public.

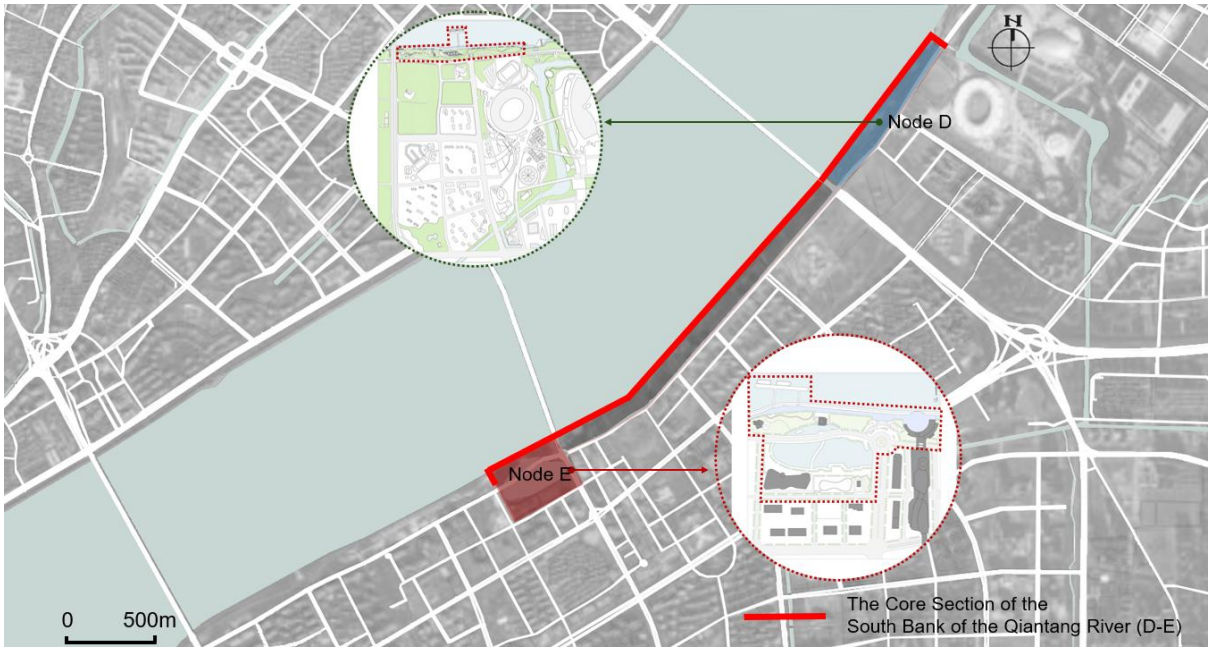


Figure 6-14 Location of the Core Section of the South Bank of the Qiantang River from D to E. (Source: drawing by author)

The Sanqiao Asian Games Park (Node D)

Node D, as a representative micro-scale observation node within the SBQR, is situated in the vicinity of the Third Qianjiang Bridge and is oriented towards the Olympic Sports Center's 'Big Lotus,' located across Wentao Road to the south. It offers a highly representative example of Chinese urban waterfront regeneration projects that integrate public infrastructure into the everyday life of the community and encourage mixed uses in newly built zones. This project was designed by the Original Design Studio of Tongji University Architectural Design (Group) Co. Ltd., with its design framework based on three core conceptual pillars: (1) the reconfiguration of riverfront walkways as an everyday urban landscape; (2) the construction of a super-seawall

infrastructure combined with daily-use facilities; and (3) the creation of multi-themed nodes along the urban waterfront open space system.

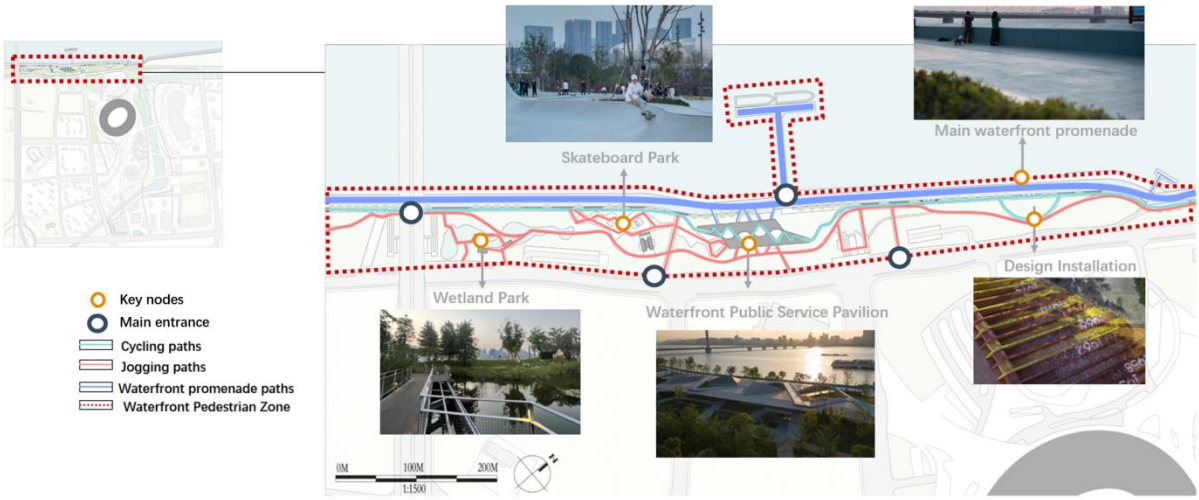


Figure 6-15 Spatial sequence and main entrances at Node D.
(Source: drawing by author).

Between 2022 and 2023, to enhance the flood defence standards along the core section of Qiantang River's south bank (upgraded from a 100-year to a 300-year flood resistance capacity), designers increased the height of the seawall to 10.3 metres, simultaneously creating multi pedestrian walkways, cycling paths and jogging routes at varying elevations in preparation for the Asian Games. Up to 2024, SAGP has undergone a process of regeneration and now encompasses several key nodes along South Bank of Qiantang River, including: (1) the Yundu Waterfront Public Service Pavilion; (2) the Skateboard Park & Children's Playground; (3) the Wetland Park; and (4) the Asian Games Mound as design installation (Figure 6-15).

The Shechao Square (Node E)

The section of Node E, which were also designed by the same team (Original Design Studio of Tongji University Architectural Design (Group) Co., Ltd.), has become a key tourist destination and a social public space for both residents and visitors along the SBQR. It includes the Shechao sculpture, Jianshi Waterfront Public Service Pavilion, China Hangzhou Low-Carbon Science and Technology Museum and Binjiang wharf (Figure 6-16).

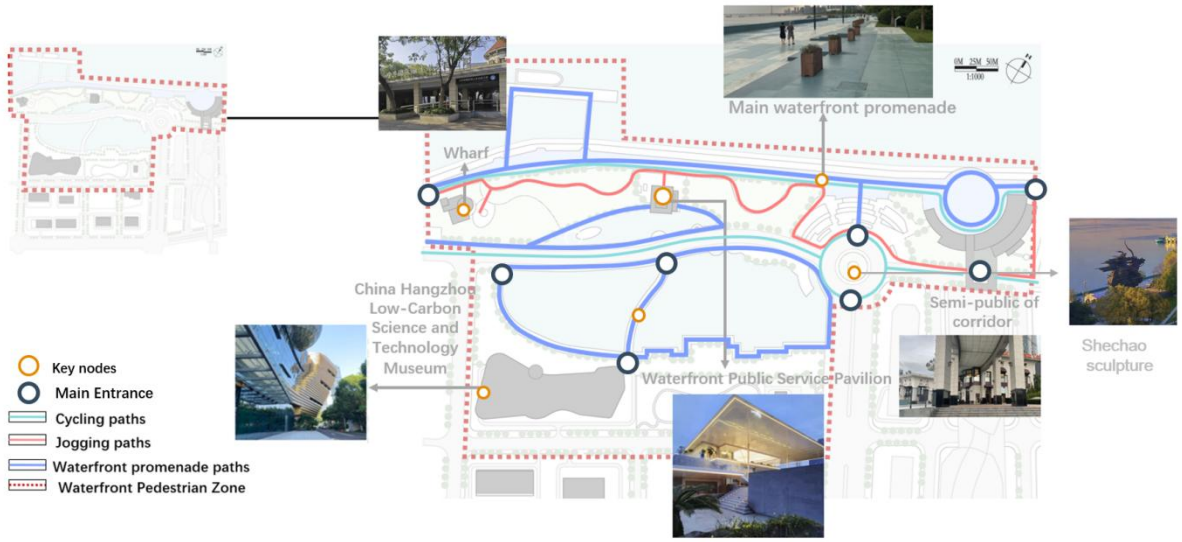


Figure 6-16 Spatial sequence and main entrances at Node E.
(Source: drawing by author).

Jianshi Waterfront Public Service Pavilion was converted from the former Holiday Garden restaurant (Figure 6-17). Its functions can be summarised in three main aspects:

- **Enterprise support services**: The pavilion provides free meeting rooms to accommodate business activities in the surrounding area, including roadshows, training sessions, and related events.

- **Leisure and social services**: Facilities such as a café and a reading lounge offer spaces for nearby residents and employees to rest, interact, and engage in informal communication.
- **Marriage and relationship services**: Building on both community-based online platforms, the pavilion offers free venues for proposals and wedding ceremonies to local residents.



Figure 6-17 Jianshi Waterfront Public Service Pavilion. (Source: author)

The diverse functions indicate that the newly developed waterfront open spaces not only support local enterprises and creative industries but also strive to establish connections with the surrounding community and integrate more closely into residents' everyday lives. Furthermore, the *King Qian Tide-Watching* sculpture (Figure 6-18) was installed on the south bank of the Qiantang River in 2008, serving both as an outdoor public artwork and as a symbolic landmark of Hangzhou's urban identity. It abstractly represents the historical events on King Qian's water-control efforts and, together with

its cultural symbols, forms part of the landmark architecture marking Hangzhou's transition from the "West Lake Era" to the "Qiantang River Era".



Figure 6-18 The King Qian Tide-Watching sculpture. (Source: author)

Despite these shared spatial characteristics as integral parts of the continuous water front open space system along the core SBQR corridor, Node D and E differ in their primary functional and symbolic themes. On the one hand, Node D is situated in the vicinity of the Third Qianjiang Bridge and is oriented towards the Olympic Sports Center's 'Big Lotus', lo cated across Wentao Road to the south. As a result, its symbolic theme is more aligned with the Asian Games legacy when combining sport-oriented facilities (e.g., a skateboard park, sculpture), reinforcing the area's new identity as a contemporary mega-event waterfront setting. On the other hand, in Node E, the sculpture emphasises Hangzhou's traditional anti-tidal spirit, and the Hangzhou Low-Carbon Science and Technology Museum serves major civic and educational functions.

In summary, Nodes D and E have reconfigured previously linear riverfront walkways into new public places, maintaining a coherent design language along the SBQR corridor. Waterfront public service pavilions at both nodes have also been introduced as landmarks to encourage public engagement and support shared place meanings. Overall, both nodes have evolved from single-function riverfront walkways into multifunctional social public places that serve a wider range of user groups.

6.3.2 Urban activity patterns across key nodes of SBQR

Urban activity patterns were reported through non-participant direct observations at two key nodes of the South Bank of the Qiantang River (SBQR), including Node D (Sanqiao Asian Games Park) and Node E (Shechao Square). Observations covered both weekday and weekend conditions and multiple periods of time across the day to reflect routine and peak-period use (see Section 5.7 for the timing of observations). The results below compare the two nodes in terms of user characteristics, activity types (necessary/optional/social), activity duration (dwell time and activity length), and activity intensity (mean number of people observed between 7:00–11:00, 13:30–15:00, and 17:00–22:00).

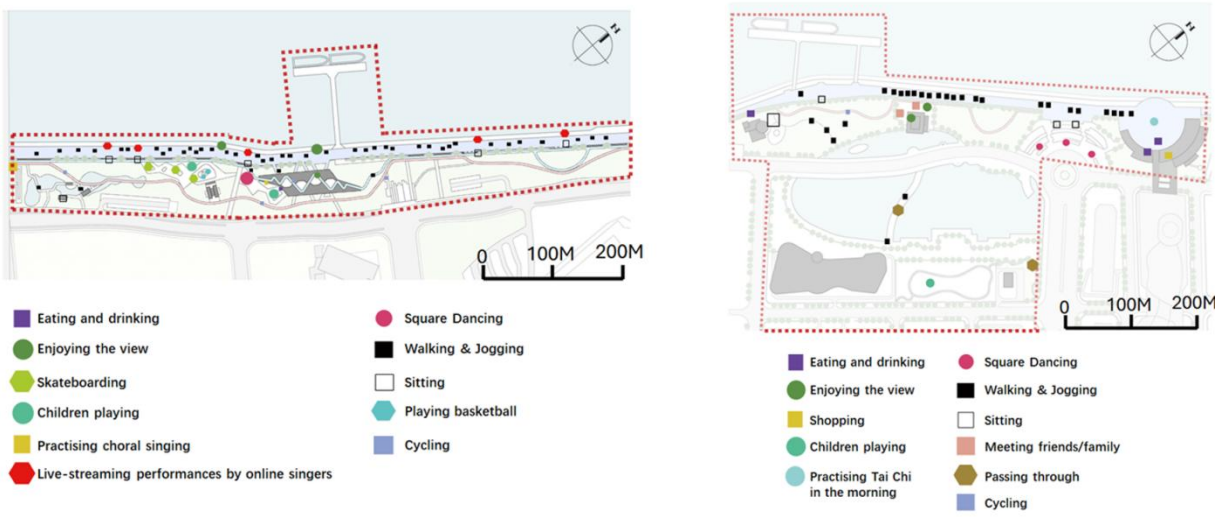
User characteristics

Waterfront open spaces across both nodes were used predominantly by Hangzhou residents, alongside a proportion of visitors from outside the city, and exhibited a

relatively balanced gender composition. Age groups, however, differed between the two nodes. Node D tended to attract fewer older adults and a higher share of young and middle-aged users, particularly among those engaged in jogging, cycling, and skateboarding. By contrast, Node E displayed a more mixed age profile, with younger and older users more evenly represented during routine use periods. Furthermore, A variation of user characteristics between weekday and weekend was also observed. At both nodes, weekends showed a stronger presence of younger users (approximately 25–39) and family groups, especially families with young children cycling and playing. This indicates that SBQR nodes not only support everyday local routines and physical exercise but also accommodate leisure-oriented visits and family-based recreation during non-working days.

Activity types

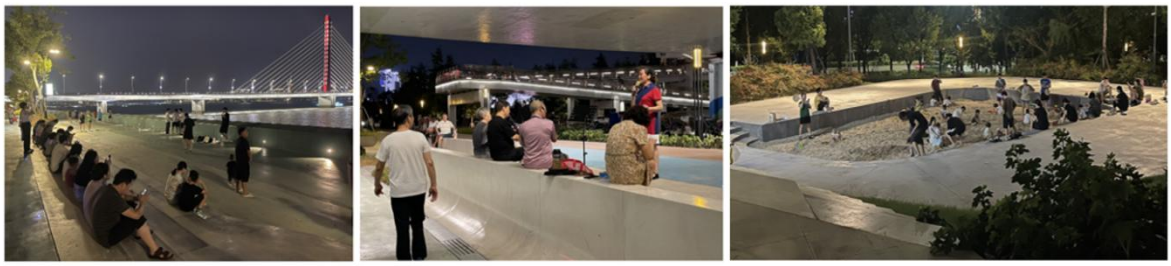
Both nodes tend to support a wide range of necessary activities (e.g., passing through and work-related movement) and optional activities (e.g., strolling, scenic viewing, sitting and resting, and people-watching). However, direct observation indicates that users are usually positioned as passive observers, with limited opportunities for multisensory waterfront experiences and water-related activities when walking along the waterfront pedestrian routes.



(a) (b)

Figure 6-19. Mapping of activities in Node D and Node E: (a) spatial analysis of user activities observed in Node D; (b) spatial analysis of user activities observed in Node E (Source: drawing by autho).

Observations also suggest that walking (strolling) constituted the dominant activity type at both sites and Node D supported more varied social activities than Node E (Figure 6-19). Beyond square dancing, which was recorded at both nodes, Node D also accommodated live-streamed singing, regular choral practice beneath the bridge and children's play (Figure 6-20).



(a) (b) (c)

Figure 6-20 Examples of social activities observed at Node D (Sanqiao Asian Games Park): (**a**) Live-streamed singing at the waterfront edge, with spectators seated on

stepped terraces; (**b**) regular choral practice beneath the bridge; (**c**) Children's play (Source: author's field photographs, 2024).

Activity duration

A significant differences in activity duration further emphasis on contrasting patterns of waterfront use. At Node D, typical dwell time ranged from 30 minutes to 2 hours, depending on activity type. For example, children's play commonly lasted from 30 minutes to 2 hours and was most evident between 19:00 and 21:00. On weekends, it typically started earlier (often around 18:00) and frequently extended to 1 to 2 hours. Skateboarding was associated with the longest observed durations (averaging over two hours) and occurred most frequently in the evening, particularly between 19:00 and 22:00. Notably, choral practice beneath the bridge was observed for approximately one hour, occurring during two main periods (09:00–10:00 and 19:00–20:00). This recurring pattern indicates a stable community-based daily activities rather than incidental or opportunistic use, and illustrates how sheltered, acoustically resonant under-bridge spaces can become regularised social infrastructure. At Node E, optional activities such as scenic viewing and sitting/resting tended to be shorter, typically lasting around 30 minutes to 1.5 hours. Compared with Node D's longer-duration activities (e.g., skateboarding and rehearsed social use), Node E exhibited more short-stay and pass-through behaviours linked to promenade movement.

Activity intensity

Nodes D and E exhibited a comparable activity intensity according to temporal pattern, with user numbers rising from around 17:30 and reaching an evening peak between 18:00 and 21:30. A significant weekday–weekend difference was observed, with substantially higher peak user counts on weekends. Mean peak user counts were calculated from instantaneous headcounts recorded at 30 minutes intervals during the evening peak period (18:00–21:30) across the two observation days at each node. At Node D, the average number of people during the evening peak was approximately 150 on weekdays and increased to around 195 on weekends (Figure 6-21). High intensity use in Node D was spatially concentrated around the waterfront public service pavilion and the skateboard park.

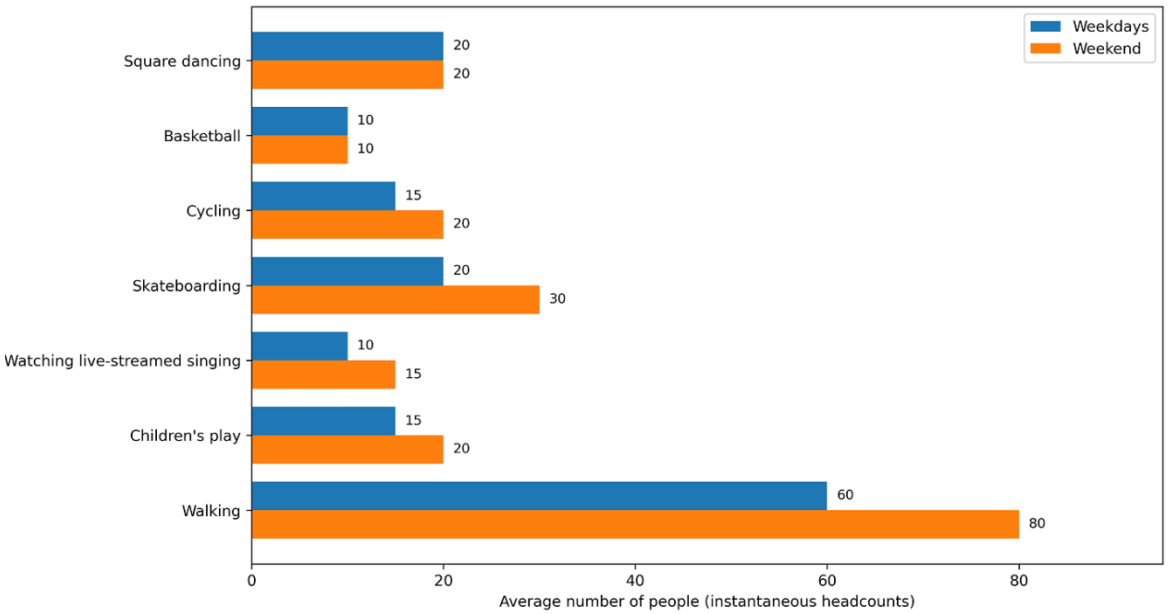


Figure 6-21 The average number of visitor's activities at Node D (Counts were derived from instantaneous headcounts recorded at 30 min intervals during 18:00–21:30).

By contrast, at Node E, the mean number of people during the evening peak was approximately 70 on weekdays and 118 on weekends (Figure 6-22). Activity clustering

was centred on the waterfront service pavilion and was dominated by walking/strolling and scenic viewing along the riverside promenade. Overall, evening-peak use was higher at Node D than at Node E.

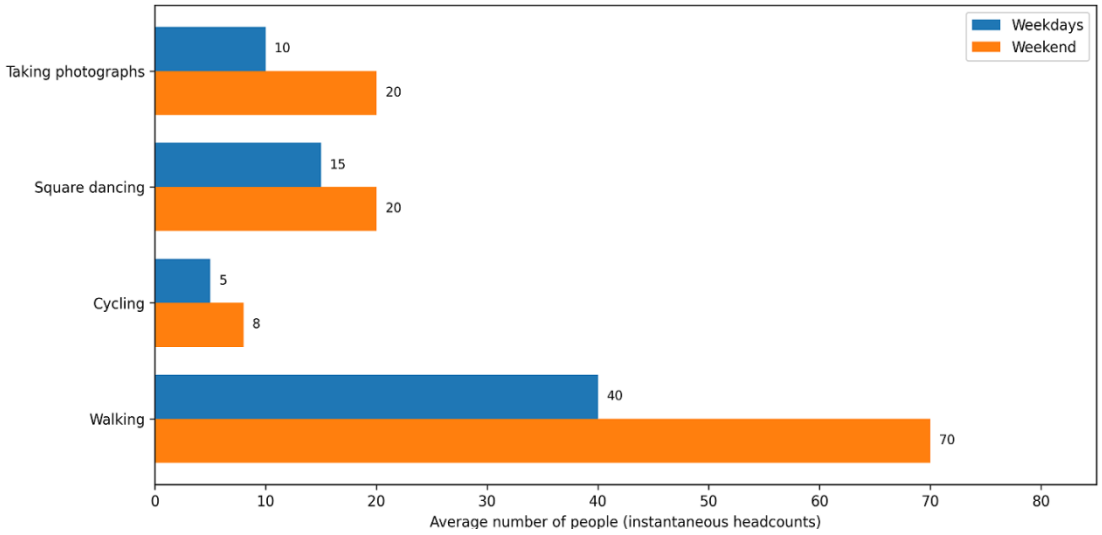


Figure 6-22. The average number of visitor's activities at Node E (Counts were derived from instantaneous headcounts recorded at 30 min intervals during 18:00–21:30).

6.4 Chapter Summary

Based on the development context, spatial analysis and activity patterns of selected two regenerated waterfront case study areas in Hangzhou, the findings reveal that, in the QHCD, culture-heritage-led regeneration has been implemented, characterised by façade restoration, museum clustering as cultural flagships and the adaptive reuse of industrial heritage. While the 2022 waterfront connectivity programme has established a continuous waterfront promenade system across Nodes A–C, tourism-oriented and consumption-driven land uses tend to lead to commodified heritage consumption and gentrification. Furthermore, the industrial past has been selectively curated, with local industrial development histories marginalised and insufficiently interpreted within the

heritage-led regeneration process. Additionally, activity patterns demonstrate high evening intensity and frequent social encounters around Gongchen Bridge and the main commercial street towards canals. As a result, the canal corridor functions simultaneously as a heritage display landscape and a leisure and commercial destination.

By contrast, regeneration along the core South Bank of the Qiantang River (SBQR) reflects a mega-event-led model shaped by the G20 Summit and the Asian Games. The riverfront has been transformed from a set of linear walkways into a more place-like sequence of everyday landscapes that supports interaction and routine leisure. Nodes D and E operate at a larger spatial scale and incorporate multifunctional public service pavilions, enabling everyday physical exercise, family-based recreation, and event-related activities. However, behavioral observations indicate a predominance of strolling and scenic viewing, suggesting that parts of the SBQR corridor still function as destination-oriented waterfront spaces rather than fully embedded everyday urban routes.

In summary, this spatial and behavioural analysis provides a foundation for the following chapters, which examine users' perceptions and evaluations of urban waterfront open space quality.

CHAPTER 7- USERS' PERCEPTIONS AND THE IPA FRAMEWORK: A QUANTITATIVE EVALUATION OF URBAN WATERFRONT OPEN SPACES

7.1 Introduction

This chapter presents the quantitative findings derived from an online questionnaire survey examining users' perceptions of the quality of urban waterfront open spaces in the Qiaoxi Heritage Canal District (QHCD) and the newly developed South Bank of Qiantang River (SBQR) in Hangzhou, China. To compare users' perceptions of the historic district and the newly developed area, two types of questionnaires were administered at each site: one measured the perceived importance of key variables; the other assessed users' satisfaction with those same variables.

This chapter begins by assessing the reliability and validity of the survey, followed by a presentation of the ranked results for importance and satisfaction levels. These results include the factors, sub-factors and variables used to evaluate the quality of urban waterfront open spaces, based on questionnaire data collected from two selected case studies. Subsequently, the Importance–Performance Analysis (IPA) method is apopted, with a view to informing future people-oriented waterfront regeneration strategies.

7.2 Building in Reliability and Validity

The reliability and validity of the assessment of the 1540 online questionnaires are presented in Table 7-1 and 7-2. In terms of a reliability test, the results of Cronbach's

α values for both the importance and satisfaction variables all exceeded 0.7 (as seen in Table 7-1), which means that the data are highly stable and reliable (Bahrainy and Khosravi, 2013). As for validity, the KMO values for all online questionnaires were above 0.8 (as seen in Table 7-2), indicating that the data represent good sample validity (Huang et al., 2025). Furthermore, the results of Bartlett's test indicate a statistically significant correlation between the variables (sig. = 0.000, $p < 0.05$), thereby justifying the suitability of the dataset for further analysis (Balram and Dragićević, 2005).

Table 7-1 Reliability assessment of the online questionnaires.

Importance level: Site 1-QHCD			***Importance level: Site 2-SBQR***		
Index of importance	**Cronbach's Alpha>0.7**	**Number of terms**	**Index of importance**	**Cronbach's Alpha>0.7**	**Number of terms**
Access and linkage	0.912	15	Access and linkage	0.944	15
Safety	0.911	13	Safety	0.938	13
Comfort	0.952	27	Comfort	0.972	27
Spatial aesthetic	0.930	13	Spatial aesthetic	0.922	13
Place identity	0.949	23	Place identity	0.963	23
Inclusiveness	0.960	19	Inclusiveness	0.969	19
All factors	0.983	110	All factors	0.992	110
Satisfaction level: Site 1-QHCD			***Satisfaction level: Site 2-SBQR***		
Index of satisfaction	**Cronbach's Alpha>0.7**	**Number of terms**	**Index of satisfaction**	**Cronbach's Alpha>0.7**	**Number of terms**
Access and linkage	0.887	15	Access and linkage	0.946	15
Safety	0.891	13	Safety	0.942	13
Comfort	0.935	27	Comfort	0.968	27
Spatial aesthetic	0.854	13	Spatial aesthetic	0.931	13
Place identity	0.924	23	Place identity	0.960	23
Inclusiveness	0.929	19	Inclusiveness	0.949	19
All variables	0.982	110	All variables	0.991	110

Table 7-2 Validity assessment of the online questionnaires (KMO and Bartlett Tests).

Importance level: Site 1-QHCD				*Importance level: Site 2-SBQR*			
Index of importance	**Bartlett Sig. Standard<0.05**	**KMO Standard>0.7**	**Number of terms**	**Index of importance level**	**Bartlett Sig. Standard<0.05**	**KMO Standard>0.7**	**Number of terms**
Access and linkage	0.000	0.943	15	Access and linkage	0.000	0.933	15
Safety	0.000	0.948	13	Safety	0.000	0.931	13
Comfort	0.000	0.970	27	Comfort	0.000	0.971	27
Spatial aesthetic	0.000	0.953	13	Spatial aesthetic	0.000		13
Place identity	0.000	0.969	23	Place identity	0.000	0.962	23
Inclusiveness	0.000	0.979	19	Inclusiveness	0.000	0.976	19
All variables	0.000	0.968	110	All factors	0.000	0.966	110
Satisfaction level: Site 1-QHCD				*Satisfaction level: Site 2-SBQR*			
Index of satisfaction level	**Bartlett Sig. Standard<0.05**	**KMO Standard>0.8**	**Number of terms**	**Index of satisfaction level**	**Bartlett Sig. Standard<0.05**	**KMO Standard>0.8**	**Number of terms**
Access and linkage	0.000	0.905	15	Access and linkage	0.000	0.961	15
Safety	0.000	0.927	13	Safety	0.000	0.966	13
Comfort	0.000	0.961	27	Comfort	0.000	0.977	27
Spatial aesthetic	0.000	0.885	13	Spatial aesthetic	0.000	0.954	13
Place identity	0.000	0.955	23	Place identity	0.000	0.975	23
Inclusiveness	0.000	0.956	19	Inclusiveness	0.000	0.967	19
All factors	0.000	0.971	110	All factors	0.000	0.978	110

7.3 Questionnaire Data Results at QHCD

This section presents the importance and satisfaction levels (each N = 385) derived from the analysis of online questionnaire data (total N = 770) collected from the Qiaoxi Heritage Canal District (QHCD). The analysis is structured into four parts: (1) basic information on the demographic profile of respondents, space use variables and users' activity patterns for the selected urban waterfront open spaces; (2) respondents' importance ranking for the variables related to urban waterfront open space quality; (3) respondents' satisfaction with the same evaluation factors, sub-factors and variables; and (4) identification of user-perceived priorities through the application of

the Importance–Performance Analysis (IPA) method.

7.3.1 Respondents' profile and their use of urban waterfront open spaces at QHCD (Site 1)

A total of 770 respondents completed the online questionnaires at QHCD, comprising 385 importance-based surveys and 385 satisfaction-based surveys. The number of male and female participants was approximately equal, the majority of respondents being aged between 25 and 39. The 18–24 and 40–59 age groups accounted for similar shares, each approximately 23% of the sample. By contrast, older adults represented a smaller proportion, comprising 15.71% of respondents. In terms of participant classification, tourists and residents each accounted for approximately 45%, while managers and designers together represented less than 10% of the sample. The demographic information for QHCD is summarised in Table 7-3.

Table 7-3 Demographic information at QHCD. (Source: author)

Demographic variables at QHCD	Number	Percentage % (n=770)
Gender		
Male	391	50.87
Female	376	48.83
Others	0	0
Prefer not to say	3	0.39
Age groups		
18-24	180	23.38
25-39	285	37.01
40-59	181	23.51
60+	121	15.71
Prefer not to say	3	0.39
Classification of Participants		
Residents surrounding QHCD	348	45.19

Visitors of QHCD	352	45.71
Designers who evolved in QHCD design process	38	4,94
Staff/managers responsible for waterfront space management in QHCD	27	3.51
Others	5	0.65

In terms of QHCD space use variables, namely visit frequency, number of visits, and dwell time, Table 7-4 shows that the most common visit frequency was once a week, reported by 23.64% of respondents. Nearly 54% indicated visiting the selected case study site 7–10 times, and most respondents (32.73%) stayed for 1–2 hours.

Table 7-4 Urban waterfront open space use at QHCD. (Source: author)

Space use variables at QHCD	Number	Percentage % (n=770)
Visit frequency		
Every day	98	12.73
Several times a week	129	16.75
Once a week	182	23.64
Several times a month	115	14.94
Once a month	67	8.7
Several times a year	71	9.22
Once a year	62	8.05
Occasionally	46	5.97
Number of visit		
1-3 times	235	30.52
4-6 times	124	16.1
7-10 times	411	53.38
Dwell Time		
<30mins	135	17.53
30-60mins	217	28.18
1-2 hours	252	32.73
>2 hours	166	21.56

The results show that in the QHCD, the two main motivations reported by respondents were “tourism” (20.9%) and “socialising” (19.3%), as illustrated in Figure 7-1. By contrast, the proportion of respondents who visited the area for commuting was relatively low, accounting for only 9.6%.

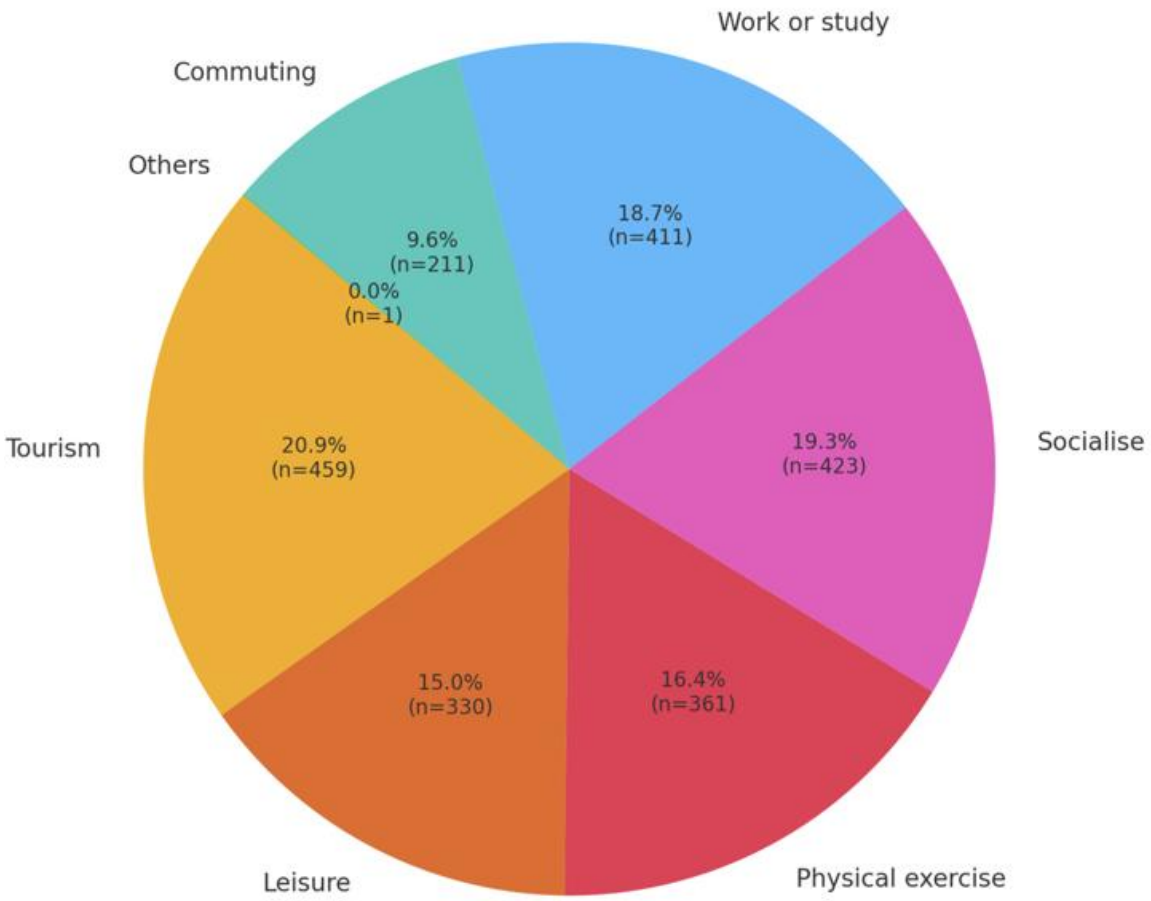


Figure 7-1 Motivations for using urban waterfront open spaces.
(Source: drawing by author)

Table 7-5 illustrates the relationship between activity patterns and the motivations for visiting waterfront open spaces in QHCD. It indicates that “enjoying natural scenery” (n = 584) and “visiting marketplaces” (n = 465) were the most frequently reported tourism-related activity patterns. In terms of physical exercise, “walking” was the most common activity (n = 500). For socialising, “meeting friends” (n = 388), “meeting neighbours” (n = 317) and “meeting strangers” (n = 261) showed relatively moderate and concentrated frequencies. In contrast, activities associated with leisure

motivations showed a clear stratification at QHCD, as evidenced by the higher number of reports for “drinking at a teahouse” (n = 381) and “dining at restaurants” (n = 364), while “seating”, “reading” and “drawing” were less frequently selected. This variation may indicate that the site is less suited to prolonged sedentary use.

Table 7-5 The relationships between activity patterns and motivation.
(Source: drawing by author)

Activity Patterns	Numbers					
Enjoying natural scenery	0	0	0	584	0	0
Walking	0	0	0	0	0	500
Visiting marketplaces	0	0	0	465	0	0
Visiting museums	0	0	0	425	0	0
Taking photos	0	0	0	396	0	0
Meeting friends	0	0	0	0	388	0
Drinking at tea house	0	381	0	0	0	0
Dining at a restaurant	0	364	0	0	0	0
Visiting public art exhibitions	0	0	0	364	0	0
Square dancing	0	0	0	0	0	357
Practise Tai Chi	0	0	0	0	0	343
Attending research activity/study tour	0	0	322	0	0	0
Meeting neighbours	0	0	0	0	317	0
Jogging	0	0	0	0	0	308
Listening to music	0	284	0	0	0	0
Children playing	0	0	0	0	0	266
Skateboarding	0	0	0	0	0	266
Meeting Strangers	0	0	0	0	261	0
Sitting and resting	0	240	0	0	0	0
Meeting family	0	0	0	0	234	0
Walking dogs	0	0	0	0	0	232
Eating breakfast	0	214	0	0	0	0
Sunbathing	0	210	0	0	0	0
Souvenir shopping	0	0	0	206	0	0
Playing board games	0	0	0	0	0	199
Reading	0	196	0	0	0	0
Passing through (work)	188	0	0	0	0	0
Eating lunch	0	184	0	0	0	0
Cycling	0	0	0	0	0	176
Passing through (home)	127	0	0	0	0	0
Drawing	0	59	0	0	0	0
Playing outdoor ball games	0	0	0	0	0	0
	Commuting	Leisure	Work/Study	Tourism	Socialise	Physical exercise



7.3.2 Importance ranking of variables affecting urban waterfront open space quality at QHCD

Access and linkage: physical accessibility

Among all the sub-factors of access and linkage, “physical accessibility” received the highest importance rating, with a mean score of **3.74**, Table 7-6 suggesting that users are most likely within this sub-factor to choose “access to water’s edge” (M = 3.96). In

this context, waterfront design should enhance physical permeability and visual connectivity to the water, encouraging both active and passive engagement with water through provision of water platforms, water-facing seating or water-related installations (Mikkelsen et al., 2018; Stevens, 2020).

In addition, urban waterfront open spaces should provide people with more opportunity to access basic public service facilities (M = 3.84), such as parking areas, public transit stops, public service points, waste bins and toilets). By contrast, “accessibility of sports amenities” showed the lowest mean importance score at 3.45, indicating relatively lower user demand for such facilities within the area.

Regarding standard deviation (SD), Hair et al. (2010) note that an SD in excess of 1.3 on a 5-point Likert scale indicates a very high level of variation among respondents, suggesting significant differences in perceptions and attitudes. In this context, the SD for the two variables “accessibility of sports amenities” and “accessibility of commercial amenities” exceeded 1.3. The larger standard deviation observed in the former can be correlated with visit frequency. The results show that respondents who visited the site only “several times a year” achieved the lowest importance rating number of 3.32 for ease of access to sport amenities, whereas those who visited the site once a week rated a higher number, at 3.78. It is therefore recommended that sports facilities be located in areas of high pedestrian flow where residents engage in daily activities, to better encourage regular use. (Koohsari et al., 2015)

As for commercial amenities, dwell time is likely to be the primary factor influencing a higher SD. The questionnaire data shows that respondents who stayed for less than 30 minutes assigned a higher importance (M = 3.83) to the ease of access to commercial amenities, compared to participants who stayed for 1–2 hours (M = 3.67). Therefore, future commercial layout strategies might prioritise small-scale retail and associated at the water's edge, such as small shops, cafés and kiosks, located near key movement routes and key circulation routes to better accommodate short-stay users (Carmona et al., 2010c; Gehl, 2011; Mehta, 2013).

Table 7-6 Ranking the importance variables related to physical accessibility in waterfront open spaces along the QHCD.

Physical accessibility variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1-not at all important	2-some what unimportant	3-neutral	4- somewhat important	5-very important			
Accessibility of **water's edge**	5.45% n=21	6.49% n=25	15.58% n=60	31.69% n=122	40.78% n=157	3.96	1.147	1
Accessibility of **basic public service facilities**	4.42% n=17	10.65% n=41	17.4% n=67	31.95% n=123	35.58% n=137	3.84	1.153	2
Accessibility of **cultural venues**	7.79% n=30	12.21% n=47	13.77% n=53	27.01% n=104	39.22% n=151	3.79	1.194	3
Accessibility of **commercial amenities**	10.65% n=41	7.72% n=28	17.66% N==68	28.05% n=108	36.36% n=140	3.72	1.310	4
Accessibility of **healthcare services**	9.61% n=37	10.13% n=39	15.84% n=61	35.06% n=135	29.35% n=113	3.65	1.265	5
Accessibility of **sport amenities**	10.65% n=41	14.55% n=56	22.08% n=85	24.94% n=96	27.79% n=107	3.45	1.318	6

Access and linkage: connectivity of waterfront path system

An overall importance Likert rating of **3.59** was assigned to this sub-factor. Three key findings should be highlighted, based on the importance results for the connectivity of the waterfront path system (Table 7-7):

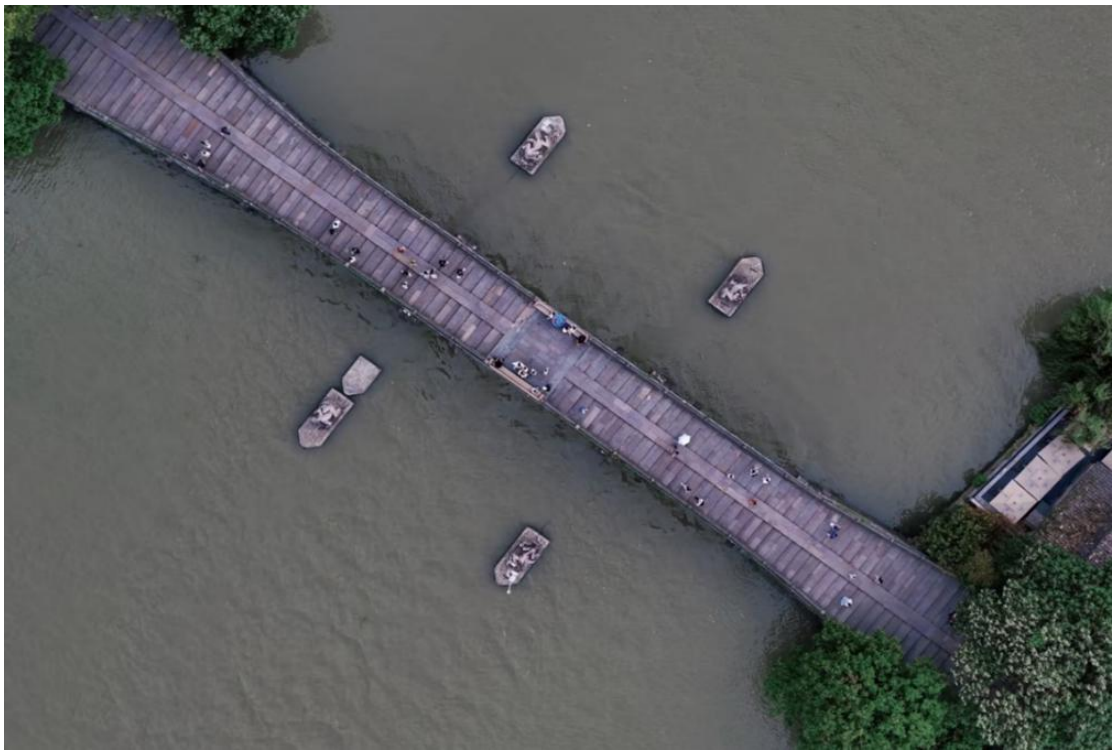


Figure 7-2 The historic Gongchen Bridge. (Source: Author)

Firstly, the integration of pedestrian bridges with key nodes along urban waterfront open spaces was rated as the most important element in enhancing waterfront path system connectivity (M = 3.87). In particular, Gongchen Bridge functions not only as a physical crossing point but also as a symbolic and spatial anchor linking the canal corridor to its adjacent urban hinterland (Figure 7-2), suggesting that bridge infrastructure plays a key role in users' perceptions of spatial connectivity. Furthermore, the bridge is highly integrated with contemporary public life through daily routine and public activities, such as crossing it to access local markets (necessary activity for commuting), fashion photography (optional activity), scenic appreciation (optional activity) and social interaction at night-time (social activity) (Giombini, 2020).

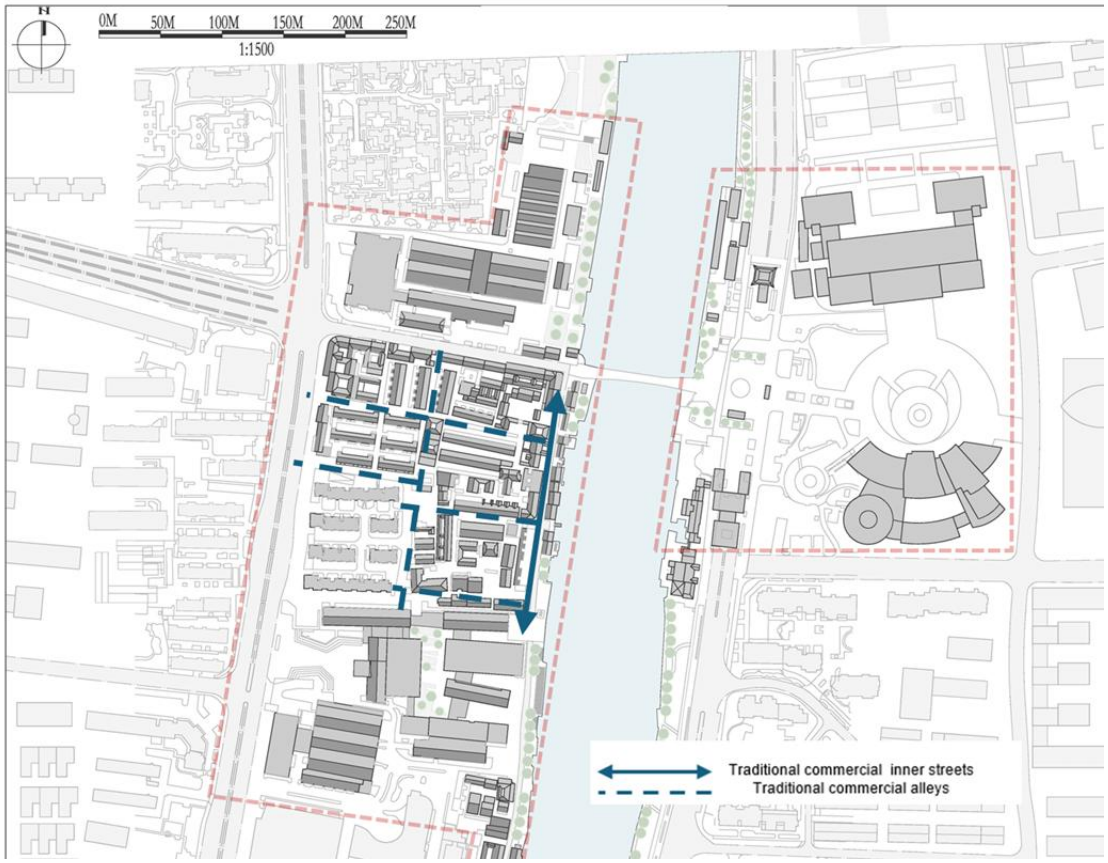


Figure 7-3 Users' primary activities taking place in inner street and alleys.

(Source: drawing by author)

Secondly, although connections between the waterfront pedestrian network and key nodes along the waterfront were ranked second in importance, they received only a modest mean importance rating (M = 3.60). This reflects the canal's continuing role as a freight corridor, which could have limited the everyday use of adjacent waterfront promenades in QHCD. Users' activities were instead concentrated in traditional commercial inner streets approximately 200 meters from the water's edge (Figure 7-3). Such spatial separation helps explain the relatively lower perceived importance of waterfront pedestrian circulation and its links to key nodes.

Thirdly, the connectivity between vehicle routes and key waterfront nodes received the lowest mean score of 3.31, indicating that users favour a pedestrian-friendly environment within the historic urban context (Gehl, 2011; Stevens, 2021).

Moving on to the high standard deviations (SD > 1.3) observed in the questionnaire data, notable variation was found in the connectivity between waterborne transport and key nodes. Male respondents assigned a higher mean score (M = 3.71) than female respondents (M = 3.34). This significant variation may reflect women's heightened sensitivity to a perceived sense of safety, as highlighted in gender sensitive urban planning when designing waterborne transport routes for daily use by women (Fenster, 2005). Variation was also evident in the perceived importance of cycling route connectivity, with tourists (M = 3.67) rating this factor higher than residents (M = 3.46). Additionally, there was a high variation in the importance ranking of the connectivity between vehicle routes and key nodes. Respondents aged 25–39 assigned a higher mean score (M = 3.44) compared to those aged 60 and above (M = 3.02), suggesting generational differences in mobility priorities and reliance on vehicular access.

Table 7-7 Ranking the importance variables related to the connectivity of the waterfront path system.

The connectivity of waterfront path systems variables	Frequency of responses (%) (N=385)					Mean	Std. Deviation	Rank
	1-not at all important	2-some what unimportant	3-neutral	4-somewhat important	5-very important			

The effective **linkage** between **pedestrian bridges** and key nodes along urban waterfront open spaces	7.27 % n=28	7.27% n=28	13.25 % n=51	35.58% n=137	36.62% n=141	3.87	1.096	1
The effective **linkage** between the **waterfront promenade route** and key nodes along urban waterfront open spaces	8.83% n=34	10.39% n=40	22.08 % n=85	29.61% n=114	29.09% n=112	3.60	1.151	2
The effective **linkage** between the **waterborne transportatio n route** and key nodes along urban waterfront open spaces	12.21% n=47	9.87% n=38	20.52 % n=79	23.9% n=92	33.51% n=129	3.58	1.360	3
The effective **linkage** between the **cycling route** and key nodes along urban waterfront open spaces	13.77% n=53	6.49% n=25	19.74 % n=76	29.09% n=112	30.91% n=119	3.57	1.351	4
The effective **linkage** between the **vehicular route** and key nodes along urban waterfront open spaces	15.06% n=58	14.81% n=57	18.44 % n=71	27.79% n=107	23.9% n=92	3.31	1.337	5

Access and linkage: continuity of waterfront path system

‘The continuity of waterfront path systems’ obtained an overall importance rating of **3.58**. Table 7-8 shows that, although “The continuity of waterfront promenade routes” rated the highest mean score of 3.77, other sub-sub-factors were considered relatively less important. These data results reveal that the creation of a continuous pedestrian friendly urban waterfront open space at QHCD, without physical and visual barriers, is critical for future urban waterfront development (Jones, 2017).

As for standard deviations, the most variation was found in perceptions of the “continuity of waterborne transport” (SD = 1.390), with participants who had visited the site more than ten times assigning higher importance (M = 3.80). This result indicates that waterborne transport could become a more common daily travel routes within the canal mobility system if provision of more reliable service continuity and easier transfers (Wardman, 2014).

Table 7-8 Ranking the importance of variables related to the continuity of waterfront path system.

The **continuity of waterfront path systems** variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1-not at all important	2-some what unimportant	3-neutral	4-somewhat important	5-very important			
The **continuity** of **waterfront promenade routes**	9.87% n=38	7.01% n=27	15.58% n=60	30.91% n=119	36.62% n=141	3.77	1.182	1
The **continuity** of **cycling routes**	10.13% n=39	11.17% n=43	19.22% n=74	34.03% n=131	25.45% n=98	3.54	1.262	2

The continuity of water transport routes	13.51% n=52	11.43% n=44	15.58% n=60	27.53% n=106	31.95% n=123	3.53	1.390	3
The **continuity** of **vehicular routes**	8.31% n=32	15.58% n=60	22.08% n=85	30.65% n=118	23.38% n=90	3.46	1.237	4

Safety: protection against traffic accidents

"Protection against traffic and accidents" received a high overall importance rating of **3.81.** Appendix C1 – Table 4 highlights the importance of creating low speed vehicular routes and prioritising a pedestrian friendly waterfront environment within mixed traffic settings, in order to enhance a sense of safety (Abulnour, 2013).

In addition, "Creation of traffic segregation or barrier zones" attained a high standard deviation (SD=1.307), which was attributed to age-group variations. The 18–24 age group considered the establishment of traffic buffer zones to be less critical (M = 3.56) than respondents aged 60 and over, who regarded it as very important (M = 3.80). Thus, in areas with a high density of elderly users, the implementation of traffic segregation measures that enhance visual permeability [9] should be considered (Mitchell and Burton, 2006).

Safety: protection against crime

[9] Visual permeability refers to the extent to which waterfront routes or key nodes along urban waterfront are visibly apparent and thus provide more moving opportunities (Silavi et al., 2017).

“Protection against crime” attained an overall importance rating of **3.75**. Appendix C1 – Table 5 shows that users feel a sense of safety in well-maintained and clean environments (M = 3.89), and where sufficient lighting has been provided (M = 3.80) in the pubic realm of waterfronts. Another important finding is that adopting a natural surveillance as a result of the routine use of property, to avoid blind spots and hidden corners (M = 3.86), to a certain extent improves crime prevention. By contrast, the use of CCTV cameras (M = 3.63) as a key artificial surveillance measure, received the lowest importance ratings.

In addition, ratings for the use of surveillance cameras differed between visitors (M = 3.66) and local residents (M = 3.58). This gap suggests that expectations of formal security measures may vary with user composition and trip purpose, and highlights the need to consider how artificial and soft surveillance complement each other in different waterfront settings.

Safety: protection against flood risks

Although “Protection against flood risks” received an overall importance rating of **3.61**, Appendix C1 – Table 6 shows that users tend to favour design-based ecological interventions for achieving long-term sustainable flood control, such as by raising the plinths of buildings on urban waterfronts (M = 3.87) and integrating greenways into existing flood control measures (M = 3.69). This pattern is consistent with the view that

waterfront infrastructure can be more effective when it operates as an adaptive framework that also supports everyday use. (Allen, 1999).

Comfort: climatic comfort

“Climatic comfort” attained a fairly high importance rating of **3.83**. As shown in Appendix C1 – Table 7, maintaining good air quality (M = 3.94), ensuring adequate water surface humidity (M = 3.87) and providing artificial shelters for shade (M = 3.87) are critical for facilitating microclimatic comfort in waterfront open spaces. However, the provision of shade through vegetation received the lowest rating (M = 3.67).

The significant difference in perception of vegetation-based shade (SD=1.314) can be attributed to the frequency of visits. Data show that those who visit only a few times per year or once a year placed greater emphasis on vegetation-based shade for microclimatic comfort, with mean scores of 3.88 and 4.05 respectively. This result suggests that low-frequency users place greater importance on natural shade.

Comfort: seating comfort

“Seating comfort” received an overall importance rating of **3.66**. Appendix C1 – Table 8 indicates that respondents placed greater emphasis on the quantity, organisation, placement and spacing of seating opportunities, while the integration of primary and secondary seating areas received comparatively lower ratings (M = 3.53).

Perceptions of diverse seating provision also showed relatively high variability (SD = 1.324), reflecting differences across user groups. Respondents aged 25–39, as well as those who reported dwell times exceeding two hours (both groups with mean scores above 3.67), attached greater importance to the integration of varied seating types, including modular and informal options such as steps, pedestals, stones or ground-level seating (Carmona et al., 2010).

Comfort: visual comfort

“Visual comfort” received a mean importance rating of 3.64. Appendix C1 – Table 9 indicates that views of “skylines” (M = 3.72) and “signage systems” (M = 3.70) are the two most significant elements for enhancing visual comfort. The combination of skyline, water and vegetation offers a stronger sense of visual comfort. In historic waterfronts, these elements function as orientation cues and visual markers and reinforce the legibility of heritage landscapes (Lu et al., 2024).

Comfort: movement comfort

“Movement comfort” attained a fairly low-level importance rating of **3.57**. Appendix C1 – Table 10 indicates that respondents placed greater emphasis on pedestrian movement comfort than on the design quality of cycling- or vehicle-oriented circulation. The waterfront pedestrian path should therefore be sufficiently wide and evenly paved,

unobstructed and built using materials that are moisture-resistant and suitable for local climatic conditions (Salama, 2022).

Spatial aesthetics: proportions and scales

“Proportions and scales” received an overall importance rating of **3.65**. Appendix C1 – Table 11 suggests that, in historical urban waterfronts, respecting the traditional water–street pattern and carefully considering the scale of residential (M = 3.85) and cultural blocks (M = 3.79) can facilitate the harmonious integration of newly-introduced functional plots. In addition, the ratio of waterfront pedestrian street width to building height is critical to the enhancement of spatial aesthetics (M = 3.75). Ashihara (1983) argues that when the ratio of street width (D) to building height (H) falls below 1 (D/H < 1), the public realm becomes susceptible to spatial discomfort caused by a sensation of excessive enclosure. Conversely, when the ratio is too large, the space may feel empty and lose its sense of place. Therefore, an aesthetically-pleasing and human-scaled environment can be achieved when the D/H ratio ranges between 1 and 2, generating a balanced and rhythmic spatial experience.

Although the appropriate scale of “commercial areas” and “office areas” received the two lowest mean scores, at 3.41 and 3.50 respectively, both show considerable differences in user perceptions. The 40–59 age group placed greater importance on the scale of commercial areas (M = 3.51) compared to other age groups, while

respondents aged 25–39 attached more importance to the scale of office areas (M = 3.69). In contrast, the youngest group, aged 18–24, rated the importance of both functional scales as relatively low, with mean scores below 3.40. These results indicate users' perception of "appropriate scale" is influenced not only by the spatial configuration in human scale, but also by the interaction between their everyday social life and social ties (Carmona et al., 2010; Gehl, 2011).

Spatial aesthetics: sensitivity to harmonic relationship

"Sensitivity to harmonic relationship" attained an overall importance rating of **3.55**. Appendix C1 – Table 12 shows that participants perceived "Articulation of historical and contemporary building styles" as the most important variable affecting sensitivity to harmonic relationships (M = 3.64), followed by "Harmonic spatial hierarchy and organisation" (M = 3.51), as well as "Richness and coordination of building façade styles" (M = 3.51). The comparatively lower ratings assigned to the latter two variables may relate to the widespread use of a uniform black–white–grey colour palette along canal facing façades characterised by southern traditional Chinese architectural façade style. While this visual consistency reinforces regional continuity, it may also limit perceived differentiation in façade articulation. In this respect, respondents' moderate evaluations may indicate a degree of visual familiarity with such stylistic coherence.

Spatial aesthetics: appreciation of rhythm

“Appreciation of rhythm” obtained a fairly low importance rating of **3.45**. Appendix C1 – Table 13 indicates that most participants were unlikely to perceive the similarity and repetition of a singular architectural style as an effective design principle for enhancing spatial aesthetics, even though such repetition could contribute to spatial rhythm and composition.

However, perceptions of “façade rhythm” shows significant variation, particularly in relation to dwell time. Participants who stayed for 1–2 hours assigned greater importance to rhythmic articulation than those who stayed for less than one hour. The divergence implies that appreciation of spatial rhythm tends to emerge more clearly with longer dwell times, as prolonged occupation makes façade sequencing more perceptible.

Place identity: distinctiveness of street furniture

“Distinctiveness of street furniture” received a relatively high importance rating of **3.74**. As shown in Appendix C1 – Table 14, respondents ranked the “Distinctiveness of water-related design installations” as the most important element (M = 3.81), indicating users’ strong desire for actively physically engaging with a body of water (Mikkelsen et al., 2018). In addition, “The distinctiveness of artificial terraces leading towards the water” also received a comparatively high mean score (M = 3.71). Such stepped or

terraced forms function as transitional spaces between land and water, often accommodating temporary and spontaneous activities, including small performances and livestreaming, thereby reinforcing their role as socially active nodes within the waterfront sequence.

Although “The uniqueness of banners/digital billboards” and of “The uniqueness of bins” received the lowest mean scores at 3.41 and 3.32 respectively, they show significant differences between age groups. Respondents aged 60 and above rated “The distinctiveness of bins” higher (M = 3.88) than younger age groups, such as those aged 18–24 (M = 3.63). Meanwhile, variation in perceptions of banners and digital billboards were observed between tourists (M = 3.75) and local residents (M = 3.37), suggesting different expectations of visual information and stimulation in tourist-oriented versus everyday waterfront settings. (Quan et al., 2024).

Place identity: distinctiveness of natural landscapes

“Distinctiveness of natural landscapes” attained an overall importance rating of **3.69**. Among the variables, unique shoreline forms and local plants were identified as the two most important factors, each scoring 3.80 (see Appendix C1 – Table 15). These findings indicate that the articulation of the land–water threshold may shape perceived ecological diversity and nature engagement, including through adding ecological design such as microhabitats and vegetation baskets (Dyson and Yocom, 2015).

In addition, a clear trend was observed whereby respondents aged 25–59 regarded “the uniqueness of shoreline forms” as more important than either younger (aged 18–24) or older participants (aged 60 and above), suggesting a greater appreciation among this age group for unique shoreline configurations as a platform for contact with nature and a means of ‘escape from the everyday’ (Stevens, 2020, p.23).

Place identity: urban memory

An overall importance value of **3.67** was recorded for “Urban memory.” Among its variables, Appendix C1 – Table 16 indicates that the integration of digital technologies into cultural and heritage interpretation (M = 3.77) is considered the most important in shaping urban memory. This aligns with Cao et al. (2024)’s argument that the use of digital technologies is the most common medium by which canal-related heritage could be interpreted in engaging ways. Indeed, the role of digital technology in protecting the authenticity of industrial heritage and canal history is crucial, as it can transcend geographical and temporal boundaries and promote interactive experiences (Abad, 2019). Within QHCD, QR-code-based interpretation systems support WeChat mini-programme navigation and AR reconstructions of historical canal scenes. In addition, bridgeheads and stepped waterfront spaces have become common short-video livestreaming spots, indicating the emergence of digitally heritage consumption and canal-related commercial activity.

Another key finding is that celebrating heritage through the adaptive reuse of existing built forms for contemporary purposes, as a means of preserving collective traditions, can effectively convey urban memory. This includes the transformation of storytelling signage and canal-related historical events, while respecting the original architectural integrity and urban fabric.

In contrast, “lifestyle transformation” received the lowest overall mean score (M = 3.55); as above, the ongoing trends of gentrification and commodification of place have led many original residents to rent out their properties and relocate to other areas. However, this variable shows a relatively high standard deviation (SD > 1.3), reflecting significant differences in perceptions across age groups. Respondents aged 60 and above rated it more highly (M = 3.67) than younger participants aged 18–24, who gave a lower mean score of 3.48. These findings suggest that older people may be more sensitive to the socio-cultural impacts of lifestyle changes, particularly due to their emotional attachments to place and the meanings they associate with it (Wiles et al., 2012).

Place identity: distinctiveness of architectural elements

“Distinctiveness of architectural elements” attained a low importance rating of **3.65.** Among its variables, the uniqueness of “roofscapes”, “decorative elements” and “balconies” along waterfront streets each received a mean score exceeding 3.70,

whereas “outdoor elevated walkways” received the lowest score, at 3.38 (see Appendix C1 – Table 17). These data results indicate that respondents in heritage-sensitive urban contexts may prefer preserving the original urban fabric and spatial coherence without disrupting historic continuity (Pendlebury and Porfyriou, 2017).

Inclusiveness: user diversity

“User diversity” received a fairly high importance rating of **4.04**. As shown in Appendix C1 – Table 18, three variables related to user diversity each received a mean score exceeding 3.90. This suggests that urban waterfront open spaces highlight the role of social mixing in the creation of more inclusive canal cities, serving as platforms for communication and democratic practice, regardless of race, gender or age (Low, 2023).

Inclusiveness: equitable access and use

“Equitable access and use” achieved a similarly high mean importance score of **4.00.** Appendix C1 – Table 19 shows that all variables relating to the importance ranking of equitable access and use received mean scores exceeding 3.90. The development of a 24/7 environment at QHCD received the highest mean importance score of 4.06. As Tan and Klaasen (2007) suggest that such 24/7 environments should encompass more than just a few shops or facilities and should be open and accessible consideration of night economy and vitality.

Inclusiveness: diverse user-activity pattern

The sub-factor “Diverse user-activity pattern” received an overall importance rating of **3.97**. According to Appendix C1 – Table 20, both variables received the mean score of 3.97 in terms of importance ranking, revealing that a diversity of functional types of buildings along with the use of space are needed to account for diverse uses (Evans et al., 2022).

Inclusiveness: social cohesion

“Social cohesion” attained a high importance rating of **3.87.** Appendix C1 – Table 21 reveals that citizen participation in the decision-making process (M = 4.04) is considered the most important variable for enhancing social cohesion in the planning and design of high quality urban waterfront open spaces, as the public are their primary users whose everyday lives should be meaningfully integrated (Shi et al., 2023). Secondly, the duration of social interaction (M = 3.97) received the second-highest mean score, which may reflect the extent to which these spaces facilitate relief from daily routines and, in turn, reinforce social cohesion at a community scale (Cattell et al., 2008). Thirdly, cooperation between public and private partnerships (M = 3.96) was ranked third highest, highlighting the importance of accommodating public interests without compromising the interests and values of other stakeholders. However, rational and transparent distribution of public funds and infrastructure service recorded only 3.50. This is because, although the shift from a centrally-planned system to a

market-oriented approach has promoted greater transparency in the allocation of funds for large-scale waterfront regeneration projects, financial instruments in China, such as urban regeneration funds and bonds issued by real estate developers or financial elites, are largely controlled by state-owned development companies or private stakeholders (Chen, 2022). As a result, citizens are rarely involved in discussions regarding the distribution and allocation of financial resources, even though local residents place greater importance on this variable than tourists.

7.3.3 Satisfaction ranking of variables affecting the quality of urban waterfront open spaces at QHCD

Access and linkage: physical accessibility

The satisfaction mean score for “Physical accessibility” was **3.67**. Although the area is served by three metro stations, more than 50 bus stops and two ferry terminals (two operational and one under construction) within a 1.2 km radius, walking times between the metro stations and the site entrances is relatively long, with most of routes requiring more than 15 minutes on foot to reach the main entrances in three key zones (see Figure 7-4). This finding suggests that future design may need to pay attention to last-mile pedestrian connectivity between transit nodes and key destinations.

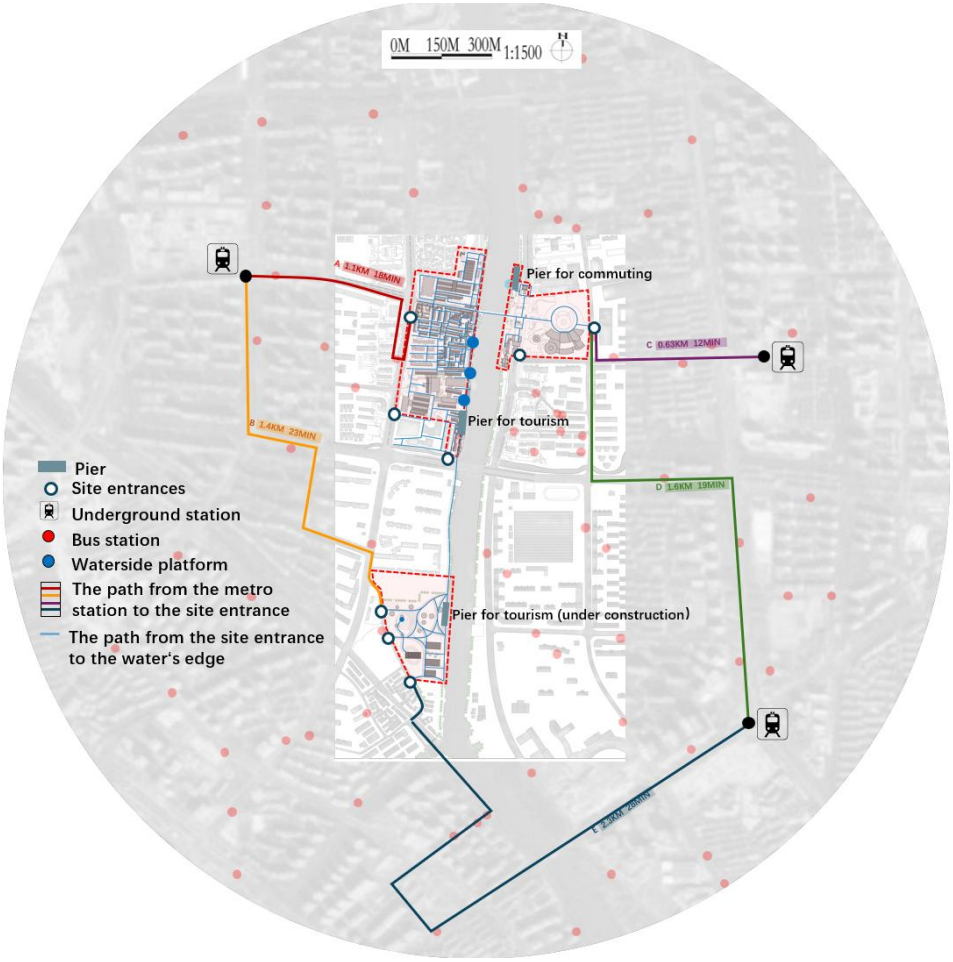


Figure 7-4 Public transport map surrounding QHCD. (Source: drawing by author)

Appendix C1 – Table 22 further indicates lower satisfaction with “access to the water’s edge” (M = 3.45). This appears to correspond with the limited number of direct waterside platforms, three in Zone A and one under construction in Zone B (Figure 7-5). Although the canal continues to accommodate freight transport, which constrains the spatial configuration of waterside platforms, the current limited provision of such platforms reduces shoreline permeability and, in turn, restricts opportunities for everyday water-related activities.

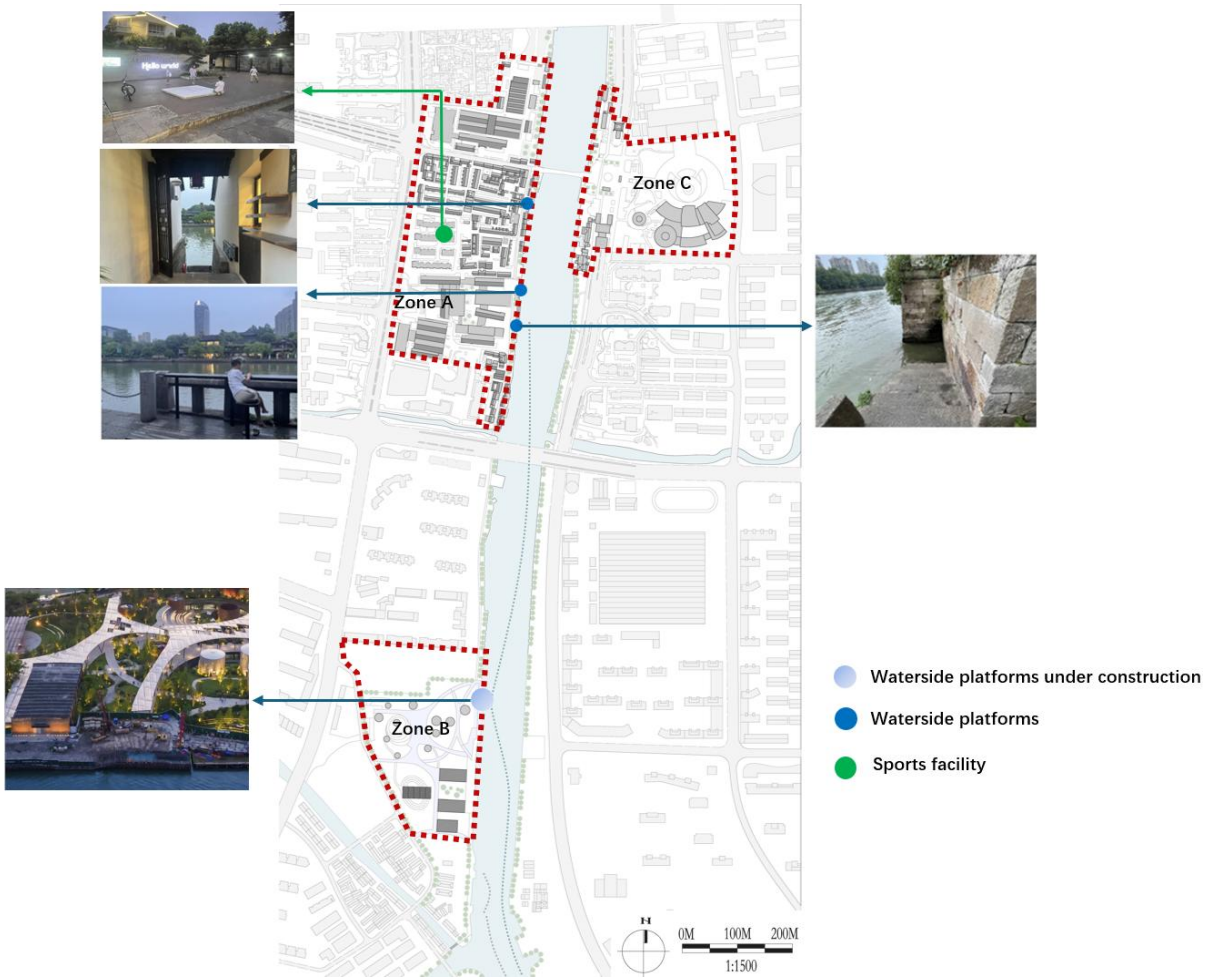


Figure 7-5 Three waterside platforms at QHCD. (Source: drawing by author)

In response to the limited number of waterside platforms resulting from continued freight transport, the 2019 Grand Canal regeneration strategy proposed the construction of a Second Navigation Channel (Figure 7-6) and the relocation of certain freight routes, aiming to release sections of the historic waterfront for enhanced water accessibility (Hangzhou Urban Planning and Design Research Institute et al., 2019). This governance intervention further illustrates how, while the canal continues to accommodate freight navigation, functional reconfiguration and route relocation can release shoreline space and help mediate tensions between living heritage (keeping

heritage in active use through continued navigation) and the demand for waterside spaces that support everyday public life.

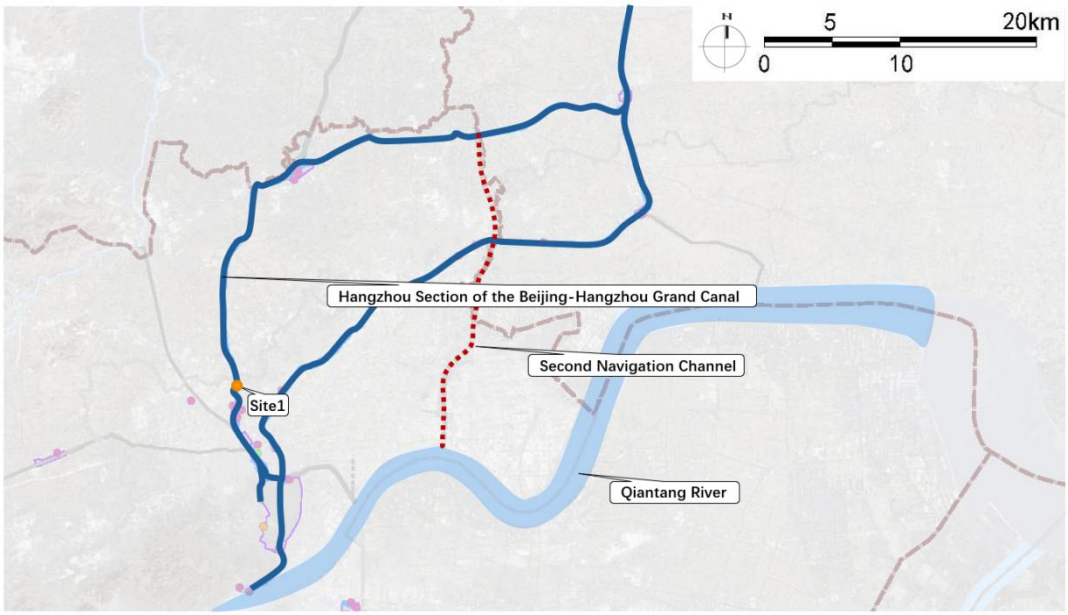


Figure 7-6 Second Navigation Channel. (Source: adapted from Hangzhou Urban Planning and Design Research Institute)

By contrast, participants reported higher satisfaction levels with the “accessibility of commercial amenities” (M = 3.93), “basic public services” (M = 3.86) and “healthcare facilities” (M = 3.78). These services are more evenly distributed across nodes and entrances based on their service scope/radius (Figure 7-7), reinforcing their integration within the existing street network.

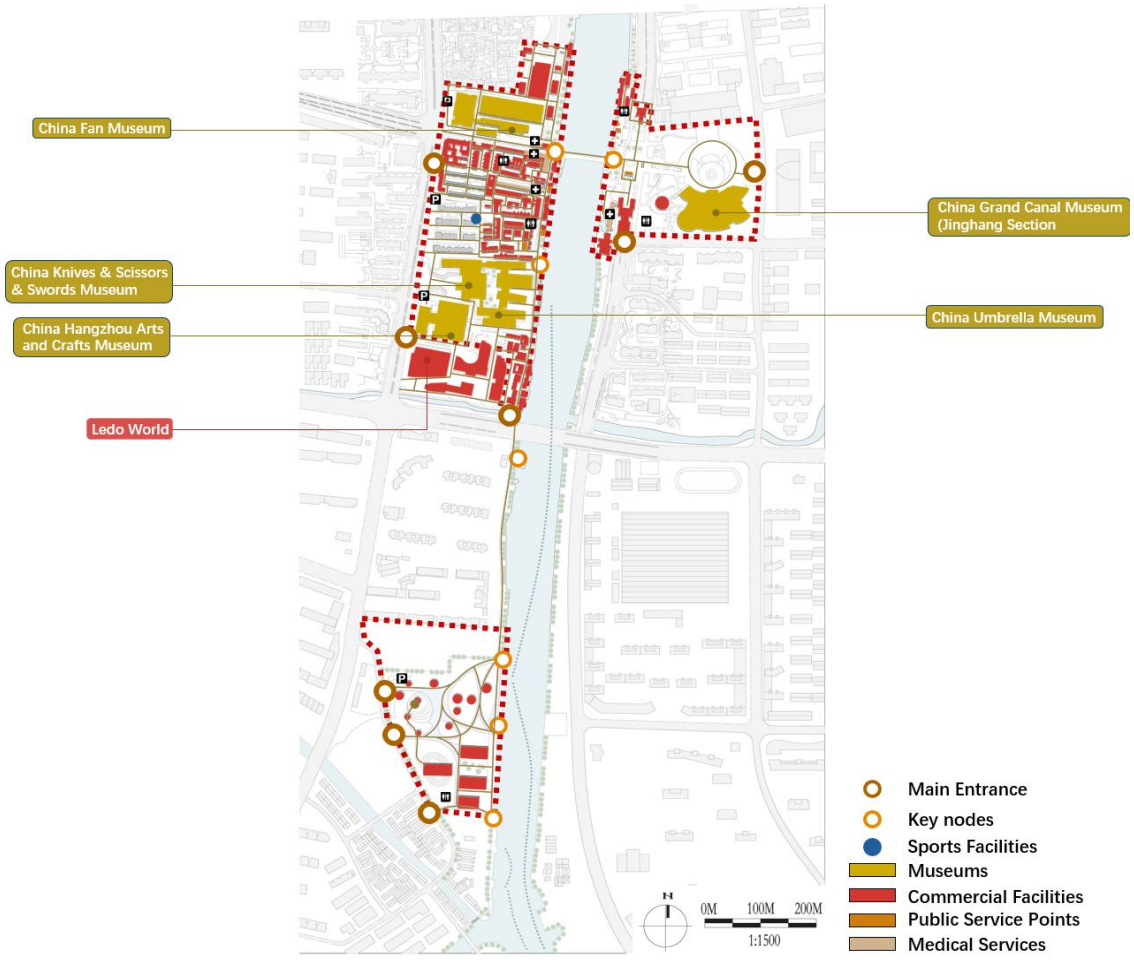


Figure 7-7 The physical accessibility at QHCD.
(Source: drawing by author)

Access and linkage: the continuity of waterfront path systems

"The continuity of waterfront path systems" achieved a satisfaction mean score of **3.54**. Appendix C1 – Table 23 reveals that participants perceived higher satisfaction in the continuity of the waterfront promenade (M = 3.94), followed by waterborne transport routes (M = 3.69); whereas the continuity of vehicular (M = 3.33) and cycling routes (M = 3.20) were both rated considerably lower. In this area, due to the need to preserve the World Heritage Site, as well as the designated buffer zones (the width of which generally ranges from 50 to 150 metres, depending on building density and the

historical urban fabric) established during the heritage nomination process, no additional cycling or vehicular routes have been introduced within these areas along the Qiaoxi heritage canal (Hangzhou Urban Planning and Design Research Institute et al., 2019). These include historic buildings, large-scale hydraulic structures and their associated remains. As a result, cycling and vehicular circulation is largely redirected to the perimeter of the heritage buffer zone, linking to the main entrances of the three primary zones (Figure 7-8), which may account for the comparatively lower satisfaction scores recorded for route continuity in these modes.

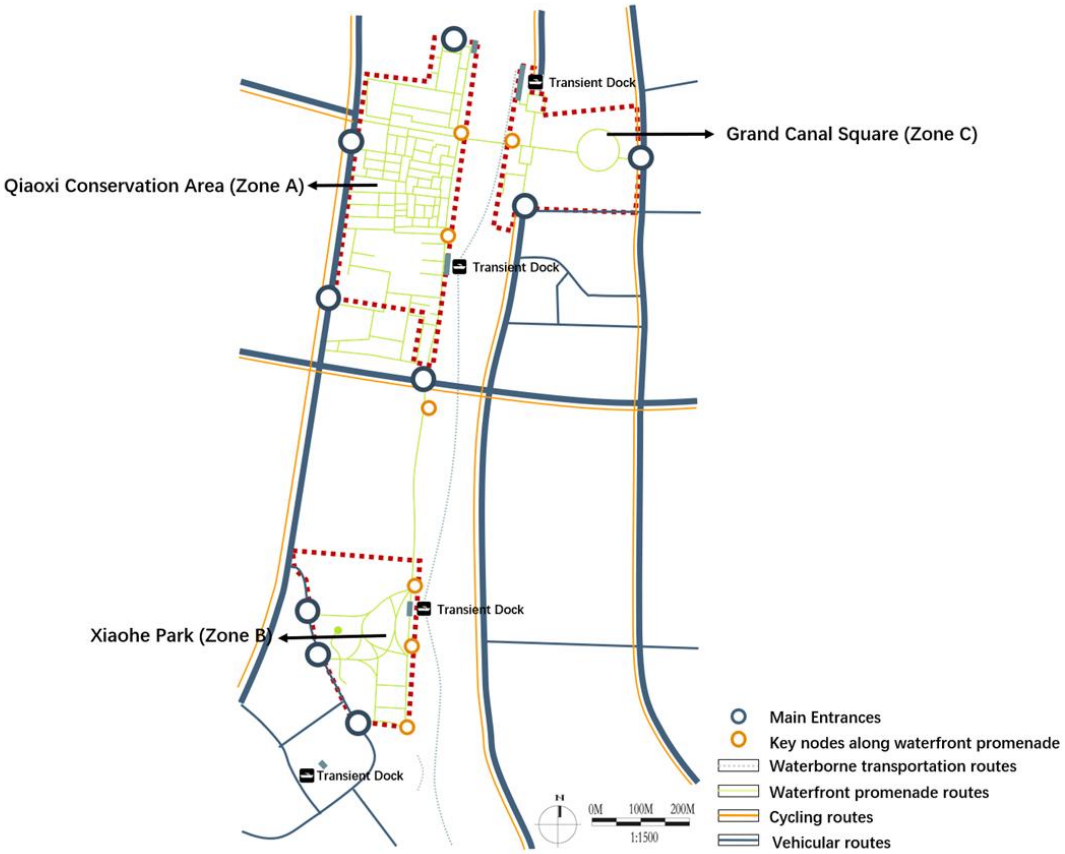


Figure 7-8 The continuity of waterfront path systems at QHCD. (Source: drawing by author)

Access and linkage: the connectivity of waterfront path systems

"The connectivity of waterfront path systems" attained a fairly low performance mean score of **3.43.** Appendix C1 – Table 24 shows that respondents were more satisfied with "The effective linkage between waterfront promenades and key nodes" (M = 3.70). By contrast, the linkages between pedestrian bridges, cycling routes and vehicular routes with key nodes received lower satisfaction scores, below 3.50. This contrast is closely associated with the heritage corridor's circulation hierarchy, in which pedestrian routes are given priority rather than cycling and vehicular movement.

Prior to 2021, the existing waterfront open spaces between Zone A and Zone B contained "artificial bottlenecks", resulting in abandonment and lack of spatial connectivity (Figure 7-9).

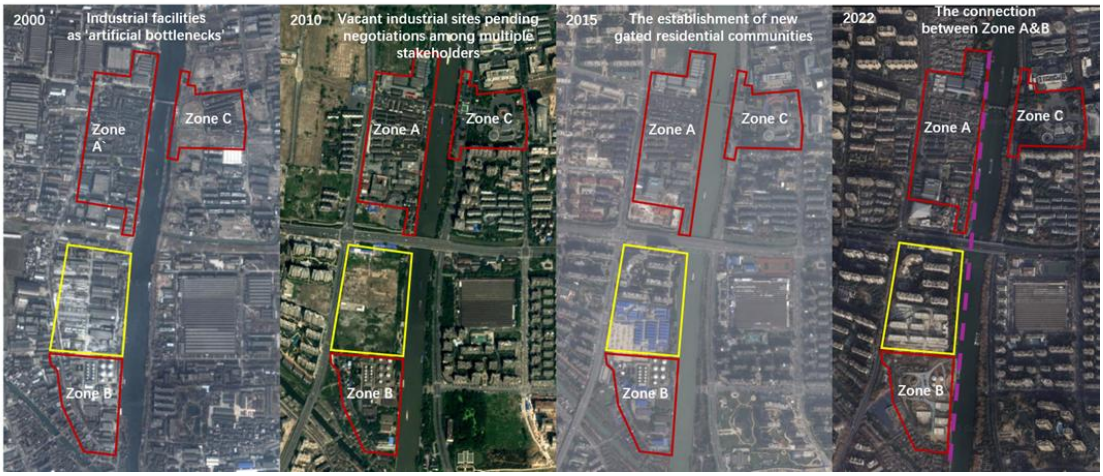


Figure 7-9 Physical obstacles and artificial bottlenecks between Node A and Node B (Source: drawing by author)

After 2021, Node A (the Qiaoxi Conservation Area), Node B (Xiaohe Park) and Node C (Canal Square) were reorganised as predominantly pedestrian environments, with motorised and non-motorised vehicles largely restricted from access. Municipal interventions tend to reconstruct waterfront walkways linking key destinations (Nodes A, B and C) without creating any bottlenecks, which is essential for enhancing user satisfaction with the connectivity of the waterfront area since 2021 (Figure 7-10).

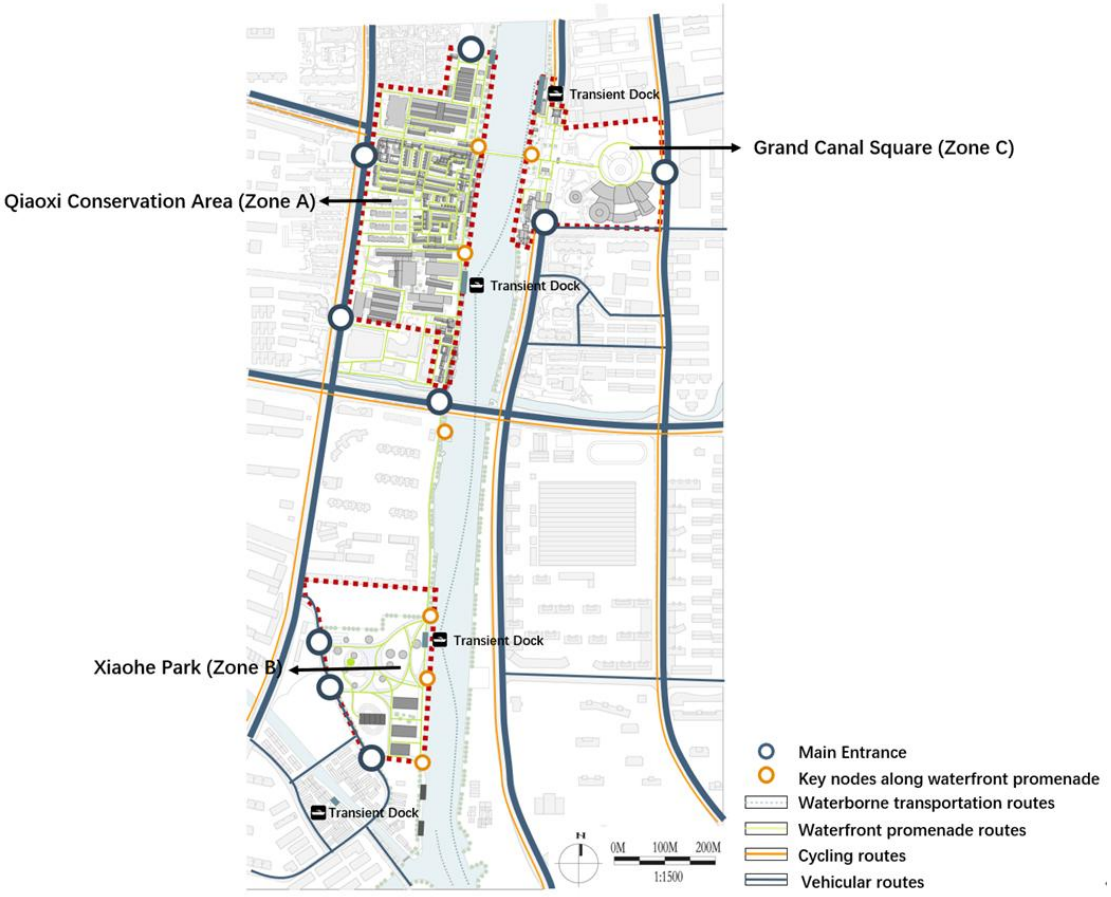


Figure 7-10 The overall circulation without obvious physical obstacles at QHCD. (Source: drawing by author)

In addition, a new commuting pier was completed in 2021 at Canal Square. while a tourist pier was introduced on the opposite bank near the Qiaoxi Conservation Area

(Figure 7-11). Such two types of piers serve different functions, one oriented towards daily commuting and the other towards tourism and leisure, thereby creating distinctions in user groups and temporal patterns of use, while strengthening connectivity within the waterfront system.

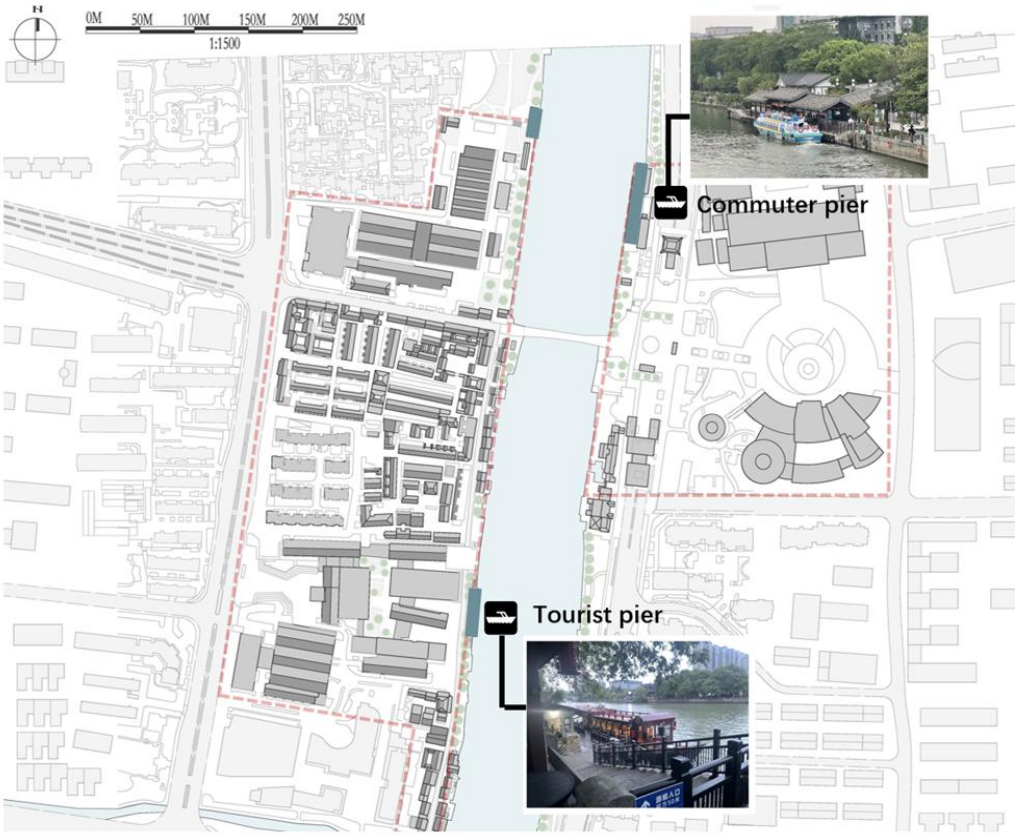


Figure 7-11 Two piers have been completed and are currently in operation. (Source: drawing by author)

Safety: protection against traffic accidents

“Protection against traffic accidents” received a high overall rating of **3.95**, with all variables scoring between 3.89 and 3.99 (see Appendix C1 – Table 25). This suggests that the creation of a pedestrian-oriented environment and the regulation of restricting

vehicular access to the heritage conservation area in historical urban waterfronts can contribute to reducing traffic-related risks.

Safety: protection against crime

"Protection against crime" was rated overall at **3.79.** Appendix C1 – Table 26 shows that, with the exception of "The use of an appropriate number of surveillance cameras" (M = 3.28), all other crime protection variables received high mean satisfaction scores of 3.78 or above. Reasons for these results may include: firstly, canal shopfronts are often personalised with plants, decorations, signage and handicrafts, which help enhance the perceived safety of the space (Figure 7-12).



Figure 7-12 Displaying plants and signage in the semi-public realm at QHCD. (Source: author)

Secondly, a variety of lighting schemes have been implemented at QHCD along the canal-facing historic building facades, the fountain plaza and the main waterfront promenade (see Figure 6-13). Warm lighting on historical buildings, colourful fountain illumination and well-lit shopfronts also secure night-time built environment.



Figure 7-13 Diverse lighting systems at QHCD. (Source: author)

Thirdly, Hangzhou Canal Comprehensive Protection and Development Co., Ltd. (a subsidiary of Hangzhou Canal Group) is responsible for implementing development and conservation of the QHCD and for its day-to-day operation and management. As a government-affiliated entity, it helps ensure that the cleanliness and sanitation are maintained to a high standard in this area. Moreover, although public guards are stationed at the entrances and exits of the tourist destinations, their presence does not disrupt the daily lives of residents or negatively impact the overall visitor experience. On the contrary, many tourists engage with these public security personnel by asking for directions or tourist information. These findings suggest that safety perception in QHCD is shaped less by technological surveillance and more by spatial activity, lighting design, neighbourhood-level crime prevention through environmental design and soft management practices to manage undesirable behaviours.

Safety: flooding risk protection

“Flood risk protection” was rated **3.55**, indicating relatively moderate satisfaction with existing flood management measures. Appendix C1 – Table 27 presents participants’

satisfaction levels regarding four flood-risk protection strategies along urban waterfronts. “The use of traditional shoreline infrastructure” received the highest satisfaction rating of 3.97, which may be associated with the widespread application of stone revetments that combine vertical retaining walls with planted greenery to mitigate flood risk (Figure 7-14). By contrast, “Integration of waterfront greenways with flood control systems” received the lowest mean satisfaction score (3.23), suggesting that much improvement is needed in relation to resilient and ecological flooding management.



Figure 7-14 Traditional shoreline infrastructure. (Source: author)

Comfort: climatic comfort

The sub-factor of “climatic comfort” was rated at 3.79. Appendix C1 – Table 28 demonstrates that participants expressed relatively high satisfaction with this variable, especially in relation to air quality (M = 3.95), water surface humidity (M = 3.95) and natural shading (M = 3.81). However, the provision of artificial shelter from wind, rain and sun was rated the lowest, with a mean performance score of 3.50. In Zone A,

artificial shading points are located primarily on both sides of the Gongchen Bridge along the water's edge, with a limited spatial coverage. Moreover, the web-like semi-transparent ETFE canopy in Zone B fails to offer adequate protection from sunlight (Figure 7-15).



Figure 7-15 The web-like semi-transparent ETFE canopy in Xiaohe Park. (Source: author)

Comfort: seating comfort

"Seating comfort" received an overall score of 3.67. Appendix C1 – Table 29 shows that, apart from "seating material" (M = 3.50) and the "provision of a variety of formal and informal seating options" (M = 3.20), the satisfaction mean scores for other variables ranged from 3.71 to 3.91 and were broadly satisfactory.

Moreover, the range of seating types within the residential areas along the canal remains relatively limited. In QHCD, primary seating areas are configured to

accommodate short stays and socialising, while fewer settings support longer stays or more varied social use. The relativeIntegration of informal seating elements, such as steps, low walls and subtle changes in ground level, may help explain why respondents expressed lower satisfaction with seating variety (see Figure 7-16).



Figure 7-16 Contrasting Seating Provision between Waterfront Tourist Area (left) and Adjacent Residential Area (right). (Source: author)

Comfort: visual comfort

"Visual comfort" received an overall performance mean score of **3.60**. Appendix C1 – Table 30 shows that most participants were fairly satisfied with "The views of a clean water body" (M = 3.88), "rich flora" (M = 3.87), and "clear visual axes" (M = 3.80). However, "The view of a good skyline" (M = 3.15) did not achieve high levels of

satisfaction, although there was a significant difference between residents and tourists. Tourists (M = 3.41) demonstrate higher satisfaction than residents (M = 3.28). This perception variation appears to relate to differences in perceptual positioning and familiarity with the landscape. For visitors standing on the Gongchen Bridge, the continuity of traditional architectural forms and characteristic roofscapes along the canal may reinforce a sense of historical coherence and place identity (Figure 7-17), whereas long-term residents may evaluate the skyline in relation to broader urban expectations beyond the heritage corridor (Figure 7-18).



Figure 7-17 Traditional architectural forms as skyline. (Source: Author)



Figure 7-18 The skyline is shaped by contemporary high-rise buildings and

monotonous residential blocks. (Source: Author)

Comfort: movement comfort

This sub-factor received an overall rating of **3.5**, indicating a relatively low satisfaction level with movement comfort. Appendix C1 – Table 31 shows that respondents generally expressed a high level of satisfaction with the ease of movement along the waterfront pedestrian route, followed by an “average” satisfaction level for the vehicular route. In contrast, satisfaction with the cycle route was lower, with scores of 3.43 for width, 3.22 for materials, and 3.17 for surface condition.

Spatial Aesthetics: proportions and scales

“Proportions and scales” was rated overall at **3.63**. Appendix C1 – Table 32 indicates that the “appropriate scale of cultural blocks” and “leisure areas” achieved the highest satisfaction score (M = 3.90), whereas the “proper scale of residential areas” and “commercial areas” were both rated below 3.40. The comparatively lower satisfaction with residential and commercial scales may reflect a perceived mismatch between property-led redevelopment intensity and the finer-grained spatial character of the heritage canal corridor. In practice, this mismatch may limit the extent to which canal-related spaces support sustained, meaningful cultural engagement and interpretation of the area’s industrial legacy. This argument echoes critiques that canal-based commercialisation may erode real heritage interpretation (Cao et al., 2024). Furthermore, the waterfront spaces in this area appear to be increasingly monopolised

by high-end commercial activities, with limited integration of both high and low cultural expressions associated with the local community's past and urban history. This imbalance may constrain the diversity of socio cultural representations and contribute to a more visitor-oriented waterfront experience. In this sense, such tourism-oriented heritage development may approximate what has been described as a "tourist bubble", catering primarily to out-of-town visitors and higher-income inner-city residents rather than reflecting the everyday cultural continuity of the local community (Stevens, 2021).

Spatial aesthetics: sensitivity to harmonic relationship

The satisfaction score for "sensitivity to harmonic relationship" was **3.62**. As seen in Appendix C1 – Table 33, "Richness and coordination of building façade styles" received the highest mean satisfaction score (M = 3.74). Such higher performance may relate to the Hangzhou government's efforts to regulate façade design through the implementation of design guidelines informed by the *Regulations on the Protection of the Grand Canal World Heritage in Hangzhou* (Hangzhou Municipal Government, 2017), which promote the use of traditional materials and architectural forms consistent with the historical character of the canal-front environment (Yan, 2021). Furthermore, the variable "Harmonic spatial hierarchy and organisation" received the second-highest satisfaction score (M = 3.73). This is because the inherent spatial configuration of traditional Chinese canalfront settlements. An urban fabric scaled to the pedestrian was the norm along the canal, forming a spatial structure in which the

streets serve as primary pedestrian routes, alleys as secondary pathways and residential courtyard units as the basic architectural components (Figure 7-19).



Figure 7-19 A pedestrian-scaled urban fabric along the canal, characterised by walkable main inner streets, narrow alleys, and traditional courtyard units, which all together support human-scale spatial organisation. (Source: Author)

Spatial aesthetics: appreciation of rhythm

“Sensitivity to appreciation of rhythm” attained a satisfaction mean score of **3.51**. Appendix C1 – Table 34 shows that, other than “The rhythm of façades above the ground floor”, which received a high level of satisfaction with a mean score close to 4.0, most variables related to the appreciation of rhythm demonstrated only a moderate level of satisfaction, with none exceeding a mean score of 3.50. This moderate satisfaction level may be because front doors, balconies, terraces, back gardens and rear tiers in the heritage canal district are designated as heritage-protected architectural elements and are subject to unified management by the Hangzhou Grand Canal Administration Committee. Any modifications to façades must first be approved by the Committee and subsequently reviewed by the Hangzhou

Municipal Bureau of Planning. The approval process is time-consuming, which may limit the flexibility of design interventions aimed at enhancing visual variation and spatial rhythm along the waterfront streets. Additionally, although some waterfront shops are designed with active frontages, such as transparent ground-floor glazing, the lack of outdoor seating and adequate shade appears to reduce opportunities for users to dwell and engage in social interaction.

To further activate the commercial frontage, local authorities introduced in 2022 a new canopy and a series of colonnades at the ground floor of a former factory building in Zone A, creating a semi-public space (Figure 7-20). However, in the absence of a more coherent and diversified user experience, this intervention did not fully translate into a clearly legible spatial rhythm, which may explain the relatively low satisfaction score associated with this variable.



Figure 7-20 Adding new canopy in the semi-public space. (Source: Archi position, 2024)

Place identity: distinctiveness of natural landscape

“Distinctiveness of natural landscape” received an overall rating of **3.84.** Appendix C1 – Table 35 indicates this sub-factor performed well, with mean scores ranging from 3.75 to 3.81. The distinctiveness of planting design in the QHCD reflects a layered integration of everyday functionality, symbolic meaning and ecological value. As part of the waterfront regeneration efforts, green islands have been deployed as a form of soft intervention to create new character for resting and staying, thereby encouraging everyday public use (see Figure 7-21).



Figure 7-21 Green islands. (Source: Archi position, 2024)

From a symbolic perspective, residents and shop owners along canalside streets have planted native species such as camphor trees, ginkgo or Chinese trumpet vine, reinforcing traditional living memories and generating micro-landscapes as a new landmark (see Figure 7-22).



Figure 7-22 Adding unique natural landscapes. (Source: author)

Ecologically, planting strategies also contribute to urban resilience. For example, willow trees were planted as early as the 1980s along the canal edges, while aquatic species such as reeds and Sweet Flag help mitigate the urban heat island effect and enhance the water-land interface (Yu, 2006).

Furthermore, at QHCD, stone revetments remain the most prevalent form of shoreline treatment, typically constructed using roughly hewn stone blocks. In contrast, stepped shorelines and wharf-platform edges that were once integral components of the historical water-based urban fabric as a whole, now prevail only within the private or semi-private courtyards of heritage buildings or canal-facing commercial premises. The reduced public accessibility of these historic shoreline elements, compared with their more open use in the 1960s, may limit opportunities for embodied engagement with the canal edge, despite the relatively high satisfaction with planting distinctiveness.

Place identity: distinctiveness of architectural elements

“Distinctiveness of architectural elements” was overall rated **3.82.** Data in Appendix C1 – Table 36 suggests that among the variables assessed, building façades received the highest mean satisfaction score (M = 4.01), followed by roofscapes (M = 3.92) and decorative elements and bridges (both M = 3.86). In contrast, balconies received the lowest score (M = 3.61).

Over the past two decades, government-led physical restoration efforts in this area have focused primarily on façade renovation, aiming to create a canal-settlement landscape and reshape antique-style commercial streets. This emphasis on façade articulation may help explain the comparatively high satisfaction with façade distinctiveness. While such interventions may contribute to economic vitality and tourism-oriented revitalisation, they may not fully capture the complexity of local everyday life or evolving social relations. Nevertheless, Zhang and Lenzer Jr (2020) note that façade restoration has strengthened the symbolic visibility of traditional Jiangnan architectural forms along the waterfront.

Place identity: urban memory

“Urban memory” was rated overall at 3.75. Appendix C1 – Table 37 shows that, with the exception of “Cultural and digital heritage interpretation and presentation”, the mean satisfaction scores of the other three variables were all close to 3.90.

Firstly, “Lifestyle evolution shaped by embodied personal memory” received the highest mean satisfaction score (M = 3.94), suggesting that individuals perceive urban memory as being sustained through continuous interaction with place. This result also highlights how past experiences are translated into daily routines and spatial behaviour, alongside the adaptive reuse of existing industrial heritage buildings and intangible canal-related cultural resources.

Secondly, “Cultural and digital heritage interpretation and presentation” received the lowest satisfaction score (M = 3.30). This may be attributed to the fact that most representations of canal culture in waterfront public spaces rely on traditional display, such as sculptures, information boards and murals (Figure 7-23), rather than more engaging interactive experiences and the integration of digital technologies. This finding echoes Cao et al.’s argument that digital storytelling and the dissemination of cultural heritage, including the use of Virtual Reality (VR) and Augmented Reality (AR), can play an important role in strengthening emotional connections and urban memory in heritage canal environments. However, heritage redevelopment in QHCD still relies largely on static interpretation, such as signage, murals and sculptural displays, for communicating urban memory.



Figure 7-23 Traditional information boards and murals displaying heritage information. (Source: Author)

Furthermore, although the original place names have been preserved and displayed on the entrance signage for regenerated waterfront neighbourhoods and along

canalside restaurants (Figure 7-24), their interpretive role within the regeneration process appears limited. From a cultural-geographical perspective, the regeneration process has overlooked their role in shaping emotional ties and cultural landscapes. More specifically, there is limited in-depth interpretation of how the cultural identity of different social groups relates to local spatial characteristics, including settlement histories and processes of urban transformation.



Figure 7-24 Preservation of original place names in the regenerated canal neighbourhoods. (Source: Author)

Place identity: distinctiveness of street furniture

“The distinctiveness of street furniture” shows a fairly low performance mean score of **3.45.** As seen in Appendix C1 – Table 38, only the “Distinctiveness of monuments” variable (M = 3.79) achieved a relatively high level of satisfaction (Figure 7-25), whereas other types of urban furniture were perceived by respondents as less distinctive and unique.



Figure 7-25 Monuments near the Gongchen Bridge. (Source: Author)

Another finding is that users expressed dissatisfaction with water-related design installations (M = 3.23), suggesting that existing waterfront furniture provides limited opportunities for direct and engaging water-related experience. These results reveal that distinctiveness is more easily perceived in landmark monuments and through interactive design interventions that connect people with water.

Inclusiveness: user diversity

"User diversity" was overall rated **3.96**. Appendix C1 – Table 39 demonstrates all variables received a fairly high satisfaction mean score above 3.90, indicating an inclusive and welcoming urban waterfront for all social groups.

Inclusiveness: user-activity pattern diversity

"User-activity pattern diversity" was rated overall at **3.85.** Appendix C1 – Table 40 shows that the historic urban waterfronts have the potential to achieve mixed urban

waterfront communities, integrating diverse functions and soft control-related urban governance.

Inclusiveness: social cohesion

“Social cohesion” achieved an overall score of **3.77**. Appendix C1 – Table 41 indicates that respondents were generally satisfied with variables related to social cohesion, with the exception of the element of public participation in the decision-making process. The results reveal that “The length of social interaction” received the highest satisfaction score (M = 3.91), reflecting participants’ willingness to dwell and develop social interaction. “Public–private partnership cooperation” (M = 3.88) and “Transparent distribution of public funds and infrastructure services” (M = 3.82) also received relatively high mean scores. However, “Community engagement in planning and decision-making” was rated the lowest at M = 3.46 and showed the greatest variation (SD = 1.338). Age-related differences were evident. Respondents aged 60 and above exhibited a higher satisfaction score (M = 3.59), compared to younger participants aged 18–24 (M = 3.40) and 25–39 (also M = 3.40). Those aged 40–59 recorded a moderate score of 3.52. This further indicates that older residents perceive existing participatory arrangements (e.g., the Community-based Urban Planner initiative) as more accessible or effective, whereas younger respondents may expect more direct involvement in decision-making.

Inclusiveness: equitable access and use

“Equitable access and use” was rated overall at **3.71**. Appendix C1 – Table 42 reflects satisfaction with barrier-free ramps (M = 3.95) and equitable access to key tourist destinations (M = 3.95) and community-led events/activities (M = 3.90). However, the two lowest mean scores are for “Free use of play areas” (M = 3.38) and “Free use of flexible spaces” (M = 3.35). Such data results that while social access and organised activities are generally perceived as equitable, more informal and flexible modes of spatial use are less supported within the current physical configuration. In this sense, equity appears to be achieved more clearly in terms of physical access than in terms of open-ended, informal and temporary appropriation of space.

7.4 Questionnaire Data Results at SBQR

7.4.1 Respondents’ profile and use of urban waterfront open spaces at the SBQR

Table 7-9 Demographic information at SBQR.

Demographic variables at SBQR	Number	Percentage % (n=770)
Gender		
Male	440	57.1
Female	316	41.0
Others	2	0.3
Prefer not to say	12	1.6
Age groups		
18-24	103	13.4
25-39	290	37.7
40-59	220	28.6
60+	126	16.3
Prefer not to say	31	4.0
Classification of Participants		
Residents surrounding SBQR	325	42.3
Visitors of SBQR	336	43.6
Designers who evolved design process at SBQR	41	5.3

Staff/managers responsible for management in SBQR	48	6.2
Others	20	2.6

A total of 770 participants completed both the importance-level and satisfaction-level online questionnaires at the SBQR (Table 7-9). Male participants comprised a higher proportion than female, at 57.1% (n = 440) and 41.0% (n = 316) of the total sample respectively. The dominant age group was 25–39 years old (37.7%), followed by those aged 40–59 (28.6%); participants aged 60 and above accounted for 16.3%, while those aged 18–24 made up 13.4% (approximately 4% of respondents chose not to disclose their age). The majority were visitors (43.6%) and local residents (42.3%), with designers (5.3%) and managers (6.2%) comprising smaller portions of the sample.

Table 7-10 Urban waterfront open space use variables at SBQR.

Space use variables at SBQR	Number	Percentage % (n=770)
Visit frequency		
Every day	60	7.8
Several times a week	154	20.0
Once a week	96	12.5
Several times a month	116	15.1
Once a month	32	4.2
Several times a year	143	18.6
Once a year	121	15.6
Occasionally	48	6.2
Number of visit		
1-3 times	254	33
4-6 times	181	23.5
7-10 times	335	43.5
Dwell Time		
<30mins	182	23.6
30-60mins	103	13.4
1-2 hours	289	37.5
>2 hours	196	25.5

Table 7-10 illustrates the spatial use variables of participants at SBQR. The highest proportion of respondents reported visiting SBQR several times a week (20.0%), followed by those who visited several times a year (18.6%) and once a year (15.6%). Only a small proportion reported visiting occasionally (6.2%) or once a month (4.2%). 43.5% of respondents had visited the park 7–10 times, suggesting a relatively high level of engagement during the sampling period. Meanwhile, 33% of users had visited only 1–3 times. As for dwell time, over 60% of participants (63%) reported staying in the urban waterfront open spaces for more than one hour.

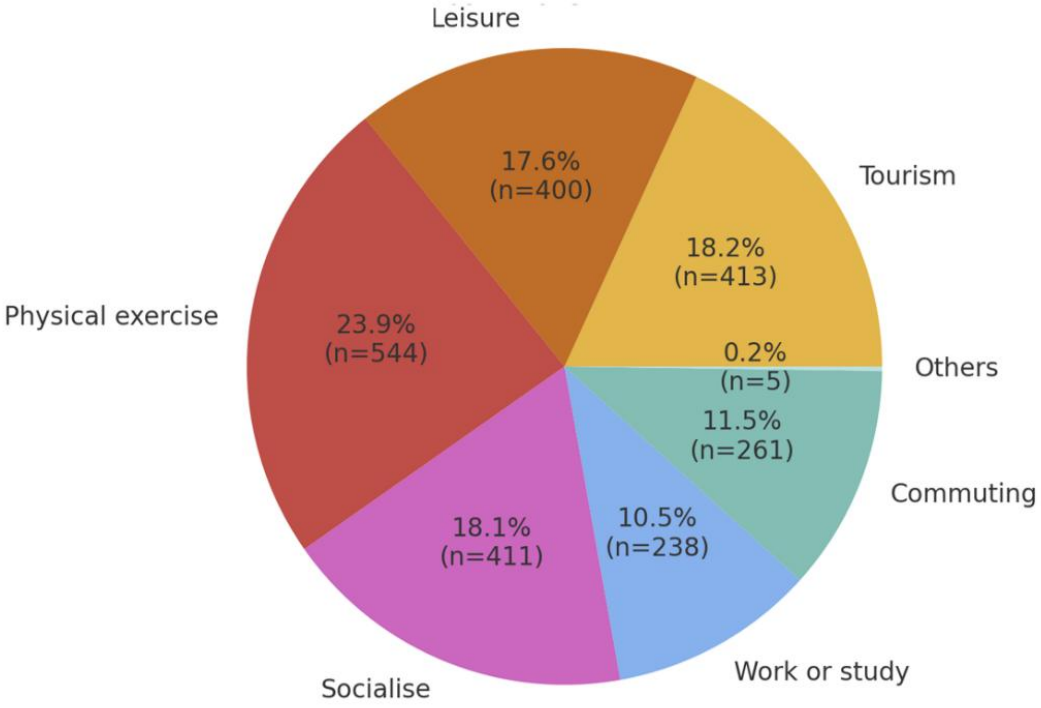


Figure 7-26 Motivations for using urban waterfront open spaces at SBQR. (Drawing by author)

Figure 7-26 indicates the main motivation for visiting the SBQR is physical exercise (23.9%), followed by socialise (18.1%) and leisure (17.6%), whereas commuting (11.5%) and work/study (10.5%) account for smaller proportions.

Table 7-11 The relationships between activity patterns and motivations at SBQR.

Activity Patterns	Numbers					
Enjoying natural scenery	0	0	0	565	0	0
Walking	0	0	0	0	0	469
Cycling	0	0	0	0	0	446
Sitting and resting	0	423	0	0	0	0
Meeting neighbours	0	0	0	0	418	0
Dinning at a restaurant	0	416	0	0	0	0
Listening to music	0	415	0	0	0	0
Meeting friends	0	0	0	0	413	0
Playing outdoor ball games	0	0	0	0	0	406
Taking photos	0	0	0	405	0	0
Meeting family	0	0	0	0	399	0
Eating lunch	0	399	0	0	0	0
Sunbathing	0	368	0	0	0	0
Passing through (home)	353	0	0	0	0	0
Jogging	0	0	0	0	0	350
Children playing	0	0	0	0	0	336
Reading	0	322	0	0	0	0
Square dancing	0	0	0	0	0	316
Drawing	0	313	0	0	0	0
Visiting public art exhibitions	0	0	0	299	0	0
Visiting marketplaces	0	0	0	290	0	0
Passing through (work)	277	0	0	0	0	0
Playing board games	0	0	0	0	0	261
Eating breakfast	0	259	0	0	0	0
Walking dogs	0	0	0	0	0	258
Attending research activity/study tour	0	0	255	0	0	0
Souvenir shopping	0	0	0	255	0	0
Practise Tai Chi	0	0	0	0	0	228
Drinking at tea house	0	225	0	0	0	0
Meeting strangers	0	0	0	0	201	0
Skateboarding	0	0	0	0	0	197
Visiting museums	0	0	0	172	0	0
	Commuting	Leisure	Work/Study	Tourism	Socialise	Physical exercise



Table 7-11 reveals that, although physical exercise and recreational activities such as enjoying natural scenery (n = 565) and walking (n = 469), are the two most popular, participation in cultural activities remains relatively limited. For instance, only 172 respondents reported visiting museums, and 299 expressed they attended public art exhibitions. This suggests that cultural venues along the SBQR are not well-integrated into everyday life. Nevertheless, urban waterfront open spaces along SBQR are convenient for social interaction, with many respondents indicating that they meet

neighbours (n = 418) or friends (n = 414) in the area. Leisure activities, such as listening to music (n = 415) and dining at restaurants (n = 416), also demonstrate high levels of participation.

7.4.2 Importance ranking of variables affecting urban waterfront open space quality at SBQR

Access and linkage: the continuity of waterfront path systems

The total importance rating calculated for the continuity of the waterfront path system was **3.91**. Appendix C2 – Table 1 shows that participants highlight the importance of waterfront promenade continuity (M = 4.08) and cycling route continuity (M = 3.99) in this area, which reveal that the role of the SBQR corridor as a linear, low-carbon mobility environment in which continuous walking and cycling routes could have the potential to shape everyday waterfront experience.

“The continuity of vehicular routes” was also rated as relatively important (M = 3.98), consistent with the regular grid street structure in newly developed districts, where access to the entrance of urban waterfront open spaces is often mediated by the surrounding vehicular road network. By contrast, “the continuity of waterborne transport routes” received the lowest importance rating (M = 3.58), suggesting that flood-control infrastructure may constrain the perceived viability of waterborne mobility as part of the on-site movement system.

Access and linkage: the connectivity of the waterfront path system

“The connectivity of the waterfront path system” received a high overall importance mean score of **3.85**. Appendix C2 – Table 2 shows that connectivity between waterfront pedestrian pathways and key nodes (M = 4.09), pedestrian bridges and key nodes (M = 4.00), and cycle routes and key nodes (M = 3.83), all of which move people to and along the water’s edge, play a vital role in enhancing access and linkage and facilitating activity. It further indicates that this area promotes sustainable and clean modes of transportation, which are increasingly embedded in healthy and eco-friendly lifestyles. By contrast, the link between waterborne transport and key nodes along the urban waterfront was considered the least important (M = 3.56), which may relate to the tidal dynamics of the Qiantang River and associated safety constraints that limit its perceived reliability as a regular mobility option.

Access and linkage: physical accessibility

“Physical accessibility” achieved a mean overall importance score of **3.80**. Among its variables, Appendix C2 – Table 3 reveals that “Physical accessibility to the water’s edge” obtained the highest importance mean score at 4.05, indicating that ensuring direct public access to the riverfront is perceived as a key component of waterfront open space development. Ease of access to “cultural venues” received high importance ratings of 4.03, whereas “Physical accessibility to commercial facilities and healthcare services was rated as less important (M = 3.55 and 3.57 respectively).

These data results indicate that SBQR continues to function primarily as a destination-oriented cultural and recreational corridor rather than as an integrated spaces in everyday lives.

Safety: protection against traffic accidents

“Protection against traffic accidents” attained an overall rating of **3.97**, reflecting a fairly high importance level in relation to traffic safety enhancement. Appendix C2 – Table 4 shows that urban waterfront open spaces highlight the importance of creating traffic buffer zones and low-speed environments in mixed-traffic areas, especially in spaces frequently used by children and older adults.

Safety: the protection against flooding risks

“The protection against flooding risks” received a high overall importance rating, with a mean score of **3.83**. Appendix C2 – Table 5 illustrates that, in newly-developed waterfront open spaces, respondents tended to favour flood protection strategies that combine ecological landscapes and greenways with engineered flood-control infrastructure, such as raised flood embankments (Figure 7-27). In contrast, temporary flood defence measures were considered less necessary to prevent flooding risks, with a lower importance mean score of 3.39.

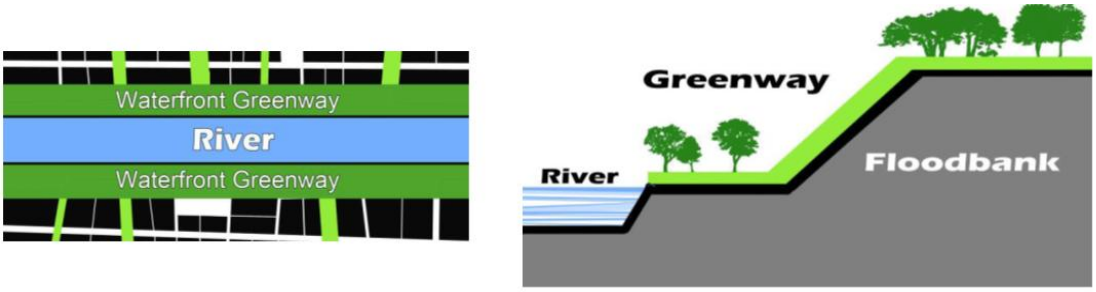


Figure 7-27 Conceptual diagram of integrating waterfront greenways with engineered foodbanks. (Drawing by author)

Safety: protection against crime

"Protection against crime" attained a mean importance score of **3.76.** Appendix C2 – Table 6 indicates that participants tend to prioritise improving the quality of night-time lighting (M = 4.01) as a key crime prevention strategy, along with the opportunity to personalise property (3.90), such as yard decorations, private plantings or well-placed furniture. In addition, the regular maintenance and cleansing of hard landscaped surfaces, urban furniture and green areas is essential for fostering a healthier and safer environment (Varna, 2014). By contrast, reliance on intensive human surveillance should be reduced; instead, a sense of security should be fostered through natural surveillance.

Comfort: seating comfort

"Seating comfort" rated an overall high mean importance score of **3.97**. Looking at Appendix C2 – Table 7, the questionnaire data highlight the need to prioritise the quantity, spatial distribution, acoustic environment and material selection of seating to support dwelling, resting, observing and discovery (Gehl, 2010). It further reveals a

strong demand for a combination of primary seating (e.g. chairs, benches, stools) and secondary seating (e.g. stairs, steps, planter walls).

Additionally, although “Arrangement of movable and flexible seats” received the lowest importance mean score among the seating comfort variables, it still presents high a relatively high rating (M = 3.70), as movable benches have the potential to enhance communication, informal gatherings and group activities (Loo and Fan, 2023).

Comfort: visual comfort

“Visual comfort” attained an overall mean importance score of **3.95**, indicating a relatively high level of perceived importance among respondents. Appendix C2 – Table 8 shows that “greenery” (M = 4.08), “skylines” (M = 4.05) and “water” (M = 4.04) can contribute significantly to visual comfort at this site. In addition, the provision of clear wayfinding signage (M = 4.03) was also rated highly, indicating that navigational is closely associated with visual clue and spatial legibility. This interpretation is consistent with above argument that emphasise the role of symbolic and directional elements in reinforcing orientation and local identity within waterfront environments (Zhou et al., 2024).

Comfort: climatic comfort

“The climatic comfort” received a mean importance score of **3.84**. Appendix C2 – Table 9 shows the provision of artificial shade is considered the most important variable (M

= 4.05), indicating a strong preference for reliable sun and rain protection at key waterfront nodes such as promenades, plazas and rest areas.

Air quality was also rated highly (close to 4.0), indicating that microclimate regulation and air circulation should be enhanced through the integration of micro-habitats, ecological green belts and wetland systems within the waterfront environment. Although natural shade received a slightly lower mean score (M = 3.75) compared to artificial shelter, it remains a relevant consideration, particularly in the design of rest zones and seating areas. Compared with shade and air quality in shaping climatic comfort, “Water surface humidity” was rated the lowest (M = 3.55).

Comfort: movement comfort

“Movement comfort” received an overall mean importance score of **3.79**. Appendix C2 – Table 10 reveals that users placed high value on the comfort of walking and cycling along the waterfront, particularly concerning the material used for cycle routes, waterfront promenade surface (paving) condition, and waterfront promenade width, all of which were above 4.0. By contrast, the importance of “Vehicular pavement materials” received the lowest mean score (M = 3.19), but exhibited a high standard deviation (SD = 1.435). This variation appears to reflect differences in how user groups frame movement comfort. Tourists and residents reported relatively similar importance ratings (M = 3.56 and 3.36 respectively), whereas designers and managers assigned

lower scores (M = 2.23 and 3.00), indicating that professional stakeholders prioritise macro-scale mobility management considerations rather than the material quality of vehicular routes, while visitors and residents show greater concern for surface conditions as part of the on-site experience.

Spatial aesthetics: sensitivity to harmonic relationship

“Sensitivity to harmonic relationship” received a mean importance score of **3.76**. Appendix C2 (Table 11) further shows that ‘harmonic spatial hierarchy and organisation’ ranked highest (M = 4.01), indicating that respondents prioritise legible spatial order and coherent layout as key aesthetic cues. Such harmonic spatial configuration and layout have the potential to evoke emotional responses, such as pleasure and calmness (Nasar, 1994).

“The richness and coordination of building façade styles” received the second-highest mean score at 3.93, whereas “Articulation of historical and contemporary building styles” was lowest (3.33), as most of the old buildings in the newly-developed area, have been demolished, making it necessary to enhance spatial aesthetics through the diversity of new building facades.

Spatial aesthetics: proportions and scales

“Proportions and scales” were overall rated with a mean importance score of **3.73**. Appendix C2 – Table 12 shows that participants considered an appropriate scale for

“commercial plots”, “residential blocks” and “cultural areas” is crucial to improving the proportions and scales within a human scale, with each receiving a mean score above 3.90.

In contrast, “An appropriate scale for office areas” received the lowest score (M = 3.26) and exhibited relatively large differences in perceived importance between age groups (SD = 1.366). Results show that participants aged 40–59 gave a lower score (M = 2.96), while those aged 18–24 gave a higher rating (M = 3.43). This result indicates that younger participants are more attentive to the visual and scale impacts of larger office developments.

Spatial aesthetics: appreciation of rhythm

“Appreciation of rhythm” attained an overall importance mean score of **3.71**. It can be observed from Appendix C2 – Table 13 that “The rhythm of active frontages (ground floor)” received the highest mean importance score (M = 3.94), followed closely by “the rhythm of façades (wall to window ratio)” (M = 3.90), while “the rhythm of colonnades in semi-public realms” was rated lowest (M = 3.29), with high standard deviation (SD=1.336). This significant difference can be attributed to visit frequency. For example, participants who visited the site every day assigned a mean score of 4.25. In contrast, those who visited only a few times a year gave a considerably lower average score of 2.80.

Place identity: urban memory

“Urban memory” received an overall mean score of **3.94**, indicating the intangible legacies of the Asian Games and the adaptive reuse of informal built heritage in SBQR have the potential to reshape collective memory, even in the absence of tangible and formally recognised heritage buildings. Appendix C2 – Table 14 shows that all variables associated with urban memory attained a fairly high mean score above 3.80. Among them “Cultural and digital heritage interpretation and presentation” was rated the highest (M = 3.98), followed closely by **“**Historical preservation and adaptive reuse of existing built form as an embodiment of collective memory” (M = 3.97), and “Lifestyle transformation shaped by embodied personal memory” (M = 3.96). The variable “Place names and their symbols”, while receiving the lowest mean score of 3.85, is nevertheless important in shaping urban memory. These data results reveal that post-Olympic legacies, whether in the form of intangible symbolic meanings or tangible cultural flagships and sports facilities, have the potential to initiate a new narrative, thereby shaping urban memory.

Place Identity: distinctiveness of urban furniture

“Distinctiveness of urban furniture” received an overall mean score of **3.87**. Among the variables examined, participants rated fountains (M = 4.03), water-related design installations (M = 4.02) and artificial terraces facing the water (M = 4.00) as the most distinctive elements (see Appendix C2 – Table 15). These findings suggest that

incorporating water features and design interventions that enhance bodily interaction with water plays a critical role in fostering an active waterfront experience, thereby strengthening the local identity. Monuments, which are seen as a cultural symbol, were also rated relatively high in distinctiveness (M = 3.98), suggesting that passive engagement through pausing, watching and discovery could facilitate the cultural identity.

Place Identity: distinctiveness of natural landscape

“Distinctiveness of natural landscape” attained an overall mean score of **3.87**. As seen in Appendix C2 – Table 16, “The distinctiveness of local plants” received the highest mean importance score (M = 3.98). In contrast, “The distinctiveness of water body shape” (M = 3.61) and “shoreline forms” (M = 3.53) were rated lower. These findings highlight the critical role of distinctive planting in constructing both practical and emotional meanings and values for users.

Place Identity: distinctiveness of architectural elements

“Distinctiveness of architectural elements” was recorded at an overall mean score of **3.76**. Appendix C2 – Table 17 indicates that “The distinctiveness of building materials”, “roofscapes”, “decorative elements” and “outdoor elevated walkways” were identified as critical to enhancing distinctiveness in relation to environmental meanings and symbolism, each receiving a mean score exceeding 3.80. By contrast, “The distinctiveness of balconies” and “local structure of buildings” received only 3.50,

Inclusiveness: diverse user-activity pattern

“Diversity of user activity patterns” attained an overall mean score of **3.85**. Among its variables, Appendix C2 – Table 18 shows that “The range of behaviour patterns (if granted a public licence)” received the highest mean score, at 4.01. In order to better balance collective and individual interests, as well as soft control, thus establishing inclusive rules that define acceptable and unacceptable behaviours, is a management priority for enhancing user activity patterns.

Inclusiveness: user diversity

“User diversity” attained an overall mean score of **3.98**, indicating that participants place significant value on promoting social mixing at QHCD. According to Appendix C2 – Table 19, all variables received high mean importance scores, exceeding 3.90.

Inclusiveness: equitable access and use

“Equitable access and use” attained an overall mean score of **3.93**, demonstrating creation of equitable environment for all the potential users is important for future development at this site. Appendix C2 – Table 20 shows a **contrast** between horizontal and vertical accessibility within barrier-free facilities provision. “The presence of accessible ramps” received the highest mean importance score (M = 4.06), whereas “The presence of accessible lifts” ranked lowest (M = 3.72). This result suggests that step-free movement at ground level is prioritised more strongly than vertical

connections, potentially reflecting the site's physical conditions and the perceived relevance of lifts in everyday use.

"Equitable access to the water's edge" ranked second (M = 4.04), reflecting the view that all social groups should have equal rights to engage with the water through physical movement. In addition, these results highlight the importance of ensuring that diverse functional spaces remain welcoming and inclusive, with care taken to avoid exclusionary signals, including upmarket design languages, branding, or luxury consumption-oriented programming, that may function as symbolic boundaries and discourage less particular user groups from entering or lingering, even in the absence of formal restrictions.

Inclusiveness: social cohesion

"Social cohesion" similarly attained an overall mean score of **3.93**, highlighting its positive role in fostering inclusivity. Appendix C2 – Table 21 shows that everyday encounters, community involvement and the active engagement of initiating stakeholders within power dynamics are critical for promoting social cohesion.

7.4.3 Satisfaction ranking of variables affecting the quality of urban waterfront open spaces at SBQR

Access and linkage-continuity of waterfront path system

"The continuity of the waterfront path system" received a mean satisfaction score of **3.78**, indicating a relatively high performance for continuous linear connectivity without

physical and visual barriers . Appendix C2 – Table 22 demonstrates that the creation of a continuous slow-mobility system, including the waterfront pedestrian paths, jogging paths and cycle paths along the water's edge (Figure 7-28 and 7-29), through a series of connectivity projects along the South Bank of the Qiantang River, has strengthened users' daily mobility demands. However, while the local government seeks to promote non-motorised waterfront promenade ecological corridors as integrated spaces in everyday life, its vision depends on whether longitudinal continuity along the river is matched by sufficient visual permeability and spatial connectivity to the surrounding hinterland.

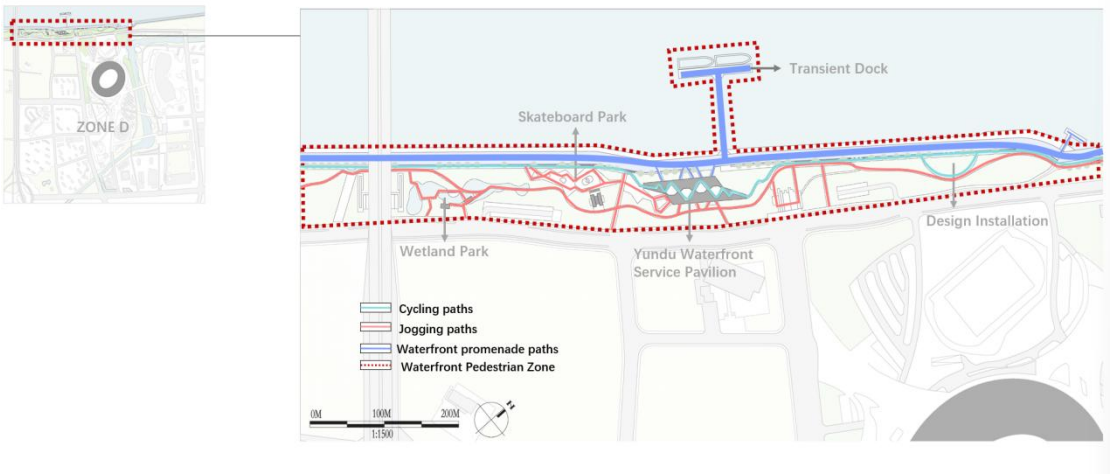


Figure 7-28 Waterfront path system in Node D. (Source: drawing by author)



Figure 7-29 Waterfront path system in Node E. (Source: drawing by author)

“The continuity of water transport routes” was rated at 3.72. Currently there are two piers connecting key nodes in the area, and these services are primarily oriented towards leisure cruising and sightseeing rather than everyday mobility (Figure 7-30). The limited transformation of water transport into an everyday commuting system may be attributed to two main factors. First, the government-led tourism-oriented operational model appears to prioritise leisure cruising rather than diversified mobility functions. Second, the spatial configuration of the piers, characterised by weak permeability and limited connectivity with the surrounding urban hinterland, may further restrict their incorporation into routine daily movement patterns.



Figure 7-30 Two Piers at SBQR. (Source: drawing by author)

Access and linkage: the connectivity of waterfront path system

The connectivity of the waterfront path system" was evaluated at **3.68**, reflecting a moderate degree of integration between the waterfront paths and the surrounding urban fabric. Appendix C2 – Table 23 shows that the effective connectivity of "cycling routes" and "waterfront promenades" to key nodes along the urban waterfront received the two highest satisfaction ratings (3.83 and 3.78), implying that users respond most positively when linear waterfront routes are converted into legible and diverse movement opportunities that support daily activities (such as physical exercise, children's play and social gatherings) rather than isolated scenic segments. This high level of satisfaction could be attributed to the impact of the 19th Asian Games, which acted as a major catalyst for the implementation of waterfront open space connectivity projects mentioned above, with the aim of reclaiming the riverfront for the public.

By contrast, “The effective connection between pedestrian bridge and key nodes along urban waterfront open spaces” earned the lowest mean score at 3.40, as there is only one Low Carbon Bridge, as a pedestrian connection between urban waterfront open spaces and nearby cultural flagships (Figure 7-31). Links become concentrated at a single crossing point, which may require users outside its catchment to take detours and, to some extent, reduce the likelihood of the waterfront being integrated into everyday daily routines.



Figure 7-31 The connection between the pedestrian bridge and Low Carbon Museum. (Source: drawing by author)

Access and linkage: physical accessibility

“Physical accessibility” received an overall mean score of 3.58. Appendix C2 – Table 24 shows that “the physical accessibility of commercial venues” achieved the highest mean score (3.75), suggesting that users value outdoor open spaces where waterfront amenities are integrated into the route network and can be entered without physical obstacles. The Yundu Waterfront Public Service Pavilion exemplifies this condition by placing café/restaurant functions directly along the promenade without fencing or controlled access, while its rooftop connection extends the pedestrian route system vertically, increasing opportunities for optional stopping and everyday social encounters (Figure 7-32).

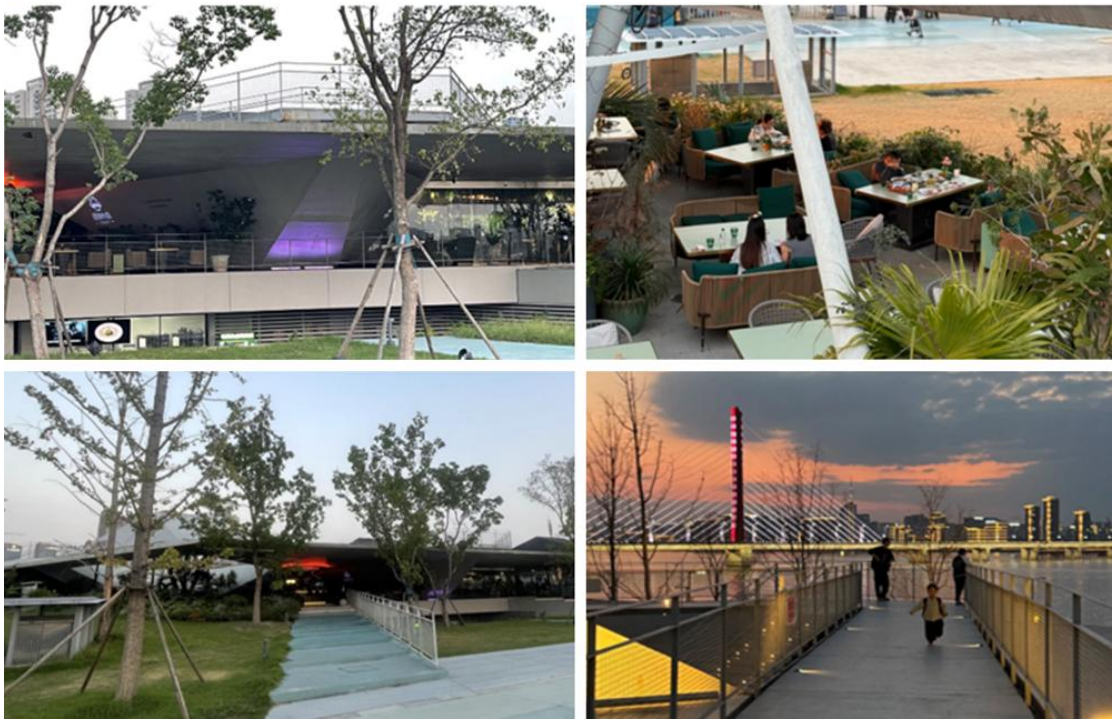


Figure 7-32 Yundu Waterfront Public Service Pavilion. (Source: Author)

“The physical accessibility of the water’s edge” received a moderate score of **3.61**. Although the waterfront pedestrian network along the south bank of the Qiantang River enables physical proximity and passive engagement with the water, the lack of lowered water platforms and stepped edges limits users’ opportunities to interact with the water and restricts the potential for a wider range of water-related activities. This outcome reflects a safety-driven design trade-off, characterised by flood-risk management prioritising a secure, uninterrupted defensive edge, but reducing the permeability of the waterfront at the micro-scale and, in turn, weakening the experiential depth of public access to the water (Figure 7-33).



Figure 7-33 Restricted Water Access along the south bank of Qiantang River. (Source: Author)

“The accessibility of sport amenities” was rated at 3.54. On the one hand, the Sanqiao Asian Games Skateboard Park offers open access and strong visual permeability, with no fencing to restrict entry. On the other hand, the Hangzhou Olympic Sports Expo Complex, as a mega-flagship for the surrounding urban waterfront, is enclosed by fixed fences and remains poorly integrated with the adjacent urban waterfront open

spaces (Figure 7-34). Although this sports amenity is free and accessible to all social groups, users must cross Guanlan Road to reach it. This contrast highlights how security methods shape perceived physical accessibility. Creating open and unfenced sport facilities encourages everyday appropriation, whereas event-oriented flagships often reproduce everyday practices via the creation of fences that limit integration with surrounding public space.



(a) (b)

Figure 7-34 Contrasting accessibility conditions of sports amenities: (a) Sanqiao Asian Games Skateboard Park with open access and visual permeability; (b) Hangzhou Olympic Sports Expo Complex. (Source: Author)

By contrast, “ease of access to cultural venues” received the lowest rating of 3.48, owing to the greater separation between these cultural flagships and the urban waterfront open spaces. Users are, for instance, required to cross a two-lane vehicular road to access the Low-Carbon Science and Technology Museum, whose main entrance is oriented away from the waterfront open spaces (Figure 7-35). Furthermore, there are no obvious visual cues to navigate and guide people from waterfront open spaces to the cultural venues. Although the upgrading of waterfront public service

stations is being implemented along the south bank of the Qiantang River, there remains a lack of cultural activities, highlighting a conflict between new concepts of activity-led waterfront open spaces and rigid land-use planning regulations. This suggests that the provision of cultural flagships alone does not generate greater public participation without diversified formal and temporary activities (such as pop-up exhibitions, festivals, markets, and outdoor screenings) and more flexible land-use arrangements (e.g., temporary or flexible use permits).

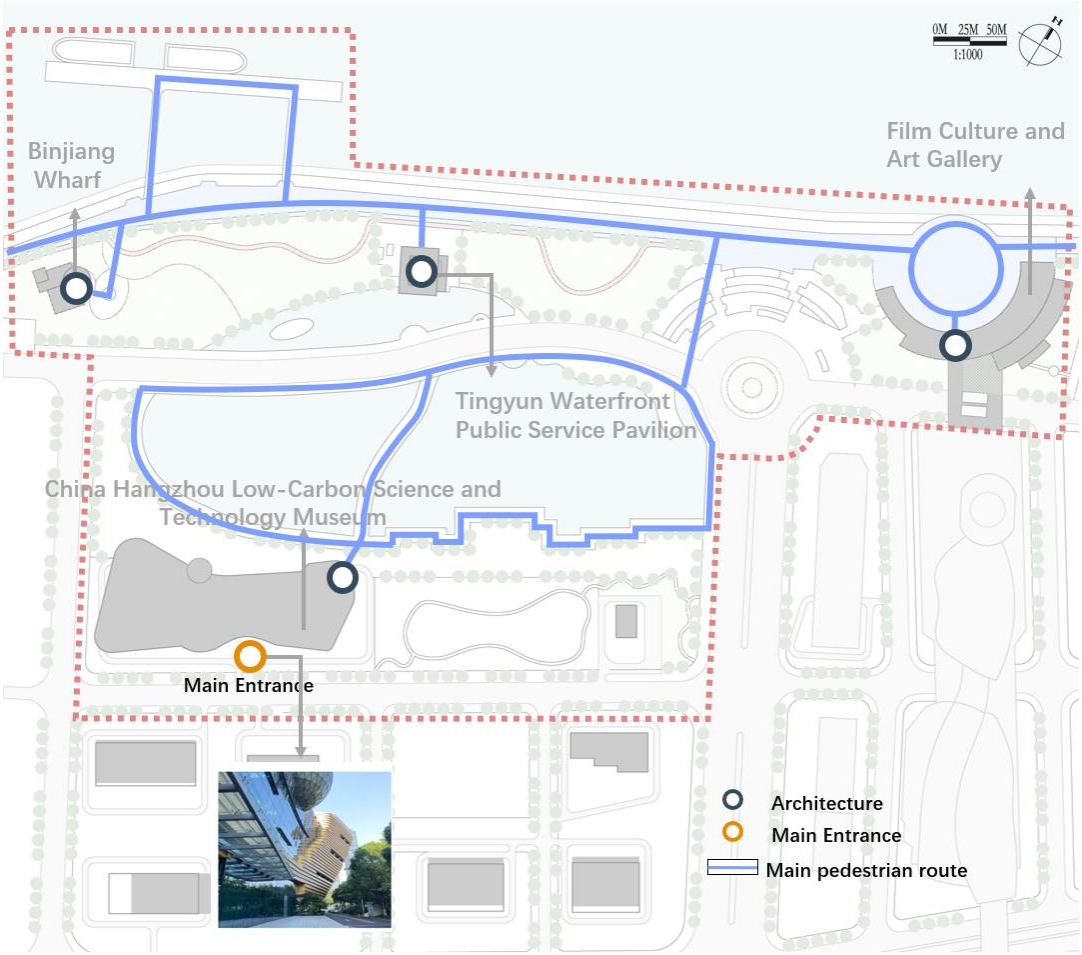


Figure 7-35 Limited accessibility of Low-Carbon Science and Technology Museum. (Source: drawing by author)

Safety: protection against traffic accidents

“Protection against traffic accidents” received a mean score of **3.80**. Appendix C2 – Table 25 shows that “The priority for pedestrian route” achieved the highest mean satisfaction score of 3.84 as, except for the primary traffic arteries, the internal road network within the waterfront public space is regulated as a vehicle-free zone and designed to prioritise pedestrian access (Figure 7-36).

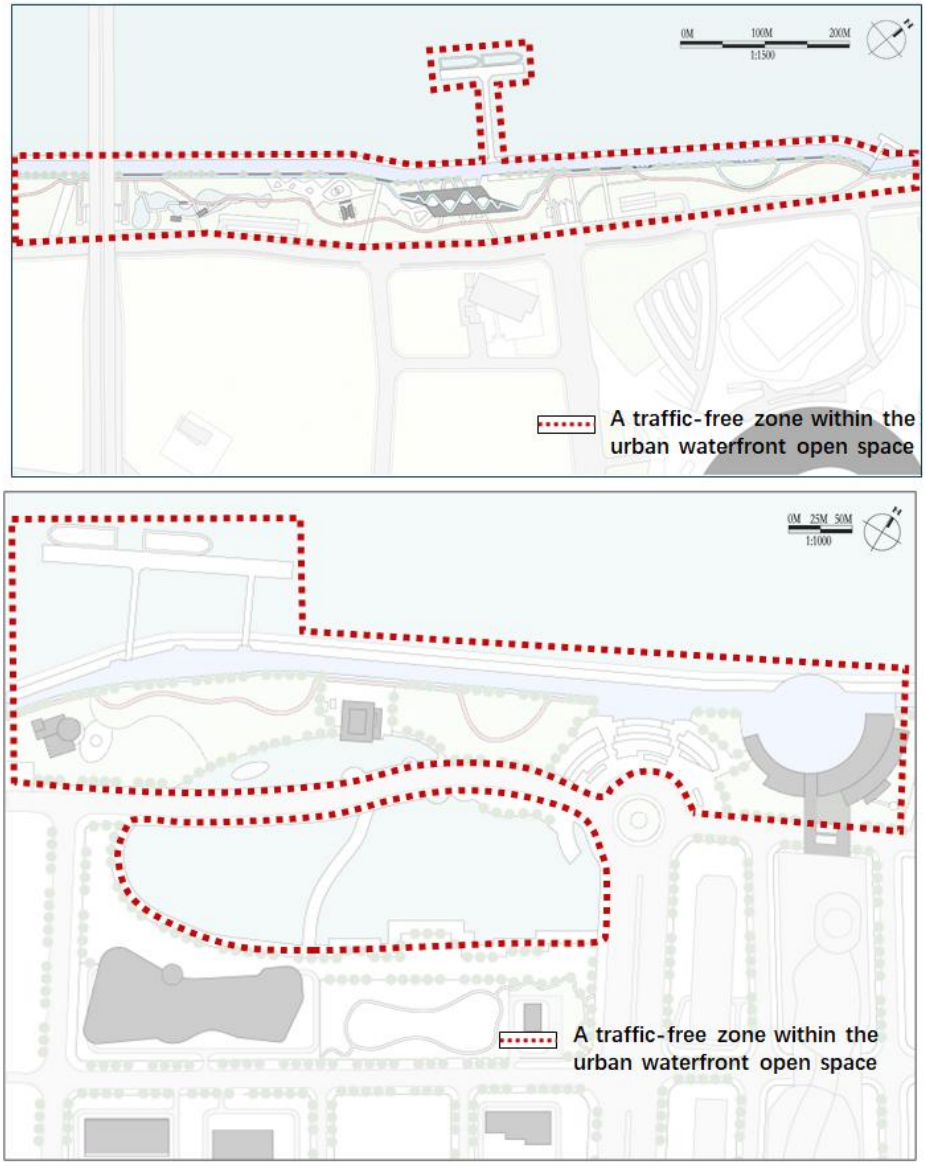


Figure 7-36 A traffic-free zone within the waterfront open space.
(Source: drawing by Author)

“Creation of traffic segregation and barrier zones” attained a satisfaction mean score of 3.79, as such traffic barrier zones have been established at the interface between vehicular and non-motorised circulation systems. These threshold spaces were created in line with the concept of “shared space”, accommodating waterfront pedestrian activities and vehicular movement. However, the unauthorised entry of motor vehicles into the waterfront slow-traffic corridors, particularly by electric two-wheelers, has been increasing, and the local authority had to temporarily enclose previously open and shared spaces with bollards and fences, in order to prohibit the entry of motor vehicles (Figure 7-37). The subsequent use of bollards and fences demonstrates a urban governance shift from soft behavioural regulation to hard physical control, diminishing the publicness of shared space.



Figure 7-37 Temporary traffic segregation zones. (Source: Author)

Safety: protection against flooding risks

Capability for “Protection against flooding risks” received an overall rating of 3.78, indicating a fairly high level of satisfaction with flood-risk protection in this area. Appendix C2 – Table 26 shows that all variables were rated above 3.70, which may be linked to the recent upgrading of flood infrastructure (2021–2023) under the Zhejiang Provincial Water Resources Department’s Anlan Trillion Seawall Project, which emphasised both resilience and everyday usability. The project raised the seawall (the original flood-control infrastructure) to 10.3 metres and introduced multiple elevation levels along the waterfront open spaces, while upgrading the flood-protection standard from a one-in-100-year to a one-in-300-year event (Figure 7-38). This also suggests that the defensive edge along the waterfront, embedded in everyday use and multi-level spatial experience, plays a significant role in shaping user satisfaction with protection against flooding risks.



Figure 7-38 Upgraded seawall and varied elevation levels to encourage public life. (Source: Author)

Safety: protection against crime

The capability for “Protection against crime” was rated overall at **3.71.** Appendix C2 – Table 27 shows that the high level of satisfaction with “Cleanliness and maintenance” (M = 3.79) derived from the street-cleaning operations led by the Binjiang District Government of Hangzhou, which include street sweeping and litter removal every day. Such routine maintenance functions as a visible signal of urban management, enhancing perceived order and potentially discouraging antisocial behaviour.

In addition, the use of physical design to promote natural surveillance received a relatively high mean score of 3.72. The Jianshi Public Service Pavilion enhances such natural surveillance through the incorporation of lakeside viewing platforms; the Yundu Public Service Pavilion achieves it by utilising rooftop spaces as pedestrian routes (Figure 7-39). These design strategies encourage frequent use and enable people to see into and move through the spaces, thereby strengthening natural surveillance. Overall, this vertical layering of circulation and viewing points increases mutual visibility and informal monitoring, which shapes key spatial character in enhancing natural surveillance.



Figure 7-39 Design interventions enhancing natural surveillance: (a) Jianshi Public Service Pavilion with lakeside viewing platforms; (b) Yundu Public Service Pavilion with rooftop pedestrian routes. (Source: Author)

The presence of security guards, although a form of hard control, received a rating of 3.70. At SBQR, the local government and its affiliated Qianjiang Waterfront Development Companies have assigned security and management personnel at each key node and access point along the urban waterfront. Their responsibilities include keeping safety and prohibiting certain activities (such as cycling on pedestrian pathways, the intrusion of motor vehicles into the slow-mobility system, etc.).

However, the introduction of a large number of CCTV cameras in this area has resulted in a relatively low satisfaction score, falling below 3.60. As the primary form of artificial surveillance, these CCTV systems have been installed near seating areas, at key nodes accompanied by electronic signage, and at intersections within the slow-traffic system, which discourage lingering and use of space (Figure 7-40). This indicates that visible and artificial surveillance can increase a sense of safety for some users while generating a sense of being watched that reduces their willingness to linger.



Figure 7-40 CCTV systems discourage lingering and informal use. (Source: Author)

Comfort: movement comfort

“Movement comfort” received a mean satisfaction score of **3.70**. As shown in Appendix C2 – Table 28, the surface quality, materials and width of the waterfront pedestrian routes were all rated relatively high, with mean scores equal to or exceeding 3.75. This outcome can be attributed to the diverse paving materials employed along the pedestrian routes, including timber boardwalks leading to the wetland park, fair-faced concrete pavements suitable for riverside walking and wandering, and rubberised surfacing designed for jogging and running (Figure 7-41).



Figure 7-41 Diverse Paving Materials of Waterfront Pedestrian Route in SBQR. (Source: Author)

In terms of width, the main waterfront promenade along the Node D and E measures approximately 30-60 metres, while jogging or running paths varied from 10 to 15 metres wide. The entry routes leading to the wetland areas vary from 3 to 5 metres, offering a range of scenic walking experiences (Figure 7-42 and 7-43).

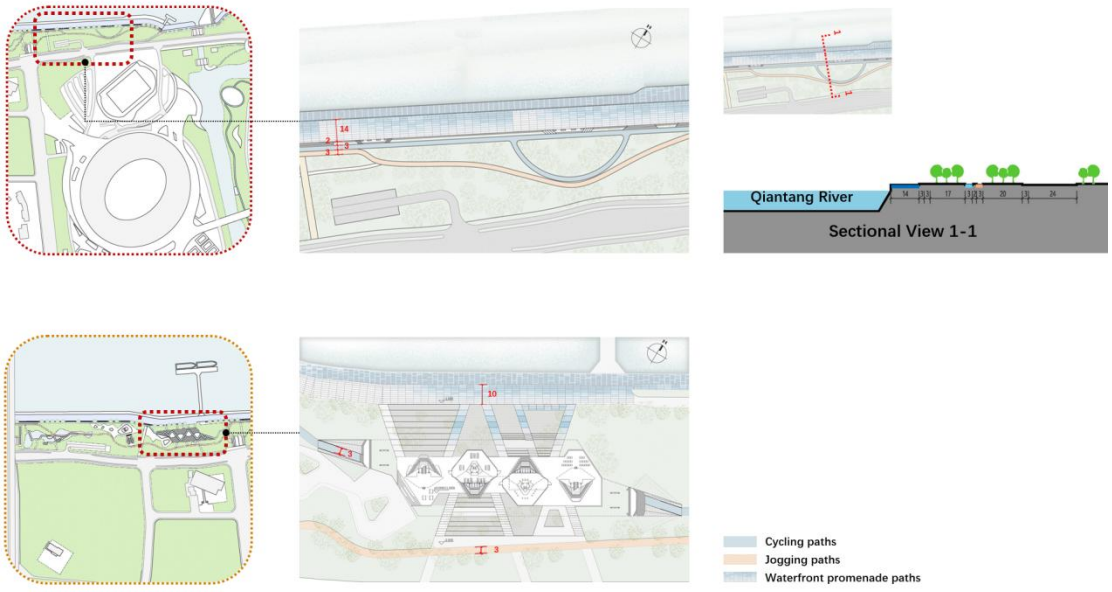


Figure 7-42 The width of slow-mobility routes in Node D. (Source: drawing by author)

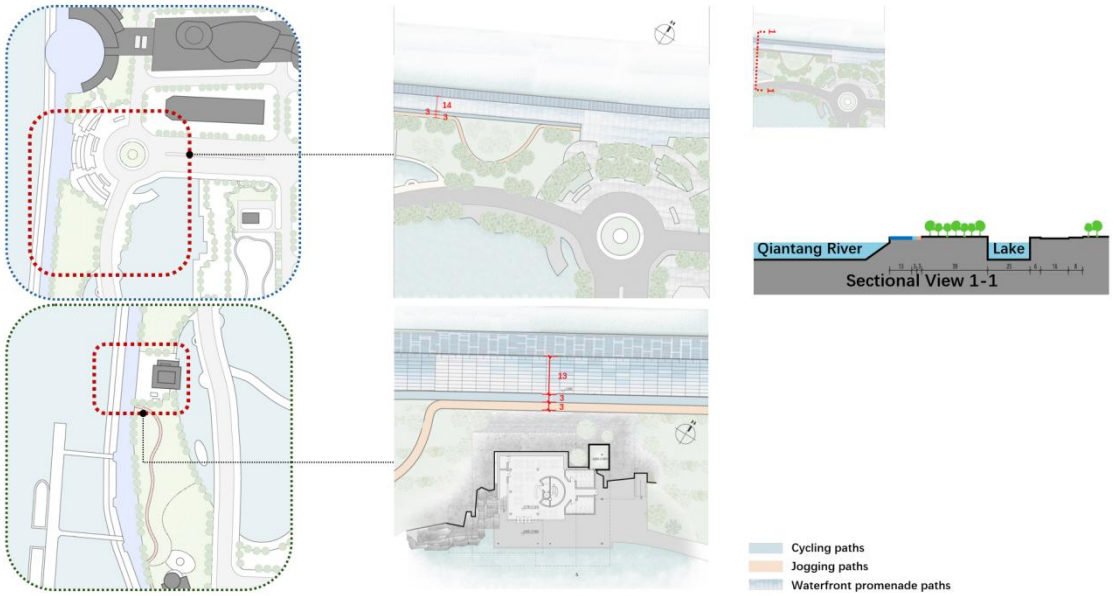


Figure 7-43 The width of slow-mobility routes in Node E. (Source: drawing by author)

Likewise, users expressed relatively high satisfaction with the width (3 m) and paving condition of the cycle routes. However, vehicular routes received the lowest mean performance score in this respect (M = 3.52), as the six-lane vehicular road acts as a physical and visual barrier that limits pedestrian access to the inland areas of the waterfront, thereby diminishing spatial integration and walkability (Figure 7-44).

Overall, movement comfort is supported by a stratified path system, where materials and widths of slow-mobility routes are designed to meet varied mobility behaviours. However, macro-scale vehicular infrastructure still restricts connectivity with surrounding neighbourhoods and hinders the holistic integration of the waterfront corridor.



Figure 7-44 Physical barrier of six-lane vehicular road. (Source: author)

Comfort: visual comfort

"Visual comfort" obtained a mean satisfaction score of **3.63**. Appendix C2 – Table 29 reveals two elements of visual comfort that attracted a high level of satisfaction, with views containing good skylines (M = 3.72) and clear signage systems (M = 3.71). This suggests that visual comfort at SBQR is shaped primarily by large-scale visual coherence and environmental legibility. This urban skyline indicates how clusters of high-rise development along the Qiantang River have been transformed into a form of visual branding for "new Hangzhou". For SBQR users, this skyline is primarily experienced as an across-river panorama from the waterfront promenade, where open sightlines shape the opposite-bank high-rise clusters as a dominant visual field.

Combined with the city's night-time light displays, these spectacles construct a recognisable urban image and contribute to contemporary place identity (Figure 7-45).



Figure 7-45 Night-time light shows along Qiantang River. (Source: author)

Secondly, although the clear signage received a fairly high performance rating of 3.71, these wayfinding systems primarily provide guidance, navigation and activity-related information, but lack a connection to cultural symbols that can help with visual interpretation of the history and values of the Qiantang River (Figure 7-46).



Figure 7-46 Signage systems in SBQR. (Source: author)

By contrast, the “view of fauna” received the lowest performance score, indicating that the ecological dimension and biodiversity remains relatively lowest satisfaction in

visual comfort. While the introduction of wetland areas at SBQR in 2022 provides essential ecosystem services, biodiversity appears to be less visible and less directly experienced within the waterfront environment. This indicates that ecological infrastructure has not yet been fully translated into everyday encounters with nature. Further improvements are required to enhance habitat provision that supports native species and to integrate it with experiential design measures (Kirk et al., 2021).

Comfort: climatic comfort

“Climatic comfort” received a somewhat lower mean performance score of **3.62,** as both artificial and natural shading performed relatively poorly, at below 3.60 (see Appendix C2 – Table 30). Although trees and hedges have been introduced to provide sun and shade in this area, these relatively-young trees have not yet developed sufficient canopy coverage to provide effective shade. In addition, although three newly-added areas with artificial shade were introduced between 2021 and 2023, their distribution away from the high-activity nodes has resulted in underutilisation. Overall, improving climatic comfort requires shading to be spatially aligned with peak-use and dwell-intensive spaces, rather than simply increasing the amount of shade.

Comfort: seating comfort

“Seating comfort” was rated with a mean performance score of **3.60**. Appendix C2 – Table 31 shows that sufficient number of seating areas rated the highest performance

mean score of 3.71, as seating spots are provided at regular intervals, approximately every 80 to 100 metres. They are generally located in areas characterised by frequent public activity and offer a variety of seating types, some of which are oriented towards the water's edge (Figure 7-47).

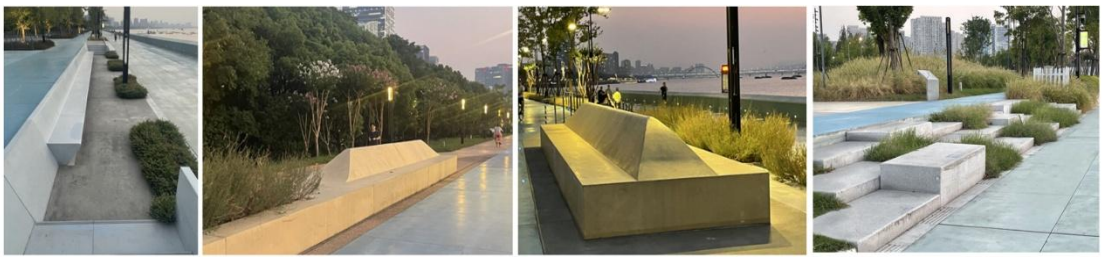


Figure 7-47 A wide range of seating types. (Source: author)

However, most of the seating in this area is fixed. Certain social activities, such as outdoor live-streaming and community choir performances by the elderly, often attract large crowds, who tend to gather on the steps or within the bridge undercroft facing the water (Figure 7-48). In these activity-intensive spaces, the limited integration of primary seating and movable chairs may have a negative on the flexibility of occupation and reduce opportunities for spontaneous actitities and temporary uses.

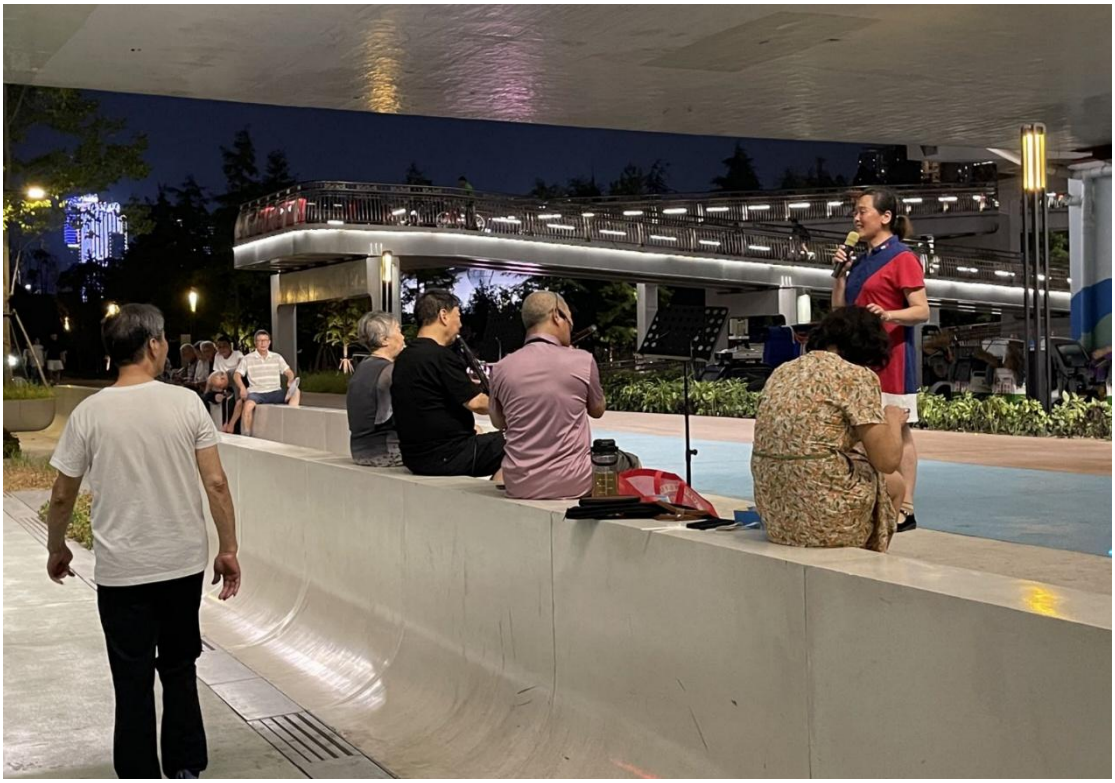


Figure 7-48 Informal gathering and social activities under the bridge undercroft. (Source: author)

Spatial aesthetics: sensitivity to harmonic relationship

“Sensitivity to harmonic relationship” was rated overall at **3.58.** Appendix C2 – Table 32 indicates that the façade design in this area tends to figurative expression and may lack sufficient complexity to hold the eye, as most of the building façades are composed of glass curtain walls of office and residential buildings (Figure 7-49). In parallel, the newly developed zones surrounding the waterfront are characterised by hierarchical road systems and enclosed, segregated urban blocks. This spatial sequence may decrease the legibility of harmonic spatial organisation and hierarchy, particularly the finer-grained pedestrian structure associated with permeable grids and pedestrian-prioritised movement, which was rated at a comparatively modest level (M

= 3.64). Since 2021, parts of the early-21st-century building stock have been cleared or redeveloped as the waterfront area has undergone rapid transformation. However, the comparatively lower rating for harmonic relationship may indicate perceived discontinuities between new development and the pre-existing urban fabric, limiting how local identity is expressed through spatial form.



Figure 7-49 Monotonous building facades along the south bank of the Qiantang River, Hangzhou. (Source: author)

Spatial aesthetics: appreciation of rhythm

“Appreciation of rhythm” achieved the fairly low performance rating of **3.52.** Appendix C2 – Table 33 reveals that the rhythm of the ground-floor interface in this area demonstrates poor interaction with people, as there is a lack of active ground-floor facades that offer views into lively internal activity for encounters and pausing. In

addition, this area lacks the rhythm of colonnades in the semi-public realm, which could have facilitated unplanned and spontaneous activities.

Spatial aesthetics: proportions and scales

“Proportions and scales” overall obtained **3.43**. Appendix C2 – Table 34 shows that, with the renovation of urban waterfront open spaces along the south bank of the Qiantang River, the scale of waterfront leisure precincts has largely met users’ needs. However, to achieve a richer mix of uses, greater attention could be given to the enhancement of commercial and cultural facilities. At key nodal points, certain segments of secondary pedestrian routes paralleling the waterfront could be redesigned to accommodate small-scale retail, exhibitions or public art displays, which would go some way to supporting such commercial and cultural activities.

In addition, this area lacks spatial enclosure (M = 3.42), as the renovated architecture along the waterfront is primarily composed of detached building, due to site constraints. In such cases, these buildings are often characterised by individual and disconnected elements, resulting in a fragmented spatial experience. In this context, Camillo Sitte’s (1889) discussion of irregular, turbine-like spatial organisation, where buildings define space through angled or enclosing edges rather than isolated detached buildings, offers a useful conceptual lens for interpreting this issue. Such an approach emphasises spatial enclosure and relational composition in understanding how

standalone waterfront buildings can contribute to coherent public space formation in newly developed areas.

Place identity: distinctiveness of natural landscapes

“Distinctiveness of natural landscapes” was overall rated **3.62**, suggesting a moderate level of satisfaction with local plants, water-body shapes and shoreline forms (see Appendix C2 – Table 35). Although the planting design in this area adopts a multilayered strategy through the use of ornamental grasses and sparse trees along the waterfront promenades to create spatial depth, more consideration of seasonal variation could further enhance users’ sense of place and emotional attachment (Figure 7-50).



Figure 7-50 Planting design along water’ edge. (Source: author)

Place identity: distinctiveness of urban memory

“Urban memory” received an overall mean score of **3.54**. As shown in Appendix C2 – Table 36, all related variables were rated below 3.60 in terms of satisfaction. This

suggests that significant effort is still required to generate urban memory in newly development zone. Lifestyle transformation is ongoing and the personal memories established by different social groups may contribute to the formation of new communal histories and collective memory. Nevertheless, certain aspects of local traditional culture, such as its history and the transformation from a small fishing village before 1930 to today's inclusive social leisure urban waterfronts, is not currently presented and interpreted by cultural and digital heritage technologies. Furthermore, adaptive re-use of existing built forms could not only focus on spatial aesthetics, but should consider the celebration of the past and its traditional social and urban fabric. Most of the public buildings along the south bank of the Qiantang River that were not considered to have cultural heritage value were largely demolished in the 1990s and 2000s, then rebuilt without preservation only in the past five years. Only some of the existing public buildings, such as the Holiday Garden restaurant established in 2004, were adaptively re-used as a new public-service shared place, part of which includes the Jianshi Waterfront Pavilion (Figure 7-51). As a result, younger and middle-aged generations in the area may experience a sense of "memory vacuum", as the waterfront public spaces and key nodes where they once lived and dined have now disappeared.

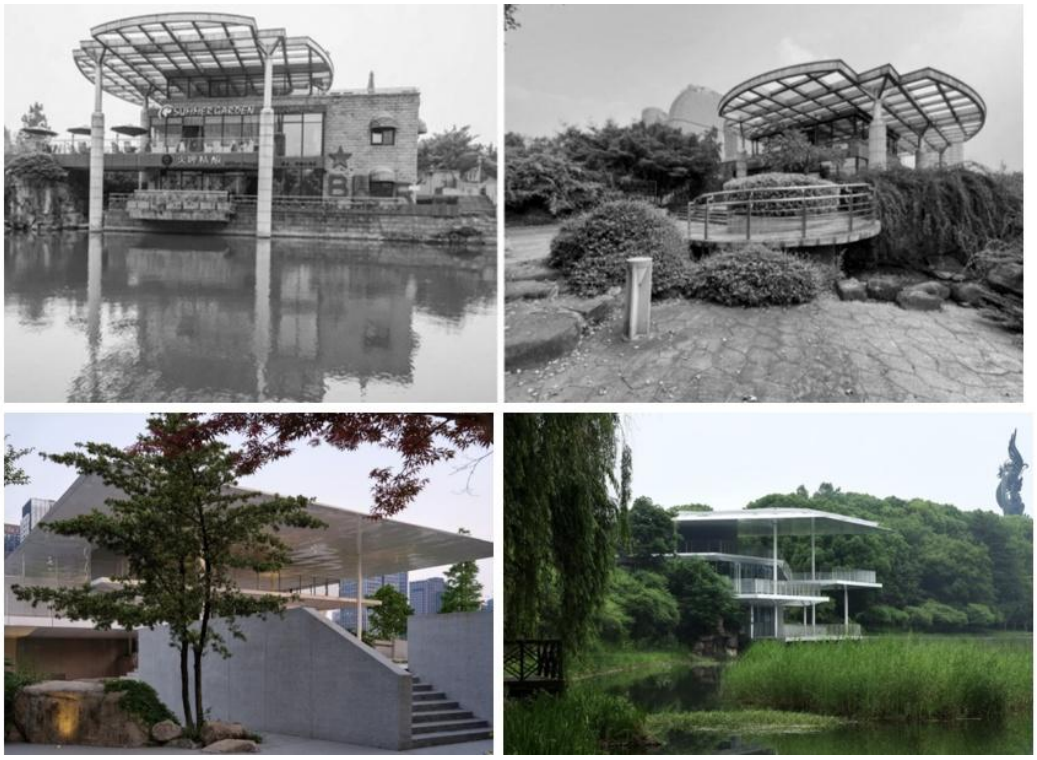


Figure 7-51 Adaptive reuse of the Holiday Garden Restaurant into the Jianshi Waterfront Pavilion. (Source: Original Design Studio of TJAD, 2023, via gooood.cn)

Place identity: distinctiveness of street furniture

"Distinctiveness of street furniture" was rated overall at **3.48**, indicating a relatively-low contribution to the formation of a distinctive urban character. Appendix C2 – Table 37 indicates that, except for benches, with a distinctiveness satisfaction score exceeding 3.60, all other elements of street furniture were rated below 3.55. Notably, water-related design installations received a low score of 3.39, indicating this area's lack of formal and temporary design installations that could encourage users' active engagement with water. Such formal and temporary design interventions can enable various forms of sensory connection between users and water, thereby evoking both curiosity and emotional responses (Mikkelsen et al., 2018).

Place identity: distinctiveness of architectural elements

“Distinctiveness of architectural elements” reported a lower satisfaction rating of **3.44**. Appendix C2 – Table 38 shows that the unique balconies along the urban waterfront received the highest performance rating (M = 3.65), as mentioned above, the Jianshi Waterfront Pavilion was renovated from the Holiday Garden restaurant into social public space and key public community service points with layered balconies (Figure 7-52). -



Figure 7-52 Jianshi Waterfront Pavilion with layered balconies. (Source: Original Design Studio of TJAD, 2023, via gooood.cn)

However, the architectural language along the SBQR remains largely uniform, with repeated façade design and material palettes across adjacent nodes, which limits users’ ability to perceive a distinctive waterfront identity (Figure 7-53). This is consistent with the modest performance rating for “Distinctiveness of architectural elements” (M = 3.44), suggesting that, beyond a few uniqueness such as the layered

balconies of the Jianshi Waterfront Pavilion, the wider urban waterfront corridor offers few uniqueness architectural elements. In the broader context of contemporary Chinese architecture development, debates on “architectural regionalism” have highlighted the issues of the lack of philosophical design theory and ongoing tensions between local historical traditions and the adoption of external aesthetic repertoires (Botz-Bornstein, 2013). This discussion provides a new lens for understanding the result observed in SBQR, where architectural distinctiveness appears to be concentrated in a limited number of landmark or showcase projects, while most everyday waterfront interfaces remain relatively uniform and standardised.



Figure 7-53 Uniform and repetitive architectural elements at SBQR. (Source: author)

Inclusiveness: diversity of users

“Diversity of users” was overall rated 3.66. According to Appendix C2 – Table 39, participants reported moderately-high levels of satisfaction with aspects of social mixing and gender diversity, with mean scores of 3.70 and 3.69 respectively. In

contrast, “Variety in age range” received the lowest mean score at 3.60, as most of the activity facilities primarily serve young and middle-aged populations, while public facilities catering to the elderly are relatively limited.

Inclusiveness: diverse user-activity pattern

“Diverse user activity pattern” achieved an overall mean satisfaction score of 3.66. Appendix C2 – Table 40 suggests that a more mix-used waterfront neighbourhood could be improved by providing for higher demand for cultural, commercial, leisure and public-service facilities, particularly catering for elderly people. In addition, this area reflects the application of soft-control strategies, as certain live-streaming activities via social media are officially required to cease after 9:30 p.m. However, local security personnel did not strictly enforce this regulation, allowing such activities to continue beyond that time. There is no street furniture on site that is designed to be uncomfortable. Such soft-control mechanisms also test the boundaries of socially acceptable behaviour.

Inclusiveness: equitable access and use

“Equitable access and use” was overall rated at 3.63. Appendix C2 – Table 41 indicates that, although the designers aim to provide universal access for all social groups, certain urban governance and management issues, such as the limited operating hours of waterfront service stations and the installation of physical barriers at pedestrian–bicycle or pedestrian–vehicular intersections, have led to inefficient use of

waterfront spaces (see Figure 7-54). This suggests that equity is not only a matter of physical provision but also of how symbol access is operationalised through management, requiring a balance between safety/control and public accessibility.



Figure 7-54 Physical barriers at intersections limiting equitable access and use in waterfront open spaces. (Source: author)

In addition, current urban waterfront open spaces lack flexible and loose areas that can adapt across time, thereby facilitating informal use, enabling social encounters and supporting the more playful aspects of social life (Franck and Stevens, 2007). Beyond spatial configuration, the corridor also appears to face programmatic limitations, ranging from a relatively narrow range of everyday amenities to low-threshold activities outside peak periods. This issues may decline its appeal for diverse user groups, meaning that “equitable use” is limited not only by symbol access but also by what users are able to do once they arrive.

Inclusiveness: social cohesion

“Social cohesion” overall attained a fairly low mean satisfaction score of **3.58**. Appendix C2 – Table 42 suggests that, although there is growing practice of community engagement and public private participation through establishing a series of waterfront public service pavilions, there are still many issues**,** including limited awareness of public participation mechanisms, low participation rates, and a weak capacity to sustain co-operation towards long-term social and economic goals**, a**ll of which may reduce social cohesion**.** This relatively modest score may also reflect programmatic issues. For instance, existing activities and service provision do not consistently promote the co-existence and interaction of diverse demographic groups, leading to segmented rather than shared use. Additionally, the current design of urban waterfront open spaces, particularly interfaces with the semi-public realm, still lacks sufficient blurred space in between (i.e., low-threshold “in-between” zones that support mixing, lingering and informal encounters) as the stimulus to bring unpredictable urban waterfront experiences.

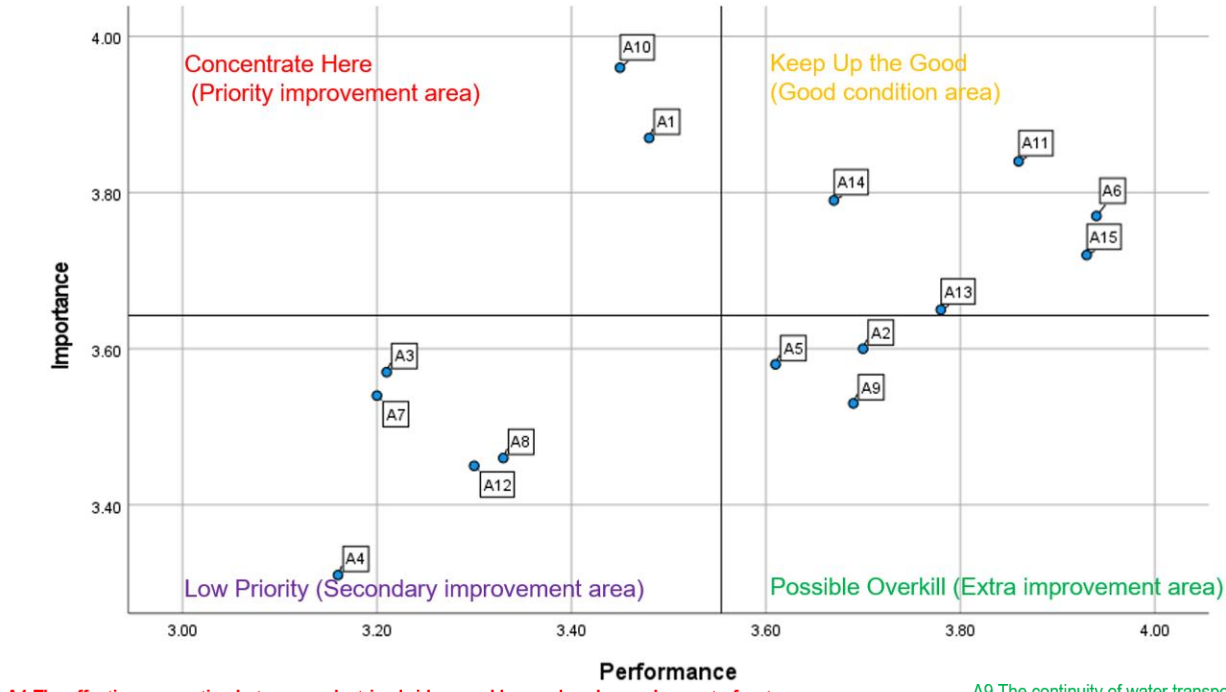
7.5 Importance-Performance (IPA) Analysis

IPA is an effective method for identifying restoration priorities to enhance the quality of urban waterfront open spaces through the evaluation of importance and satisfaction. Building on this, the following section outlines key recommendations to inform future waterfront regeneration policy and design principles in the selected sites.

7.5.1 Mapping of IPA scatter plots of access and linkage

As illustrated in Figure 7-55 and 7-56, key findings from the IPA scatter plot of access and linkage variables are summarised below:

- At both sites, “The connectivity between pedestrian bridge and key nodes along urban waterfronts” (A1) and “Water’s edge accessibility” (A10) are positioned within the high-importance, low-satisfaction quadrant. This indicates a common need to prioritise the establishment of new pedestrian bridges and core pedestrian circuits leading to the water’s edge, in order to enhance pedestrian flow and connectivity along the waterfront. However, as Stevens (2021) notes, achieving both horizontal and vertical integration of cross-water links with the existing urban fabric is particularly difficult. Particularly in heritage canal districts, this difficulty is intensified by heritage conservation requirements and fragmented multi-agency governance, which can constrain planning approvals.
- Compared with the newly developed area, the heritage canal district records lower performance on the linkage of waterfront cycling routes (A3 and A7), suggesting that cycling route links is a secondary priority for improvement.



A1 The effective connection between pedestrian bridges and key nodes along urban waterfront open spaces
A2 The effective connection between the waterfront promenade route and key nodes along urban waterfront open spaces
A3 The effective connection between the cycling route and key nodes along urban waterfront open spaces
A4 The effective connection between the vehicular route and key nodes along urban waterfront open spaces
A5 The effective connection between the waterborne transportation route and key nodes along urban waterfront open spaces
A6 The continuity of waterfront promenade routes
A7 The continuity of cycling routes
A8 The continuity of vehicular routes
A9 The continuity of water transport routes
A10 Accessibility of water's edge
A11 Accessibility of basic public service facilities
A12 Accessibility of sport amenities
A13 Accessibility of healthcare services
A14 Accessibility of cultural venues
A15 Accessibility of commercial amenities

Figure 7-55 IPA scatter plot of access and linkage variables at QHCD.
(Source: drawing by author)

- In newly developed areas of SBQR, ease of "access to cultural venues" (A14) could be improved through better integration with pedestrian networks, enhanced wayfinding systems and the reorientation of main entrances of cultural facilities towards key waterfront pedestrian routes. In addition, ease of "access to basic public service facilities" (A11), such as parking areas, public transit stops and public service points, should be enhanced to support overall daily contemporary activities on waterfronts.

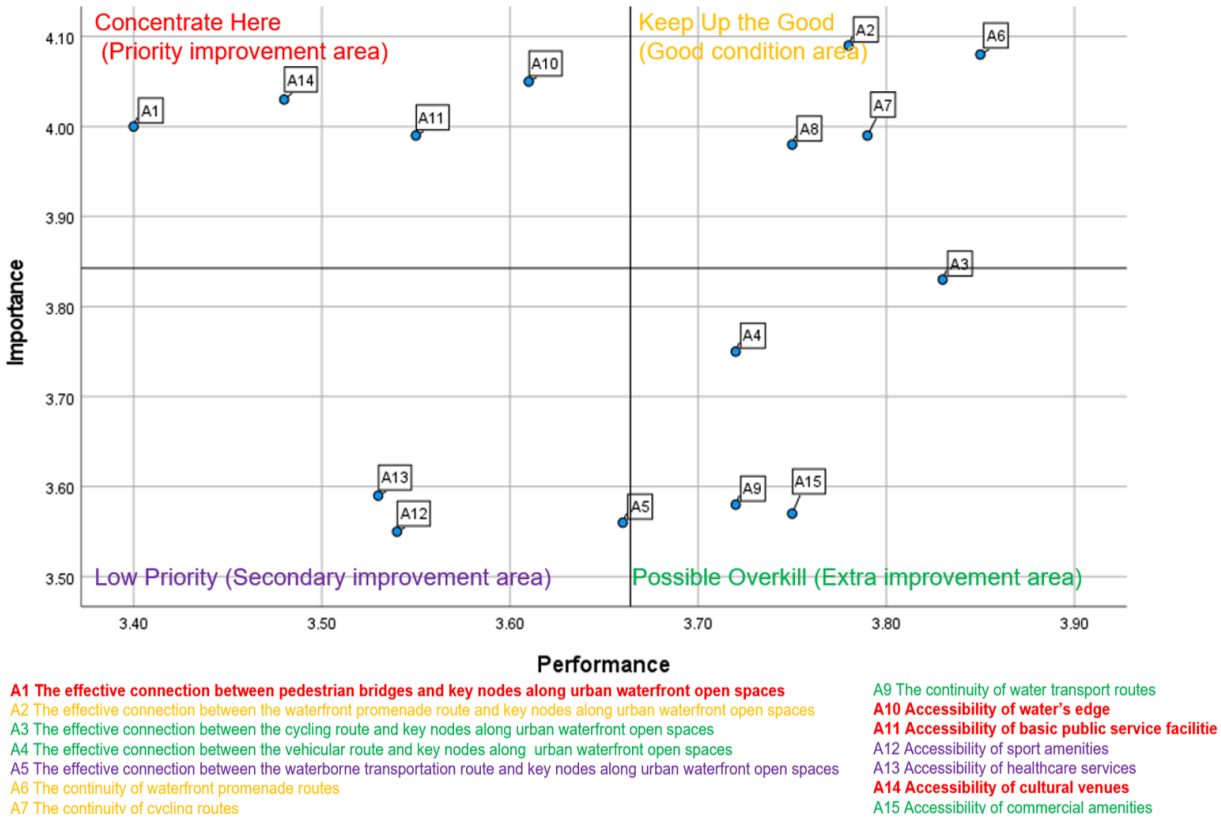


Figure 7-56 IPA scatter plot of access and linkage variables at SBQR.
(Source: drawing by author)

7.5.2 Mapping of IPA scatter plots of safety

As shown in Figures 7-57 and 7-58, the following section summarises the key results and recommendations derived from the IPA scatter plots of safety variables:

- At both sites, traffic-related safety measures (B5, B6, B7), "sufficient night-time lighting quality" (B11), and "good maintenance and cleanliness" (B13) are positioned within the high-importance, high-satisfaction quadrant at both sites, indicating a common high performance level.
- Compared to SBQR, there is an urgent need to enhance flood resilience through "raising the plinths of buildings with adaptable elevated surfaces" (B2) and

integrating blue–green infrastructure (B4) at QHCD. This necessity arises from the evolving changes to public life, which demand new ways of using waterfront open spaces that are both climate resilient and socially inclusive.

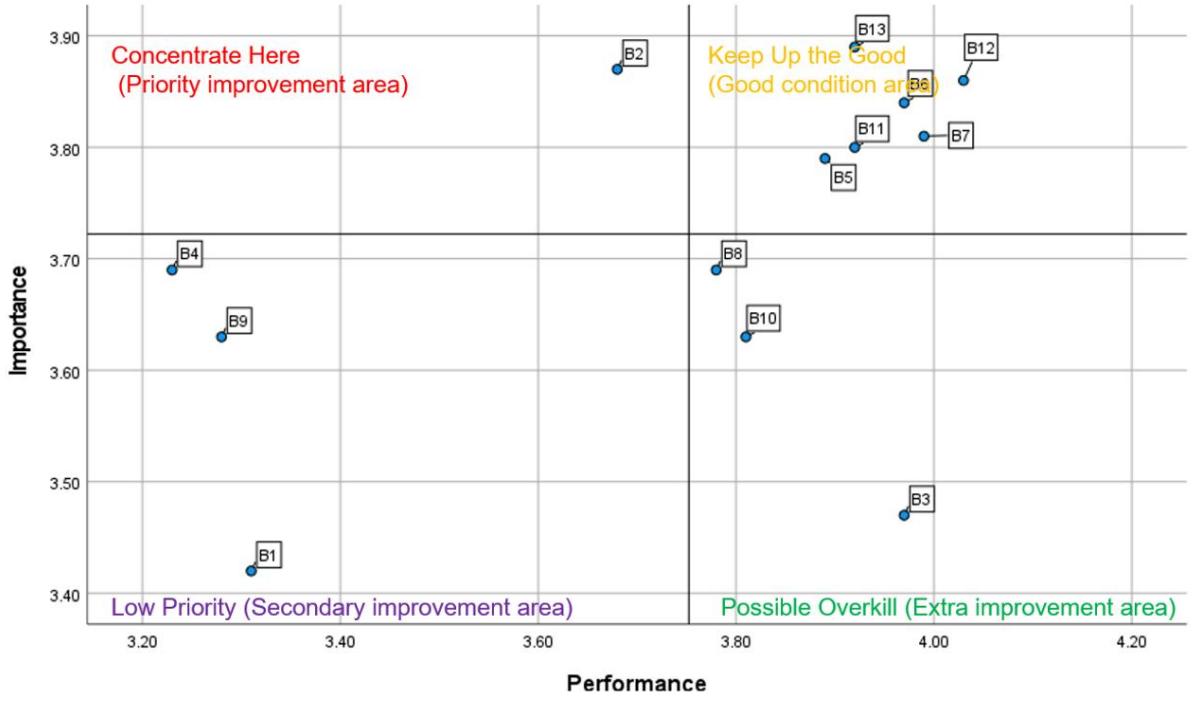


Figure 7-57 IPA scatter plot of safety variables at QHCD. (Source: drawing by author)

- In urban waterfront open spaces along the South Bank Qiantang River, the IPA scatter plot highlights that the placement of “personal belongings in the semi-public realm” (B12), such as pictures, plants and small-scale public artworks, is a priority for improvement of sense of safety and security.

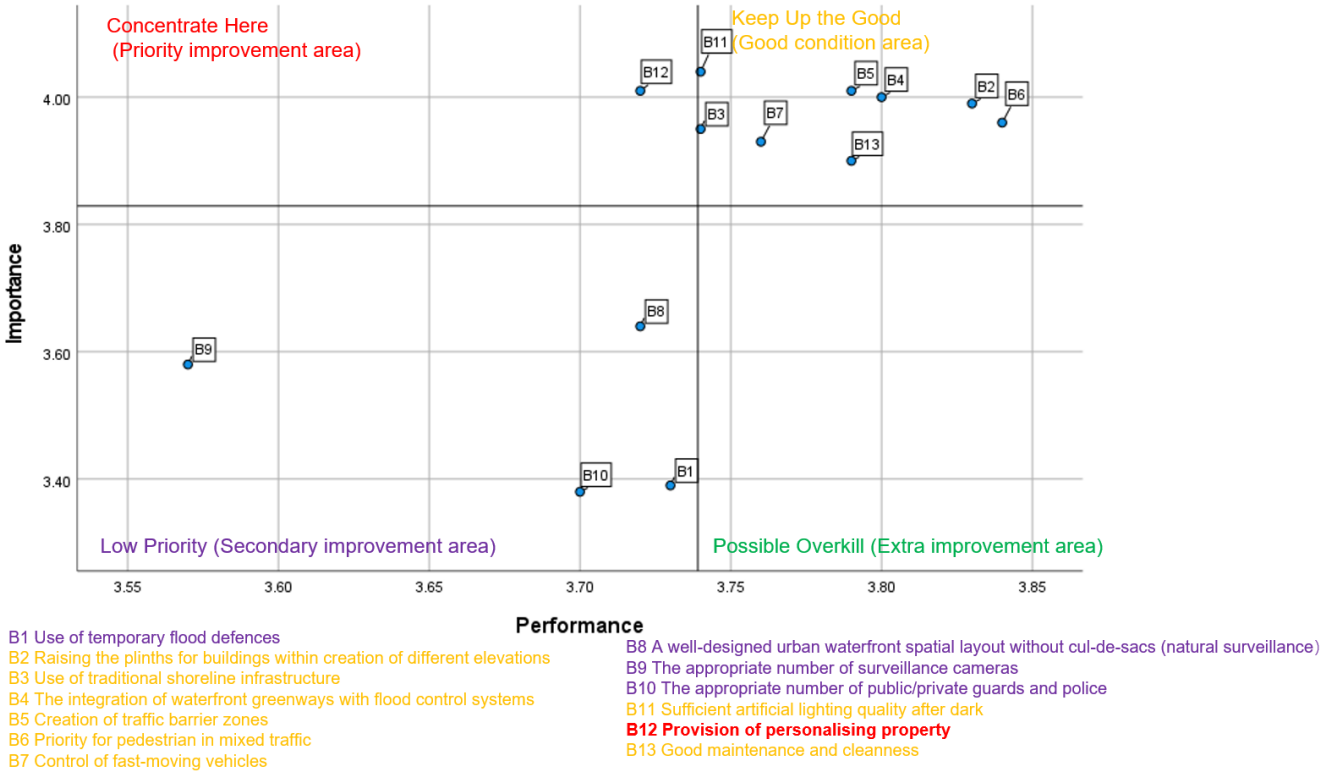


Figure 7-58 IPA scatter plot of safety variables at SBQR.
(Source: drawing by author)

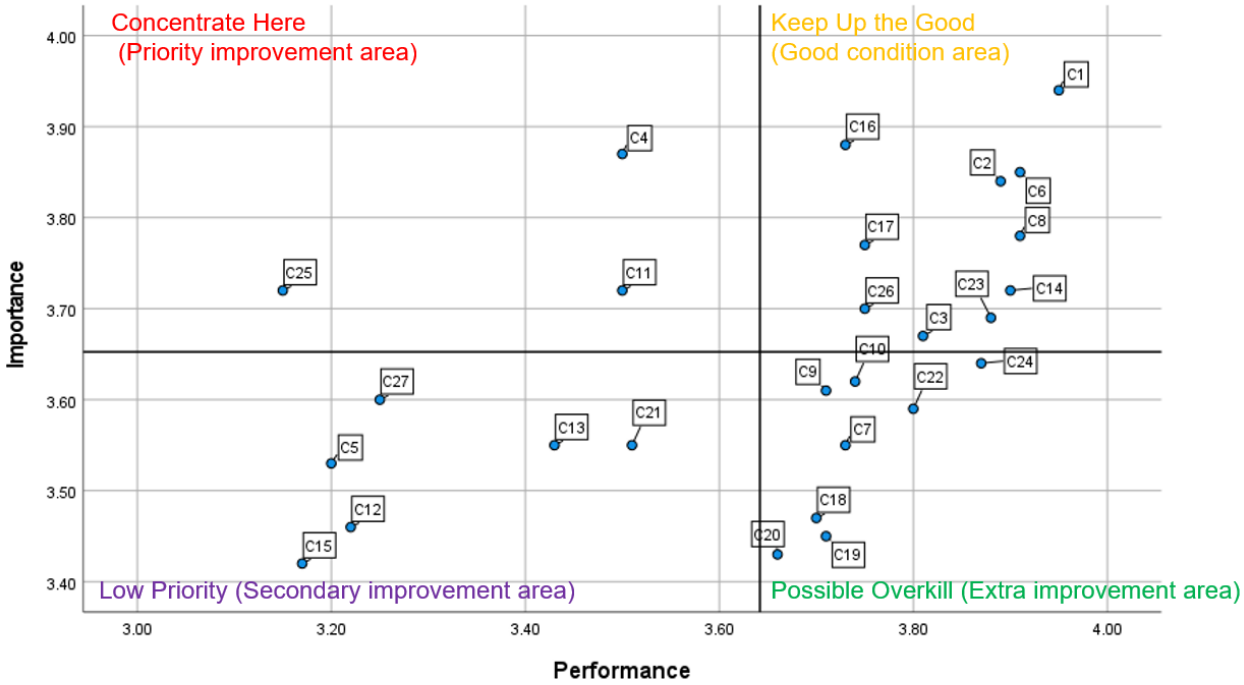
7.5.3 Mapping of IPA scatter plots of comfort

Based on the IPA scatter plots illustrated in Figures 7-59 and 7-60, the key results can be summarised as follows:

- In both sites, provision of “artificial shading” (C4), and adoption of “seating materials” that offer adequate insulation and water-repellent performance (C11) are both positioned within the priority improvement area. Therefore, future design strategies should focus on providing shade in high-activity areas. For example, urban designers could use trees, pergolas, or tensile canopies, along with using seating materials that remain thermally comfortable and weather-resistant, so that

the spaces can be used throughout the year.

- Compared to SBQR, where combination of the night lighting show to enhance its night-time visual appeal, “view of good skyline” (C25) is positioned within the high-importance but low-performance quadrant at QHCD, indicating an urgent need to enhance visual comfort through skyline improvements. This finding suggests that co-ordinated lighting displays could be adopted to animate the skyline that reinterpret urban history and cultural heritage resources associated with the industrial and canal cultural heritage.



C1 Good air quality
C2 Appropriate water surface humidity
C3 Presence of temperature-regulating shade provided by natural vegetation
C4 Provision of artificial shelter from wind, rain and sun
C5 A variety of formal and informal seating options
C6 An adequate number of sitting arrangements
C7 Low noise level during seating and resting
C8 Good seating placement, preferably with good views
C9 Appropriate size of seating areas
C10 Arrangement of movable/flexible seats
C11 Materials for seats with insulating and water-repellent properties
C12 The material of the cycle route
C13 The appropriate cycle route width
C14 The material of the urban waterfront promenade route
C15 The surface condition of the cycle route
C16 The appropriate waterfront promenade route width
C17 The surface condition of the waterfront pedestrian route
C18 The surface condition of the vehicular route
C19 The appropriate vehicular route width
C20 The material of the vehicular route
C21 View of rich fauna
C22 View of clear visual axis
C23 View of clean water body
C24 View of rich flora
C25 View of good skyline
C26 View of clear information board and maps
C27 Readability of digital transport schedule screens

Figure 7-59 IPA scatter plot of comfort variables at QHCD.
(Source: drawing by author)

- Considering the urban waterfront development in Hangzhou Binjiang New District, the provision of “primary and formal, as well as secondary and informal, seating opportunities” (C4) has been identified as an urgent area for improvement in future waterfront public space development. By offering a combination of primary and secondary seating opportunities, including both flexible and fixed seating areas provided by outdoor teahouses, cafés and restaurants, as well as informal elements such as steps, ledges and bollards, the urban waterfront open spaces could not only accommodate stationary activities, but also facilitate spontaneous ones, such as elderly choir groups practising musical instruments (Gehl,2010). This, in turn, helps to foster social life and enhance opportunities for staying in a specific area and encouraging social interaction (Mehta, 2007; Gehl, 2010). In addition, the establishment of a “clear visual corridor” (C4), referring to the visibility and openness of public squares and waterfront promenade paths, should be recognised as a key priority in the integration of future waterfront regeneration strategies. Such visual corridors within the waterfront public realm should carefully consider the highly-sensitive visual relationship between the urban and river landscapes (Hradilová, 2012).

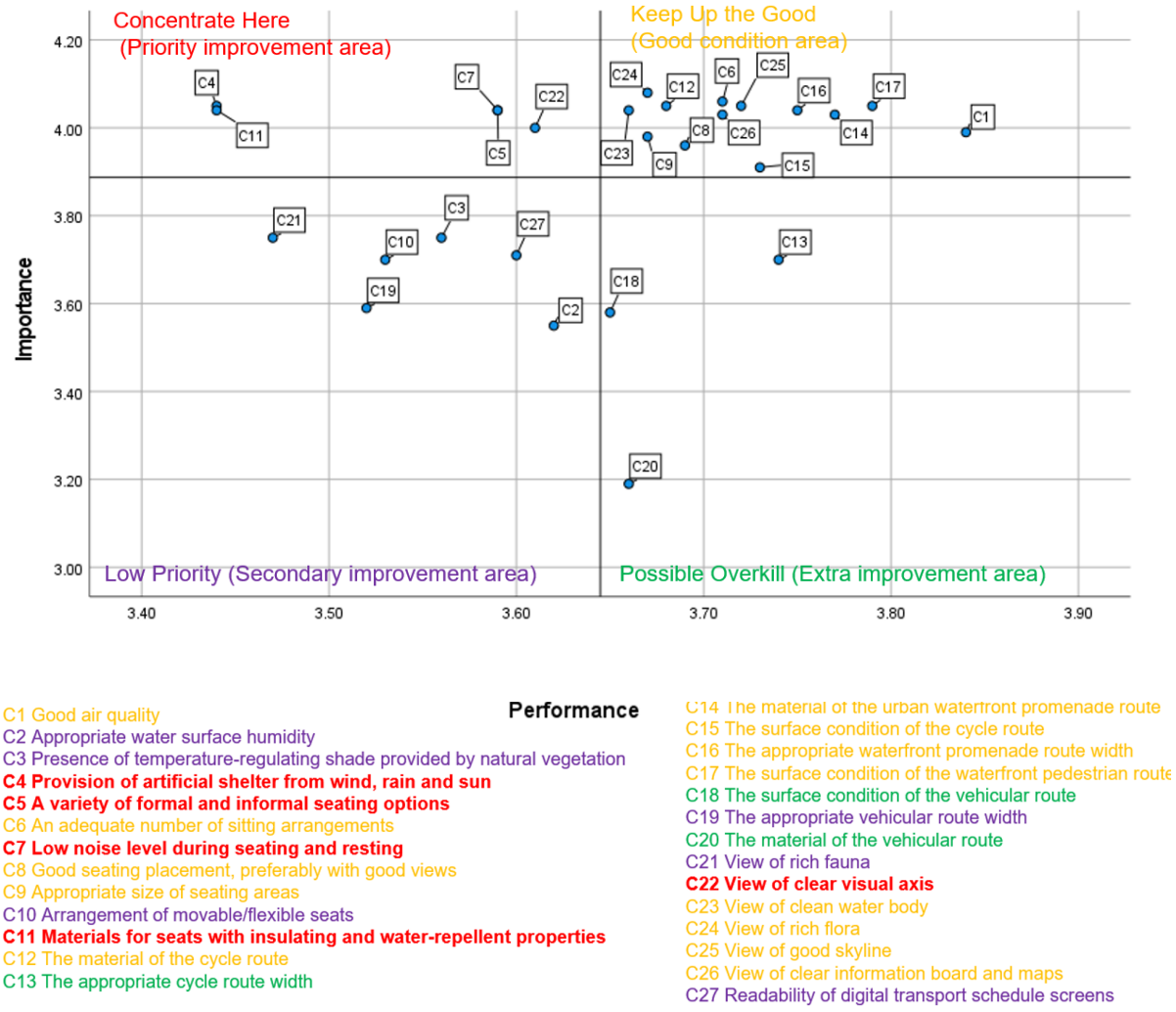


Figure 7-60 IPA scatter plot of comfort variables at SBQR.
(Source: drawing by author)

7.5.4 Mapping of IPA scatter plots of spatial aesthetics

Drawing upon the IPA scatter plots of spatial aesthetics presented in Figures 7-61 and 7-62, the key findings are summarised below:

- In both areas, “The rhythm of active frontages at the ground floor level” (D13) and “the appropriate scale of residential blocks” (D4) have been identified as key variables located within the high-importance but low-performance quadrant,

indicating priority areas for urban design interventions. Such design of ground floor and their direct interaction with adjoining public space strongly influences the inclusiveness and walkability of the urban waterfront. As Kickert (2016) points out, a well-designed active frontage should meet three key criteria: physical transparency (allowing passers-by to see into the premises), functional permeability (providing functional reasons for them to enter) and perceptual hospitality (creating a welcoming atmosphere that invites people into the premises). Such good active frontages should not appear on individual waterfront buildings, but rather be co-ordinated to establish a coherent rhythm along the entire waterfront edge. Active frontages are not merely passive physical thresholds distinguishing between interior and outdoor spaces. They are more likely to reflect the social, economic and cultural dynamics of the communities they serve (Kickert, 2016). Additionally, in both areas, residential land use constitutes the most prominent proportion of the urban waterfront surroundings. In this context, future waterfront regeneration strategies need to ensure a more balanced and clustered distribution of diverse public facilities, such as cultural venues, commercial and retail services and recreational facilities, supplemented by municipal, sports and healthcare services; this could help enhance spatial functionality and fulfil users' daily demands (Wu & Li, 2025).

- At QHCD, one of the most important issues relating to spatial aesthetics is the compatibility of contemporary architecture with historic urban contexts (D10),

which was rated as highly important but comparatively less satisfactory in the IPA results, indicating a perceived tension between rapid urbanisation and heritage conservation. This reflects a key challenge for historical canal cities in China on how to reconcile urban identity with ongoing commercialisation and propertly-led regeneration pressures. As a UNESCO-recognised World Heritage Site, the Qiaoxi Conservation Area (Zone A) provides a representative case where, between the 1990s and 2010s, intensive commercialisation and real estate projects altered the buffer zone of historic landscape in ways that are largely irreversible. Such transformations in the areas surrounding the conservation zone (buffer zone) have reconfigured building massing, façade articulation and the urban fabric, thereby declining urban context despite formal heritage designation. While tangible spatial attributes, such as façade styles, volumetric composition and street layout, are difficult to restore, the relatively low satisfaction score suggests that users' concerns extend beyond urban form to the experiential and integration of heritage values into daily lives. In this regard, the concept of the Historic Urban Landscape (HUL) (as mentioned above, in Chapter 2) tends to retain urban historical landscape continuity, highlights the importance of intangible cultural resources and advocates community participation and public private partnerships among different stakeholders to tackle these challenges (Choi, 2025). However, the Hangzhou case demonstrates that translating HUL principles into operational planning practice remains challenging, as the framework has not been

systematically integrated into regulatory instruments across China. Effective implementation therefore depends not only on design sensitivity but also on institutional coordination, governance capacity and long-term community engagement mechanisms.

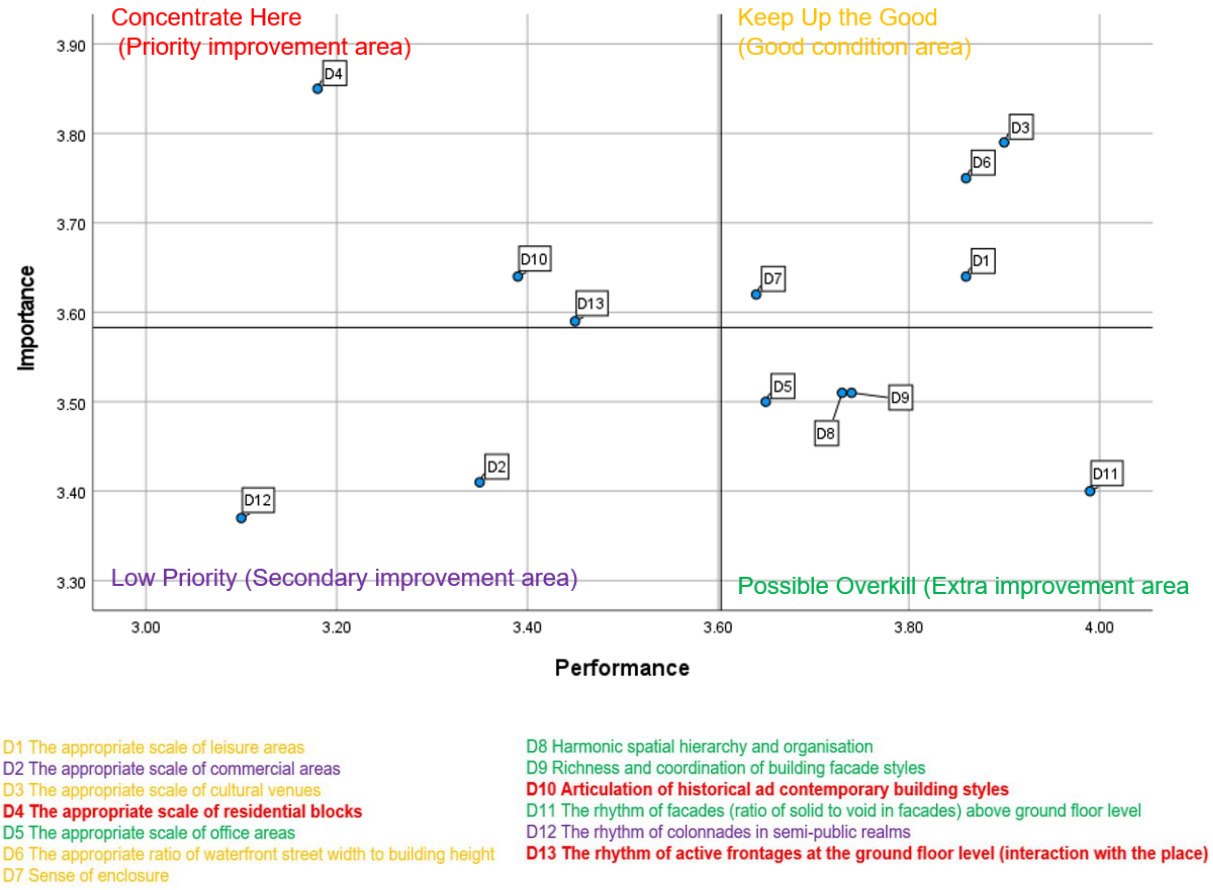


Figure 7-61 IPA scatter plot of spatial aesthetics variables at QHCD.
(Source: drawing by author)

- At SBQR, besides the shared priorities (D4 and D13), D10 highlights a key challenge in building a contemporary urban identity that remains legible in relation to local history and valued architectural character, even in the absence of formally listed heritage assets.. In addition, the “rhythm of colonnades in semi-public

realms" (D12) and the "appropriate scale of commercial areas" (D2) are positioned as secondary priorities for improvement. This suggests that the newly developed waterfront streetscape lacks a continuous semi-public interface, such as colonnaded edges and sheltered thresholds, that encourages lingering and social interaction. Meanwhile, the comparatively lower performance on commercial scale implies that everyday mixed use support remains incomplete.

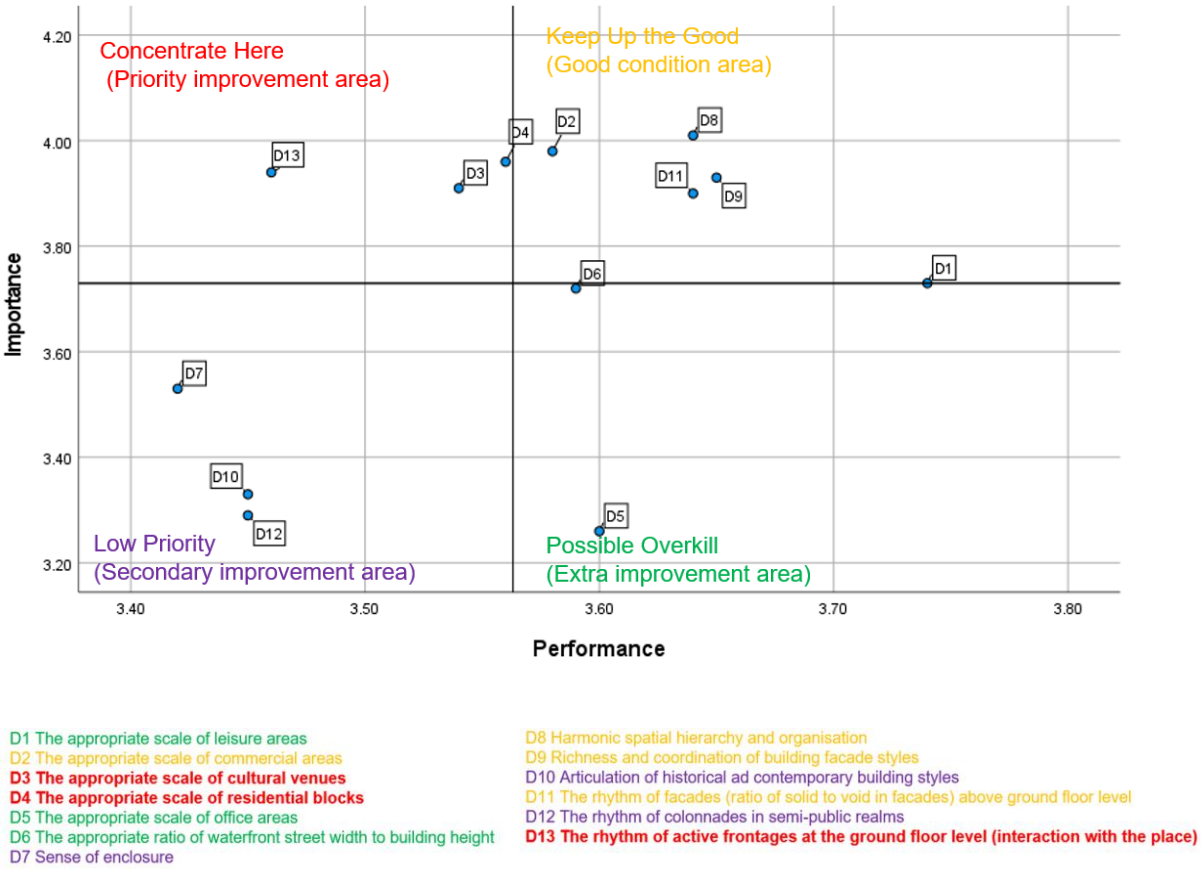


Figure 7-62 IPA scatter plot of spatial aesthetics variables at SBQR.
(Source: drawing by author)

7.5.5 Mapping of IPA scatter plots of place identity

Based on the IPA scatter plots of place identity illustrated in Figures 7-63 and 7-64,

the key findings are outlined as follows:

- Both study areas share a common need for priority improvement in terms of place identity. This includes: (i) enhancing the distinctiveness of water features, such as “fountains” (E15) and “water-related design installations” (E16); (ii) improving the presentation of “cultural and digital heritage interpretation” (E23); (iii) strengthening “the distinctiveness of artificial terraces leading towards water” (E19); and (iv) “the distinctiveness of lampposts” (E14) in terms of unique street furniture. All of these variables in both selected areas are positioned within the “Concentrate Here” quadrant, indicating high user-perceived importance, but relatively low satisfaction with current performance. This result indicates that responds seek accessible opportunities for close, tactile engagement with the wate, and engaging ways to understand local history and heritage via using digital technologies. On the one hand, these water features and water-related design installations not only support mental health, but also enhance a sense of place, as such facilities are more likely to offer multiple behavioural opportunities at the water’s edge and support active interaction with the water (Mikkelsen et al., 2018). On the other hand, the application of digital technologies, such as 3D reconstruction, VR interaction and other immersive tools, represents a major development trend for enhancing place identity. These digital technologies aim to enrich users’ multisensory experiences and foster active, interactive engagement with urban heritage resources (Lian & Xie, 2024).

- In Hangzhou's Heritage Canal District, beyond the shared priority items, users also prioritised improving the distinctiveness of "balconies" (E3) and "benches" (E18). By contrast, "transit shelters" (E11), "digital billboards" (E12) and "waste bins" (E13) fall into a secondary improvement category. Overall, this suggests that place identity are valued most when they enrich dwelling oriented experiences, including lingering, watching and resting, whereas utilitarian infrastructure is less central to users' identity perceptions.

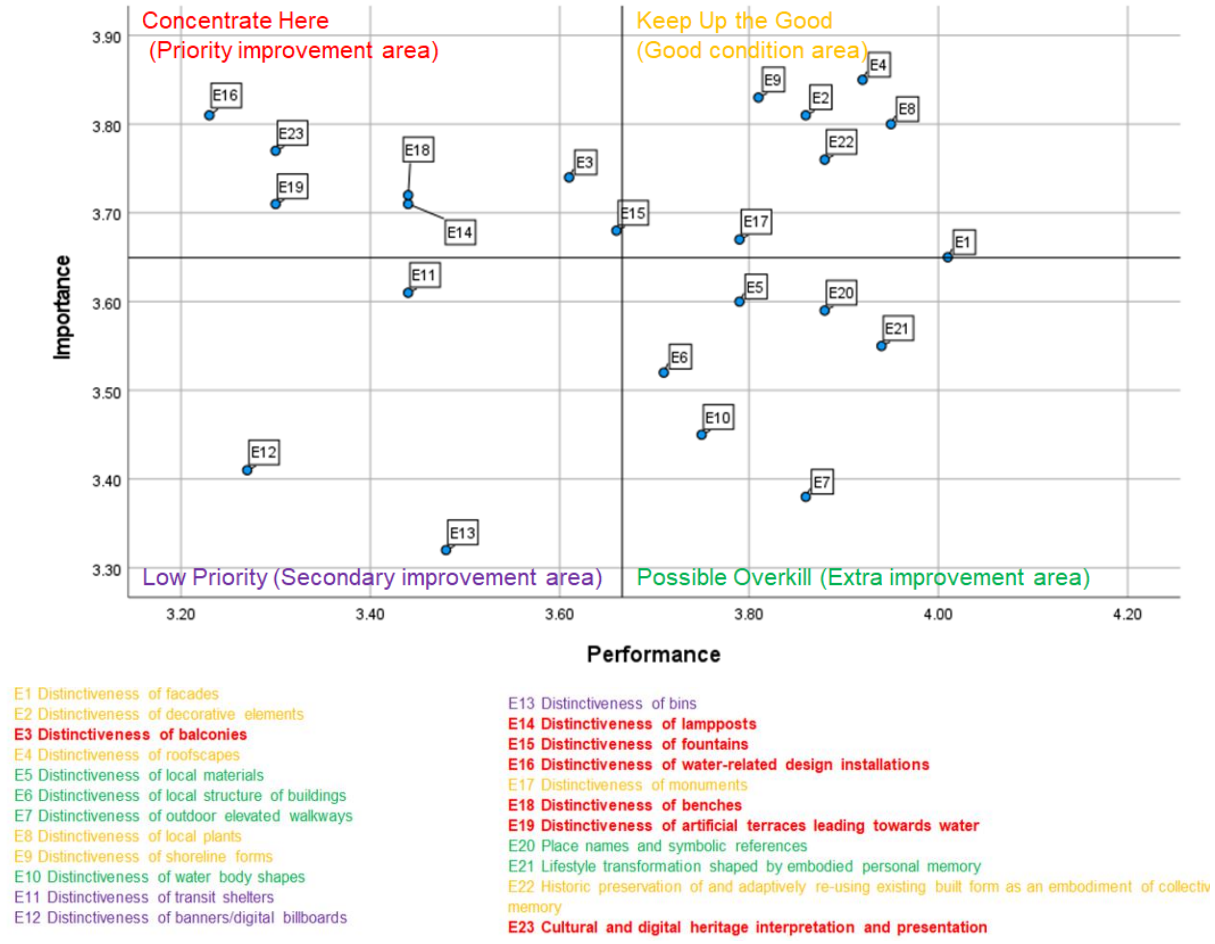


Figure 7-63 IPA scatter plot of place identity variables at QHCD.
(Source: drawing by author)

- At SBQR, the newly developed waterfront demonstrates a wider distribution of

items within the priority improvement areas, such as distinctiveness of “decorative elements” (E2), “outdoor elevated walkways” (E7), “transit shelters” (E11), “monuments” (E17) and “Historic preservation of and adaptively re-using existing built form as an embodiment of collective memory” (E22). This indicates that, unlike the spontaneously accumulated urban memory and sense of attachment found in the historic canal district, the physical distinctiveness of the new district has not yet been closely associated with users’ everyday lives. The weak connection between people and place, due to the lack of iconic and symbolic meanings embedded in key nodes along the urban waterfront, has resulted in a diminished sense of locality.

Although newly developed zones may lack formally recognised architectural heritage and their existing buildings are not listed as official heritage sites, certain key built forms, especially those rooted in collective memory or local meaning to residents, should also be preserved and adaptively re-used to respond to contemporary needs (Zhang and Zhang, 2023).

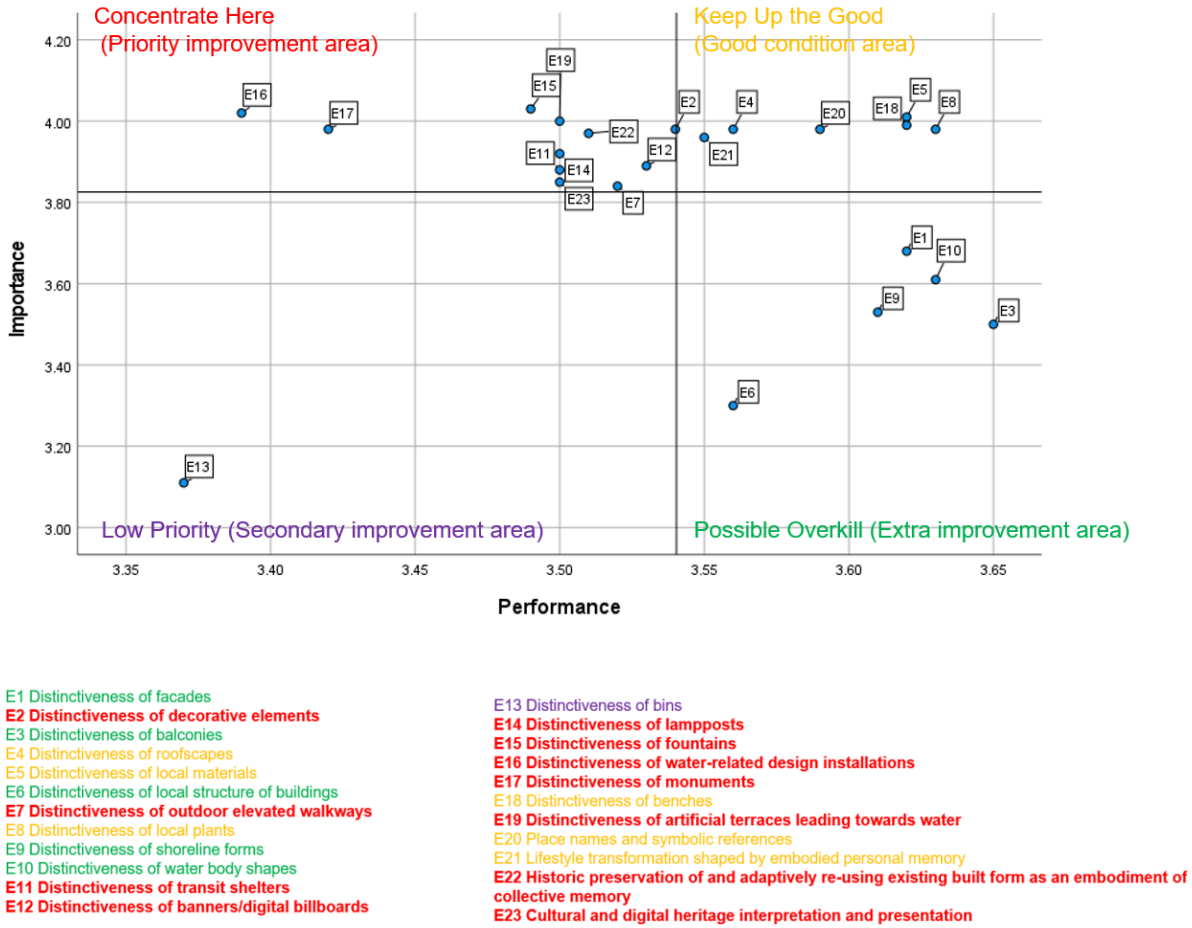


Figure 7-64 IPA scatter plot of place identity variables at SBQR.
(Source: drawing by author)

7.5.6 Mapping of IPA scatter plots of inclusiveness

Drawing on the IPA scatter plots of inclusiveness presented in Figures 7-65 and 7-66, the key findings are summarised as follows:

- The improvement measures identified as priorities for both study sites include the free use of “movable benches” (F13) and the provision of flexible spaces accessible to all social groups (F15). Movable street furniture and flexible spaces support diverse everyday practices and allow proper adjustment over time, which

can increase opportunities for informal social encounters (Sepe, 2025).

- At QHCD in the Heritage Canal District of Hangzhou, in addition to F13 and F15, improvements are still urgently needed in terms of “free access to Wi-Fi” (F8) and “public participation” in the planning process (F18). In addition, the heritage canal district lacks “play areas” (F9). It is therefore recommended to establish a dedicated waterfront “exploration zone” for children near the museum, incorporating water features, terrain variation and interactive installations to create an engaging and inclusive environment.

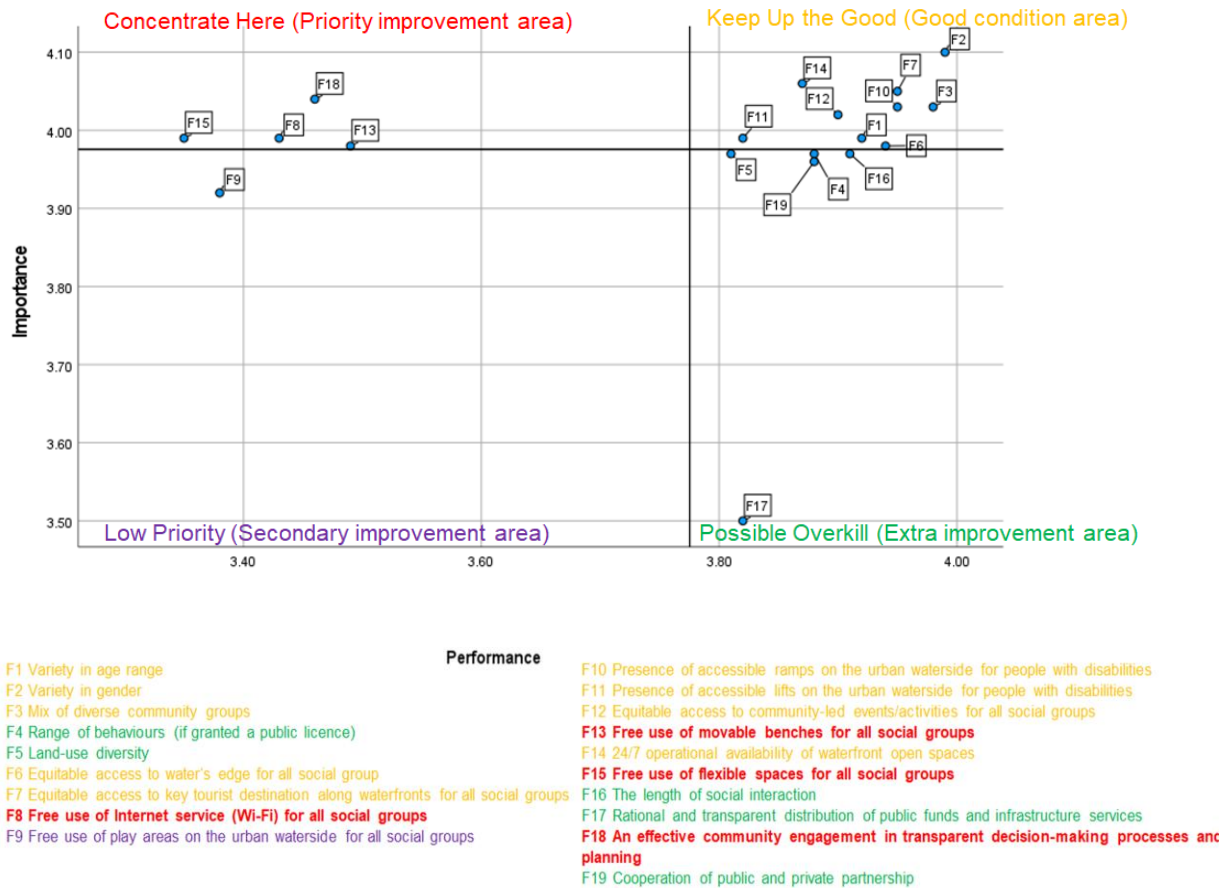


Figure 7-65 IPA scatter plot of inclusiveness variables at QHCD.
(Source: drawing by author)

- Compared to QHCD, SAGP in Hangzhou Binjiang New District shows that “variety in age” (F1), “the length of social interaction” (F16), and “public–private collaboration” (F19) are positioned within the ‘Concentrate Here’ quadrant, indicating urgent priorities for improvement in terms of inclusiveness (Figure 7-66). Firstly, future waterfront regeneration in newly-developed areas tends to incorporate age-friendly design principles to tackle the current low-frequency use condition for older adults. This includes the provision of both vertical and horizontal barrier-free facilities, as well as the creation of soft edges of dynamic activity zones and static rest areas. Secondly, although the newly-developed waterfront has provided a solid foundation in terms of infrastructure facilities, it still lacks active public places on the waterfront that invite users to linger and to discover, and places that support social activities. To address this, it is recommended to introduce a variety of temporary and participatory activities, such as street performances, temporary thematic markets and small-scale festivals, alongside the use of flexible street furniture and active frontages. These interventions could encourage users to create their own opportunities for staying and interacting within the space.

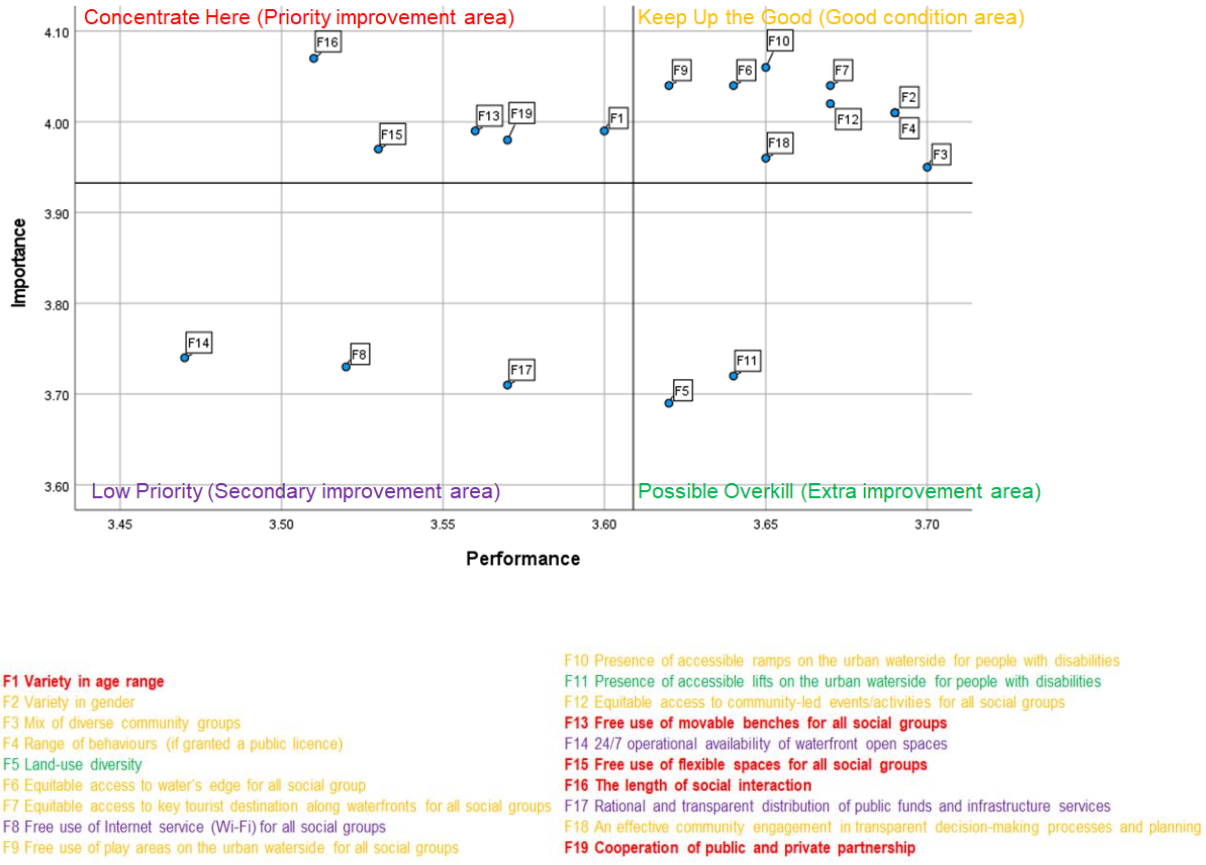


Figure 7-66 IPA scatter plot of inclusiveness variables at SBQR.
(Source: drawing by author)

7.6 Chapter Summary

This chapter presents the online questionnaire survey results from the selected case studies and provides a comprehensive analysis of two types of urban waterfront open space: one located in the Heritage Canal District of Hangzhou; and the other on the South Bank of the Qiantang River in Hangzhou's Binjiang New District.

Such online questionnaire findings indicate that tourism (20.9%) and socialising (19.3%) were the primary motivations for visiting the urban waterfront open spaces along the Qiaoxi Heritage Canal District, whereas commuting accounted for a

comparatively-smaller proportion of user activity. This is further evidenced by high levels of participation in optional and social activities, such as enjoying natural scenery, attending cultural events and meeting others. In newly-developed areas, the urban waterfront open spaces are mainly used for physical exercise (23.9%), tourism (18.2%) and socialising (18.1%). These high-frequency uses are commonly manifested through optional and social activities, such as enjoying natural scenery, walking, cycling and meeting neighbours. This suggests that in the newly-developed areas, users' demand for daily physical exercise has been incorporated more into the existing public infrastructure of waterfront open spaces.



Figure 7-67 Comparative radar chart showing similar trends in importance rating across urban waterfront open space quality dimensions. (Source: drawing by author)

This comparative analysis of importance ratings reveals a similar tendency in user perceptions towards urban waterfront open space quality across the two sites (See Figure 6-70). Inclusiveness receives as the most highly-valued dimension at both locations, while spatial aesthetics ranks lowest (see Figure 6-71 and 6-72). Similarly, safety is consistently rated among the top three dimensions, underscoring a shared user priority to ensure a sense of security in urban waterfront environments.

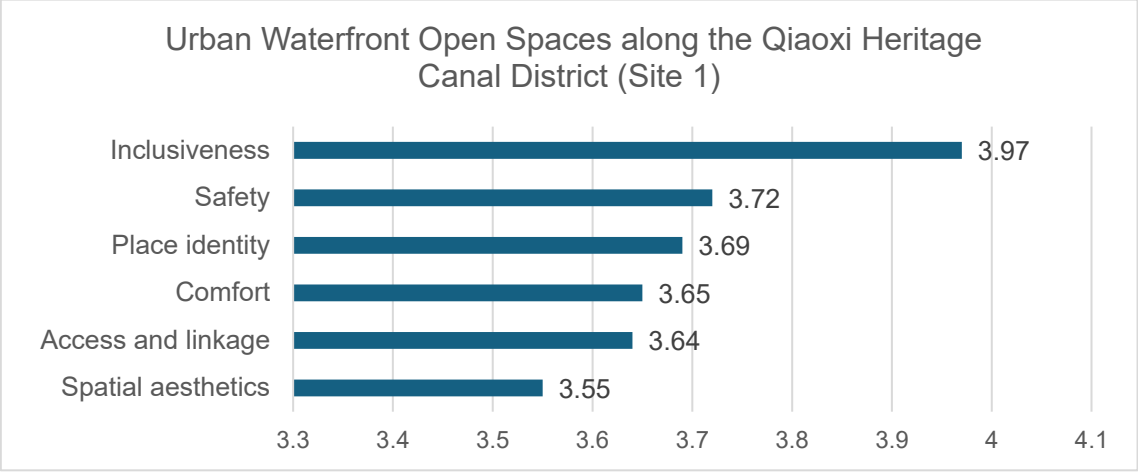


Figure 7-68 Importance ratings of urban waterfront open space quality dimensions at Qiaoxi Heritage Canal District (Site 1).

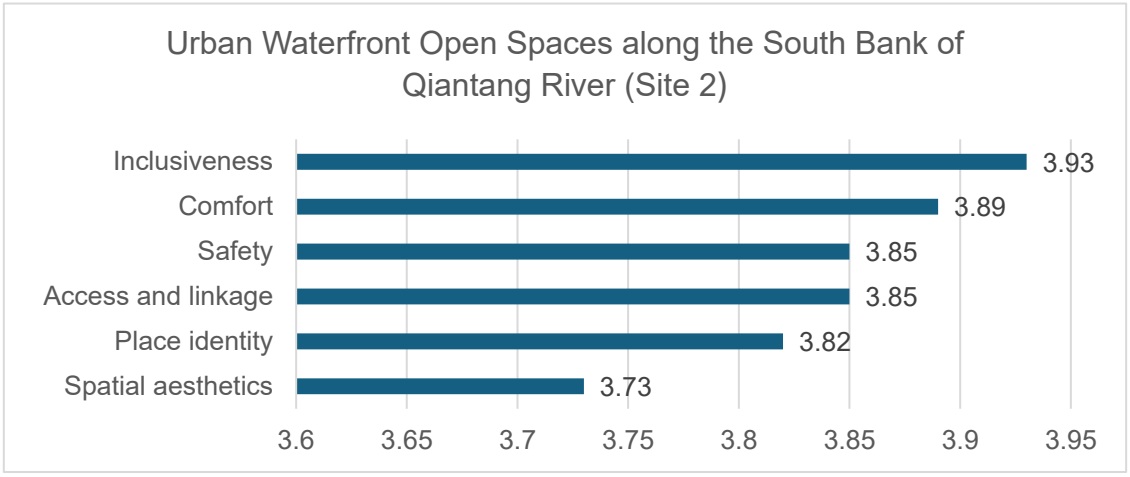


Figure 7-69 Importance ratings of urban waterfront open space quality dimensions at

South Bank of Qiantang River (Site 2).

A certain degree of difference is also evident. Firstly, users at the newly developed site assign relatively higher importance to comfort (M=3.89) compared to the Heritage Canal District (M=3.65), suggesting a stronger desire for active engagement with the environment. Secondly, although place identity ranks third in the Heritage Canal District (M=3.69), its absolute importance score is slightly lower than that in the newly developed area (M=3.82). This result suggests that, although users in the heritage district place strong importance on the interpretation and preservation of canal- and industry-related heritage resources, these values are not yet reflected in the spatial distinctiveness of the waterfront public realm due to the incomplete representation of industrial history. Thirdly, the urban waterfront open spaces at the Core South Bank of the Qiantang River receive somewhat higher importance scores across all six dimensions compared to those along the Qiaoxi Heritage Canal District, except for inclusiveness, which is slightly lower. This reflects a higher level of user expectation and desire in the newly-developed area for contemporary waterfront open spaces to support diverse forms of public life.

Further analysis of individual variables within each dimension reinforces the general pattern of convergence in user perceptions, with a certain degree of divergence observed in specific variables. For example, in relation to access and linkage dimension, both sites rank “accessibility of the water’s edge” and “connectivity

between pedestrian bridges and key nodes" as the most important variables, highlighting a common emphasis on water integration and pedestrian connectivity in future regeneration strategies. However, a key difference lies in perceptions of waterfront path systems: users at the heritage site value waterborne transport connectivity more highly; in contrast, those at the newly-developed site prioritise continuous waterfront promenade routes.

In both areas, traffic risks are seen as the main safety issue. A further shared priority is the use of green infrastructure as part of flood management, including the use of green infrastructure to deliver ecological benefits and the design of multi-level waterfront spaces that combine flood protection with recreational functions. By contrast, views on CCTV diverge: in the heritage district, users are more likely to consider it essential for ensuring safety.

Regarding comfort, users at both sites shows similar trends in importance ranking concerning microclimatic comfort; visual comfort aspects such as "skyline views" and "wayfinding systems"; as well as seating comfort, particularly in terms of arrangement, quantity and materials. However, a significant difference is that users in the newly-developed waterfront pubic space place greater importance on the "view of rich flora", compared to those in the Heritage Canal District.

From the perspective of spatial aesthetics, three variables show significant differences. The newly developed waterfront open spaces assign significantly greater importance to the appropriate scale of commercial areas than the heritage canal district. Users in the newly developed area also rate “Active frontages at ground floor” and “Colonnades in the semi-public realm” as more important. This results suggests that large-scale waterfront projects in the new district currently lack the spatial granularity, intimacy and sheltered edge conditions that characterise the heritage canal district. In contrast, the small-scale urban morphology and continuous street-edge interfaces in the historic area naturally support human scale interaction.

With regard to place identity, the newly-developed area received higher mean importance scores than the heritage district in relation to the distinctiveness of street furniture, urban memory and architectural elements. Only in the aspect of the distinctiveness of natural landscape did the two sites show similar mean scores. This can be attributed primarily to the following three factors in the Heritage Canal District: 1) the influence of residential relocation in the 1990s on the transformation of the social fabric; 2) the commercialisation of the area, which increases the risk of gentrification; 3) the development of heritage tourism and its impact on the loss of traditional vocations and cultural authenticity. Consequently, while historic districts typically support a mix of cultural, residential and commercial functions that reflect their layered historical evolution, newly-developed waterfront spaces possess the potential to

construct a renewed urban identity – one that bridges local traditions to contemporary societal values.

When considering inclusiveness, the sub-factors of user diversity, diverse user-activity patterns and social cohesion exhibit broadly similar trends across the two sites, though some notable differences remain. For example, QHCD reflects a higher perceived importance for infrastructural elements, such as 24/7 accessibility, accessible lifts and Wi-Fi. In contrast, SAGP places slightly more emphasis on play area provision for children. Another important finding is that the higher standard deviations observed in the Heritage Canal District indicate that participants held more differing views regarding the quality of waterfront public space. This indicates the increased complexity of designing space in use and managing urban waterfront open spaces in heritage contexts. This requires addressing the specific needs of diverse user groups and reimagining the waterfront public realm, not merely as a space for transit, tourism or leisure, but as a meaningful public place that fosters interaction with the urban historical landscape; integrates canal and industrial heritage into everyday life; encourages community engagement and public-private partnership; and ultimately balances sustainable development vision, everyday urban design, adaptive re-use of space and the dynamic management of urban cultural heritage resources. In this context, the next chapter will draw on interviews with residents, visitors, designers and

managers to further synthesise insights into the key processes involved in creation of urban waterfront open space at both selected sites.

CHAPTER 8- STAKEHOLDER PERSPECTIVES AND THE PLACE-SHAPING CONTINUUM: A QUALITATIVE EXPLORATION OF URBAN WATERFRONT OPEN SPACES

8.1 Introduction

Building upon the empirical findings from the previous chapter that analysed users' perceptions and attitudes towards urban waterfront open spaces based on the questionnaire results, this chapter shifts the focus towards a more qualitative exploration of how different actors, from residents and visitors to designers and managers, perceive and negotiate urban waterfront open space quality within the selected case study areas. A total of 15 interviews were conducted along the Qiaoxi Heritage Canal District (QHCD) in 2024, including: four local residents living in the surrounding area; four visitors; four designers (urban planners or architects) involved in urban waterfront open space connectivity and regeneration projects; and three management staff members. An equal number of interviews (n=15) was conducted at the second site along the South Bank of Qiantang River, following the same sampling structure as in QHCD.

Frequently expressed views emerging from the interviews, as underpinned by direct observations, are analysed in relation to design and development, usage, and management. The findings from the qualitative method were synthesised into six core themes (Figure 8-1), which are also presented in the following sub-chapters.

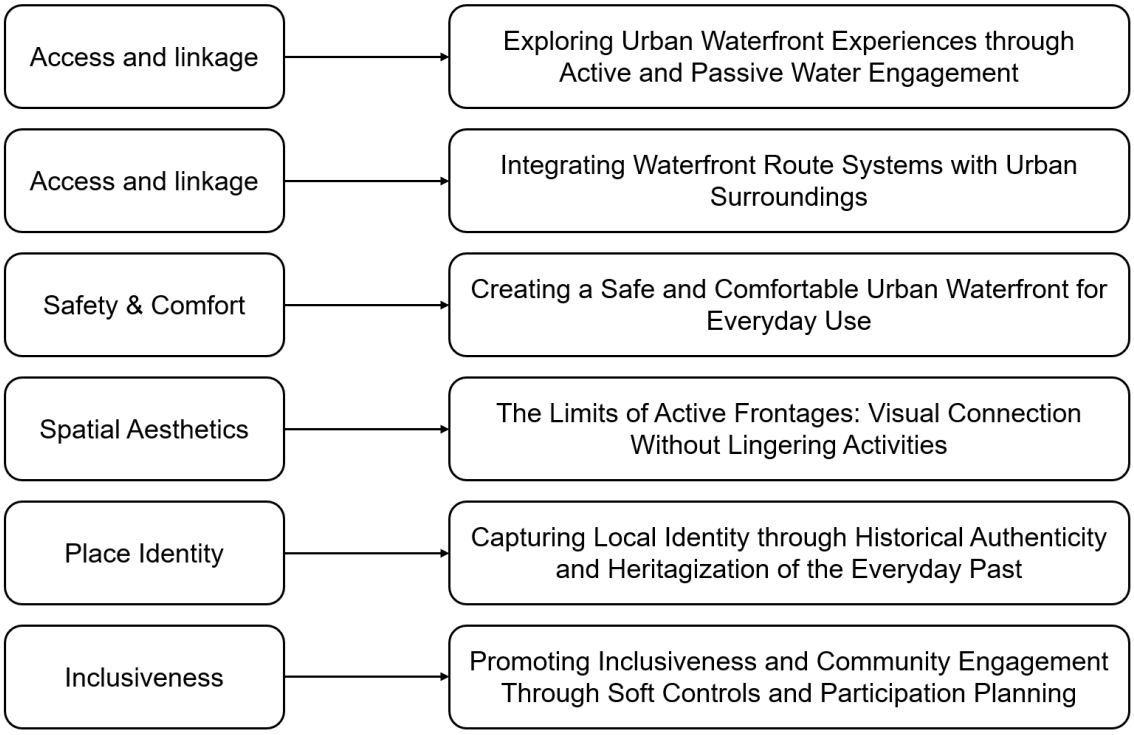


Figure 8-1 Core themes based on the key dimensions of urban waterfront open space qualities from the qualitative method. (Source: author)

8.2 Exploring Urban Waterfront Experiences through Active and Passive Water Engagement

Pubic space along the Qiaoxi Heritage Canal District (Site 1)

Semi-structured interview results reveal that water engagement experience is critical to shaping new public spaces resulting from waterfront regeneration projects at Site 1, as it enables users to escape from the everyday, and also offers a sense of freedom and relaxation (Gordon, 1996; Stevens, 2020). However, visitors complained that most of the waterfront designs in this area do not provide more opportunities for interaction with the water. Instead, urban designers and architects tend to position users as passive observers who lack opportunities for other sensory experiences, such as smell,

touch and sound. For example, a visitor expresses a desire for a multisensory waterfront experience at QHCD:

> "I hope to see the creation of more waterfront platforms where I can physically get close to the water, such as through ramps or terraced platforms, that allow me to linger and even touch the water." (V1-4, interview, 2024)

Urban planners emphasise the importance of water accessibility. Their main concern was that the current planning and regulatory framework made it difficult to approve any new waterside platforms within the heritage canal area. As a planner from the Hangzhou Urban Planning Institute stated:

> "The Qiaoxi Historic District (Zone A) forms part of a World Heritage Site, which prohibits the construction of new waterside platforms within five metres of the canal edge. As a result, our design proposals for water platforms are subject to certain limitations."(D1-1, interview, 2024)

From another Institute planner:

> "In this area, one major issue is that some of the original waterside platforms have now become part of the backyards of commercial properties as quasi-public spaces. Even though the platforms are supposed to be open to all social groups, in some places you can only get to them by going through the shops."(D1-2, interview, 2024)

In this context, all four planners and architects who had participated in the canal-side development agreed that small-scale micro-regeneration interventions could help transform the currently-privatised waterside platforms into more open and physical accessible spaces.

However, a manager from the Hangzhou Bureau of Planning and Natural Resources offered this critique:

> “The heritage protection area is a complex site that involves coordination among multiple departments. Such micro-regeneration projects must obtain recognition from the Canal Management Committee, heritage conservation experts, the business owners themselves and district-level leadership. In addition, the proposals are subject to expert review, and the planning department considers approval only once this process has been completed.” (M1-2, interview, 2024)

In this context, introducing temporary water-related design installations tends to become a flexible and sustainable design method to shift users from being passive observers to active users (Mikkelsen et al., 2018; Stevens, 2021). As one architect suggested:

> We are currently working on using the canal as a setting for new displays. At the same time, we attempt to connect with local artists to display temporary public art that can convey canal heritage values (D1-4, interview, 2024)

Overall, these interview data indicate the role of moving water in shaping active waterfront experiences and enhancing vitality within public spaces, particularly where water features can be combined with public art to attract diverse users and support lingering and interaction.

Public spaces along the South Bank of the Qiantang River in Hangzhou (Site 2)

During the interviews conducted at Site 2, in contrast to Site 1, only two participants at Site 2 believed that the construction of additional waterside platforms would help improve water engagement. They suggested adding waterside platforms near the wetland park, where people could sit, enjoy the sound of the water and watch wildlife. However, similar to Site 1, most participants at Site 2 (n=9) suggested that temporary water-related design installations would be more appropriate for enhancing water engagement. For example, one of the tourists noted:

> "Adding more water features is another method to encourage water engagement."(V2-3, interview, 2024)

Likewise, a planner from the Hangzhou Urban Planning and Design Institute stated:

> Because the site has to meet the 1-in-300-year flood standard, building waterside platforms would cost too much public money. So instead, we usually design smaller water features, like pavement fountains or trickles, to enhance the waterfront experience." (D2-4, interview, 2024)

A management staff member from Hangzhou Qianjiang New City Investment Group Co., Ltd.observed:

> "While the construction of large-scale waterfront platforms along the north bank has achieved positive results, the high flood protection requirements demand significant financial investment. We would therefore prefer to incorporate water elements into public spaces along the urban waterfront, as they can improve physiological well-being, enrich the spatial composition of public environments, and save on costs."(M2-1, interview, 2024)

In summary, as also found at QHCD, newly developed waterfront public spaces tend to enhance active water engagement through the incorporation of temporary and flexible water-related design installations, rather than the construction of fixed waterside platforms. This tendency also indicates that SBQR allows water interaction to be adapted across seasons, events, safety requirement and risk conditions.

8.3 Integrating Waterfront Route Systems with Urban Surroundings

Public space along the Qiaoxi Heritage Canal District (Site 1)

Throughout the interviews, the integration of waterfront route systems with their urban surroundings emerged as one of the core themes, in two key respects: (1) the effectiveness of cross water connectivity through pedestrian bridges; and (2) the effective connectivity of the waterfront promenade routes to key nodes along urban waterfronts. Most residents believe adding pedestrian bridges surrounding key nodes along the urban waterfront can attract more pedestrian movement and provide an additional platform for appreciating the canal landscape. Similarly, one urban planner emphasised:

> “The location of the new pedestrian bridge is vital to the pathway system. It should not only connect key landmarks more efficiently but also integrate with the surrounding urban fabric in accordance with the city’s everyday functional patterns.” (D1-2, interview, 2024)

However, efforts to improve the link between a pedestrian bridge and key nodes along historic urban waterfronts face dual challenges: the necessity of integrating new

circulation into users' cognitive maps (existing daily routes), and the restrictive planning and conservation constraints inherent in the historic urban context. A staff member from the Hangzhou Canal Comprehensive Protection and Development Construction Group expressed concern that although new bridges could improve the overall permeability of the city, the linkage between the new and past, and how they integrated into the existing waterfront circulation system is a challenge (M1-3, interview, 2024). Furthermore, another management staff member also emphasised that the creation of both horizontal and vertical pedestrian connections within the historic urban fabric needs close collaboration among multiple government departments (M1-1, interview, 2024).

Compared to the opposition toward the pedestrian bridge connection, the effective integration of the waterfront promenade with key urban nodes has received wider support. In the design phase, a key way for enhancing the connectivity of waterfront pedestrian routes is to create a diversified pathway system that avoids bland urban experiences. Another urban planner mentioned:

> "One of the main tasks in the renewal of the historic Hangzhou section of the Beijing-Hangzhou Grand Canal is the connectivity of waterfront open spaces, with an emphasis on creating a rich internal pedestrian circulation to avoid a monotonous waterfront experience." (D1-1, interview, 2024)

From the perspective of future operations and management, one manager suggested when new cultural activity and cultural venues are introduced, the connected

waterfront promenade needs to link effectively with public nodes and entrance points (M1-2, interview, 2024)

In summary, interview evidence indicates support among both residents and urban planners for integrating waterfront routes with urban nodes, while attitudes towards cross-water pedestrian bridges remain cautious. This is because the challenges of established everyday movement routines, heritage conservation limitations and the complexities of multi agency coordination need to be overcome. Future waterfront design practices should prioritise richer internal walking experiences on waterfronts, strengthen linkages to public entrances and cultural venues, thereby reinforcing cross-institutional coordination and sensitivity to the historical context at the implementation stage.

Public spaces along the South Bank of the Qiantang River in Hangzhou (Site 2)

At Site 2, the integration of waterfront route systems with their urban surroundings places greater emphasis on a three-dimensional slow-mobility circulation (walking, jogging and cycling routes) that connects public infrastructure and key nodes along the urban waterfront, rather than on waterborne transportation routes. As one of the visitors observed:

> “After the waterfront regeneration in this area, the new walking paths have been well integrated with the newly built waterfront pavilion and original embankment at different elevation levels, providing me with a rich waterfront experience.” (V1-4, interview, 2024)

However, one of the residents emphasised that the connectivity between urban waterfront open spaces and their hinterland may require more waterfront pathway routes. As he explained：

> “I hope a pedestrian bridge can be built between the waterfront service pavilion and the Olympic stadium. In that case I could just walk straight along the waterfront pedestrian route back home without waiting at the traffic lights to cross the road.” (R1-1, interview, 2024)

This indicates that the users expectation for establishing a continuous three-dimensional waterfront pedestrian system in SBQR. Considering the design and development process, creating a clear waterfront vision was crucial in the connectivity projects at this site (Carmona, 2014). The intention was to transform the site into an experiential “event space”, a distinctive and appealing destination that attracts engagement from a range of stakeholders and fosters users’ expectations. One of the urban planners stated that as a major sporting event, the 19th Asian Games stimulated local authorities to articulate a waterfront vision of “returning the river to the people.” At the same time, it introduced the concept of the “orange-blue ribbon, super seawall, and urban slice” into the practice of urban waterfront connectivity program (D-2, interview, 2024). One of the management staff from the Hangzhou Qianjiang New City Investment Group Co., noted:

> “For the management of this waterfront open space connectivity project, while the first step of the project was to identify the existing breakpoints and boundaries along the urban waterfront pedestrian routes, the establishment of a clear vision laid the foundation for the future

> introduction of functional elements, and the surrounding residents expressed high expectations for the project.” (M1-2, interview, 2024)

In summary, integrating waterfront route systems with urban surroundings at Site 2 could focus more on establishing a multi-level slow mobility system (walking, jogging, and cycling), which links pavilions, embankments and everyday routes, rather than relying on newly added cross-water connections. Although waterfront public service pavilions established at approximately 500-metre intervals have enhanced the functional diversity of the overall waterfront promenade, residents still note that micro-scale barriers, such as road crossings, interrupt the sense of continuity between the waterfront and its urban hinterland.

8.4 Creating a Safe and Comfortable Urban Waterfront for Everyday Use

Public space along the Qiaoxi Heritage Canal District (Site 1)

Interview results revealed that within the QHCD, the presence of 24-hour security personnel could enhance a sense of safety, particularly at night. Another key finding is that providing sufficient lighting along the urban waterfront after dark, without a wider range of activities, fails to enhance the sense of safety. Most visitors (N=3) reveal that they prefer areas where activities occur more frequently and where sufficient illumination is provided. Two residents and one visitor claim that the lighting provision along the secondary commercial pedestrian streets after dark was also perceived as inadequate (R1-2, R1-4, V1-1, interview 2024).

In terms of comfort, 66.67% (n=10) of the participants mentioned that the provision of shade and seating areas could enhance daily comfort, thereby increasing passive contact and social activity at a neighbourhood scale. One resident pointed out that the lack of adequate artificial shade had negatively affected the use of open spaces:

> “In summer, it’s usually too hot, especially in the afternoon. So I only go out in the evening sometimes due to the lack of artificial shelter.” (R1-3, interview, 2024)

In response to the need for artificial shade and seating areas, both designers and managers articulated their underlying design principles as well as the challenges involved.

First, they both emphasised the importance of collaboration and demonstrated a consistent view that decisions regarding the placement of shade and seating facilities should be based on the nature of commercial leasing and the frequency of social activities. One urban planner acknowledged that:

> “At present, many of the designed seating and shading facilities have not fully met their expectations due to the cooperation between the management teams and design teams”. (D1-1, interview, 2024).

One management staff member highlights that the recommendations and suggestions proposed by the operation and management team were not incorporated at the initial stage of the design process.

Second, the tension between pursuing commercial operational interests and safeguarding public spatial rights (spatial justice) requires negotiation of the balance between private and public interests. Commercial tenants often seek to maximise their use of space for display or business expansion, while decreasing the fundamental needs of everyday use. Another management staff member highlighted:

> "We try to balance merchants' business interests, while at the same time considering the importance of local culture. That is the main reason for only bringing in merchants who have intangible cultural heritage skills with the national certification." (M1-1, interview, 2024)

The findings indicate that perceived safety and comfort in QHCD depend not only on the provision of physical infrastructure but also on the coordination of activity programming, management collaboration and the negotiation between economic development and public interests.

Public spaces along the South Bank of the Qiantang River in Hangzhou (Site 2)

At SBQR, most residents and visitors indicated that the use of artificial surveillance, such as CCTV cameras and the presence of security guards, cannot effectively enhance a sense of safety. One visitor stated:

> "I originally wanted to have a rest with my family near the newly built waterfront public service pavilion. But when I saw the surveillance cameras and a security guard standing nearby, I chose to avoid that area because I was worried about personal privacy." (V2-1, interview, 2024)

Most designers and managers were reluctant to discuss issues related to artificial surveillance. Instead, they emphasised that the integration of flood control into daily lives is the primary concern in the context of infrastructure urbanism. As one urban planer remarked:

> “We have reconfigured the existing flood control embankment to not only meet flood control requirements but also to integrate existing public infrastructure into daily life, so local residents have more opportunities to do physical exercise, socialise and relax.” (D2-1, interview, 2024)

In terms of comfort, 75% of the interviewed residents (n=3) mentioned the importance of providing shady areas and flexible seating options. One local resident explained:

> “I come here every morning around six o’clock to practise the saxophone, usually under the bridge or beneath the eaves of the waterfront service pavilion with my own chair because of well-shaded in this spot.” (R2-1, interview, 2024)

Another resident indicates a higher level of demand for flexible movable benches when users enjoyed the live shows on the waterfront promenade in the evening (R2-3, interview, 2024). In contrast to residents, all four visitor participants highlighted the importance of quality walking and cycling surfaces. As one noted:

> “Even though I am not a local resident, I often come here for cycling. and I’m satisfied with their current state about the cycling route quality.” (V2-2, interview, 2024)

Additionally, there is a consensus among designers and management staff that creating a sense of daily comfort should consider user feedback and lessons via their daily operation and maintenance experience. One urban planner points out:

> “Before starting the design, we look at everyday activities like seating, walking or chatting, so that people feel comfortable. Still, once the space is used, some updates are always needed. That is why user feedback of the maintenance staff becomes important.”(D2-2, interview, 2024)

A management staff responsible for daily cleanliness and maintenance expressed concern about the lack of an effective feedback channel between the operation and the design teams.

> “Although I can observe how people actually use the space and hear about their needs for daily comfort, this information is rarely taken into account.” (M2-3, interview, 2024)

Overall, the findings suggest that in SBQR, perceived safety and comfort are shaped less by surveillance-based control and more by how infrastructural design, everyday use (such as enhancing natural surveillance, providing artificial shelters and offering diverse seating options) and feedback mechanisms are integrated into ongoing design and management practices.

8.5 The Limits of Active Frontages

Public space along the Qiaoxi Heritage Canal District (Site 1)

Based on interviews exploring participants’ sensory perceptions of built form and spatial aesthetics at QHCD, the findings reveal that focusing only on active frontages

is limited in supporting social interactions along the waterfront, as repetitive rhythm and lack of contextual sensitivity may result in spatial homogenisation.

In this study, “active frontages” refers to the creation of engaging interfaces through transparent display windows and visible indoor activities that enable interaction at the boundary between the public realm of the waterfront street and the interior of the building (Gehl, 2011). One visitor appreciated the active frontage of this site because the use of the timber facade, transparent glazing, plants, figurines and signage at street-level frontages offered a rich sensory experience, allowing people to physically engage with the material rather than simply observe. However, another visitor points out that the rhythm of active frontages could lead to spatial homogenisation due to the uniformity of activities and built forms (V1-4, interview, 2024). The majority of the managers and designers interviewed also questioned whether merely establishing a visual connection, by incorporating extensive transparent glazing at street-level frontages and eliminating monotonous walls and large blank surfaces, was sufficient to support lingering and spontaneous activities on urban waterfronts.

One staff member responsible for daily operations stated:

> “Since I’m in charge of maintenance, I often watch how people use the space. Most of the time, apart from people taking photos, not many actually stay for other social activities (M1-3, interview, 2024)

One urban planner expressed a similar view:

> “When we redeveloped the waterfront in 2021, we introduced some transitional spaces, such as verandas and shaded colonnades. However, their actual use has remained limited.” (D1-2, interview, 2024)

According to these semi-structured interview results, this low level of usage in active frontages is primarily attributed to the privatisation of commercial space and blurred boundaries of spatial use rights. As one visitor remarked:

> “When I walk in front of the shop along the water commercial street, it gets a bit awkward. This is because I am confusing if I am allowed to be there without buying something, and the place feels really exposed.” (V1-4, interview, 2024)

In conclusion, the findings point out that active frontages alone are insufficient to foster social interaction in QHCD, as spatial homogenisation and the privatisation of commercial interfaces undermine users’ sense of comfort and entitlement in using such semi-public waterfront spaces.

Public spaces along the South Bank of the Qiantang River in Hangzhou (Site 2)

In contrast to the Heritage Canal District, the active frontages along the urban waterfront in the newly-developed district did not exhibit low usage due to spatial ownership or privacy issues. However, several residents raised concerns that the lack of diversity of building facades and architectural types surrounding the waterfront could have a negative impact on active frontages (R2-1, R2-3, interview, 2024).

Field observations indicate that small-scale amenities, such as ground-floor shops and small art galleries, are absent. One urban planner notes that the decision not to

introduce small shops stems from a lack of understanding of what people needed (D2-3, interview, 2024). One manager also explained that our aim for the later stage is to include small-scale commercial uses. The initial phase concentrated on cultural flagship projects to shape place branding and attract more desirable enterprises and employers (M2-1, interview, 2024)

The findings indicate that at SBQR, active frontages remain open to the public, although their vibrancy is undermined by monotonous surrounding built forms and the absence of small amenities (e.g., ground-floor shops and small galleries). This suggests that an early-stage flagship-led trajectory prioritises cultural branding and investment attraction, while postponing the everyday uses that activate the waterfront edge.

8.6 Capturing Local Identity through historical authenticity and “heritagisation” of the everyday past

Public space along the Qiaoxi Heritage Canal District (Site 1)

Cultural heritage-related tourism, as a leading development tool, is critical in facilitating socio economic development in heritage canal areas. However, the interviews reveal that heritage tourism could raise the risk of gentrification and threaten historical authenticity due to over-commercialisation.

Firstly, the interviews identified two distinct types of visitors. Drawing on Stebbins (1996)'s user classification criteria, these can be described as "serious heritage visitors" and "casual heritage visitors".

The first group includes "serious heritage visitors", who are keen on real heritage knowledge and historical events before they arrive (Stebbins, 1996). Several interviewees also highlighted that what they value most is not simply museum display, but the everyday life and living culture of the canal district. For example, one visitor noted that they preferred to "see how local people actually live here" rather than only "reading history in an exhibition" (V1-2, interview, 2024). Similar views were expressed by V1-3 and V1-4, who emphasised street-level experiences, local routines and ordinary cultural practices as key parts of their visit (V-3; V-4, interview, 2024).

By contrast, casual heritage visitors tend to prioritise leisure and entertainment at the outset, with limited advance planning around heritage content. However, interview evidence suggests that their motivations can shift on site, which means that once they encounter heritage cues, such as interpretive installations, historic streetscapes or canal-related stories, they often become curious and begin to look for more authentic local experiences. As one participant explained, they came mainly "to relax and take photos", but became interested in the canal's history after seeing a specific exhibit (V1-1, interview, 2024).

As for local inhabitants, some are familiar with the area's history and urban transformation, and tend to show greater tolerance toward the authentic heritage information. They expressed a strong desire to see their urban memories represented more meaningfully in broader heritage narratives. These memories are rooted in everyday lived experience. For instance, the industrial development histories, the historical origins and meanings of shop signs and names at alley entrances, as well as canal associated historical events, as important urban memories that are seldom interpreted. Digital interpretation and other immersive technologies were therefore seen as useful ways to make such lived memories visible. As One resident says

> "My child often asks me about the meaning of names like *Ruyili* or *Tongyuanli*, which we frequently see on plaques surrounding neighbourhood entrances. I suggest that such heritage information and its symbolic meanings should be better displayed, for instance through the use of digital heritage technologies." (R1-3, interview, 2024)

Another resident also highlights the role of historical architectural elements in shaping their collective memory:

> ""Before introducing piped water, people mainly relied on the well for all their daily needs, and it played a vital role in our community life."

However, there is little to no on-site interpretation or informational signage related to the well, largely due to its exclusion from the official list of heritage buildings.

In response to the "heritagisation" of the everyday past and the potential issue of historical authenticity in heritage conservation practices, most designers and

managers proposed corresponding strategies to address these challenges. As one urban planner invokes the profound transformation of the Cultural Heritage Site from focusing on spatial practice to social relations, as well as fulfils visitors' desire for an authentic heritage experience by integrating cultural activities with digital heritage interpretation (D1-4, interview, 2024).

In addition, the interviewed managers emphasised local canal and industrial-related heritage refers to what humanity inherits from the past and actively engages in the contemporary context. They have expressed a desire to distinguish between real and fake experiences, and hoped that inauthentic elements could gradually be removed. In this context, sustainable heritage tourism could combine sightseeing, leisure, and heritage interpretation, while also offering local communities more opportunities to display their everyday life.

Public spaces along the South Bank of the Qiantang River in Hangzhou (Site 2)

At site 2, the interview results reveal that it is important to recognise that heritage does not have to be "old" to be meaningful; even newly-developed areas can acquire heritage value through the heritagisation of non-traditional spaces. Most of the residents and visitors insisted that intangible heritage associated with the Qiantang River, such as music, language, dance, religion, folklore, artistic expressions, traditional knowledge, culinary traditions, social practices, rituals, and ceremonies,

should be rightfully acknowledged as deserving both conservation and appropriate promotion through cultural tourism (R2-2, R2-4; V2-1, V2-3, V2-4, interviews, 2024)

Some local designers noted that, due to the lack of tangible cultural heritage resources in the area, certain forms of intangible heritage were overlooked, particularly with respect to their aesthetic, scientific and educational value (D2-1, D2-4, interview, 2024). At the meantime, some managers indicated that they are considering ways to connect individual tourist attractions in the area under a unified heritage theme, such as linking them to Qiantang River culture, in order to create a coherent network of related cultural sites that could collectively support the development of more-sustainable linear cultural routes along the Qiantang River, building upon the existing waterfront trails (M2-1, M2-3, interview, 2024).

Overall, the findings reveal that heritage value in SBQR is being constructed through processes of “informal heritagisation”, whereby intangible cultural heritage associated with the Qiantang River and a series of heritage related events at the social level, such as exhibitions on the history of tidal-bore defence, nighttime light shows, and traditional Qiantang River tidal-bore viewing practices, have facilitated the integration of heritage and urban regeneration discourse. Consequently, this case demonstrates that heritage recognition is not solely dependent on age or formal listing, but can emerge from social practices. In particular, the collaborative involvement of architectural historians and local residents in official heritage decision-making can raise heritage awareness and

broaden what is considered worthy of conservation beyond officially designated assets. Such bottom-up processes may also help retain intangible social values, including personal relationship networks and mutually supportive neighbourhood ties.

8.7 Promoting Inclusiveness and Community Engagement Through Soft Controls and Participatory Planning

Public space along the Qiaoxi Heritage Canal District (Site 1)

In QHCD, despite potential differences in activity and behaviour patterns, the majority of residents and tourists exhibited a high level of tolerance and understanding towards the use of public spaces on the urban waterfront, which contributed to promoting social inclusion. As one resident points out:

> "In the heritage canal district, I don't feel there is much conflict over the use of public spaces between tourists and residents. Tourists usually stay on the commercial main street along the canal, while I tend to spend my time in the canal plaza, near the relocated housing community, and around the museum entrance. The growing number of visitors has improved the local image, as it was seen as a shantytown that few people were willing to visit before the 1990s." (R1-4, interview, 2024)

Furthermore, most visitors expressed a desire for social mix in urban waterfront open spaces. In addition, interviewees in the canal heritage district shared a consensus that public facilities designed to accommodate all social groups, particularly those that address the needs of older adults and people with disabilities, are essential to the creation of inclusive spaces.

In terms of community engagement, several residents also stated that the involvement of multiple municipal departments in planning, supervising, maintaining and controlling the urban waterfront could lead to protracted decision-making and unclear boundaries of responsibility. Despite the decision-making process still lacking transparency, an increasing number of bottom-up policies are seeking to address this shortcoming. As one resident pointed out:

> “The way of getting involved in the decision-making process has become diverse. In addition to the traditional approach, the local municipality has also introduced the ‘Street Planner’ system.” The designers involved in this project can develop a clearer understanding of local residents’ needs as well as the current deficiencies in the area.” (R1-1, interview, 2024).

These urban governance policies represent complex institutional reforms in China, where the government has been pursuing the devolution of authority, decentralisation of decision-making and the de-layering of hierarchical governance structures (Zhang, 2023). Interviews with designers and managers indicated the need for a comprehensive design governance toolkit that integrates soft control and incentive mechanisms to balance flexibility with the vision of urban waterfront regeneration. Firstly, “soft control” refers to the use of “soft” power in place of legal authority. In Site 1, although security guards were deployed to prohibit certain activities and behaviours, on-site observations revealed that, apart from the ban on bicycles and motor vehicles, other prohibited activities, such as unauthorised trading or certain street performances and livestreaming at night, still took place under the soft control

supervised by the security personnel. Secondly, one interviewee from the Hangzhou Bureau of Planning and Natural Resources referred to the term “incentive mechanism” as guiding the implementation of waterfront regeneration policies through incentives directed at key stakeholders (such as developers, property owners and the general public), rather than relying solely on coercive measures, thereby balancing users’ interests with the imperatives of urban development (M1-2, interview, 2024).

Consequently, inclusiveness is shaped not only by spatial design but, more fundamentally, by a governance approach that combines soft control through flexible management practices with participatory planning (e.g., the “Street Planner” programme as a bottom-up engagement mechanism), alongside the continuity of the area’s historically rooted culture of tolerance.

Public spaces along the South Bank of the Qiantang River in Hangzhou (Site 2)

At SBQR, responds expressed there are no apparent spatial use conflicts between local residents, even though some young people engaged in singing or livestreaming along the water’s edge (R2-2; R2-3, interview, 2024). In relation to the participation planning phases, from fragmented intervention to whole-cycle empowerment, residents emphasised the significance of digital empowerment and institutional innovation in advancing participatory planning development (Fu et al., 2025). Most residents interviewed stated that civic engagement could be improved by developing digital platforms to gauge public demand. One designer further noted:

> “During the consultation process, traditional mechanisms for gathering resident feedback, such as building-posted notices, were insufficient in effectively responding to residents’ suggestions. Consequently, the development of new media platforms should play a more crucial role in facilitating participatory engagement in newly-developed zones.” (D2-3 interview, 2024)

One member of the management staff also pointed out that the establishment of digital and media platforms could help address the problem of low-income groups being excluded and ostracised during the regeneration process (M2-2, interview, 2024).

Within the overarching government-led, market-driven paradigm of urban waterfront regeneration in newly development zones, the government’s dominant role has evolved from a form of coercive authority to one characterised by *negotiated adjustments* in the Chinese context (Zhu et al., 2024). This new urban governance policy framework has witnessed a transformation in urban development from a focus on quantity to an emphasis on quality through tripartite negotiation, and has facilitated a people-centred, high-quality development model under pluralistic co-governance between the government, public society and the market. In this context, another member of management asserted that the “Street Planner” system, as a new public participation mechanism, could be implemented across Hangzhou’s regeneration projects to enhance the inclusiveness and transparency of decision making (M2-1, interview, 2024). As a result, such pluralistic governance could empower local residents to get involved in discussions and negotiations with other researchers, local authorities and the private sector.

8.8 Chapter summary

This chapter examines design and development, space in use and urban governance through the perspectives of residents, tourists, designers and management staff. It also addresses the fourth and fifth sub-research questions by analysing semi-structured interviews conducted in the Qiaoxi Heritage Canal District (QHCD) and the newly developed South Bank of the Qiantang River (SBQR) in Hangzhou's Binjiang New District.

Across the six dimensions, both sites reveal a shared demand for stronger water engagement and everyday connectivity, even though active water contact remains constrained via heritage regulations and micro-regeneration at QHCD, and through cost-effective, event-informed interventions and a three-dimensional slow-mobility system at SBQR. In safety and comfort, the two dimensions diverge in governance preferences. On one hand, QHCD relies more on visible human presence (24-hour guards), whereas at SBQR artificial surveillance can be perceived as intrusive, with greater expectations for flexible and effectiveness of crime prevention through environmental design. For spatial aesthetics and interface quality, active frontages at both sites underperform, but for different reasons: privatisation and ambiguous use rights in the heritage district versus a lack of fine-grained amenities and programmatic diversity in the new development. Finally, place identity and inclusiveness highlight contrasting trajectories. QHCD faces risks of overcommercialised heritage tourism

and potential gentrification, while demonstrates how heritage value can be socially constructed through intangible river-related practices and digitally enabled participation, supported by negotiated governance. Based on these comparative insights, Chapter 9 provides a deeper critical discussion of cultural identity, heritage commodification, and the relationship between community engagement and community-driven heritage conservation, while refines the research framework by offering a brief simplification strategy.

CHAPTER 9- DISCUSSION AND CONCLUSION

9.1 Introduction

Synthesising the quantitative and qualitative results from the previous two chapters, this chapter examines how cultural-heritage-led regeneration reshapes urban waterfront open spaces as an integral part of historic urban landscapes in both historic districts and newly developed zones. It further focuses on the mechanisms linking spatial form, urban governance and design principles, as well as further critically discusses the tensions among place identity, heritage commodification, inclusiveness and everyday urban integration, based on the users' perception data. By situating the empirical findings within broader theoretical discussion, this chapter reviews the research questions, clarifies the study's conceptual contributions and refines the 110-variable framework into a more coherent and practice-oriented usability informed by simplification strategy.

9.2 Integrated Comparative Analysis of Urban Waterfront Placemaking

This section develops a critical synthesis of waterfront placemaking by moving beyond whether regeneration improves urban waterfront open space, towards how values and place identity are interpreted through spatial form, urban governance and everyday practices. Although both QHCD and SBQR are reshaped by cultural-heritage-led regeneration, they construct public value through different heritage resources and logics: QHCD is grounded in living canal heritage and museum clusters, whereas

SBQR leverages the intangible Asian Games legacy to generate new symbolic meanings and layered histories. Drawing on questionnaire-based IPA results, interviews and direct observations, the analysis examines how tangible configurations and intangible resources jointly facilitate waterfront placemaking across the historic QHCD and the newly developed SBQR.

9.2.1 Encouraging permeable Interfaces rather than linear promenade improvement

Integrating waterfront promenade route systems with their urban surroundings provides a key foundation for transforming the waterfront from a tourism-oriented destination corridor into an everyday public place, as it enables both active and passive engagement with the water and supports a wider range of experiences and multi-functional uses. In both QHCD and SBQR, connectivity initiatives have prioritised identifying “breakpoints” because these bottlenecks (discontinuities) are where everyday walking loops fail to form, turning the waterfront into a segmented destination rather than a continuous public realm. In this sense, the initial phase of waterfront regeneration in both cases has focused on relinking the historic district and newly developed areas to the waterside by integrating waterfront open spaces with their surrounding urban contexts and adjacent water bodies. Online questionnaire results provide supporting evidence for this emphasis: A6 (continuity of waterfront promenade routes) received high importance ratings (M = 3.77 in QHCD; M = 4.08 in SBQR) and relatively high satisfaction/performance scores (M = 3.94 in QHCD; M = 3.85 in SBQR).

In both cases, the first round of connectivity upgrades largely identified and addressed linear gaps along the promenade, thereby establishing overall route continuity. In subsequent stages, the remaining “breakpoints” have tended to cluster at key interfaces, such as the cross access interface where arterial road sections meet waterfront entrances, fenced or restricted waterside edges, and the transitional zone linking inner-street networks with the canalside promenade.

Based on this background, interviews data results further suggest that introducing pedestrian bridges can provide a targeted response to interface-related breakpoints, particularly in QHCD. Such cross-over links could not only improve urban permeability (if these new cross-water links become part of users’ image of the city), but also provide natural social meeting points when they are located along the main promenade axis at wide junctions. Such implementation is consistent with the second principle of the “10 Principles for Sustainable Urban Waterfronts Development”, which highlights that “waterfronts are designed as an integral part of the existing urban fabric” (Sepe, 2013, p. 600).

Furthermore, A10 (public accessibility of water) was rated highly important (M = 3.77 in QHCD; M = 4.05 in SBQR) and appears in the IPA “Concentrate Here” quadrant in both cases, indicating that users strongly value direct water contact but do not experience it in practice. In this context, improving A10 therefore needs a clearer and more permeable access points, finer-grained opportunities to approach the water (w

water related design installations) and effective wayfinding signage that encourage lingering rather than pass through movement.

Although the shared access and linkage characteristics of the two sites have been identified, distinctive spatial and social context, on the other hand, are also evident. In QHCD, the connectivity programme is dominated primarily by micro-regeneration interventions in the context of the heritage conservation approach. In order to respect and preserve the original spatial organisation of traditional waterfront spaces and the living connection to the past, the main axis of pedestrian pathways is not fully adjacent to the water throughout, with only certain sections of the pedestrian routes providing direct views of the canal. In this context, the local authorities aim to enhance a functional connectivity in heritage sites, mainly by developing pedestrian routes along the waterfront, as well as from the water itself, that enable users to navigate, move, reach and enjoy important nodes along the canalside, in addition to the individual buildings. Local authorities also emphasised the significance of “desire lines” within waterfront pedestrian route systems in the development of heritage tourism, complemented by the inclusion of community coffeehouses, traditional Chinese teahouses and small-scale general stores or bookstores, to create more opportunities for social interaction. Although a continuous cycle-path system has not yet been established in QHCD, owing to spatial constraints and heritage conservation requirements, some visitors have nonetheless expressed a desire for continuous

cycling circulation. Therefore, a future waterfront placemaking approach could add cycling routes along the boundary of the heritage buffer zone, to combine with the existing waterfront pathway system and historic fabric to enhance connectivity and the visitor experience.

In contrast, the development of SBQR's waterfront path system has been driven primarily by mega-events such as the G20 Summit and the 19th Asian Games. To fulfil the vision of "returning the river to the people", local authorities and urban planners have prioritised the creation of a multi-level slow-mobility network, incorporating pedestrian routes, jogging paths and cycling lanes. Rather than serving only as circulation infrastructure, this network has become a key setting for everyday routines and social meeting points, as reflected in observations that many users deliberately choose longer riverside running or cycling loops instead of more direct shortcuts. This tendency highlights how the regenerated riverside public spaces have reshaped local patterns of use, facilitating communal interaction and social encounters. Additionally, despite the fact that waterborne transport and accessibility of cultural venues remain less developed compared with the heritage canal district, the development of multimodal transportation networks has emerged in the newly developed area as a critical driver in the placemaking of waterfront public spaces. Building on this, future placemaking would benefit from coupling the existing slow mobility network with a more coherent mix of cultural, leisure and everyday commercial programmes,

ensuring that these uses are directly connected to the waterfront path system across different elevation levels.

9.2.2 Facilitating soft surveillance and daily comfort

Safety and comfort represent crucial dimensions of the placemaking approach, influencing the formation of high quality pubic places. In both case studies, particularly during the early and middle stages of waterfront regeneration, a shared design objective has been to create a state of physiological, psychological and physical harmony between users' needs and the spatial configuration of the waterfront. The empirical results identify four key physical attributes that shape perceived safety and comfort in both cases: natural surveillance, lighting quality, sufficient seating options and shelter provision.

First, the findings highlight the importance of enhancing safety through neighbourhood design and walkable environments, reflected in the high importance ratings for B12 (provision for personalising property, such as block watch signs, yard decorations and private plantings; M = 3.86 in QHCD and M = 4.01 in SBQR). This also aligns with the concept of "Eyes on the Street"", highlighting the link between crime and the built environment and reflecting the principles of Crime Prevention Through Environmental Design (CPTED) (Senna et al., 2025). The combination of these two theories highlights the importance of developing the natural surveillance provided by land use diversity and neighbourhood designs as key effective means of

enhancing safety (Desyllas et al., 2003). This finding responds to a key tension between “permeable space”, where through movement and visual connectivity are key to enhance safety, and “defensible space,” which prioritises territoriality, ownership and guardianship. While defensible space theory implies that restricting movement and access may increase safety, the results of this study support the argument that walkability, local movement potential and street layout visibility strengthen natural surveillance and, in turn, perceived safety. This implies a context specific urban design principle. In the heritage canal district (QHCD), safety improvements should prioritise good visual connections and continuous sightlines within low connectivity cul-de-sac segments to strengthen natural surveillance. By contrast, in the newly developed waterfront (SBQR), the key is to enhance land use diversity and ground floor permeability so that walkable routes are supported by active and visible street level interfaces, thereby improving perceived safety and comfort.

Secondly, compared with access control measures aimed at preventing crime opportunities, the results indicate that improvements in lighting quality and greater evening activity, particularly along secondary streets in the heritage canal district, are key physical attributes that can reduce crime at both sites. This is reflected in the high importance ratings for B11 (sufficient artificial lighting quality after dark; M = 3.80 in QHCD and M = 4.04 in SBQR). The empirical results relating to the design process reveal that, despite the overall lighting performance being better in QHCD, high lighting

quality in alleys and secondary waterfront promenades remains inadequate. As a result, there are fewer activities that attract people to these areas. Interview findings further suggest that most participants perceived lighting and evening activity to be most effective when implemented together, as increased evening presence amplifies the benefits of improved illumination by strengthening natural surveillance.

Thirdly, the provision of comfortable seating areas is not only a key for supporting sociability and longer stays in the waterfront public realm, but it also contributes to everyday public life and informal social interaction (Oram et al., 2018). In both case study areas, online questionnaire results emphasised the importance of providing sufficient outdoor seating oriented towards the water's edge, suggesting that comfort is closely linked to opportunities for staying, discovering and social encounter. Burton and Mitchell (2006) highlighted that, to maximize socialising and public views, seating should be provided at intervals of 100 to 125 meters along a street, oriented towards the water. However, this research indicates that the high quality of seating spaces depends not only on their material, quantity, placement, outlook and spacing, but also on the governance and access arrangements that mediate whether seating is perceived as genuinely public. This tendency is obvious in semi-private realms, where direct observation results show that seating in privately-operated teahouses, souvenir shops and dining spaces is often under-utilised, due to limited privacy and ambiguous usage rights for non-paying users. Furthermore, provision of primary and secondary

seating plays a key role in promoting spontaneous activities and prolonged outdoor stay activities at SBQR, as indicated by the higher importance rating of 4.04 in SBQR than in QHCD (M = 3.53). This distinction can be interpreted through differences in spatial configuration and governance approaches between the two sites. In the newly developed waterfront public spaces, where waterfront experience of slow mobility systems are homogeneous, seating becomes a critical physical setting that converts movement-based use into longer duration staying, watching and social interaction, thereby helping to generate evening activity. By contrast, in the heritage canal district, everyday staying activities are more strongly conditioned by fine-grained alley networks, mixed uses and existing semi-public interfaces, meaning that users' comfort and sociability can be supported through multiple informal or incidental opportunities for resting (e.g., shopfront edges), rather than relying primarily on planned seating provision.

Last but not least, according to direct observation results, both sites show that higher levels of static activities are associated with a well-designed shelters. In contrast, higher levels of dynamic activities, such as fitness exercises, square dancing, skateboarding, jogging, running and cycling, exhibit minimal correlation with low noise levels or the provision of shaded areas, but display a strong relationship with temporal patterns, being most concentrated during the evening hours from 7:00 to 9:30 pm at both sites. This suggests that static activities are more dependent on micro-scale

comfort conditions that support lingering, while dynamic activities are shaped more strongly by temporal rhythms and everyday governance (e.g., after-work daily routines, and the time windows in which active use is socially accepted), which helps explain why evening hours form a consistent peak across both sites.

9.2.3 Translating active frontage into everyday use

Both the QHCD and SBQR case studies provide evidence on spatial aesthetics. Analysis yields both congruent and divergent results and, when combined, these findings reveal that spatial aesthetics contribute to waterfront placemaking only when they are converted into usable social settings that encourage staying, social life and appropriation, rather than remaining as façade-led visual coherence.

A shared design ambition in both sites is the production of a coherent rhythm of active frontages along waterfront walking routes to encourage social interaction. Nevertheless, a gap remains between spatial aesthetics and their usage in everyday practice. The aesthetic production of “active” edges, often emphasising proportional harmony, façade continuity and linear order, has not automatically generated vitality or sustained social life. This phenomenon implies a critical placemaking mechanism: visual order can enhance the image of the waterfront yet simultaneously decline spontaneous activities when semi-public interfaces lack micro-scale diversity and flexible settings for appropriation. This interpretation is supported by the relatively lower satisfaction rating of D13 (the rhythm of active ground floor frontages; M = 3.10

in QHCD and M = 3.46 in SBQR). In this sense, the “most visible” layer of spatial aesthetics, embodied in façades and public spaces (García-Doménech, 2015), can become a double-edged tool, enhancing legibility and symbolic identity while potentially reducing sensory variation and everyday adaptability when applied through uniform design codes.

In the case of QHCD, the underperformance of active frontages is attributed to the spatial homogenisation, low levels of privacy and blurred boundaries in semi-public realm. This uniformity of rhythm in the facades and their linear layout conspire to reduce visual interest and hinder spontaneous activities, particularly within the semi-public realm. These spatial characteristics reduce users’ willingness to linger and socialising, as the interface neither provides clear cue of invitation nor clarifies degrees of publicness in terms of access, use and control. In SBQR, by contrast, the key limitation lies less in ambiguity of ownership than in the limited provision of small-scale commercial amenities and diversified recreational facilities along the promenade. This is reflected in the relatively lower satisfaction score for D1 (“the provision of leisure areas at an appropriate scale”, M = 3.42), which suggests that the spatial distribution relating to scale of leisure-related settings do not yet fully support small scale everyday use.

Behavioural evidence from semi-public spaces adjacent to active frontages further supports the aforementioned results. In both sites, semi-public spaces at the ground

floor tend to support short-duration and low-commitment activities, while providing limited flexible space for more varied everyday life practices. This result indicates that the semi-public realm is currently shaped more as a spatial configuration organised around adjacent retail and dining activities than as an adaptable social platform. Therefore, enhancing waterfront placemaking requires rebalancing spatial aesthetics and human needs and integrating flexible programming and activities, as well as community engagement to liven up these spaces without undermining the overall spatial order.

Despite these commonalities in the low levels of usage along active frontages, the two sites still exhibit significant differences in the formation logic of spatial aesthetics, reflecting different design principles and urban governance.

In QHCD, design principles have shifted from façade restoration and contextual harmony (1990s–2010s) towards adaptive reuse historical canalside buildings for tourism and commercial activities. The transition from property-led redevelopment to heritage-oriented and micro-regeneration has reduced the intensity of direct physical displacement and helped avoid the conflicts associated with large-scale demolition. However, heritage tourism has put the goal of heritage preservation and participatory planning at risk, which could also increase the threat of social division. The findings of this research show that users expressed dissatisfaction with the scale of QHCD's commercial areas (M = 3.35). Physical observations indicate that over 90% of the

stores there cater to tourism and commercial uses, aiming to recreate an environment inspired by traditional Jiangnan waterside public spaces, while serving the middle class and tourists. Furthermore, influenced by cultural-heritage-led regeneration, most QHCD buildings are planned to accommodate creative industries, cultural-heritage retail, co-working, educational facilities and studios, while only limited amenities remain for local residents' daily needs. Furthermore, this trend has led to the displacement of the original residents, a functional transformation which reflects a heritage-led waterfront regeneration that has reshaped the social relationships and character of the area, while nevertheless failing to integrate the concept of everyday heritage effectively into future policies. The semi-public realm illustrates that despite public land ownership, spatial use is increasingly impacted by consumption logics, with shopping and curated leisure dominating over ordinary local routines. In terms of water-oriented use (Wrenn et al., 1983), QHCD's canalside setting supports a denser mix of water-related activities, such as sitting, viewing, and informal socialising that gain value from proximity to the canal， though these everyday uses are increasingly filtered through commercialised semi-public interfaces, which narrows the range of non-consumptive staying and authentic daily local life.

In SBQR meanwhile, instead of small-scale incremental development and micro-regeneration, large-scale demolition has been implemented since 2021, to develop a leisure and entertainment environment suitable to meet the demands of international

urban competition. In terms of the design principles, instead of preserving and refurbishing historic buildings, their absence in this area has allowed the demolition of most waterfront buildings, to be replaced by high-rise developments characterised by a lack of active or interactive frontages, while maintaining a uniform facade treatment with glass curtain walls. Furthermore, although the overall spatial aesthetic standards of the waterfront public realm emphasise simplicity, modernity and consistent, orderly spatial layouts, the absence of small-scale commercial or cultural nodes has diminished vitality and public activities at the micro scale. In other words, a macro-scale image of simplicity and order is achieved, but the micro-scale conditions that support diverse public activities remain limited. This helps explain why the spatial aesthetics of SBQR are more strongly expressed through movement-oriented patterns of use than through sustained staying and water engagement. This activity pattern is also evident according to Wrenn et al.'s (1983) categories of water-oriented activities. In SBQR, water-independent practices (e.g., jogging, cycling and shopping) dominate and align with the linear, highly ordered spatial layout, indicating that the waterfront often functions as a generic movement corridor rather than a water-specific place. Water-related uses (e.g., outdoor dining, terraces and green spaces) do occur and benefit from proximity to the river, but their limited variety and uneven distribution limit the waterfront's capacity to generate diverse social life. Water-dependent activities remain marginal, typically appearing as temporary or episodic engagements, and have

not yet developed into sustained patterns that integrate visual aesthetics with dynamic water-based practice.

Overall, despite differences in the factors shaping the lower performance levels of active frontages at both sites, spatial aesthetics currently prioritise an enhanced visual image rather than a multi-layered “water-as-activity” placemaking approach, thereby limiting the range of waterfront experience and the durability of public life. Cultural-heritage-led regeneration in both historic and newly developed areas has enhanced aesthetic values through the transformation of the urban landscape along the water’s edge. These newly created urban images are generated to produce an “aesthetic space of representation” (Lefebvre 2003, 88). The urban waterfront regeneration projects in both sites demonstrate processes of beautification in which sites are turned into urban public places for wandering and discovering.

9.2.4 Relying on formal and informal heritage resources to reshape the place attachment and city image

From the two case studies, it is evident that perceptions of place identity in urban waterfront open spaces are multifaceted and complex. Although both sites seek to use cultural heritage resources as catalysts for regenerating existing urban waterfront open spaces, they adopt distinct approaches in practice. In the historic conservation district, local authorities have endeavoured to package local canal-related heritage resources as an effective economic policy and key approach of micro-rehabilitation to

improve competitiveness and economic restructuring in terms of Hangzhou's leisure and tourism industry, thereby reshaping place attachment. In newly developed areas, the intangible legacies of the Asian Games and the adaptive reuse of informal built heritage have the potential to reshape a distinctive new city image and collective memory, even in the absence of tangible and formally recognised heritage buildings. These contrasts indicate that place identity depends not only on what heritage resources are available, but on how they are represented and combined with everyday life practices through spatial design and governance. Building on this, the findings suggest a socio-spatial mechanism through which cultural identity becomes meaningful through three processes: (1) heritage resources are selected and recognised through interactions between experts and local residents; (2) cultural heritage and urban memory are interpreted as symbols of local identity in the built environment; and (3) these meanings are strengthened through repeated everyday practices in the public realm.

In QHCD, the heritage canal, Gongchen Bridge, the site of the former Tongyigong Cotton Mill, and associated industrial heritage buildings constitute formal tangible heritage elements, which tend to be commodified to cater to multiple types of consumers alongside ongoing micro-scale physical restoration. However, under accelerated micro-regeneration, consumption-driven activities increasingly push heritage interpretation towards city branding, turning the waterfront into a tourism-

oriented destination rather than an integrated everyday space. This shift helps explain why place identity in the heritage canal district relies less on curated interpretive products and more on lived experience and locally urban memories, which can be reflected in the lower satisfaction with E23 (cultural and digital heritage interpretation and presentation; M = 3.30), compared with the higher score for E21 (personal memory associated with urban change; M = 3.80). Although users demand digital interpretation to understand and experience historical events and local cultural character, such as through 3D reconstruction and VR interaction, digital narratives strengthen place identity only when they function as connectors to place-based experience and daily routine engagement, rather than as stand-alone spectacles that replace everyday practices. Furthermore, street furniture that closely supports everyday life often lacks historical character and cultural continuity, as reflected in the relatively lower satisfaction rating for urban furniture (M = 3.45). Nevertheless, interview participants emphasised the value of such street furniture, because it facilitates lingering, observing and resting, thereby providing everyday settings through which place identity can be repeatedly experienced. This suggests that strengthening place identity requires micro-scale design strategies that embed culturally readable cues into everyday furniture and waterside elements (e.g., materials, motifs, or naming histories), alongside governance arrangements that clarify use rights and protect nonconsumptive staying. Prior to examining how urban governance modes shape place identity in historic districts, it is essential to clarify the

relationship between heritage conservation and its impact on the gentrification. In QHCD, the early stage of heritage-led redevelopment, officially justified in terms of improving living conditions, largely served social elite interests and facilitated residents' accessing into the housing market, thereby legitimising the gentrification of the historic environment. Furthermore, accelerating micro-rehabilitation does not necessarily increase visible public conflicts. Instead, through gradual resident out-migration (often driven by rising rents and functional change) and platform-style unified management, tensions are frequently transformed from collective public confrontation into everyday restrictions on use (e.g., reduced legitimacy of non-consumptive staying), subtle exclusion from semi-public interfaces, and growing internal differentiation between beneficiaries and non-beneficiaries, thereby advancing heritage commodification by employing the discourse of cultural improvement and beautification. To avoid treating heritagisation as a purely positive process, often regarded as promoting neighbourhood social cohesion and a sense of place, policy and planning need to acknowledge the inherent tensions between residents' dispossession and newcomers' re-appropriation. Accordingly, top-down value frameworks developed by authorities and urban planners should be complemented by bottom-up value articulations that recognise and accommodate the identity claims of both long-term residents and newcomers, and these combined frameworks should be embedded within future heritage recognition and designation processes. In this context, residents may be both beneficiaries and drivers of gentrification as heritage values shift from social and

cultural meanings to economic and political interests. Under China's context-specific conception of gentrification, gentrification can be portrayed as a "beneficial process", reflected in its role in generating land-leasing revenue and helping to fulfil state-led urbanisation goals. In QHCD, notions of "regeneration" and "relocation" are also pervasive among displaced groups. According to the interview findings, most residents accepted this framing and tended to view conservation of heritage assets intervention as a once-in-a-lifetime opportunity to substantially improve their quality of life, even though it meant they had to relocate farther away.

SBQR undertakes a transformation into spectacular cities of and for physical exercise, populated by a harmonious and cosmopolitan citizenry (Luo et al., 2022). In more detail, mega-event legacies (Asian Games in Hangzhou) provide a powerful narrative resource for constructing a contemporary cultural identity, although this identity is vulnerable to homogenised aestheticisation and symbolic accumulation (Tai et al., 2023). The findings suggest that large-scale mega event driven regeneration program has tended to privilege a uniform international-style image, which may increase recognisability but reduce the distinctiveness that supports place attachment. This tendency is further reflected in the lower satisfaction mean score achieved by distinctiveness of architectural elements (M= 3.44) due to homogenised architectural forms and styles. Despite the distinctive architectural style of the newly established waterfront public service pavilions, they are often treated as separate entities and

oriented more towards younger groups and have failed to form a systematic network integrated into the existing waterfront communities. Therefore, the mechanism for fostering place identity through public spaces in newly developed waterfront areas should consider not only personal factors, such as length of residence and patterns of migration, but also the meanings created through the emotional connections between people and place.

In this sense, commodification in SBQR may operate differently from that in QHCD: rather than being dominated by tourism-oriented retail consumption, cultural identity risks being produced as cultural branding, highly visible, yet only weakly embedded in everyday life, as reflected by the relatively lower satisfaction rating of distinctive urban street (M = 3.48) and distinctiveness of architectural elements (M = 3.44). This aligns with the premise that locality is socially produced, with meanings derived from everyday experience. In this sense, informal heritage has certain heritage value, and its principal support has shifted from the upper middle class comprising a few elites to grassroot-level communities. Drawing on the living heritage approach in the heritage canal district, which takes the local community as the heritage's core responsible group and the incorporation of heritage conservation into the community process, the newly developed area should focus upon the extent of participation of the local community and to intangible elements in heritage conservation. At the same time, although government authorities and experts may still assume responsibility in the

coordination process, local opinions and voices should be incorporated into the management process of cultural heritage. Overall, SBQR suggests that informal heritage can play a key role in strengthening place identity in newly developed waterfronts. This is reflected in the high importance ratings for urban memory (M = 3.94), urban furniture (M = 3.87), and architectural elements (M = 3.76). Accordingly, each community should be encouraged to identify its own heritage traces, and collaborative relationships among older buildings, the public, scholars, and community actors can help link social values, heritage conservation practice, civic participation and contemporary urbanism in the Chinese context.

9.2.5 Facilitating inclusiveness via relaxed management practices

Across both case studies, the development of inclusive and welcoming urban waterfront open spaces that accommodate all social groups is a common feature embedded in the objectives sustaining their regeneration policies. From the perspective of the design process, it is evident that both case study areas have recently transitioned from growth-oriented to people-centred waterfront regeneration, highlighting the importance of participatory planning. Unlike previous models of bottom-up urban governance in Western countries, the new round of urban waterfront regeneration in China has implemented the “Street Planner System” with the concept of participation, which is still led by the local state, but features co-design and involves residents, local community representatives and urban designers and planners from

the local government. Although such participatory planning is supposed to encourage public consultation and represents a new model of multi-stakeholder collaborative urban governance in both case studies, public participation remains limited, particularly among older adults, who find it challenging to be involved in the decision-making processes of urban waterfront connectivity projects. This interpretation is further supported by the satisfaction scores for F18 (effective community engagement in transparent decision-making processes), which remain relatively modest in both QHCD (M = 3.46) and SBQR (M = 3.65).

Looking at how these spaces are managed, the control practices of security personnel reflect the exercise of “soft power” in their policing of the two selected sites. When addressing certain restricted behaviours, such as dog walking or street performances continuing beyond 9:00 p.m., the security personnel operated without resorting to outright coercive measures. Instead, they employed a more inclusive, subtle, soft and cooperative approach, respecting the rights and needs of all involved. This suggests that inclusiveness is shaped not only by formal participatory approach, but also by everyday regulatory practices that determine whose activities are tolerated, where, and when.

After exploring these similar characteristics, the following part identifies the key differences between the two sites in relation to their planning objectives, design process and spatial use from the perspective of inclusiveness.

Firstly, one of the primary planning objectives during the regeneration of QHCD has been to balance heritage tourism and residents' quality of life. With this in mind, urban designers and architects have aimed to create a waterfront public realm that is inclusive and equitable for all ages and social groups. The questionnaire results show that the heritage canal district demonstrates greater inclusiveness in its public spaces than is observed in the newly-developed district. This could also be attributed to the historic development of the heritage canal district, in that the area primarily served lower- and middle-class communities and has continued to retain these social networks. Furthermore, the distinctive historic and social fabric of the old canal-based district has continued to support diverse and inclusive neighbourhood relations throughout the process of spatial transformation. This ongoing inclusiveness towards all social groups within the canal-side communities has ensured equality of rights to use the newly-regenerated waterfront open spaces, regardless of individual wealth or means, for both new residents and tourists. As regards the design process, the combination of questionnaire and semi-structured interview results shows a higher demand at QHCD for play areas for children and flexible spaces with movable tables and chairs. These local citizens' demands align with Lefebre's (1996) concept of the "right to the city", which highlights users' rights both to have equal access to basic public services and to be fully involved in the process of urban space development, thereby avoiding spatial segregation (Jian et al., 2020). These demands should not be regarded merely as requests for additional physical amenities, but could be considered

a manifestation of the right to participate in the shaping of urban space and to access its benefits on equal terms. As Soja (2010) noted, physical justice constitutes a fundamental and stable background that supports social justice through its influence on social action. In terms of spatial use, inclusiveness in the QHCD is primarily reflected in daily activity patterns of coexistence, whereby different social groups are able to find suitable places on historic urban waterfronts to engage actively in their pursuits without causing social conflict. Direct observation and semi-structured interview data indicate that the commercial streets, the area surrounding Gongchen Bridge and the squares near the museum entrances are key shared spaces frequently used by both residents and tourists. Elderly groups, for instance, always gather in the pavilion near the museum between 8:00 and 10:00 in the morning for dance activities, while in the evening hours from 6:00 to 9:00, they occupy the canal plaza for social interaction, exercise and square dancing. By contrast, younger users and tourists are more often observed on Gongchen Bridge, taking photographs and enjoying the scenery, or participating in leisure activities along the canal-side commercial promenade.

At SBQR, part of the waterfront planning objective in the post-Asian Games era was to construct public spaces that would serve the surrounding high-end communities. In terms of design principles, although these waterfront public spaces are physically accessible to everyone, the provision of sports facilities and the layout of cycling routes

along the waterfront primarily cater to younger groups, thus failing to adequately incorporate the needs of older adults, who are partially marginalised as a result. Another key finding is that the creation of point-based waterfront service pavilions along the linear waterfronts has been one of the major regeneration projects in this area. These pavilions, positioned at intervals ranging from approximately 200 to 1,000 metres, mainly accommodate coffee shops, exhibition spaces and other public service functions. Nevertheless, existing urban waterfront public service pavilions are not open 24/7, which can be supported by the lowest mean satisfaction score of F14 (the 24/7 operational availability of waterfront open spaces, M = 3.47). At Node D in particular, the waterfront service pavilion has been converted into a restaurant, which fails to meet some important day-to-day needs of residents and visitors, such as access to first-aid supplies, drinking water, or temporary storage. These shortcomings can be traced back to the design stage, where the everyday demands of users, particularly those of marginalised groups, were neither systematically collected nor adequately reflected in the planning and decision-making process. This circumstance indicates that participatory planning in China remains at a starting stage, and because the opening hours of these waterfront public service pavilions often do not align with local residents' after-work schedules, opportunities for consultation are time-restricted, and public participation has therefore remained limited in practice. In addition, direct observations shows that activities are primarily dominated by younger users, with older adults relegated to marginal zones. These observations suggest that the activities of

older adults, including playing musical instruments, choral singing and square dancing, are primarily concentrated in under-bridge spaces and open areas of the waterfront plazas. Based on these findings, to improve their quality of life and to create an age-friendly urban waterfront public realm, it is necessary to adopt human-centred design strategies, which should address the lack of flexible seating and the insufficient integration of primary and secondary seating arrangements, while also mitigating conflicts between younger and older users that arise from noise and other forms of mutual disturbance during activities in shared spaces.

In summary, inclusiveness should not be reduced to the simplistic expansion of participation, as merely increasing the number of participants does not necessarily ensure meaningful social inclusion. Rather, meaningful inclusiveness depends on whether participatory mechanisms are adapted to specific institutional and socio-cultural contexts, including existing governance structures, the strength of local community networks, the extent of place attachment, and the extent to which different social groups can participate in decision-making and translate their needs and values into action. In this respect, inclusiveness is also shaped by who dominates heritage conservation and spatial transformation, and by the extent of local community participation in these processes. As such, the scholar–community–heritage relationship can be understood as a dynamic coordination process among scholar participation, community processes and heritage evolution. From this perspective, a

more inclusive approach to waterfront regeneration depends not simply on the presence of participation, but on whether these interactions can be translated into a more responsive, socially-based and context-sensitive process of urban governance.

9.3 Summary of the Key Findings

This section aims to synthesise the key research findings in relation to each research question and the study objectives, while establishing connections with the reviews of the existing literature.

9.3.1 Research Question One & Objective One: Definition of urban waterfront regeneration that incorporates the role of culture and heritage

This section addresses Research Question One and Objective One by clarifying how urban waterfront regeneration can be defined when culture and heritage are understood as integral components of waterfront transformation rather than as supplementary elements. Drawing on the literature reviewed in Chapter 2, the findings show that urban waterfront regeneration has evolved significantly since the 1960s, when many abandoned and underused waterfronts first became major targets of urban redevelopment. Over time, successful waterfront regeneration has come to be understood not simply as a urban planning strategy for physical restoration or economic revitalisation, but as a broader social, spatial and cultural process involving the reusing of urban resources and the negotiation of interests among multiple actors.

The review of waterfront regeneration at different historical stages demonstrates that culture and heritage have become increasingly important in shaping contemporary waterfront open spaces globally. At a more detailed level, tangible cultural heritage elements (such as historical canals, buildings, piers, bridges and hydraulic infrastructure) and intangible cultural heritage elements (such as urban memory, local history, social relationships, emotional experiences and cultural identities) both support reconstruction of the local identity and social meanings. In addition, the literature indicates that community participation has become an increasingly important dimension of cultural- and heritage-led regeneration, particularly where long-term sustainability depends on balancing public interest, social inclusion and public involving in decision-making.

Based on these findings, this study conceptualise urban waterfront regeneration as a comprehensive process of socio-spatial and cultural heritage interpretation in which waterfront spaces are reshaped not only through physical redevelopment, but also through the heritage conservation and everyday integration of cultural and heritage resources. It involves connecting old and new urban elements, creating new meanings and uses, supporting adaptive reuse, facilitating cultural identity, encouraging cultural and creative activities, and integrating heritage within daily life and placemaking practice. This interpretation also aligns with broader theoretical perspectives discussed in Chapter 2, including the concept of creative city, Historic Urban

Landscape (HUL) and everyday heritage. Together, these theoretical fundamental suggest that future waterfront regeneration should move beyond narrowly commercial or flagship-led redevelopment models. This result is consistent with Jones's (2017) findings, which highlight the key trajectories shaping future sustainable waterfront transformation from commercial developments and leisure markets to more inclusive, socially sustainable, entrepreneurial, culturally and innovatively relevant and integrated regeneration objectives.

The literature also makes clear that the use of culture and heritage in waterfront regeneration is not without tension. Such cultural heritage-led strategies may lead to gentrification, cultural commodification and the exclusion of the pre-existing social milieu and the original patterns of daily life. Therefore, this chapter argues that successful urban waterfront regeneration cannot be judged solely by spatial and physical improvement, cultural branding or economic development. Instead, it depends on whether regeneration can unlock the everyday value of heritage, balance the conflicts between development and place identity, reuse heritage resources in meaningful and new functions, and strengthen community participation in planning and urban management. These four aspects together provide a clearer conceptual foundation for understanding how culture and heritage should be incorporated into contemporary urban waterfront regeneration that can shape public realm.

9.3.2 Research Question Two & Objective Two: The influence of culture heritage-led regeneration on shaping different types of waterfront open spaces in heritage canal districts and newly-developed zones within the Chinese context

In addressing the sub-question, “How does culture heritage-led urban waterfront regeneration shape different types of waterfront open space in heritage canal districts and newly-developed zones within the Chinese context?”, Chapter 3 argues that cultural-heritage-led regeneration in China has produced two distinct but interrelated spatial typologies of urban waterfront open space: the heritage canal district along the Beijing-Hangzhou Grand Canal and the newly developed waterfront areas. Rather than viewing waterfront regeneration as a uniform national process, the chapter shows that these two models shaped new public realm that needs to examined, while they have been shaped by different historical periods, spatial structures and urban governance, and that these differences are crucial for interpreting how waterfront public space is generated, used and managed.

In the heritage canal district, the traditional spatial form of waterfront open space remains fundamentally rooted in the historical water-street typology derived from the Beijing-Hangzhou Grand Canal, and emerged through spontaneous commercial and social activities closely connected to canals, streets, bridges, marketplaces and courtyard-based public spaces. Chapter 3 shows that contemporary culture- and heritage-led regeneration along the Beijing-Hangzhou Grand Canal has gradually transformed these spaces through heritage tourism, façade-oriented restoration,

ecological corridor construction and the adaptive reuse of historic buildings into museum and creative clusters. However, the chapter has shown that, from the 1980s onwards, and particularly since the 2000s, cultural-heritage-led regeneration along the Beijing-Hangzhou Grand Canal has focused upon heritage conservation, façade restoration and tourism development. While these strategies have helped preserve canal landscapes and strengthen ecological corridor construction, they have also reduced the role of such spaces as integral parts of everyday life and social production. Over-commercialisation, the controlled representation of industrial history along the Beijing-Hangzhou Grand Canal and the growth of semi-public realms have weakened opportunities for spontaneous and informal use, while local residents still lack a meaningful voice in redevelopment decision-making and in determining the functional direction of adaptive reuse.

By contrast, newly developed waterfront areas in China have been shaped primarily through planned urban expansion, ecological restoration and the creation of new urban images. These spaces are usually characterised by the integration of green spaces, waterfront promenades, public service infrastructure and cultural landmarks into a point-line spatial structure. In these areas, culture resources is facilitated less through tangible historic heritage and more through mega-events legacy, public art, exhibitions, sports activities and symbolic place branding, all of which contribute to the formation of new urban identities and collective memories. These contemporary

waterfront spaces therefore tend to function as top-down planned but people-oriented and visually coherent public spaces that support physical excises, leisure and sociialising, while also serving broader goals of ecological rehabilitation and city branding. **Nevertheless, the chapter also suggests that the extent to which these newly developed spaces, including post-Asian Games legacies such as landmark buildings, sculptures and symbolic urban features, can generate new collective memory and facilitate community attachment remains to be critically examined.**

To further examine these key argument in a concrete urban context, the chapter has demonstrated that Hangzhou provides an especially appropriate urban context for comparing these two typologies, due to its long historical development, polycentric spatial form and dual waterfront transformation. On the one hand, the HQCD reflects the transformation of a production-oriented and industrial waterfront into a heritage-led canal district. On the other hand, the SBQR reflects the emergence of a newly developed waterfront shaped by culture-led planning, mega-event legacy and people-oriented regeneration. In this sense, Hangzhou's shift from the "West Lake Era" to the "Qiantang River Era", together with its broader polycentric urban development, provides the historical and spatial basis for selecting the two comparative case study areas.

Overall, this chapter has shown that although both traditional canal districts and newly developed waterfront zones are increasingly shaped by cultural-heritage-led regeneration and both aim to improve public life, **they do so through different socio-spatial mechanisms**. Heritage canal districts are primarily shaped by the conflicts between heritage conservation and adaptive reuse, as well as tourism development and everyday life continuity, whereas newly developed waterfront zones are more strongly driven by ecological infrastructure and mega-event legacy to shape new place identity. This distinction is important because it establishes the contextual and conceptual fundamental for the following chapters, which examine how the quality of waterfront open space is perceived and experienced by users in the two Hangzhou case study areas.

9.3.3 Research Question Three & Objective Three: Identification of the key factors affecting urban waterfront open space qualities

Chapter 4 addresses research question three and objective three by identifying the key factors affecting the quality of urban waterfront open spaces. Chapter 4 shows that existing public space quality and publicness models provide an important theoretical foundation. However, these models also reveal several limitations when applied to urban waterfront open spaces. Some focus primarily on the degree of publicness rather than on overall spatial quality; others pay insufficient attention to users' perceptions of place identity, comfort and safety, and these perceptual dimensions lack sufficiently detailed second- and third-level indicators for examining

experiential dimensions. Overall, many general public space models do not adequately capture waterfront-specific design concerns (such as water accessibility, promenade continuity, flood resilience, biodiversity and the integration of waterfronts with their hinterlands), as well as subjective dimensions. In this sense, the relation Maslow's (1968) five-stage hierarchy of basic human needs to people's needs in public spaces is fundamental in shaping the first-level dimensions. Maslow's theory points out that physiological needs are the fundamental aspects of warmth and comfort. Safety and security needs refer to feeling safe from natural and human threats. After satisfaction of these two levels of need, affiliation needs can reflect a sense of belonging, community cohesion, inclusiveness and social stability. The need for esteem includes a sense of control and involvement, and the upper (final) level is self-actualisation needs, related to fulfilment, beauty, enjoyment and personalisation. Building on these insights, this study establishes a research framework comprising six quality factors: access and linkage; safety; comfort; spatial aesthetics; place identity; and inclusiveness, together with their associated sub-factors, which are used to assess users' perceptions and preferences. This research framework considers how subjective factors can be assessed through objective variables, which could in turn provide new insights for assessing the quality of urban waterfront open space based on human factors.

9.3.4 Research Question Four and Five & Objective Four and Five: Users' perceptions and attitudes towards urban waterfront open space quality and their implications for future development

By turning to the ongoing waterfront open space transformation in Hangzhou and the combination of the relationship between public space development and the broader cultural heritage-led regeneration efforts, this study identifies commonalities and differences based on users' perspectives across the two case-study sites. Chapter 7 utilises quantitative data from semi-structured online questionnaires to rank the importance and performance degree of variables (the third level) based on a five-point Likert scale (i.e. ranging from 1 to 5). This approach breaks down subjective perceptions into objective variables, thereby providing empirical findings that address sub-question 4 and objective 4 as they relate to perceptions of the differences in the quality of urban waterfront open spaces between heritage canal districts and newly-developed zones. Furthermore, an Importance-Performance Analysis (IPA) is presented in Chapter 7 to help identify priorities for addressing sub-question 5 and objective 5, examining how users' perceptions can inform urban waterfront regeneration strategies in the future. In Chapter 8, qualitative data derived from direct observations and semi-structured interviews are systematically analysed according to the research framework established in this study, with a focus on the perspectives of residents, visitors, designers and managers. The findings suggest that cultural heritage-led waterfront regeneration can produce different types of high quality public space, but through different methods. In the heritage canal district, despite their rich

cultural heritage resources, are more likely to shaping place identity and historical memory. However, the incomplete representation of industrial heritage and the limited continuation of residents' everyday experiences mean that the historical narrative remains fragmented. By contrast, newly developed waterfronts, although lacking a wide range of urban heritage resources, are able to foster new forms of urban memory through continuous, open and modern public facilities that encourage walking, cycling and jogging, together with the incorporation of Asian Games legacies and newer but locally meaningful buildings that have not been formally recognised as heritage. Lastly, through the integration of online questionnaire surveys, direct observations and semi-structured interviews, Section 9.2 presents a further systematic analysis of how users perceive and experience waterfront public spaces in the Heritage Canal District and in the newly-developed zone of Hangzhou, which will help shape urban waterfront placemaking and implications for future development based on the three aspects of development and management objectives, design process and spatial use, as seen in Table 9-1.

Table 9-1 Similarities and differences between the two sites in urban waterfront placemaking (Source: author)

Dimension	Commonalities in both QHCD and SBQR	QHCD (Heritage Canal District)	SBQR (Newly developed Zones)
Access & Linkage	● **Findings from the interviews**: Both sites focus on improving connections between waterfront open spaces and their hinterland by *eliminating breakpoints.* ● **Findings from the questionnaires**: Users attach high importance to *continuity of waterfront promenade routes* and to *public accessibility of water.* ● **Observation findings:** Users are positioned as passive observers with limited opportunities for multisensory waterfront experiences at both sites. In addition, **walking and enjoying the scenery**, with peak activity periods occurring at similar times, namely **between 19:00 to 21:30 p.m**. **Implications: future placemaking approach could：** ● Adding dynamic *water features/water-related installations* along the waterfront to improve both active and passive water engagement. ● Providing *user-friendly entrances and wayfinding* and enhance the accessibility of basic public service facilities (parking, transit, bins, toilets, etc.) at key nodes along urban waterfronts.	● **Findings from the interviews**: limited opportunities for *multisensory waterfront walking experiences.* ● **Findings from the questionnaires**: *pedestrian bridges* are perceived as valuable elements. ● **Observation findings**: More *social activities* occur around the historic pedestrian bridges. **Implications: future placemaking approach could：** ● Improving *cross-water connections* through construction of **new** *pedestrian bridges* that should be integrated into daily routine while ensuring compliance with heritage regulations. ● **Adding** *small-scale sports facilities* surrounding historical waterfront community areas. ● Adding continuous cycling loop at buffer zone edge that can be integrated with the existing pedestrian routes within the consideration of historic fabric.	● **Findings from the interviews**: *multi-level slow-mobility system* integrating walking, jogging and cycling is really important for everyday life. ● **Findings from the questionnaires**: Users attach high importance to *physical accessibility to cultural venues*. ● **Observation findings**: Local residents deliberately choose longer recreational pedestrian loops rather than direct shortcut. **Implications: future placemaking approach could：** ● Integration of *multi-level slow-mobility networks.* (walking, jogging, cycling) with water-based routes ● Improving the *accessibility of cultural venues.* ● Introducing *water features,* such as pavement fountains or water.
Safety & Comfort	● **Findings from the interviews**: Low activity levels in areas with *high CCTV density* ● **Findings from the questionnaires**: *natural surveillance* through design method to prevent crime is welcoming*; lighting quality, seating arrangement and shelter* are key physical settings to enhance daily comfort; Lack of *artificial shading* in high-activity areas; Users attach high importance to *seating materials.* ● **Observation findings:** *Low activity levels* in areas *with high CCTV density* **Implications: future placemaking approach could：** ● Adding *artificial shelters* around waterfront promenade routes. ● Encouraging *movement and good visual connections* to increasing safety. ● Enhancing current *seating materials with water-repellent prosperities.*	● **Findings from the interviews**: *lighting quality and the number of cultural events along the secondary waterfront pedestrian routes* are lower than that of commercial street surrounding canals. ● **Findings from the questionnaires**: *Higher tolerance of security presence* (although women raised concerns about privacy); ● *Private guards existing at key nodes* did not interrupt the daily life and tourism-related activities. **Implications: future placemaking approach could：** ● Enhances *lighting quality* while introducing more cultural activities along secondary waterfront pedestrian streets.	● **Findings from the interviews**: *the integration of existing public flooding infrastructure and greenways* to enhance ecological benefits as well as mental and physical well-being performance well. ● **Findings from the questionnaires**: *the multiple options for formal and informal seating areas* is limited; few places with l*ower noise* level when resting. ● **Observation findings:** *Private guards existing at key nodes* did interrupt the daily life and tourism-related activities. **Implications: future placemaking approach could：** ● *Adding primary and secondary seating* under the bridge. ● Decreasing the *security guard's* presence at key nodes along the urban waterfront.
Spatial aesthetics	● **Findings from the interviews**: Spatial aesthetics contribute to placemaking only when *visual order is translated into usable social settings that support staying, appropriation and social interaction*, rather than remaining at the level of facade-led image construction; *Spatial homogenization could limit the socialising.* ● **Findings from the questionnaires**: Users attach high importance but lower satisfaction rating to the proper scale of residential blocks. ● **Observation findings:** *Active frontages* mainly support *short-term and temporary activities.*	● **Findings from the interviews:** *spatial homogenisation, low privacy and blurred boundaries within the semi-public realm* reduce the social performance of active frontages; *Over-commercialisation and tourism* pose risks of eroding everyday life and residential functions. ● **Findings from the questionnaires**: Users attach high importance but lower satisfaction rating to the *articulation between historical and contemporary building styles.* ● Observation findings: semi-public spaces are	● **Findings from the interviews**: Lack of *small-scale retail and cultural facilities*; *the uniform of high-rise building glass facades* reduce the unique walking experience. ● **Findings from the questionnaires**: Scale of the cultural and commercial nodes does not correspond well to the human scale. ● **Observation findings:** spatial aesthetic of the waterfront is expressed more strongly *through movement-oriented use than through staying, water engagement or sustained social interaction.*

	Implications: future placemaking approach could： ● rebalancing *visual coherence with human needs* by integrating flexible programming, adaptable social spaces and more diverse micro-scale settings into the design of active frontages and semi-public edges. ● Balancing *historical and contemporary building styles.*	increasingly organised around *consumption and short-duration use.* **Implications: future placemaking approach could：** ● Focusing on diversifying the social and functional character of semi-public interfaces, thereby improving *flexible everyday use* without undermining contextual harmony. ● Developing *mixed use programming* that supports local daily life in addition to heritage tourism and curated leisure.	**Implications: future placemaking approach could：** ● Introducing more *small-scale cultural, leisure and commercial nodes* along the promenade to support everyday social use. ● Enhancing the relationship between *visual permeability and lived public life at ground-floor interfaces.*
Place identity	● **Findings from the interviews**: Lack of *digital tools to express historical events and urban heritage resources in the public realm of urban waterfront.* ● **Findings from the questionnaires**: *Steet furniture and water feature* in both case studies lacks sufficient historical and local cultural characteristics and needs to be improved. ● **Observation findings**: place identity depends not only on *spatial image, but also on how heritage meanings are embedded in everyday use, memory, and public experience.* **Implications: future placemaking approach could：** ● Developing *digital tools*, such as 3D and VR to express *historical events and urban heritage resources in the public realm of urban waterfront.* ● Hosting more *local festivities* and celebration of heritage, which generate a sense of local identity and belonging. ● *Water features, such as fountains and water-related design installations* should improve their *distinctiveness.*	● **Findings from the interviews**: For both serious and, to some extent, casual heritage visitors, the attraction lies not only in museum-based display, but in whether *the canal district's everyday life and residents' lived memory are incorporated into heritage narratives* ● **Findings from the questionnaires**: Users attach high importance to *the uniqueness of balconies.* ● **Observation findings:** *some industrial heritage elements are missing* and have not been adequately presented. **Implications: future placemaking approach could：** ● Understanding the *authenticity* (objective, constructive and existential) according to different user groups ● *The tangible heritage buildings, such as ancient water gates, moats and industrial buildings*, can be embedded into the urban fabric to connect local communities and daily walking routes, thereby enhancing belongingness.	● **Findings from the interviews**: Heritage is not understood only as *old or officially listed assets;* newly developed spaces can also gain heritage value through social recognition and everyday use. ● **Findings from the questionnaires**: Users attach high importance to *the uniqueness of decorative elements and outdoor elevated walkways.* ● Observation findings: Faces risks of *symbolic capital accumulation and urban landscape homogenisation*; *New waterfront public service pavilions* are distinctive in design but lack systematic networking and local integration, with a bias towards younger users. **Implications: future placemaking approach could：** ● Strengthening *community-based interpretation of informal heritage,* integrate cultural identity more closely with everyday public use. ● Enhancing the *informal heritage buildings*' role in shaping new urban memory. ● Encouraging ongoing *cultural activities and public art*, enabled by multi-stakeholder collaborative governance in the future.
Inclusiveness	● **Findings from the interviews**: Both sites' emphasis on *participatory planning* (e.g.the "Street Planner System"), but in practice public participation in decision-making *in its early stage.* ● **Findings from the questionnaires**: Users attach high importance to free use *flexible elements.* ● **Observation findings**: *Social conflicts and relaxed management* encourages more social activities. *Social conflicts* between residents and tourists are relatively limited at both sites **Implications: future placemaking approach could：** ● strengthening both *participatory planning and everyday management* responsiveness, with more systematic attention to the needs of less vocal and *marginalised groups, including older adults, children and non-consuming user*s.	● **Findings from the interviews**: *mixed-age activity patterns and fine-grained neighbourhood spaces* support a relatively broader range of users. ● **Findings from the questionnaires**: higher demand for *children's play areas and flexible movable seating; design reflects "right to the city" (Lefebvre).* ● **Observation findings**: *Residents and tourists share key nodes* (e.g. Gongchen Bridge, museum squares), *while elderly dominate plazas* (morning dance, evening square dancing). **Implications: future placemaking approach could：** ● introducing more *child-friendly and flexible facilities.* ● improving mechanisms for community consultation and human demands.	● **Findings from the interviews**: *elderly people* are frequently marginalised. ● **Findings from the questionnaires**: Participation remains largely government-led and only partially responsive to everyday needs, especially in relation to *opening hours.* ● **Observation findings**: Public service pavilions are more strongly oriented towards *younger and more mobile users*, while *older adults* are more often concentrated in under-bridge spaces and marginal area **Implications: future placemaking approach could：** ● adopting a more human-centred and age-friendly approach by improving flexible seating, service provision and the everyday usability of public service pavilion.

9.4 Contribution to Knowledge

In terms of its t**heoretical contribution**, this research has furthered the development of the existing literature on assessing urban waterfront open spaces generated by culture- and heritage-led regeneration in the Chinese context. In particular, both the public spaces along the Beijing-Hangzhou Grand Canal and those in newly-developed waterfront zones, as two distinct types of urban form in the Chinese context, have been reshaped by waterfront regeneration. Although numerous studies have explored the development of urban waterfront open spaces, a comparative study of development across the two different sites has not previously been undertaken. The cultural and historical background, public values and regeneration policies for developing waterfront open spaces along the Beijing–Hangzhou Grand Canal differ from those in newly-developed zones. Although empirical results demonstrate a certain degree of commonality in users' perceptions across the two types, they also indicate that, in the heritage canal district, the role of urban culture and heritage resources has not been fully transformed into an effective mechanism for shaping place identity, but instead encourages unsustainable tourism development and over-commercialisation.

Furthermore, much of the existing research has either focused on the impact of urban waterfront regeneration on shaping social, economic and physical sustainability or examined waterfront public spaces themselves, while neglecting the interrelationship between the two. Nevertheless, whether in heritage canal districts or newly-developed zones, urban waterfront open spaces are being reshaped as a result of regeneration efforts, and are themselves reshaping the new public realm in the Chinese context. This thesis shows that the improvement of urban waterfront open space quality

requires bridging macro-level regeneration policies with users' needs at the the micro-level. This would help to compensate for the limitations of China's predominantly top-down, state-led model of waterfront regeneration.

Most importantly, existing literature provides few evaluation frameworks for assessing the quality of waterfront open spaces, with the majority utilising quality frameworks designed for the public space in general. These evaluation frameworks often combine subjective and objective dimensions without a clear distinction and lack the secondary indicators and third level of sub-indicators deployed in this research. Therefore, this study contributes to the establishment of a unique three-level research framework to assess urban waterfront open space quality and, by employing objective tertiary sub-sub indicators as fundamental variables, to examine subjective primary dimensions. In practice, the framework is intended to function as a diagnostic-to-action tool rather than a checklist applied in full. A brief simplification strategy is therefore adopted. First, variables are contextualised and filtered according to site-specific characteristics to produce a smaller core set. Second, this core set can be tested through a pilot study in which both experts and residents rate variable importance, allowing consistently low-ranked or redundant items to be removed. Third, during questionnaire instrument design in the analysis stage, the retained variables are reviewed to confirm conceptual coverage across dimensions, ensuring that simplification does not undermine the integrity of the overall framework.

In addition, this study extends the concept of the place-shaping continuum as an elaboration of place-making theory, combining development and management in the Chinese context, where state-owned waterfront agencies undertake both. By dividing interview groups into designers, managers, residents and other stakeholders (e.g.

tourists), the study enriches the theoretical and waterfront placemaking practicality of the framework in the Chinese context.

Regarding its **empirical contribution**, this thesis has provided important new evidence on users' perspectives and attitudes towards urban waterfront open spaces in the selected case studies. Through a combination of 1540 questionnaires, 30 semi-structured interviews and direct observations, this study reveals the similarities and differences in users' perceptions and attitudes towards urban waterfront open spaces in both exemplars. In addition, the empirical results are fundamental to the assessment of 110 variables designed to evaluate the quality of urban waterfront open spaces across the two selected sites, at the same time considering respondents' assessments of both importance and satisfaction. By comparing urban waterfront open spaces along heritage canal districts with those in newly-developed waterfront zones, this research provides key insights into the commonalities and differences in users' perceptions and attitudes, which are absent from existing empirical data in the Chinese context. Currently, the majority of empirical studies on urban waterfront development in China focus too much on Shanghai or Shenzhen, while canal cities such as Hangzhou have received limited scholarly attention. The findings of this study thus hold practical significance for informing the future development of urban waterfront public spaces in Hangzhou, China.

In relation to its **methodological contribution**, the mixed-methods approach has been adopted in this research, applying Importance–Performance Analysis (IPA) to the quantitative online questionnaire data, and combining this with semi-structured interviews and direct observations as its key qualitative methods. Furthermore, this

study proposes a user-oriented research framework that emphasises a comparative analysis across multiple groups – namely residents, tourists, designers and managers.

9.5 Limitations and Future Recommendations

Due to the scope of the research and the time limitations mentioned earlier, this study has focused solely on the Hangzhou context. However, the cultural heritage-led waterfront regeneration experienced by other canal cities along the Beijing-Hangzhou Grand Canal may differ from that observed in Hangzhou. The latter's culture- and heritage-led regeneration and the development of its waterfront open spaces are relatively advanced and considered to be a successful paradigm within the context of urban regeneration in China. By contrast, second- and third-tier canal cities, or first-tier canal cities in northern China, may differ in their social, economic and environmental aspects, which in turn could shape different pathways for enhancing the quality of waterfront public spaces. Furthermore, the urban waterfront along the Hangzhou Section of the Beijing-Hangzhou Grand Canal is undergoing continuous transformation and regeneration, and the data collected in this study reflects only a specific stage and core sections of the urban waterfront open spaces along heritage canals and the Qiantang River. To achieve a more comprehensive understanding of their development, future studies could also incorporate a broader scale of core nodes along the Hangzhou section of the Grand Canal and Qiantang River to aid in the creation of high-quality places on the urban waterfronts.

In addition, this study's direct observations were conducted only during the summer months, without covering other seasons such as winter. As a result, potential seasonal variations in activities and everyday behaviours, particularly those shaped by climatic conditions, were not captured within the scope of this research.

Although this research attempted to quantify users' perception of and attitudes towards the urban waterfront open spaces, users may have different opinions and judgment standards and some individual cases may represent extreme circumstances. Furthermore, due to limitations on time, the study proceeded directly with the questionnaire survey without conducting a pilot study of the established research framework at the initial stage. As a result, some ineffective variables could not be screened out in advance.

Furthermore, future research could be extended from other canal cities along the Beijing-Hangzhou Grand Canal to international cases, comparing the differences between public space development in historic canal districts and newly developed waterfront zones from a similar user-centred perspective. The established research framework could therefore be assessed – and its validity corroborated – across a wider range of case studies. If the aim of future research is to establish an assessment framework for evaluating the quality of urban waterfront open spaces in general, the framework developed in this study could be further refined through the application of other factor analysis methods, such as Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA), in order to determine appropriate evaluation indicator systems across a wide range of contexts.

The contribution of this study is evident in its potential to influence future waterfront place-making practices. In other words, by comparing the commonalities and differences between public spaces in the heritage canal district and those in the newly developed waterfront zones on the basis of users' perspectives and attitudes, it is possible to assess whether cultural heritage-led regeneration has fulfilled its intended role in creating high-quality places within the Chinese context. However, in order to

further examine how cultural heritage-led regeneration reshapes the public realm, it is necessary to develop a deeper understanding of the relationship between regeneration strategies and subsequent development. Thus, the official policy documents relating to waterfront regeneration in China should be systematically identified and organised chronologically, so that they can be analysed along with the frequency of use of urban waterfront open spaces. Moreover, the direct observation approach in future studies could employ “big data” techniques, for instance in the analysis of social media content, to further interpret usage and behavioural patterns in urban waterfront open spaces.

In summary, both cases highlight the importance of development quality and a people-centred approach within the broader context of co-creation of public space and social life. Although the development of urban waterfront open spaces currently remains situated within the traditional top-down urban agenda, human factors and participatory planning have emerged as experimental approaches in waterfront place-making practice. With this in mind, it is necessary to establish an integrated and systematic framework that incorporates daily route patterns and citizens’ perceptions of daily enjoyment, in turn establishing a fruitful dialogue between past and present.

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APPENDICES

Appendix A-Ethics Approval Documents

Ethics Committee Reviewer Decision

This form must be completed by each reviewer. Each application will be reviewed by two members of the ethics committee. Reviews may be completed electronically and sent to the Faculty ethics administrator from a University of Nottingham email address, or may be completed in paper form and delivered to the Faculty of Engineering Research Office.

Applicant full name Zilun Shao

Reviewed by: S08

Name

Signature (paper based only) ……

Date 04/06/2024

- [x] Approval awarded - no changes required
- [ ] Approval awarded - subject to required changes (see comments below)
- [ ] Approval pending - further information & resubmission required (see comments)
- [ ] Approval declined – reasons given below

Comments:

n/a

Please note:

1. The approval only covers the participants and trials specified on the form and further approval must be requested for any repetition or extension to the investigation.
2. The approval covers the ethical requirements for the techniques and procedures described in the protocol but does not replace a safety or risk assessment.
3. Approval is not intended to convey any judgement on the quality of the research, experimental design or techniques.
4. Normally, all queries raised by reviewers should be addressed. In the case of conflicting or incomplete views, the ethics committee chair will review the comments and relay these to the applicant via email. All email correspondence related to the application must be copied to the Faculty research ethics administrator.

Any problems which arise during the course of the investigation must be reported to the Faculty Research Ethics Committee

Ethics Committee Reviewer Decision

This form must be completed by each reviewer. Each application will be reviewed by two members of the ethics committee. Reviews may be completed electronically and sent to the Faculty ethics administrator from a University of Nottingham email address, or may be completed in paper form and delivered to the Faculty of Engineering Research Office.

Applicant full name Zilun Shao

Reviewed by: M03

Name

Signature (paper based only) ……

Date 20/02/2024

- [x] Approval awarded - no changes required
- [ ] Approval awarded - subject to required changes (see comments below)
- [ ] Approval pending - further information & resubmission required (see comments)
- [ ] Approval declined – reasons given below

Comments:

1. Ethics application form Q3: the answer should be 'No'. The researcher does not recruit participants under 18 years old and the participants information sheet, consent form and questions will be translated in Chinese.
2. The consent form for the interviews, please remove this statement "I agree I have one chance to withdraw or refuse this interview without any consequences before two days for the interview." as it sounds like, there will be consequences if participants withdraw their consent two days before the interview. Unfortunately, as participation should be on a voluntary basis, they can withdraw at any time.
3. Statements on the participant information sheet for the interviews: "If you do not wish to be recorded, these recordings can be transcribed and translated by the software of the Tengxun meeting or Otter, if necessary." This statement does not make sense; please amend as appropriate. If the participants refuse to be recorded, then the researcher can still proceed with the interview and make notes by hand. Also, please provide a tick for each statement in the consent form, so that even participants who refuse to be recorded can still participate.
4. Please add an additional statement in the consent form for all data collection forms (online questionnaires and interviews): "I understand that my data will be transferred to the UK and subsequent data-processing operations will comply with General Data Protection Regulation (GDPR) "
5. For the interview data collection, please avoid obtaining the name of the participant, especially as the data will be transfer to the UK. Obtaining the job position and how long they have done their job is fine. As the researcher will report the findings anonymously anyway, I don't see why there is a need to obtain the name as part of the data collection. It is OK to request the name on the participant consent form. Please also change your response to Q4 in the ethics application form to 'No'.

Please note:

1. The approval only covers the participants and trials specified on the form and further approval must be requested for any repetition or extension to the investigation.

Appendix B- Recruitment Email, Consent Form and Online Questionnaire Questions (Q1)

Users' Perceptions and Preferences of Urban Waterfront Open Space Quality: A Comparative Study of Two Regenerated Waterfronts in Hangzhou, China

Invitation for online questionnaire (Set1) – Email text

Dear [**community member representative** of the core district of Hangzhou Heritage Canal in China/ xxx university **experts** who involved in the urban waterfront open place improvement projects in the Hangzhou Heritage Canal District (Qiaoxi) in China / **management staff** who have managed the urban waterfront open spaces along the core district of in the Hangzhou Grand Canal in China],

My name is Zilun Shao, I am a PhD student from the Department of Architecture and Built Environment, University of Nottingham. I am currently conducting a questionnaire as part of PhD research project titled "Users' Perceptions and Preferences of Urban Waterfront Open Space Quality: A Comparative Study of Two Regenerated Waterfronts in Hangzhou, China". The study investigates the relationship between the use experiences and the quality of urban waterfront open spaces in the context of urban waterfront regeneration. It is anticipated that such findings may benefit for reformulating appropriate cultural-heritage-led urban waterfront regeneration strategies and inform urban waterfront design principles to improve the quality of public spaces on the urban waterfront.

I am seeking particiapnts to participate in an online questionnaire, which may take about 20-25 minutes to complete. Participants are 18 years old or older, and once have been to the urban waterfront open spaces along the core district of Hangzhou Heritage Canal in China. Participation is completely voluntary, and all answers will be anonymous. Participants are free to withdraw at any time without any consequences of any kind. If you are interested in this questionnaire and have been to the urban waterfront open spaces along the core district of Hangzhou Heritage Canal in China, please click the link [insert link] (the consent form and questions will appear) for the additional information about online questionnaire.

Furthermore, I am also conducting an interview to discuss the questionnaire about the user experiences, perceptions and the factors that influence the quality of urban waterfront open spaces. Participants for interview are 18 years old or older, including (1) **residents** of the core district of **Hangzhou Heritage Canal in China**, who once have been to the urban waterfront open spaces along the core district of **Hangzhou Heritage Canal in China;** (2) **visitors** who once have been to the urban waterfront open spaces along the core district of **Hangzhou Heritage Canal in China**; (3) **experts** involved in the urban waterfront open place improvement projects in the core district **of Hangzhou Heritage Canal in China**;(4) **management staff** who have managed the urban waterfront open spaces along the core district of **Hangzhou Heritage Canal in China**. The interview will be conducted by phone, Tencent Meeting, WeChat or in-person and may take around an hour (depending on your availability). Participation is completely voluntary, and all answers will be anonymous. Participants are free to withdraw at any time without any consequences of any kind. If you are interested in this interview and belong to one of the targeted participant groups, more information about signing up for an interview are available in the [link] below (the consent form will appear).

Please note that, to help me reach as many participants as possible, I am wondering if you could kindly support this research by sharing my ‘call for participants’ text and the live link to your fellows, family and friends who belong to above targeted participants groups**.** The ‘call for participants’ text and the live link to my online questionnaire and interview are reproduced below.

If you have any questions, please do not hesitate to contact me via emails. Alternatively, my study is supervised by Dr Amy Tang and Dr Laura Hanks, and they can be contacted on yue.tang@nottingham.ac.uk and laura.hanks@nottingham.ac.uk. This research has been approved by the Faculty Research Ethics Committee, University of Nottingham.

I would be very grateful if you would be willing to support my study and take part in my study.

Thank you for your time.

Zilun Shao

PhD candidate at the University of Nottingham

‘Call for participants’-text and links

PhD student Zilun Shao from the Department of Architecture and Built Environment, University of Nottingham is conducting a study to investigate in what ways urban waterfront open space can help deliver a people-led urban waterfront regeneration vision driven by cultural and heritage resources. The study concerns the relationship between the use experiences and the quality of urban waterfront open spaces in the context of urban waterfront regeneration, and what elements could affect the quality of urban waterfront open spaces. It aims to influence the future strategies of urban waterfront regeneration and related design principles. Zilun Shao is looking for participants (18 years old or older) who once have been to the **urban waterfront open spaces along the core district of Hangzhou Heritage Canal in China for questionnaire.** The questionnaire may take about 20-25 minutes to complete, and participation is completely voluntary. All answers will be anonymous. Participants are free to withdraw at any time without any consequences of any kind. If you are interested in this questionnaire and once have been to the **urban waterfront open spaces along the core district of Hangzhou Heritage Canal in China,** please follow this link here. [link] (the consent form and questions will appear).

After you have finished the questionnaires, I am also seeking volunteers for my interview. Participants for interview are 18 years old or older, including (1) **residents** of the core district of **Hangzhou Heritage Canal in China**, who once have been to the urban waterfront open spaces along the core district of **Hangzhou Heritage Canal in China;** (2) **visitors** who once have been to the urban waterfront open spaces along the core district of **Hangzhou Heritage Canal in China**; (3) **experts** involved in the urban waterfront open place improvement projects in the core district **of Hangzhou Heritage Canal in China**;(4) **management staffs** who have managed the urban waterfront open spaces along the core district of **Hangzhou Heritage Canal in China**. The interview will be conducted by phone, Tencent Meeting, WeChat or in-person and may take around an hour (depending on your availability). Participation is completely

voluntary, and all answers will be anonymous. Participants are free to withdraw at any time without any consequences of any kind. If you would like to participate in a future interview about the topic, you can access the [link] (the consent form for interview will appear) or email zilun.shao@nottingham.ac.uk. Thanks so much for your help and I am looking forward to your reply and participation.

Consent to take part in online questionnaire (Set 1) for users who once have been to the urban waterfront open spaces along the core district of Hangzhou Heritage Canal in China

Please read the following important information

You are invited to participate in PhD research titled "Urban Waterfront Open Space Quality Evaluation in the context of the Cultural-Heritage-led Urban Waterfront Regeneration: A Case Study of Hangzhou, China." The purpose of this research is to investigate in what ways urban waterfront open space can help deliver a people-led urban waterfront regeneration vision driven by cultural and heritage resources. The study concerns the relationship between the use experiences and the quality of urban waterfront open spaces in the context of urban waterfront regeneration, and what elements could affect the quality of urban waterfront open spaces based on users' perception. It is anticipated that such findings may benefit for reformulating appropriate culture-heritage-led waterfront regeneration strategies and inform urban waterfront design principles to improve the quality of public spaces on the urban waterfront. Participation is completely voluntary, and you can withdraw at any time without any consequences of any kind. Your answers will be anonymous.
This research is conducted by Zilun Shao, a PhD student from the Department of Architecture and Built Environment, University of Nottingham. It is a self-funded study. If you have any questions, please contact me at zilun.shao@nottingham.ac.uk. Alternatively, this study is supervised by Dr Amy Tang and Dr Laura Hanks, and they can be contacted at yue.tang@nottingham.ac.uk and laura.hanks@nottingham.ac.uk. The Faculty Research Ethics Committee, University of Nottingham, has approved this study.
Before beginning this online-based questionnaire, please carefully read the following statements and tick if you agree with the following statements:

☐ I understand that I am participating in research that is investigating the key indicators that can improve the quality of public spaces based on users' perspective in the context of culture-heritage-led waterfront regeneration.

☐ I understand that even if I agree to participate now, I can withdraw at any time or refuse to answer any question without any consequences of any kind.

☐ I understand I will not benefit directly from participating in this research.

☐ I understand that all information I provide for this study will be treated confidentially.

☐ I understand that in any report on the results of this research my identity will remain anonymous. No name or address is required for online survey.

☐ I understand that disguised extracts from my online survey may be quoted in dissertation, conference presentation, published papers.

☐ I understand that my data will be transferred to the UK and subsequent data-processing operations will comply with General Data Protection Regulation (GDPR).

☐ I understand that the signed consent forms and survey results will be retained electronically at the University of Nottingham in accordance with GDPR data security legislation. Only the investigations have the access to data.

☐ I understand that the result from the online surveys, which all identifying information will be kept securely for seven years following the research publication in accordance with GDPR data security legislation, after that, all the data will be permanently deleted.

☐ I understand that I am free to contact any of the people involved in the research to seek further clarification and information.

☐ I understand that I am over 18, and have been to the urban waterfront open spaces along the core district of Hangzhou Heritage Canal in China

☐ Yes- I consent to the study as described above (Online)

☐ No- I no longer consent to participate (Online)

Please understanding the key terms used in this questionnaire before beginning this online questionnaire.

Urban waterfront open spaces: As a specific category of public space, urban

waterfront open spaces play a vital role in shaping social life and achieving social inclusion and equity. They usually consist of three parts: water, transitional places at the interface between the water body and the land, and adjacent urban public places.

Urban waterfront regeneration: It can be defined as a timeless city-building activity that provides an excellent opportunity to transform the city spatially, socially and economically and improve the quality of the public realm along coasts, rivers, lakes, canals, etc. .

Access and linkage: it can be defined as the ease of reaching desirable destinations and considers the physical, visual, and functional connections of public urban waterfront open spaces.

Safety: it refers to a feeling of being protected from natural disasters, traffic threats, and crime.

Comfort: it refers to a state where waterfront open space promotes physical and psychological comfort through provision certain water features, climatic conditions, arrangement of seating, and walking convenience to meet daily use convenience.

Spatial aesthetics: it refers to the aesthetic elements of urban form and space, including the proportion, sense of rhyme, building height and massing, scale and variety of styles.

Place Identity: it refers to the unique character of a place where people feel like they belong. It reflects the identity that is continuously shaped by its local natural and cultural characteristics.

Inclusiveness: It refers to the characteristics of waterfront open space that support a variety of activities and behaviours and be open to all users from all social classes. It emphasizes the role of social cohesion/inclusion and equity in shaping inclusive public space on the urban waterfronts.

Questions

1. What’s your gender? (*Single choice * to be answered*)

☐ Male

☐ Female

☐ Others

☐ Prefer not to say

2. What is your age-range? (*Single choice * to be answered*)

☐ 18-24 years old

☐ 25-39 years old

☐ 40-59 years old

☐ 60-74 years old

☐ 75-84 years old

☐ 85+

☐ Prefer not to say

3. What's your current main status? (*Single choice * to be answered*)

☐ Residents of core district of Hangzhou Heritage Canal in China

☐ Visitors who once have been to the urban waterfront open spaces along the core South Bank of Qiantang River

☐ Experts/ designers who involved in the urban waterfront open place improvement projects of core district of Hangzhou Heritage Canal

☐ Staff/managers who have worked and managed in the urban waterfront open space along the core district of Hangzhou Heritage Canal

☐ Other __(Please specify)

4. How often do you visit urban waterfront open spaces along the core district of Hangzhou Heritage Canal in China? (*Single choice * to be answered*)

☐ Everyday

☐ Once a week

☐ Several times a week

☐ Several times a month

☐ Occasionally

5. How many times have you visit urban waterfront open spaces along the core district of Hangzhou Heritage Canal in China? (*Single choice * to be answered,* if you cannot remember clearly, please choose the minimum number)

☐ 1 time

☐ 2 times

☐ 4 times

☐ 5 times

☐ 6 times

☐ 7 times

☐ 8 times

☐ 9 times

☐ 10+ times

6. How long do you usually stay in urban waterfront open spaces along the core district of Hangzhou Heritage Canal in China each time? (Single choice * to be answered)

   ☐ <30mins

   ☐ 30-60 mins

   ☐ 1-2 hours

   ☐ > 2 hours

7. What are the purposes of your visit to the urban waterfront open spaces along the core district of Hangzhou Heritage Canal in China? (*multiple choice * to be answered*)

   ☐ Tourism (taking photos, enjoying natural scenery, observing wildlife, shopping, visiting museums, visiting art exhibition, attending guided tours, visiting markets, drinking and eating at tourist attraction, etc.)

   ☐ Leisure (reading, drawing, picnicking, sunbathing, sitting, observing surroundings or people, listening to music, dinning at outdoor coffee, drinking at tea house, playing chess & board games, etc.)

   ☐ Physical exercise (jogging, cycling, doing yoga, doing tai chi, fishing, playing , skateboarding, walking a dog, playing outdoor ball sports, outdoor rock climbing, etc.)

   ☐ Socialise (meeting friends, meeting family, meeting with communities, interacting with strangers, etc.)

   ☐ Work or study (attending research activities, taking children to attend activities, etc.)

   ☐ Commuting (passing through on the way to/from work, passing through on the way to/from home, etc.)

   ☐ Other __(Please specify)

8. What activities did you do at urban waterfront open spaces along the core district of Hangzhou Heritage Canal in China? (*multiple choice * to be answered*)

- ☐ Taking photos
- ☐ Enjoying natural scenery
- ☐ Observing wildlife
- ☐ Shopping
- ☐ Visiting museums
- ☐ Visiting art exhibition
- ☐ Attending guided tours
- ☐ Visiting markets
- ☐ Drinking and eating at tourism attraction
- ☐ Reading
- ☐ Drawing
- ☐ Writing
- ☐ Picnicking
- ☐ Sunbathing
- ☐ Sitting
- ☐ Observing surroundings or people
- ☐ Listening to music
- ☐ Dinning at outdoor coffee
- ☐ Drinking at tea house
- ☐ Playing chess & board games
- ☐ Jogging
- ☐ Cycling
- ☐ Doing yoga
- ☐ Doing tai chi
- ☐ Fishing
- ☐ Skateboarding
- ☐ Walking dogs
- ☐ Playing outdoor ball sports
- ☐ Outdoor rock climbing
- ☐ Meeting friends
- ☐ Meeting family

☐ Meeting with communities

☐ Interacting with strangers

☐ Attending research activity

☐ Taking children to attend activities

☐ Passing through on the way to/from work

☐ Passing through on the way to/from home

☐ Others __(Please specify)

9. Do you think the following options are important when evaluating the **access and linkage** of urban waterfront open spaces along the Hangzhou Heritage Canal in China (*Please tick the marking question. * must be answered*)

Access and linkage		Not at all Important	Somewhat unimportant	Neutral	Somewhat important	Very important
The connectivity of waterfront path systems	The effective linkage between pedestrian bridges and key nodes along urban waterfront open spaces					
	The effective linkage between the waterfront promenade route and key nodes along urban waterfront open spaces					
	The effective linkage between the waterborne transportation route and key nodes along urban waterfront open spaces					
	The effective linkage between the cycling route and key nodes along urban waterfront open spaces					
	The effective linkage between the vehicular route and key nodes along urban waterfront open spaces					
The continuity of waterfront path systems	The continuity of waterfront promenade routes					
	The continuity of cycling routes					
	The continuity of water transport routes					
	The continuity of vehicular routes					
	Accessibility of water's edge					

Physical accessibility	Accessibility of basic public service facilities					
	Accessibility of cultural venues					
	Accessibility of commercial amenities					
	Accessibility of healthcare services					
	Accessibility of sport amenities					

10. Please state any other indicators that you think would influence the access and linage of urban waterfront open spaces along the core district of Hangzhou Heritage Canal in China. If there were any, please fill in and also indicate the important degree (not at all important/ somewhat important/ neutral/ somewhat important/ very important) _____(*not must be answered*)
11. Do you think the following options are important when evaluating the **safety** of urban waterfront open spaces along the core district of Hangzhou Heritage Canal in China (P*lease tick the marking question. * must be answered*)

Safety		Not at all Important	Somewhat unimportant	Neutral	Somewhat important	Very important
Protection against flood risks	Raising the plinths for buildings within creation of different elevations (longitudinal design)					
	The integration of waterfront greenways with flood control systems					
	Use of traditional shoreline infrastructure					
	Use of temporary flood defences					
Protection against traffic accidents variables	Priority for pedestrian in mixed traffic					
	Control of fast-moving vehicles					
	Creation of traffic segregation or barrier zones					
Protection against crime	Good maintenance and cleanness					
	Provision of personalising property					
	Sufficient artificial lighting quality after dark					
	A well-designed urban waterfront street spatial layout without cul-de-sacs (natural surveillance)					
	The appropriate number of surveillance cameras					

	The appropriate number of public/private guards and police					

12. Please state any other indicators that you think would influence the **safety** of urban waterfront open spaces along the core district of Hangzhou Heritage Canal in China. If there were any, please fill in and also indicate the important degree (not at all important/ somewhat important/ neutral/ somewhat important/ very important) (*not must be answered*)
13. Do you think the following options are important when evaluating the **comfort** of urban waterfront open spaces along the core district of Hangzhou Heritage Canal in China (*Please tick the marking question. * must be answered*)

Comfort		Not at all Important	Somewhat unimportant	Neutral	Somewhat important	Very important
Climatic comfort	Good air quality					
	Provision of artificial shelter from the wind, rain and some sun					
	Appropriate water surface humidity					
	Presence of temperature-regulating shade by natural vegetation (tree planting shrubs, etc.)					
Seating comfort	An adequate number of sitting arrangements					
	Good placement, preferably with good views					
	Materials for seats with insulating and water-repellent properties					
	Arrangement of movable/flexible seats					
	Appropriate size of seating areas					
	Low noise level during seating and resting					
	A variety of formal and informal seating options, combining primary and secondary seating					
Movement comfort	The appropriate waterfront promenade route width					
	The surface condition of the waterfront pedestrian route					
	The material of the urban waterfront promenade					
	The appropriate cycle route width					
	The surface condition of the vehicular route					

	The material of the cycle route					
	The appropriate vehicular route width					
	The material of the vehicular route					
	The surface condition of the cycle route					
Visual comfort	View of good skyline					
	View of clear information board and maps					
	View of clean water body					
	View of rich flora					
	Readability of digital transport schedule screens					
	View of clear visual axis					
	View of rich fauna					

14. Please state any other indicators that you think would influence the **comfort** of urban waterfront open spaces along the core district of Hangzhou Heritage Canal in China. If there were any, please fill in and also indicate the important degree (not at all important/ somewhat important/ neutral/ somewhat important/ very important) (*not must be answered*)
15. Do you think the following options are important when evaluating the **spatial aesthetics** of urban waterfront open spaces along the core district of Hangzhou Heritage Canal in China (*Please tick the marking question. * must be answered*)

Spatial aesthetics		Not at all Important	Somewhat	Neutral	Somewhat important	Very important
Scales and massing	The appropriate scale of residential blocks					
	The appropriate scale of cultural venues					
	The appropriate ratio of waterfront promenade width to building height					
	The appropriate scale of leisure areas					
	Sense of enclosure					
	The appropriate scale of office areas					
	The appropriate scale of commercial areas					
Sensitivity to harmonic relationship	Articulation of historical and contemporary building styles					
	Harmonic spatial hierarchy and organisation					
	Richness and coordination of building facade styles					
Appreciation of rhythm	The rhythm of active frontages at ground floor level (interaction with the place)					
	The rhythm of facades above ground floor (ratio of solid to void in facade)					

	The rhythm of colonnades in semi-public realm					

16. Please state any other indicators that you think would influence the **spatial aesthetics** of urban waterfront open spaces along the core district of Hangzhou Heritage Canal in China. If there were any, please fill in and also indicate the important degree (not at all important/ somewhat important/ neutral/ somewhat important/ very important) _____(*not must be answered*)
17. Do you think the following options are important when evaluating the **place identity** of urban waterfront open spaces along the core district of Hangzhou Heritage Canal in China (*Please tick the marking question. * must be answered*)

Place identity		Not at all	Somewhat	Neutral	Somewhat	Very important
Distinctiveness of urban furniture	Distinctiveness of water-related design installations					
	Distinctiveness of benches					
	Distinctiveness of lampposts					
	Distinctiveness of artificial terraces leading towards water					
	Distinctiveness of fountains					
	Distinctiveness of monuments					
	Distinctiveness of transit shelter					
	Distinctiveness of banners/digital billboards					
	Distinctiveness of bins					
Distinctiveness of natural landscape	Distinctiveness of shoreline forms					
	Distinctiveness of local plants					
	Distinctiveness of water body shapes					
Urban memory	Cultural and digital heritage interpretation and presentation					
	Historical preservation of and adaptively re-using existing built form as an embodiment of collective memory					
	Place names and their symbols					
	Lifestyle transformation shaped by embodied personal memory					
Distinctiveness of architectural	Distinctiveness of roofscapes					
	Distinctiveness of decorative elements					
	Distinctiveness of balconies/verandas					
	Distinctiveness of facades					
	Distinctiveness of local materials					

	Distinctiveness of local structure of buildings					
	Distinctiveness of outdoor elevated walkways					

18. Please state any other indicators that you think would influence the **place identity** of urban waterfront open spaces along the core district of Hangzhou Heritage Canal in China. If there were any, please fill in and also indicate the important degree (not at all important/ somewhat important/ neutral/ somewhat important/ very important) _____(*not must be answered*)
19. Do you think the following options are important when evaluating the **inclusiveness** of urban waterfront open spaces along the core district of Hangzhou Heritage Canal in China (*Please tick the marking question. * must be answered*)

Inclusveness		Not at all Important	Somewhat	Neutral	Somewhat important	Very important
User diversity	Variety in gender					
	Mix of community groups					
	Variety in age range					
Diversity of activities	Range of behaviours (if granted a public licence)					
	Land use diversity					
Equal access right	24/7 operational availability of waterfront open spaces					
	Equitable access to key tourist destination along urban waterfront for all social groups					
	Presence of accessible ramps on the urban waterside for people with disabilities					
	Equitable access to community-led events/activities					
	Free use of flexible spaces					
	Presence of accessible lifts on the urban waterside for people with disabilities					
	Free use of Internet service (Wi-Fi) for all social groups					
	Equitable access to water's edge					
	Free use of movable benches					
	Free use of play areas					
Social cohesion	An effective community engagement in decision-making process and planning					
	The length of social interaction					
	Cooperation of public and private partnership					
	Rational and transparent distribution of public funds and infrastructure service					

20. Please state any other indicators that you think would influence the **inclusiveness** of urban waterfront open spaces **along the core district of Hangzhou Heritage Canal in China**. If there were any, please fill in and also indicate the important degree (not at all important/ somewhat important/ neutral/ somewhat important/ very important) _____(not must be answered)
21. Please state any **other dimensions** that you think would influence the quality of urban waterfront open spaces along the core district of Hangzhou Heritage Canal in China. If there were any, please fill in and also indicate the important degree (not at all important/ somewhat important/ neutral/ somewhat important/ very important) (*not must be answered*)

Interview Intension Survey

22. Would you be interested in leaving your contact information to take part in a further in-depth interview to discuss the relationship between the use experiences and the quality of urban waterfront open spaces? (*not must be answered*)

    ☐ Yes, I would like to _____ (with an option to leave your WeChat, Email, or Telephone number)
    ☐ No, thanks

[Thank you message-end]

Please note that as Questions 2–4 share a similar structure with Question 1, they are not presented in detail in this appendix.

Appendix C- Importance and Satisfaction Ratings of Key Variables Based on Online Questionnaire Results for Two Selected Urban Waterfront Sites

ACCESS & LINKAGE DIMENSIONS

Appendix C1 – Table 1 Ranking the importance of variables related to physical accessibility at Qiaoxi Heritage Canal District (QHCD)

Physical accessibility *Variables*	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1 - not at all important	2 - somewhat unimportant	3 - neutral	4 - somewhat important	5 - very important			
Accessibility of water's edge	5.45% n=21	6.49% n=25	15.58% n=60	31.69% n=122	40.78% n=157	3.96	1.147	1
Accessibility of basic public service facilities	4.42% n=17	10.65% n=41	17.4% n=67	31.95% n=123	35.58% n=137	3.84	1.153	2
Accessibility of cultural venues	7.79% n=30	12.21% n=47	13.77% n=53	27.01% n=104	39.22% n=151	3.79	1.194	3
Accessibility of commercial amenities	10.65% n=41	7.72% n=28	17.66% N==68	28.05% n=108	36.36% n=140	3.72	1.310	4
Accessibility of healthcare services	9.61% n=37	10.13% n=39	15.84% n=61	35.06% n=135	29.35% n=113	3.65	1.265	5
Acce**ssib**ility of sport amenities	10.65% n=41	14.55% n=56	22.08% n=85	24.94% n=96	27.79% n=107	3.45	1.318	6

Appendix C1 – Table 2 Ranking the importance of variables related to the connectivity of waterfront path system at QHCD

The connectivity of waterfront path systems variables	Frequency of responses (%) (N=385)					Mean	Std. Deviation	Rank
	1-not at all important	2-some what unimportant	3-neutral	4-somewhat important	5-very important			
The effective linkage between pedestrian bridges and	7.27 % n=28	7.27% n=28	13.25% n=51	35.58% n=137	36.62% n=141	3.87	1.096	1

key nodes along urban waterfront open spaces								
The effective linkage between the waterfront promenade route and key nodes along urban waterfront open spaces	8.83% n=34	10.39% n=40	22.08% n=85	29.61% n=114	29.09% n=112	3.60	1.151	2
The effective linkage between the waterborne transportation route and key nodes along urban waterfront open spaces	12.21% n=47	9.87% n=38	20.52% n=79	23.9% n=92	33.51% n=129	3.58	1.360	3
The effective linkage between the cycling route and key nodes along urban waterfront open spaces	13.77% n=53	6.49% n=25	19.74% n=76	29.09% n=112	30.91% n=119	3.57	1.351	4
The effective linkage between the vehicular route and key nodes along urban waterfront open spaces	15.06% n=58	14.81% n=57	18.44% n=71	27.79% n=107	23.9% n=92	3.31	1.337	5

Appendix C1 – Table 3 Ranking the importance of variables related to the continuity of waterfront path system at QHCD

	Frequency of responses (%) (n=385)					Mean		Rank

The continuity of waterfront path systems variables	1-not at all important	2-some what unimportant	3-neutral	4-somewhat important	5-very important		Std. Deviation	
The continuity of waterfront promenade routes	9.87% n=38	7.01% n=27	15.58% n=60	30.91% n=119	36.62% n=141	3.77	1.182	1
The continuity of cycling routes	10.13% n=39	11.17% n=43	19.22% n=74	34.03% n=131	25.45% n=98	3.54	1.262	2
The continuity of water transport routes	13.51% n=52	11.43% n=44	15.58% n=60	27.53% n=106	31.95% n=123	3.53	1.390	3
The continuity of vehicular routes	8.31% n=32	15.58% n=60	22.08% n=85	30.65% n=118	23.38% n=90	3.46	1.237	4

SAFETY DIMENSIONS

Appendix C1 – Table 4 Ranking the importance of variables related to the protection against traffic accidents at QHCD

Protection against traffic accidents variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1-not at all important	2-some what unimportant	3-neutral	4-somewhat important	5-very important			
Priority for pedestrian in mixed traffic	8.83% n=34	4.94% n=19	18.44% n=71	28.83% n=111	38.96% n=150	3.84	1.143	1
Control of fast-moving vehicles	8.05% n=31	8.31% n=32	15.06% n=58	31.95% n=123	36.62% n=141	3.81	1.141	2
Creation of traffic segregation or barrier zones	11.17% n=43	5.71% n=22	13.77% 53	31.69% 122	37.66% 145	3.79	1.307	3

Appendix C1 – Table 5 Ranking the importance of variables related to protection against crime at QHCD

Protection against crime variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1-not at all important	2-some what unimportant	3-neutral	4-somewhat important	5-very important			
Good maintenance and cleanness	5.97% n=23	6.23% n=24	17.14% n=66	33.77% n=130	36.88% n=142	3.89	1.149	1
Provision of personalising property	5.19% n=20	8.31% n=32	18.96% n=73	30.39% n=117	37.14% n=143	3.86	1.160	2
Sufficient artificial lighting quality after dark	7.01% n=27	9.35% n=36	16.62% n=64	30.91% n=119	36.1% n=139	3.80	1.223	3
A well-designed urban waterfront street spatial layout without cul-de-sacs (natural surveillance)	8.05% n=31	9.87% n=38	20.78% n=80	27.79% n=107	33.51% n=129	3.69	1.253	4
The appropriate number of surveillance cameras	7.27% n=28	14.29% n=55	18.96% n=73	28.31% n=109	31.17% 120	3.63	1.259	5
The appropriate number of public/private guards and police	5.97% n=23	12.99% n=50	24.42% n=94	26.75% n=103	29.87% n=115	3.63	1.207	6

Appendix C1 – Table 6 Ranking the importance of variables related to the protection against flood risks at QHCD

Protection against flood risks variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1-not at all important	2-some what unimportant	3-neutral	4-somewhat important	5-very important			

Raising the plinths for buildings within creation of different elevations (longitudinal design)	7.01% n=27	7.01% n=27	14.81% n=57	34.03% n=131	34.14% n=143	3.87	1.191	1
The integration of waterfront greenways with flood control systems	10.13% n=39	7.01% n=27	18.7% n=72	32.21% n=124	31.95% n=123	3.69	1.267	2
Use of traditional shoreline infrastructure	10.13% n=39	15.32% n=59	20.26% n=78	27.01% n=104	27.27% n=105	3.47	1.309	3
Use of temporary flood defences	13.25% n=51	13.25% n=51	19.48% n=57	27.79% n=107	26.23% n=101	3.42	1.353	4

COMFORT DIMENSIONS

Appendix C1 – Table 7 Ranking the importance of variables related to the climatic comfort at QHCD

Climatic comfort variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1-not at all important	2-some what unimportant	3-neutral	4-somewhat important	5-very important			
Good air quality	6.23% n=24	4.94% n=19	17.66% n=68	30.65% n=118	40.52% n=156	3.94	1.158	1
Provision of artificial shelter from the wind, rain and some sun	5.45% n=21	8.83% n=34	15.84% n=61	33.25% n=128	36.62% n=141	3.87	1.164	2
Appropriate water surface humidity	7.01% n=27	8.83% n=34	14.81% n=57	31.69% n=122	37.66% n=145	3.84	1.220	3
Presence of temperature-regulating	10.65% n=41	9.35% n=36	15.84% n=61	30.39% n=117	33.77% n=130	3.67	1.314	4

shade by natural vegetation (tree planting shrubs, etc.)								

Appendix C1 – Table 8 Ranking the importance of variables related to the seating comfort at QHCD

Seating comfort variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1-not at all important	2-some what unimportant	3-neutral	4-somewhat important	5-very important			
An adequate number of sitting arrangements	8.83% n=34	4.16% n=16	16.62 % n=64	33.51% n=129	36.88% n=142	3.85	1.016	1
Good placement, preferably with good views	10.13% n=39	7.79% n=30	13.77 % n=53	30.39% n=117	37.92% n=146	3.78	1.103	2
Materials for seats with insulating and water-repellent properties	8.31% n=32	9.61% n=37	18.44 % n=71	28.83% n=111	34.81% n=134	3.72	1.062	3
Arrangement of movable/flexible seats	12.73% n=49	7.79% n=30	17.92 % n=69	28.05% n=108	33.51% n=129	3.62	1.253	4
Appropriate size of seating areas	9.09% n=35	14.03% n=54	15.58 % n=60	29,87% n=115	31.43% n=121	3.61	1.203	5
Low noise level during seating and resting	11.17% n=43	9.61% n=37	23.12 % n=89	25.45% n=98	30.65% n=118	3.55	1.214	6
A variety of formal and informal seating options, combining primary and secondary seating	14.03% n=54	13.25% n=51	12.99 % n=50	26.49% n=102	33.25% n=128	3.53	1.324	7

Appendix C1 – Table 9 Ranking the importance of variables related to visual comfort at QHCD

Visual comfort elements/variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1-not at all important	2-some what unimportant	3-neutral	4-somewhat important	5-very important			
View of good skyline	10.65% n=41	8.31% n=32	12.21% n=47	35.58% n=137	33.25% n=128	3.72	1.16	1
View of clear information board and maps	5.71% n=22	16.88% n=65	14.03% n=54	28.05% n=108	35.32% n=136	3.70	1.265	2
View of clean water body	10.39% n=40	8.57% n=33	15.06% n=58	33.51% n=129	32.47% n=125	3.69	1.289	3
View of rich flora	8.83% n=34	8.05% n=31	22.08% n=85	32.21% n=124	28.83% n=111	3.64	1.225	4
Readability of digital transport schedule screens	9.61% n=37	11.69% n=45	19.22% n=74	29.35% n=113	30.13% n=116	3.60	1.288	5
View of clear visual axis	11.17% n=43	8.31% n=32	17.14% n=66	37.66% n=145	25.71% n=99	3.59	1.264	6
View of rich fauna	12.47% n=48	12.21% n=47	14.29% n=55	30.65% n=118	30.39% n=117	3.55	1.361	7

Appendix C1 – Table 10 Ranking the importance of variables related to the movement comfort at QHCD

Movement comfort variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1-not at all important	2-some what unimportant	3-neutral	4-somewhat important	5-very important			
The appropriate waterfront promenade route width	3.64% n=14	11.43% n=44	14.55% n=56	34.29% n=132	36.1% n=139	3.88	1.131	1
The surface condition of the waterfront pedestrian route	9.09% n=35	6.49% n=25	19.48% n=75	27.79% n=107	37.14% n=143	3.77	1.264	2
The material of the urban	7.53% n=29	11.69% n=45	14.29% n=55	34.29% n=132	32.21% n=124	3.72	1.239	3

waterfront promenade								
The appropriate cycle route width	9.61% n=37	12.73% n=49	17.66% n=68	32.99% n=127	27.01% n=104	3.55	1.274	4
The surface condition of the vehicular route	9.09% n=35	13.51% n=52	21.3% n=82	33.51% n=129	22.6% n=87	3.47	1.233	5
The material of the cycle route	16.62% n=64	5.19% n=20	23.12% n=89	25.17% n=99	29.35% n=113	3.46	1.393	6
The appropriate vehicular route width	10.13% n=39	14.81% n=57	21.56% n=83	26.49% n=102	27.01% n=104	3.45	1.302	7
The material of the vehicular route	12.99% n=50	12.73% n=49	19.74% n=76	27.27% n=105	27.27% n=105	3.43	1.352	8
The surface condition of the cycle route	11.69% n=45	11.69% n=45	22.86% n=22.86	30.39% n=117	23.38% n=90	3.42	1.285	9

SPATIAL AESTHETICS DIMENSIONS

Appendix C1 – Table 11 Ranking the importance of variables related to the proportions and scales at QHCD

Proportions and scales variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1-not at all important	2-some what unimportant	3-neutral	4-somewhat important	5-very important			
The appropriate **scale of residential blocks**	4.42% n=17	9.35% n=36	16.1% n=62	36.88% n=142	33.25% n=128	3.85	1.116	1
The appropriate **scale of cultural venues**	8.05% n=31	7.53% n=29	17.92% n=69	29.87% n=115	36.62% n=141	3.79	1.238	2
The appropriate	6.75% n=26	7.27% n=28	16.62% n=64	43.12% n=166	26.23% n=101	3.75	1.126	3

ratio of **waterfront promenade width to building height**								
The appropriate **scale of leisure areas**	8.31% n=32	13.77% n=53	16.88% n=65	28.05% n=108	32.99% n=127	3.64	1.292	4
Sense of **enclosure**	7.01% n=27	8.57% n=33	26.49% n=102	31.69% n=122	26.23% n=101	3.62	1.165	5
The appropriate **scale of office areas**	10.39% n=40	13.77% n=53	18.44% n=71	29.87% n=115	27.53% n=106	3.50	1.305	6
The appropriate **scale of commercial areas**	12.47% n=48	12.99% n=50	19.22% n=74	31.69% n=122	23.63% n=91	3.41	1.314	7

Appendix C1 – Table 12. Ranking the importance of variables related to the sensitivity to harmonic relationship at QHCD

Sensitivity to harmonic relationship elements/variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1-not at all important	2-some what unimportant	3-neutral	4-somewhat important	5-very important			
Articulation of historical and contemporary building styles	8.57% n=33	11.95% n=46	16.36 % n=63	33.25% n=128	29.87% n=115	3.64	1.259	1
Harmonic spatial hierarchy and organisation	8.05% n=31	16.1% n=62	19.74 % n=76	28.83% n=111	27.27% n=105	3.51	1.267	2
Richness and coordination of building facade styles	9.61% n=37	13.25% n=51	21.3% n=82	28.05% n=108	27.79% n=107	3.51	1.285	3

Appendix C1 – Table 13 Ranking the importance of variables related to the appreciation of rhythm at QHCD

	Frequency of responses (%) (n=385)	Mean		Rank

Appreciation of rhythm variables	1-not at all important	2-some what unimportant	3-neutral	4-somewhat important	5-very important		Std. Deviation	
The rhythm of active frontages at ground floor level (interaction with the place)	8.05% n=31	13.25% n=51	19.48% n=75	29.87% n=115	29.35% n=113	3.59	1.257	1
The rhythm of facades above ground floor (ratio of solid to void in facade)	13.25% n=51	11.43% n=44	23.64% n=91	25.71% n=99	25.97% n=100	3.40	1.337	2
The rhythm of colonnades in semi-public realm	12.99% n=50	12.73% n=49	22.6% n=87	27.27% n=105	24.42% n=94	3.37	1.327	3

PLACE IDENTITY DIMENSIONS

Appendix C1 – Table 14 Ranking the importance variables related to distinctiveness of urban furniture at QHCD

Distinctiveness of urban furniture variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1-not at all important	2-some what unimportant	3-neutral	4-somewhat important	5-very important			
Distinctiveness of water-related design installations	5.71% n=22	7.79% n=30	25.45 % n=98	22.08% n=85	38.96% n=150	3.81	1.199	1
Distinctiveness of benches	9.09% n=35	5.97% n=23	22.34 % n=86	28.83% n=111	33.77% n=130	3.72	1.243	2
Distinctiveness of lampposts	8.05% n=31	7.53% n=29	20.26 % n=78	33.51% n=129	30.65 n=118	3.71	1.196	3
Distinctiveness of artificial terraces leading towards water	7.01% n=27	7.01% n=27	26.75 % n=103	26.23% n=101	32.99% n=127	3.71	1.207	4
Distinctiveness of fountains	9.61% n=37	9.61% n=37	18.18 %	28.31% n=109	34.29% n=132	3.68	1.274	5

			n=70					
Distinctiveness of monuments	9.09% n=35	9.61% n=37	19.74 % n=76	28.57% n=110	32.99 n=127	3.67	1.323	7
Distinctiveness of transit shelter	10.39% n=40	10.39% n=40	21.3% n=82	24.16% n=93	33.77% n=130	3.61	1.278	6
Distinctiveness of banners/digital billboards	12.47% n=48	12.99% n=50	22.6% n=87	24.68% n=95	27.27% n=105	3.41	1.342	8
Distinctiveness of bins	12.21% n=47	13.25% n=51	27.27 % n=105	24.42% n=94	22.86% n=88	3.32	1.295	9

Appendix C1 – Table 15 Ranking the importance variables related to distinctiveness of natural landscapes at QHCD

Distinctiveness of natural landscape variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1-not at all important	2-some what unimportant	3-neutral	4-somewhat important	5-very important			
Distinctiveness of shoreline forms	9.87% n=38	7.27% n=28	15.32 % n=59	25.19% n=97	42.34% n=163	3.83	1.316	1
Distinctiveness of local plants	9.35% n=36	8.05% n=31	13.77 % n=53	31.17% n=120	37.66% n=145	3.80	1.281	2
Distinctiveness of water body shapes	9.87% n=38	12.73% n=49	25.97 % n=100	25.71% n=99	25.71% n=99	3.45	1.270	3

Appendix C1 – Table 16 Ranking the importance variables related to urban memory at QHCD

Urban memory variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1-not at all important	2-some what unimportant	3-neutral	4-somewhat important	5-very important			
Cultural and digital heritage interpretation and presentation	7.27% n=28	6.49% n=25	22.6% n=87	29.35% n=113	34.29% n=132	3.77	1.197	1
Historical preservation	9.09% n=35	7.79% n=30	15.58% n=60	32.73% n=126	34.81% n=134	3.76	1.258	2

of and adaptively re-using existing built form as an embodiment of collective memory								
Place names and their symbols	9.61% n=37	9.87% n=38	20.78% n=80	31.43% n=121	28.31% n=109	3.59	1.260	3
Lifestyle transformation shaped by embodied personal memory	10.13% n=39	12.47% n=48	19.22% n=74	28.83% n=111	29.35% n=113	3.55	1.302	4

Appendix C1 – Table 17 Ranking the importance variables related to distinctiveness of architectural elements at QHCD

Distinctiveness of architectural variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1-not at all important	2-some what unimportant	3-neutral	4-somewhat important	5-very important			
Distinctiveness of roofscapes	7.53% n=29	6.23% n=24	17.14% n=66	31.43% n=121	37.66% n=145	3.85	1.207	1
Distinctiveness of decorative elements	10.39% n=40	5.97% n=23	12.99% n=50	34.03% n=131	36.62% n=141	3.81	1.279	2
Distinctiveness of balconies/verandas	6.49% n=25	14.03% n=54	13.25% n=51	31.69% n=122	34.55% n=133	3.74	1.248	3
Distinctiveness of facades	10.65% n=41	9.87% n=38	18.18% n=70	26.49% n=102	34.81% n=134	3.65	1.328	4
Distinctiveness of local materials	10.91% n=42	10.65% n=41	17.66% n=68	28.83% n=111	31.95% n=123	3.60	1.323	5
Distinctiveness of local structure of buildings	9.09% n=35	13.77% n=53	19.22% n=74	31.95% n=123	25.97% n=100	3.52	1.263	6
Distinctiveness of outdoor elevated walkways	10.65% n=41	14.55% n=56	25.45% n=98	25.45% n=98	23.9% n=92	3.38	1.283	7

INCLUSIVENESS DIMENSIONS

Appendix C1 – Table 18 Ranking the importance variables related to user diversity at QHCD

User diversity variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1-not at all important	2-some what unimportant	3-neutral	4-somewhat important	5-very important			
Variety in gender	4.42% n=17	5.71% n=22	12.99% n=50	40% n=154	36.88% n=142	4.10	1.046	1
Mix of community groups	5.45% n=21	4.68% n=18	15.32% n=59	29.87% n=115	44.68% n=172	4.03	1.131	2
Variety in age range	4.42% n=17	5.71% n=22	12.99% n=50	40% n=154	36.88% n=142	3.99	1.062	3

Appendix C1 – Table 19 Ranking the importance variables related to equitable access and use at QHCD

Equitable access and use elements/ variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1-not at all important	2-some what unimportant	3-neutral	4-somewhat important	5-very important			
24/7 operational availability of waterfront open spaces	3.9% n=15	5.97% n=23	15.32 % n=59	29.61% n=114	45.19% n=174	4.06	1.093	1
Equitable access to key tourist destination along urban waterfront for all social groups	5.19% n=20	5.71% n=22	12.47 % n=48	31.95% n=123	44.68% n=172	4.05	1.033	2
Presence of accessible ramps on the urban waterside for people with disabilities	5.71% n=22	5.97% n=23	10.65 % n=41	34.81% n=134	42.86% n=165	4.03	1.136	3
Equitable access to	4.16% n=16	3.64% n=14	16.62 %	37.66% n=145	37.92% n=146	4.02	1.106	4

community-led events/activities			n=64					
Free use of flexible spaces	4.42% n=17	7.01% n=27	12.47 % n=48	37.14% n=143	38.96% n=150	3.99	1.116	5
Presence of accessible lifts on the urban waterside for people with disabilities	5.45% n=21	5.19% n=20	14.03 % n=54	35.06% n=135	40.26% n=155	3.99	1.093	6
Free use of Internet service (Wi-Fi) for all social groups	4.94% n=19	4.42% n=17	14.29 % n=55	39.48% n=152	36.88% n=142	3.99	1.126	7
Equitable access to water's edge	5.45% n=21	5.97% n=23	11.17 % n=43	39.48% n=152	37.92% n=146	3.98	1.066	8
Free use of movable benches	5.19% n=20	6.75% n=26	12.47 % n=48	35.84% n=138	39.74% n=153	3.98	1.124	9
Free use of play areas	8.05% n=31	3.64% n=14	11.95 % n=46	41.3% n=159	35.06% n=135	3.92	1.156	10

Appendix C1 – Table 20 Ranking the importance variables related to the diversity user-activity pattern at QHCD

Diversity user-activity pattern variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1-not at all important	2-some what unimportant	3-neutral	4-somewhat important	5-very important			
Range of behaviours (if granted a public licence)	4.16% n=16	8.31% n=32	11.69% n=45	37.66% n=145	38.18% n=147	3.97	1.099	1
Land use diversity	4.42% n=17	7.01% n=27	12.73% n=49	38.7% n=149	37.14% n=143	3.97	1.086	2

Appendix C1 – Table 21 Ranking the importance variables related to the social cohesion at QHCD

	Frequency of responses (%) (n=385)	**Mean**		**Rank**

Social cohesion elements/ variables	1-not at all important	2-some what unimportant	3-neutral	4-somewhat important	5-very important		**Std. Deviation**	
An effective community engagement in decision-making process and planning	5.19% n=20	4.16% n=16	15.32% n=59	31.69% n=122	43.64% n=168	4.04	1.152	1
The length of social interaction	6.23% n=24	5.19% n=20	14.81% n=57	32.99% n=127	40.78% n=157	3.97	1.107	2
Cooperation of public and private partnership	4.94% n=19	4.94% n=19	17.4% n=67	32.49% 132	38.44% n=148	3.96	1.096	3
Rational and transparent distribution of public funds and infrastructure service	10.65% n=41	11.43% n=44	21.3% n=82	30.39% n=117	26.23% n=101	3.50	1.283	4

ACCESS AND LINKAGE DIMENSIONS

Appendix C1 – Table 22 Ranking the performance level related to the physical accessibility at QHCD

Physical accessibility *Variables*	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1 - very unsatisfied	2 - unsatisfied	3 - neutral	4 - satisfied	5 -very satisfied			
Accessibility of commercial amenities	4.42% n=17	7.53% n=29	14.81% n=57	37.4% n=144	35.84% n=138	3.93	1.097	1
Accessibility of basic public service facilities	5.45% n=21	7.01% n=27	20.26% n=78	30.65% n=118	36.62% n=141	3.86	1.151	2
Accessibility of healthcare services	7.53% n=29	8.83% n=34	15.84% n=61	33.51% n=129	34.29% n=132	3.78	1.120	3
Accessibility of cultural venues	7.79% n=30	11.43% n=44	19.74% n=76	28.31% n=109	32.73% n=126	3.67	1.156	4
Accessibility of water's edge	12.47% n=48	16.1% n=62	14.03% n=54	28.57% n=110	28.83% n=111	3.45	1.178	5

Accessibility to sport amenities	13.77% n=53	17.4% n=67	17.92% n=69	27.27% n=105	23.64% n=91	3.30	1.264	6

Appendix C1 – Table 23 Ranking the performance level related to the continuity of waterfront path system at QHCD

The continuity of waterfront path system variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1- very unsatisfied	2- unsatisfied	3- neutral	4- satisfied	5-very satisfied			
The continuity of waterfront promenade route	5.19% n=20	5.97% n=23	13.51% n=52	40% n=154	35.32% n=136	3.94	1.093	1
The continuity of water transport route	9.35% n=36	9.35% n=36	16.62% n=64	32.99% n=127	31.69% n=122	3.69	1.166	2
The continuity of vehicular route	11.17% n=43	17.92% n=69	22.6% n=87	23.38% n=90	24.94% n=96	3.33	1.224	3
The continuity of cycling routes	14.03% n=54	20.78% n=80	18.96% n=73	23.64% n=91	22.6% n=87	3.20	1.269	4

Appendix C1 – Table 24 Ranking the performance level related to the connectivity of waterfront path system at QHCD

The connectivity of waterfront path system variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1- very unsatisfied	2- unsatisfied	3- neutral	4- satisfied	5-very satisfied			
The effective linkage between waterfront promenades and key nodes along urban waterfront open spaces	9.61% n=37	9.09% n=35	16.88% n=65	30.13% n=116	34.29% n=132	3.70	1.187	1
The effective linkage between the waterborne transportation routes and key nodes along urban waterfront open spaces	11.43% n=44	8.83% n=34	17.92% n=69	30.91% n=119	30.91% n=119	3.61	1.213	2

The effective linkage between pedestrian bridges and key nodes along urban waterfront open spaces	15.58% n=60	11.43% n=44	14.81% n=57	26.23% n=101	31.95% n=123	3.48	1.334	3
The effective linkage between the cycling route and key nodes along urban waterfront open spaces	19.48% n=75	14.03% n=54	16.88% n=65	25.71% n=99	23.9% n=92	3.21	1.348	4
The effective linkage between the vehicular route and key nodes along urban waterfront open spaces	16.88% n=65	19.74% n=76	16.1% n=62	24.68% n=95	22.6% n=87	3.16	1.275	5

SAFETY DIMENSIONS

Appendix C1 – Table 25 Ranking the performance level related to protection against traffic accidents at QHCD

Protection against traffic accidents variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1- very unsatisfied	2- unsatisfied	3- neutral	4- satisfied	5-very satisfied			
Control of fast-moving vehicles	4.68% n=18	5.97% n=23	14.03% n=54	36.36% n=140	38.96% n=150	3.99	1.092	1
Priority for pedestrian in mixed traffic	5.71% n=22	4.16% n=16	15.32% n=59	37.4% n=144	37.4% n=144	3.97	1.100	2
Creation of traffic segregation or barrier zones	6.23% n=24	6.23% n=24	16.88% n=65	33.77% n=130	36.88%	3.89	1.157	3

Appendix C1 – Table 26 Ranking the performance level related to protection against crime at QHCD

	Frequency of responses (%) (n=385)	Mean		Rank

Protection against crime variables	1- very unsatisfied	2- unsatisfied	3- neutral	4- satisfied	5-very satisfied		Std. Deviation	
Provision of personalising property	4.68% n=18	6.49% n=25	12.99% n=50	32.47% n=125	43.38% n=167	4.03	1.016	1
Sufficient artificial lighting quality after dark	8.05% n=31	3.9% n=15	13.77% n=53	36.88% n=142	37.4% n=144	3.92	1.079	2
Good maintenance and cleanness	4.94% n=19	4.94% n=19	20.26% n=78	32.47% n=125	37.4% n=144	3.92	1.003	3
The appropriate number of public/private guards and police	8.05% n=31	7.27% n=28	16.62% n=64	32.21% n=124	35.84% n=138	3.81	1.027	4
A well-designed urban waterfront spatial layout without cul-de-sacs (natural surveillance)	7.27% n=28	7.79% n=30	16.88% n=65	35.84% n=138	32.21% n=124	3.78	1.088	5
Use of appropriate number of surveillance cameras	13.51% n=52	17.92% n=69	20.26% n=78	23.9% n=92	24.42% n=94	3.28	1.365	6

Appendix C1 – Table 27 Ranking the performance level related to protection against flooding risks at QHCD

Protection against flooding risk variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1- very unsatisfied	2- unsatisfied	3- neutral	4- satisfied	5-very satisfied			
Raising the plinths for buildings within creation of different elevations (longitudinal design)	5.45% n=21	5.19% n=20	14.55% n=56	36.1% n=139	38.7% n=149	3.97	1.111	1
Use of traditional	10.13% n=39	7.27% n=28	20% n=77	30.13% n=116	32.47% n=125	3.68	1.175	2

shoreline infrastructure								
The integration of waterfront greenways with flood control systems	15.06% n=58	16.1% n=62	15.84% n=61	28.31% n=109	95% n=24.68	3.31	1.293	3
Use of temporary flood defences	16.62% n=64	15.32% n=59	16.36% n=63	31.43% n=121	20.26% n=78	3.23	1.276	4

COMFORT DIMENSIONS

Appendix C1 – Table 28 Ranking the performance level related to climatic comfort at QHCD

Climatic comfort variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1- very unsatisfied	2- unsatisfied	3- neutral	4- satisfied	5-very satisfied			
Good **air quality**	7.53% n=29	2.6% n=10	17.92% n=69	31.69% n=122	40.26% n=155	3.95	1.068	1
Appropriate **water surface humidity**	7.53% n=29	4.68% n=18	14.03% n=54	38.44% n=148	35.32% n=136	3.89	1.062	2
Presence of temperature-regulating **shade by provided by natural vegetation**	5.19% n=20	10.13% n=39	16.88% n=65	34.55% n=133	33.25% n=128	3.81	1.057	3
Provision of **artificial shelter** from wind, rain, and sun	11.95% n=46	13.77% n=53	15.58% n=60	29.87% n=115	28.83% n=111	3.50	1.250	4

Appendix C1 – Table 29 Ranking the performance level related to seating comfort at QHCD

Seating comfort variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1- very unsatisfied	2- unsatisfied	3- neutral	4- satisfied	5-very satisfied			

Good placement, preferably with good views	4.94% n=19	7.01% n=27	16.36% n=63	35.32% n=136	36.36% n=140	3.91	1.017	1
An adequate number of sitting arrangements	5.19% n=20	7.27% n=28	14.29% n=55	38.18% n=147	35.06% n=135	3.91	1.016	2
Arrangement of moveable/flexible seats	8.57% n=33	6.75% n=26	19.22% n=74	32.99% n=127	32.47% n=125	3.74	1.123	3
Low noise level during seating and resting	7.27% n=28	8.57% n=33	20.52% n=79	31.17% n=120	32.47% n=125	3.73	1.108	4
Appropriate size of seating areas	8,83% n=34	8.83% n=34	17.66% n=68	32.21% n=124	32.47% n=125	3.71	1.152	5
Materials for seats with insulating and water-repellent properties	11.43% n=44	15.06% n=58	14.03% n=54	30.65% n=118	28.83% n=111	3.50	1.248	6
A variety of formal and informal seating options, combining primary and secondary seating	17.14% n=66	17.66% n=68	16.62% n=64	24.94% n=96	23.64% n=91	3.20	1.322	7

Appendix C1 – Table 30 Ranking the performance level related to visual comfort at QHCD

Visual comfort elements/ variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1- very unsatisfied	2- unsatisfied	3- neutral	4- satisfied	5-very satisfied			
View of clean water body	5.97% n=23	6.49% n=25	16.88% n=65	34.81% n=134	35.84% n=138	3.88	1.046	1
View of rich flora	6.75% n=26	5.19% n=20	15.58% n=60	38.96% n=150	33.51% n=129	3.87	1.037	2
View of clear visual axis	5.71% n=22	8.31% n=32	18.96% n=73	34.29% n=132	32.73% n=	3.80	1.052	3
View of clear information board and maps	5.97% n=23	10.65% n=41	19.48% n=75	30.39% n=117	33.51% n=129	3.75	1.097	4
View of rich fauna	12.99% n=50	13.77% n=53	13.77% n=53	27.79% n=107	31.69% n=122	3.51	1.294	5

The readability of digital transport schedule screen	14.29% n=55	18.18% n=70	17.4% n=67	28.57% n=110	21.56% n=83	3.25	1.258	6
View of good skyline	18.44% n=71	16.88% n=65	17.66% n=68	25.19% n=97	21.82% n=84	3.15	1.319	7

Appendix C1 – Table 31 Ranking the performance level related to movement comfort at QHCD

Movement comfort variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1- very unsatisfied	2- unsatisfied	3- neutral	4- satisfied	5-very satisfied			
The material of the urban waterfront promenade	4.42% n=17	7.53% n=29	15.84% n=61	37.92% n=146	34.29% n=132	3.90	1.092	1
The surface condition of the waterfront pedestrian route	8.05% n=31	8.83% n=34	18.96% n=73	28.05% n=108	36.1% n=139	3.75	1.154	2
The appropriate waterfront promenade route width	5.45% n=21	9.61% n=37	20.52% n=79	35.06% n=135	29.35% n=113	3.73	1.143	3
The appropriate vehicular route width	8.57% n=33	5.71% n=22	24.94% n=96	28.05% n=108	32.73% n=126	3.71	1.222	4
The surface condition of the vehicular route	5.45% n=21	10.91% n=42	21.3% n=82	32.47% n=125	29.87% n=115	3.70	1.164	5
The material of the vehicular route	9.09% n=35	9.61% n=37	19.48% n=75	29.35% n=113	32.47% n=125	3.66	1.170	6
The appropriate cycle route width	15.32% n=59	11.43% n=44	17.4% n=67	26.23% n=101	29.61% n=114	3.43	1.311	7
The material of the cycle route	19.48% n=75	12.73% n=49	19.22% n=74	23.38% n=90	25.19% n=97	3.22	1.451	8

The surface condition of the cycle route	17.14% n=66	16.1% n=62	21.04% n=81	24.42% n=94	21.3% n=82	3.17	1.386	9

SPATIAL AESTHETICS DIMENSIONS

Appendix C1 – Table 32 Ranking the performance level related to proportions and scales at QHCD

Proportions and scales variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1- very unsatisfied	2- unsatisfied	3- neutral	4- satisfied	5-very satisfied			
The appropriate scale of cultural venues	4.68% n=18	6.49% n=25	16.1% n=62	39.22% n=151	33.51% n=129	3.90	1.082	1
The appropriate scale of leisure areas	5.71% n=22	6.75% n=26	15.84% n=61	38.96% n=150	32.73% n=126	3.86	1.120	2
The appropriate ratio of waterfront street width to building height	5.97% n=23	5.71% n=22	18.18% n=70	36.36% n=140	33.77% n=130	3.86	1.127	3
The appropriate scale of office areas	7.53% n=29	11.95% n=46	17.92% n=69	33.25% n=128	29.35% n=113	3.65	1.229	4
Sense of enclosure	7.27% n=28	8.83% n=34	23.12% n=89	34.03% n=131	26.75% n=103	3.64	1.175	5
The appropriate scale of commercial areas	13.25% n=51	15.32% n=59	18.7% n=72	29.09% n=112	23.64% n=91	3.35	1.343	6
The appropriate scale of the residential block	16.36% n=63	15.84% n=61	20.78% n=80	27.27% n=105	19.74% n=76	3.18	1.359	7

Appendix C1 – Table 33 Ranking the performance level related to sensitivity to harmonic relationship at QHCD

	Frequency of responses (%) (n=385)	Mean		Rank

Sensitivity to harmonic relationship variables	1- very unsatisfied	2- unsatisfied	3- neutral	4- satisfied	5-very satisfied		Std. Deviation	
Richness and coordination of building facades styles	5.19% n=20	6.75% n=26	22.6% n=87	39.74% n=153	25.71% n=99	3.74	1.075	1
Harmonic spatial hierarchy and organisation	4.94% n=19	9.61% n=37	20% n=77	38.44% n=148	27.01% n=104	3.73	1.109	2
Articulation of the historical and contemporary building styles	13.77% n=53	13.25% n=51	17.66% n=68	31.17% n=120	24.16% n=93	3.39	1.348	3

Appendix C1 – Table 34 Ranking the performance level related to appreciation of rhythm at QHCD

Appreciation of rhythm variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1- very unsatisfied	2- unsatisfied	3- neutral	4- satisfied	5-very satisfied			
The rhythm of facades (ratio of solid to void in facades) above ground floor level	4.42% n=17	7.79% n=30	13.51% n=52	32.73% n=126	41.45% n=160	3.99	1.12	1
The rhythm of active frontage at the ground floor level (interaction with the place)	13.51% n=52	11.95% n=46	19.48% n=75	26.49% n=102	28.57% n=110	3.45	1.269	1
The rhythm of colonnades in semi-public realm	18.96% n=73	14.03% n=54	22.6% n=87	27.27% n=105	17.14% n=66	3.10	1.261	3

PLACE IDENTITY DIMENSIONS

Appendix C1 – Table 35 Ranking the performance level related to distinctiveness of natural landscape at QHCD

Distinctiveness of natural landscape variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1- very unsatisfied	2- unsatisfied	3- neutral	4- satisfied	5-very satisfied			
Distinctiveness of local plants	3.9% n=15	8.57% n=33	14.29% n=55	35.06% n=135	38.18% n=147	3.95	1.104	1
Distinctiveness of shoreline forms	8.57% n=33	5.45% n=21	17.4% n=67	33.25% n=128	35.32% n=136	3.81	1.219	2
Distinctiveness of water body shapes	7.79% n=30	8.31% n=32	15.84% n=61	37.14% n=143	30.91% n=119	3.75	1.101	3

Appendix C1 – Table 36 Ranking the performance level related to distinctiveness of architectural elements at QHCD

Distinctiveness of **architectural variables**	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1- very unsatisfied	2- unsatisfied	3- neutral	4- satisfied	5-very satisfied			
Distinctiveness of facades	4.68% n=18	5.97% n=23	13.77% n=53	34.81% n=134	40.78% n=157	4.01	1.099	1
Distinctiveness of roofscapes	5.45% n=21	5.45% n=21	15.32% n=59	39.48% n=152	34.29% n=132	3.92	1.096	2
Distinctiveness of decorative elements	7.01% n=27	5.71% n=22	17.92% n=69	32.47% n=125	36.88% n=142	3.86	1.080	3
Distinctiveness of outdoor elevated walkways	5.71% n=22	7.79% n=30	14.03% n=54	39.48% n=152	32.99% n=127	3.86	1.032	4
Distinctiveness of building materials	7.53% n=29	7.27% n=28	18.18% n=70	32.99% n=127	34.03% n=131	3.79	1.104	5
Distinctiveness structure of buildings	7.79% n=30	9.35% n=36	17.14% n=66	35.84% n=138	29.87% n=115	3.71	1.110	6
Distinctiveness of balconies	9.87% n=38	8.31% n=32	21.56% n=83	31.95% n=123	28.31% n=109	3.61	1.152	7

Appendix C1 – Table 37 Ranking the performance level related to distinctiveness of urban memory at QHCD

Urban memory	Frequency of responses (%) (n=385)	Mean	

variables	1- very unsatisfied	2- unsatisfied	3- neutral	4- satisfied	5-very satisfied		Std. Deviation
Lifestyle transformation shaped by embodied personal memory	5.19% n=20	5.45% n=21	15.58% n=60	37.66% n=145	36.1% n=139	3.94	1.096
Historical preservation and adaptively re-using existing built form as an embodiment of collective memory	5.71% n=22	6.75% n=26	17.14% n=66	34.55% n=133	35.84% n=138	3.88	1.142
Place names and their symbols	6.75% n=26	3.9% n=15	17.66% n=68	38.18% n=147	33.51% n=129	3.88	1.124
Cultural and digital heritage interpretation and presentation	15.84% n=61	12.99% n=50	20.26% n=78	27.53% n=106	23.38% n=90	3.3	1.370

Appendix C1 – Table 38 Ranking the performance level related to distinctiveness of urban memory at QHCD

Distinctiveness of urban furniture variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1- very unsatisfied	2- unsatisfied	3- neutral	4- satisfied	5-very satisfied			
Distinctiveness of monuments	3.12% n=12	8.83% n=34	25.71% n=99	30.65% n=118	31.69% n=122	3.79	1.080	1
Distinctiveness of fountains	6.49% n=25	9.87% n=38	22.34% n=86	33.77% n=130	27.53% n=106	3.66	1.169	2
Distinctiveness of bins	11.95% n=46	13.51% n=52	16.62% n=64	30.13% n=116	27.79% n=107	3.48	1.241	3
Distinctiveness of lamppost	16.62% n=64	11.69% n=45	13.77% n=53	26.75% n=103	31.17% n=120	3.44	1.247	4
Distinctive transit shelter	11.17% n=43	16.62% n=64	17.4% n=67	26,75% n=103	28.05% n=108	3.44	1.351	5
Distinctiveness of benches	12.99% n=50	13.77% n=53	16.88% n=65	28.83% n=111	27.53% n=106	3.44	1.286	6
Distinctiveness of artificial terraces leading towards water	14.55% n=56	14.55% n=56	21.82% n=84	24.94% n=96	24.16% n=93	3.30	1.264	7

Distinctiveness of banner/digital billboards	15.58% n=60	15.06% n=58	20.52% n=79	24.68% n=95	24.16% n=93	3.27	1.263	8
Distinctiveness of water-related design installations	17.4% n=67	16.1% n=62	18.7% n=72	22.08% n=85	25.71% n=99	3.23	1.236	9

INCLUSIVENESS DIMENSIONS

Appendix C1 – Table 39 Ranking the performance level related to user diversity at QHCD

Diversity of users	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1- very unsatisfied	2- unsatisfied	3- neutral	4- satisfied	5-very satisfied			
Variety in **gender**	4.42% n=17	6.23% n=24	14.55% n=56	35.58% n=137	39.22% n=151	3.99	0.090	1
Mix of **community groups**	4.68% n=18	5.97% n=23	15.58% n=60	34.03% n=131	39.74% n=153	3.98	1.003	2
Variety in **age range**	5.19% n=20	6.49% n=25	18.96% n=73	29.35% n=113	40% n=154	3.92	1.047	3

Appendix C1 – Table 40 Ranking the performance level related to user-activity pattern diversity at QHCD

Diversity user-activity pattern variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1- very unsatisfied	2- unsatisfied	3- neutral	4- satisfied	5-very satisfied			
Range of behaviour patterns (if granted a public licence)	5.19% n=20	6.23% n=24	15.32% n=59	41.56% n=160	31.69% n=122	3.88	1.085	1
Diverse land use patterns	6.23% n=24	5.19% n=20	22.34% n=86	34.03% n=131	32.21% n=124	3.81	1.132	2

Appendix C1 – Table 41 Ranking the performance level related to social cohesion at QHCD

	Frequency of responses (%) (n=385)	Mean		Rank

Social cohesion variables	1- very unsatisfied	2- unsatisfied	3- neutral	4- satisfied	5-very satisfied		Std. Deviation	
The length of social interaction	4.42% n=17	6.75% n=26	15.32% n=59	40.52% n=156	32.99% n=127	3.91	1.070	1
Cooperation of public and private partnership	5.71% n=22	6.49% n=25	17.14% n=66	35.58% n=137	35.06% n=135	3.88	1.133	2
Rational and transparent distribution of public funds and infrastructure service	4.68% n=18	5.71% n=22	21.04% n=81	40% n=154	28.57% n=110	3.82	1.057	3
An effective community engagement in decision-making process and planning	10.65% n=41	16.36% n=63	17.4% n=67	27.01% n=104	28.57% n=110	3.46	1.338	4

Appendix C1 – Table 42 Ranking the performance level related to equitable access and use at QHCD

Equal access and use variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1- very unsatisfied	2- unsatisfied	3- neutral	4- satisfied	5-very satisfied			
Presence of accessible ramps on the urban waterside for people with disabilities	5.71% n=22	4.94% n=19	16.36% n=63	34.55% n=133	38.44% n=148	3.95	1.123	1
Equitable access to key tourist destination along urban waterfront for all social groups	6.23% n=24	6.23% n=24	13.77% n=53	33.77% n=130	40% n=154	3.95	1.153	2
Equitable access to water's edge for all social group	5.19% n=20	7.27% n=28	16.62% n=64	30.39% n=117	40.52% n=156	3.94	1.162	3
Equitable access to community-led events/activities	3.9% n=15	7.53% n=29	15.06% n=58	42.08% n=162	31.43% n=121	3.90	1.053	4

for all social groups								
24/7 operational availability of waterfront open spaces	5.45% n=21	5.97% n=23	18.7% n=72	35.84% n=138	34.03% n=131	3.87	1.115	5
Presence of accessible lifts on the urban waterside for people with disabilities	6.23% n=24	8.57% n=33	15.32% n=59	36.88% n=142	32.99% n=127	3.82	1.165	6
Free use of moveable benches	13.77% n=53	11.95% n=46	15.32% n=59	29.09% n=112	29.87% n=115	3.49	1.385	7
Free use of Internet service (Wi-Fi)	13.51% n=52	12.47% n=48	17.4% n=67	30.39% n=117	26.23% n=101	3.43	1.355	8
Free use of play areas on the urban waterside	14.03% n=54	13.51% n=52	18.44% n=71	28.05% n=108	25.97% n=100	3.38	1.368	9
Free use of flexible spaces	15.58% n=60	12.47% n=48	19.22% n=74	27.01% n=104	25.71% n=99	3.35	1.389	10

ACCESS & LINKAGE DIMENSIONS

Appendix C2 – Table 1 Ranking the importance of variables related to the continuity of waterfront path systems at SBQR

Waterfront path systems' continuity variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1-not at all important	2-some what unimportant	3-neutral	4-somewhat important	5-very important			
The continuity of waterfront promenade routes	2.6% n=10	4.94% n=19	10.39% n=40	46.49% n=179	35.58% n=137	4.08	.942	1
The continuity of cycling routes	5.19% n=20	3.38% n=13	18.44% n=71	32.99% n=127	40% n=154	3.99	1.091	2
The continuity of vehicular routes	4.16% n=16	4.42% n=17	12.21% n=47	47.53% n=183	31.69% n=122	3.98	.966	3
The continuity of	5.19% n=20	10.65% n=41	29.35% n=113	30.13% n=116	24.68% n=95	3.58	1.142	4

water transport routes								

Appendix C2 – Table 2 Ranking the importance of variables related to the connectivity of waterfront path systems at SBQR

The connectivity of waterfront path system variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1-not at all important	2-some what unimportant	3-neutral	4-somewhat important	5-very important			
The effective connection between waterfront promenades and key nodes along urban waterfront open spaces	4.94% (n=19)	4.94% (n=19)	10.65% (n=41)	35.06% (n=135)	44.42% (n=171)	4.09	1.09	1
The effective connection between the pedestrian bridges and key nodes along urban waterfront open spaces	5.19% (n=20)	3.38% (n=13)	10.13% (n=39)	48.83% (n=188)	32.47% (n=125)	4.0	1.016	2
The effective connection between the cycling routes and key nodes along urban waterfront open spaces	3.64% (n=14)	4.42% (n=17)	22.08% (n=85)	44.68% (n=172)	25.19% (n=97)	3.83	0.975	3
The effective connection between vehicular routes and key nodes along urban	4.94% (n=19)	3.12% (n=12)	28.05% (n=108)	40% (n=154)	23.9% (n=92)	3.75	1.014	4

waterfront open spaces								
The effective connection between the waterborne transportation routes and key nodes along urban waterfront open spaces	5.19% (n=20)	11.43% (n=44)	29.35% (n=113)	30.39% (n=117)	23.64% (n=91)	3.56	1.124	5

Appendix C2 – Table 3 Ranking the importance of variables related to the physical accessibility at SBQR

Physical accessibility variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1-not at all important	2-some what unimportant	3-neutral	4-somewhat important	5-very important			
Accessibility to water's edges	3.12% n=12	5.71% n=22	15.06% n=58	35.58% n=137	40.52% n=156	4.05	1.032	1
Accessibility to cultural amenities	4.42% n=17	3.38% n=13	11.17% n=43	46.75% n=180	34.29% n=132	4.03	.994	2
Accessibility to basic public service facilities	3.64% n=14	3.38% n=13	20.78% n=80	34.81% n=134	37.4% n=144	4.00	1.023	3
Accessibility to sport amenities	4.68% n=18	11.43% n=44	24.42% n=94	38.7% n=149	20.78% n=80	3.59	1.081	4
Accessibility to commercial venues	5.45% n=21	11.17% n=43	28.83% n=111	30.13% n=116	24.42% n=94	3.57	1.135	5
Accessibility to healthcare service amenities	7.01% n=27	10.91% n=42	25.19% n=97	33.77% n=130	23.12% n=89	3.55	1.163	6

SAFETY DIMENSINOS

Appendix C2 – Table 4 Ranking the importance of variables related to the protection against traffic accidents at SBQR

Protection against traffic accidents variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1-not at all important	2-some what unimportant	3-neutral	4-somewhat important	5-very important			
Creation of traffic segregation or barrier zones	5.45% n=21	3.64% n=14	10.13% n=39	46.23% n=178	34.55% n=133	4.01	1.042	1
The priority for pedestrian in mixed traffic	3.9% n=15	4.94% n=19	18.96% n=73	35.84% n=138	36.36% n=140	3.96	1.050	2
Control of fast-moving vehicles	4.94% n=19	3.12% n=12	21.04% n=81	36.1% n=139	34.81% n=134	3.93	1.061	3

Appendix C2 – Table 5 Ranking the importance of variables related to the protection against flooding risks at SBQR

Protection against flooding risks variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1-not at all important	2-some what unimportant	3-neutral	4-somewhat important	5-very important			
The integration of waterfront greenways with flood control systems	4.68% n=18	4.94% n=19	10.39% n=40	45.97% n=177	34.03% n=131	4.00	1.032	1
Raising the plinths for buildings within creation of different elevations (longitudinal design)	4.42% n=17	4.42% n=17	11.17% n=43	47.79% n=184	32.21% n=124	3.99	1.005	2
Use of traditional shoreline infrastructure (such as	3.12% n=12	4.42% n=17	22.08% n=85	35.32% n=136	35.06% n=135	3.95	1.014	3

bulkheads, seawalls, and revetements, embankments, flood-proofing plinths, etc.)								
Use of temporary flood defences	4.16% n=16	23.38% n=90	25.19% n=97	23.38% n=90	23.9% n=92	3.39	1.119	4

Appendix C2 – Table 6 Ranking the importance of variables related to the protection against crimes at SBQR

Protection against crimes variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1-not at all important	2-some what unimportant	3-neutral	4-somewhat important	5-very important			
Sufficient artificial lighting quality after dark	4.94% n=19	2.86% n=11	9.35% n=36	48.83% n=188	34.03% n=131	4.04	.997	1
Provision of personalising property	3.38% n=13	5.19% n=20	12.21% n=47	45.71% n=176	33.51% n=129	4.01	.986	2
Good maintenance and cleanness	4.42% n=17	5.19% n=20	20.26% n=78	36.36% n=140	33.77% n=130	3.90	1.067	3
A well-designed urban waterfront spatial layout without cul-de-sacs (natural surveillance)	5.45% n=21	10.13% n=39	23.38% n=90	37.14% n=143	23.9% n=92	3.64	1.114	4
Use of appropriate number of surveillance cameras	3.38% n=13	12.47% n=48	29.61% n=114	31.95% n=123	22.6% n=87	3.58	1.073	5
The appropriate number of public/private	4.94% n=19	23.38% n=90	25.45% n=98	21.3% n=82	24.94% n=96	3.38	1.225	6

guards and police								

Comfort DIMENSIONS

Appendix C2 – Table 7 Ranking the importance of variables related to the seating comfort at SBQR

Seating comfort variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1-not at all important	2-some what unimportant	3-neutral	4-somewhat important	5-very important			
An adequate number of **sitting arrangements**	3.64% n=14	3.64% n=14	10.39% n=40	47.79% n=184	34.55% n=133	4.06	.960	1
Low noise level during seating and resting	3.38% n=13	5.45% n=21	9.61% n=37	47.01% n=181	34.55% n=133	4.04	.982	2
Materials for seats with insulating and water-repellent properties	4.16% n=16	3.64% n=14	10.65% n=41	47.53% n=183	34.03% n=131	4.04	.984	3
A variety of **formal and informal seating options**, combining primary and secondary seating	3.38% n=13	3.64% n=14	12.99% n=50	45.19% n=174	34.81% n=134	4.04	.963	4
Appropriate **size** of seating areas	4.16% n=16	4.94% n=19	10.91% n=42	48.57% n=187	31.43% n=121	3.98	.999	5
Good placement, preferably with **good views**	6.23% n=24	3.9% n=15	10.13% n=39	46.75% n=180	32.99% n=127	3.96	1.072	6
Arrangement of **movable/flexible seats**	5.97% n=23	2.34% n=9	30.13% n=116	38.96% n=150	22.6% n=87	3.70	1.035	7

Appendix C2 – Table 8 Ranking the importance of variables related to the visual comfort at SBQR

Visual comfort variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1-not at all important	2-some what unimportant	3-neutral	4-somewhat important	5-very important			
View of rich flora	2.08% n=8	3.38% n=13	12.99% n=50	47.27% n=182	34.29% n=132	4.08	.889	1
View of good skyline	4.16% n=16	3.64% n=14	9.09% n=35	49.35% n=190	33.77% n=130	4.05	.974	2
View of clear water body	4.16% n=16	4.68% n=18	10.91% n=42	43.9% n=169	36.36% n=140	4.04	1.017	3
View of clear information board and maps	3.9% n=15	3.64% n=14	11.69% n=45	47.01% n=181	33.77% n=130	4.03	.976	4
View of clear visual axis	5.45% n=21	3.64% n=14	10.39% n=40	46.75% n=180	33.77% n=130	4.00	1.040	5
View of rich fauna	4.16% n=16	4.42% n=17	27.79% n=107	39.22% n=151	24.42% n=94	3.75	1.007	6
Readability of transport schedule screens	4.94% n=19	4.16% n=16	28.57% n=110	39.74% n=153	22.6% n=87	3.71	1.020	7

Appendix C2 – Table 9 Ranking the importance of variables related to the climatic comfort at SBQR

Climatic comfort variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1-not at all important	2-some what unimportant	3-neutral	4-somewhat important	5-very important			
Provision of artificial shelter from wind, rain, and sun	4.94% n=19	2.86% n=11	10.13% n=39	45.97% n=177	36.1% n=139	4.05	1.010	1
Good air quality	6.23% n=24	2.08% n=8	10.91% n=42	48.05% n=185	32.73% n=126	3.99	1.041	2
Presence of temperature-regulating shade by provided by	4.16% n=16	2.6% n=10	29.09% n=112	42.6% n=164	21.56% n=83	3.75	.961	3

natural vegetation								
Appropriate water surface humidity	5.19% n=20	12.47% n=48	27.53% n=106	31.95% n=123	22.86% n=88	3.55	1.127	4

Appendix C2 – Table 10 Ranking the importance of variables related to the movement comfort at SBQR

Movement comfort variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1-not at all important	2-some what unimportant	3-neutral	4-somewhat important	5-very important			
The material of the cycle route	3.12% n=12	3.38% n=13	12.21% n=47	47.79% n=184	33.51% n=129	4.05	.934	1
The surface condition of the waterfront pedestrian route	3.38% n=13	4.94% n=19	9.09% n=35	48.83% n=188	33.77% n=130	4.05	.964	2
The appropriate waterfront promenade route width	3.64% n=14	3.64% n=14	10.65% n=41	48.83% n=188	33.25% n=128	4.04	.955	3
The material of the urban waterfront promenade	3.9% n=15	3.64% n=14	11.69% n=45	47.53% n=183	33.25% n=128	4.03	.973	4
The surface condition of the cycle route	4.68% n=18	3.9% n=15	21.56% n=83	35.06% n=135	34.81% n=134	3.91	1.066	5
The appropriate cycle route width	5.45% n=21	3.12% n=12	27.79% n=107	43.12% n=166	20.52% n=79	3.70	1.006	6
The appropriate vehicular route width	3.9% n=15	12.47% n=48	25.45% n=98	36.62% n=141	21.56% n=83	3.59	1.076	7
The surface condition of the vehicular route	2.86% n=11	12.47% n=48	27.27% n=105	38.18% n=147	19.22% n=74	3.58	1.025	8

The material of the vehicular route	18.44% n=71	15.32% n=59	19.48% n=75	22.34% n=86	24.42% n=94	3.19	1.435	9

SPATIAL AESTHETICS DIMENSIONS

Appendix C2 – Table 11 Ranking the importance of variables related to the sensitivity to harmonic relationship at SBQR

Sensitivity to harmonic relationship variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1-not at all important	2-some what unimportant	3-neutral	4-somewhat important	5-very important			
Harmonic spatial hierarchy and organisation	3.64% n=14	2.6% n=10	12.21% n=47	51.95% n=200	29.61% n=114	4.01	.923	1
Richness and coordination of building facade styles	4.42% n=17	3.9% n=15	13.77% n=53	49.87% n=192	28.05% n=108	3.93	.985	2
Articulation of the historical and contemporary building styles	5.45% n=21	22.34% n=86	26.49% n=102	25.45% n=98	20.26% n=78	3.33	1.101	3

Appendix C2 – Table 12 Ranking the importance of variables related to the proportions and scales at SBQR

Proportions and scales variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1-not at all important	2-some what unimportant	3-neutral	4-somewhat important	5-very important			
The appropriate scale of commercial areas	4.94% n=19	2.86% n=11	10.65% n=41	51.95% n=200	29.61% n=114	3.98	.981	1
The appropriate scale of residential blocks	2.86% n=11	5.45% n=21	13.77% n=53	48.31% n=186	29.61% n=114	3.96	.954	2

The appropriate scale of cultural venues	2.86% n=11	5.19% n=20	22.86% n=88	36.1% n=139	32.99% n=127	3.91	1.009	3
The appropriate scale of leisure areas	3.9% n=15	4.16% n=16	26.75% n=103	45.19% n=174	20% n=77	3.73	.957	4
The appropriate ratio of waterfront street width to building height	4.42% n=17	3.64% n=14	29.35% n=113	40.78% n=157	21.82% n=84	3.72	.989	5
Sense of enclosure	4.42% n=17	13.51% n=52	28.05% n=108	32.73% n=126	21.3% n=82	3.53	1.184	6
The appropriate scale of office areas	17.66% n=68	10.13% n=39	21.04% n=81	30.91% n=119	20.26% n=78	3.26	1.366	7

Appendix C2 – Table 13 Ranking the importance of variables related to the appreciation of rhythm at SBQR

Appreciation of rhythm variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1-not at all important	2-some what unimportant	3-neutral	4-somewhat important	5-very important			
The rhythm of active frontages at the ground floor level (interaction with the place)	4.94% n=19	2.34% n=9	21.3% n=82	36.36% n=140	35.06% n=135	3.94	1.049	1
The rhythm of facades (ratio of solid to void in facades) above ground floor	3.64% n=14	4.68% n=18	21.3% n=82	38.44% n=148	31.95% n=123	3.90	1.020	2
The rhythm of colonnades in	15.84% n=61	10.91% n=42	21.82% n=84	31.17% n=120	20.26% n=78	3.29	1.336	3

semi-public realm								

PLACE IDENTITY DIMENSIONS

Appendix C2 – Table 14 Ranking the importance of variables related to the urban memory at SBQR

Urban memory variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1-not at all important	2-some what unimportant	3-neutral	4-somewhat important	5-very important			
Cultural and digital heritage interpretation and presentation	4.68% n=18	4.16% n=16	9.87% n=38	50.91% n=196	30.39% n=117	3.98	.996	1
Historical preservation and adaptively re-using exiting built form as an embodiment of collective memory	4.42% n=17	4.42% n=17	11.69% n=45	48.57% n=187	30.91% n=119	3.97	1.001	2
Lifestyle transformation shaped by embodied personal memory	3.9% n=15	5.45% n=21	11.43% n=44	49.61% n=191	29.61% n=114	3.96	.990	3
Place names and their symbols	3.9% n=15	3.9% n=15	25.19% n=97	37.66% n=145	29.35% n=113	3.85	1.015	4

Appendix C2 – Table 15 Ranking the importance of variables related to the distinctiveness of urban furniture at SBQR

Distinctiveness of urban furniture variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1-not at all important	2-some what unimportant	3-neutral	4-somewhat important	5-very important			
Distinctiveness of fountains	3.38% n=13	4.94% n=19	10.65 %	47.79% n=184	33.25% n=128	4.03	.971	1

			n=41					
Distinctiveness of water-related design installations	4.42% n=17	2.34% n=9	12.47 % n=48	48.57% n=187	32.21% n=124	4.02	.969	2
Distinctiveness of artificial terraces toward water	4.16% n=16	4.68% n=18	10.91 % n=42	47.79% n=184	32.47% n=125	4.00	.999	3
Distinctiveness of benches	4.16% n=16	4.68% n=18	11.43 % n=44	47.53% n=183	32.21% n=124	3.99	1.000	4
Distinctiveness of monuments	4.68% n=18	5.19% n=20	10.39 % n=40	46.49% n=179	33.25% n=128	3.98	1.083	5
Distinctiveness of lampposts	4.42% n=17	3.64% n=14	21.04 % n=81	37.4% n=144	33.51% n=129	3.92	1.041	7
Distinctiveness of banners/digital billboards	4.94% n=19	4.68% n=18	20.78 % n=80	35.32% n=136	34.29% n=132	3.89	1.083	6
Distinctiveness of transit shelters	4.16% n=16	5.45% n=21	21.82 % n=84	35.58% n=137	32.99% n=127	3.88	1.062	8
Distinctiveness of bins	18.18% n=70	15.84% n=61	22.86 % n=88	22.6% n=87	20.52% n=79	3.11	1.387	9

Appendix C2 – Table 16 Ranking the importance of variables related to the distinctiveness of natural landscape at SBQR

Distinctiveness of natural landscape variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1-not at all important	2-some what unimportant	3-neutral	4-somewhat important	5-very important			
Distinctiveness of local plants	3.64% n=14	4.94% n=19	12.73 % n=49	46.75% n=180	31.95% n=123	3.98	.987	1
Distinctiveness of water body shapes	3.38% n=13	11.69% n=45	29.09 % n=112	32.47% n=125	23.38% n=90	3.61	1.070	2
Distinctiveness of shoreline forms	3.9% n=15	12.21% n=47	31.17 % n=120	32.73% n=126	20% n=77	3.53	1.063	3

Appendix C2 – Table 17 Ranking the importance of variables related to the distinctiveness of architectural elements at SBQR

Distinctiveness of architectural elements	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1-not at all important	2-some what unimportant	3-neutral	4-somewhat important	5-very important			
Distinctiveness of building materials	5.19% n=20	2.34% n=9	12.73% n=49	45.71% n=176	34.03% n=131	4.01	1.015	1
Distinctiveness of roofscapes	4.16% n=16	3.9% n=15	13.25% n=51	47.01% n=181	31.69% n=122	3.98	.991	2
Distinctiveness of decorative elements	4.42% n=17	13.64% n=14	12.99% n=50	47.79% n=184	31.17% n=120	3.98	.993	3
Distinctiveness of outdoor elevated walkways	4.42% n=17	3.38% n=13	25.45% n=98	36.88% n=142	29.87% n=115	3.84	1.032	4
Distinctiveness of facades	5.71% n=22	3.9% n=15	28.05% n=108	41.56% n=160	20.78% n=80	3.68	1.028	5
Distinctiveness of balconies	4.68% n=18	13.25% n=51	29.61% n=114	32.73% n=126	19.74% n=76	3.50	1.092	6
Distinctiveness of structure of buildings	4.16% n=16	25.19% n=97	28.57% n=110	20.52% n=79	21.56% n=83	3.30	1.183	7

INCLUSIVENESS DIMENSIONS

Appendix C2 – Table 18 Ranking the importance of variables related to the diversity user-activity pattern at SBQR

Diversity user-activity pattern variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1-not at all important	2-some what unimportant	3-neutral	4-somewhat important	5-very important			
Range of behaviours (if granted a public licence)	3.12% n=12	5.19% n=20	12.47% n=48	46.23% n=178	32.99% n=127	4.01	.972	1
Land-use diversity	4.16% n=16	12.47% n=48	22.86% n=88	31.43% n=121	29.09% n=112	3.69	1.139	2

Appendix C2 – Table 19 Ranking the importance of variables related to the user diversity at SBQR

Diversity of users variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1-not at all important	2-some what unimportant	3-neutral	4-somewhat important	5-very important			
Variety in gender	2.86% n=11	5.19% n=20	13.51% n=52	44.94% n=173	33.51% n=129	4.01	.968	1
Variety in age range	4.68% n=18	4.42% n=17	10.91% n=42	47.53% n=183	32.47% n=125	3.99	1.017	2
Mix of diverse community groups	5.19% n=20	2.86% n=11	11.95% n=46	51.95% n=200	28.05% n=108	3.95	.991	3

Appendix C2 – Table 20 Ranking the importance of variables related to the equitable access and use at SBQR

Equitable access and use variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1-not at all important	2-some what unimportant	3-neutral	4-somewhat important	5-very important			
Presence of accessible ramps on the urban waterside for people with disabilities	4.68% n=18	3.64% n=14	8.31% n=32	47.79% n=184	35.58% n=137	4.06	1.002	1
Equitable access to water's edge	4.16% n=16	3.12% n=12	9.61% n=37	50.91% n=196	32.21% n=124	4.04	.987	2
Free use of play areas on the urban waterside	3.38% n=13	3.12% n=12	13.51 % n=52	45.97% n=177	34.03% n=131	4.04	.958	3
Equitable access to key tourist destinations along waterfront	4.16% n=16	3.9% n=15	10.13 % n=39	47.53% n=183	34.29% n=132	4.04	.951	4

Equitable access to community-led events/activities	4.94% n=19	3.38% n=13	10.39 % n=40	47.27% n=182	34.03% n=131	4.02	1.013	5
Free use of movable benches	3.38% n=13	4.94% n=19	12.21 % n=47	47.79% n=184	31.69% n=122	3.99	.971	6
Free use of flexible spaces	5.19% n=20	4.68% n=18	9.61% n=37	48.57% n=187	31.95% n=123	3.97	1.035	7
24/7 operational available of waterfront open spaces	5.45% n=21	3.9% n=15	26.49 % n=102	40% n=154	24.16% n=93	3.74	1.042	8
Free use of Internet service (Wi-Fi)	4.94% n=19	3.12% n=12	29.35 % n=113	39.22% n=151	23.38% n=90	3.73	1.013	9
Presence of accessible lifts on the urban waterside for people with disabilities	4.68% n=18	3.64% n=14	30.13 % n=116	37.66% n=145	23.9% n=92	3.72	1.017	10

Appendix C2 – Table 21 Ranking the importance of variables related to the social cohesion at SBQR

Social cohesion variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1-not at all important	2-some what unimportant	3-neutral	4-somewhat important	5-very important			
The length of social interaction	3.12% n=12	4.68% n=18	10.13% n=39	46.49% n=179	35.58% n=137	4.07	.960	1
Cooperation of public and private partnership	4.16% n=16	3.38% n=13	11.95% n=46	51.43% n=198	29.09% n=112	3.98	.960	2
An effective community engagement in decision-making process and planning	4.68% n=18	4.68% n=18	12.47% n=48	46.49% n=179	31.69% n=122	3.96	1.025	3
Rational and transparent	4.16% n=16	3.64% n=14	29.61% n=114	41.82% n=161	20.78% n=80	3.71	.972	4

distribution of public funds and infrastructure service								

Appendix C2 – Table 22 Ranking the performance level of variables related to the continuity of waterfront path system at SBQR

The continuity of waterfront path systems variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1- very unsatisfied	2- unsatisfied	3- neutral	4- satisfied	5-very satisfied			
The continuity of waterfront promenade routes	7.27% n=28	6.75% n=26	17.66% n=68	30.65% n=118	37.66% n=145	3.85	1.208	1
The continuity of cycling routes	7.27% n=28	5.45% n=21	20.26% n=78	34.55% n=133	32.47% n=125	3.79	1.167	2
The continuity of vehicular routes	5.19% n=20	8.57% n=33	23.64% n=91	31.43% n=121	31.17% n=120	3.75	1.139	3
The continuity of water transport routes	7.79% n=30	9.09% n=35	20.26% n=78	28.83% n=111	34.03% n=131	3.72	1.239	4

Appendix C2 – Table 23 Ranking the performance level of variables related to the connectivity of waterfront path system at SBQR

The connectivity of waterfront path systems variables	Frequency of responses (%) (N=385)					Mean	Std. Deviation	Rank
	1- very unsatisfied	2- unsatisfied	3- neutral	4- satisfied	5-very satisfied			
The effective connection between the cycling routes and key nodes along urban waterfront open spaces	7.01% n=27	8.05% n=31	17.92% n=69	29.09% n=112	37.92% n=146	3.83	1.219	1
The effective connection	7.01% n=27	7.53% n=29	20.52% n=79	30.65% n=118	34.29% n=132	3.78	1.198	2

between waterfront promenades and key nodes along urban waterfront open spaces								
The effective connection between the vehicular routes and key nodes along urban waterfront open spaces	9.61% n=37	8.05% n=31	20% n=77	25.19% n=97	37.14% n=143	3.72	1.298	3
The effective connection between the waterborne transportation routes and key nodes along urban waterfront open spaces	8.05% n=31	9.87% n=38	22.08% n=85	27.53% n=106	32.47% n=125	3.66	1.248	4
The effective connection between pedestrian bridges and key nodes along urban waterfront open spaces	12.21% n=47	12.99% n=50	21.82% n=84	28.31% n=109	24.68% n=95	3.40	1.316	5

Appendix C2 – Table 24 Ranking the performance level of variables related to the physical accessibility at SBQR

Physical accessibility variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1- very unsatisfied	2- unsatisfied	3- neutral	4- satisfied	5-very satisfied			
Accessibility of commercial venues	5.45% n=21	7.53% n=29	25.19% n=97	29.87% n=115	31.95% n=123	3.75	1.143	1
Accessibility of water's edge	10.39% n=40	8.31% n=32	20% n=77	32.47% n=125	28.83% n=111	3.61	1.268	2
Accessibility of basic public service facilities	9.61% n=37	10.13% n=39	23.38% n=90	29.61% n=114	27.27% n=105	3.55	1.255	3

Accessibility of sport amenities	11.69% n=45	10.91% n=42	18.44% n=71	29.61% n=114	29.35% n=113	3.54	1.326	4
Accessibility of healthcare services	8.57% n=33	10.65% n=41	24.68% n=95	31.43% n=121	24.68% n=95	3.53	1.214	5
Accessibility of cultural venues	9.87% n=38	12.99% n=50	23.12% n=89	27.27% n=105	26.75% n=103	3.48	1.281	6

SAFETY DIMENSIONS

Appendix C2 – Table 25 Ranking the performance level of variables related to the protection against traffic accidents at SBQR

Protection against traffic accidents variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1- very unsatisfied	2- unsatisfied	3- neutral	4- satisfied	5-very satisfied			
The priority for pedestrian in mixed traffic	5.71% n=22	7.27% n=28	20.52 % n=79	30.13% n=116	36.36% n=140	3.84	1,163	1
Creation of traffic segregation/barrier zones	5.45% n=21	9.09% n=35	20.78 % n=80	29.87% n=115	34.81% n=134	3.79	1.171	2
Control of fast-moving vehicles	4.42% n=17	8.57% n=33	25.45 % n=98	29.87% n=115	31.69% n=122	3.76	1.121	3

Appendix C2 – Table 26 Ranking the performance level of variables related to the protection against flooding risks at SBQR

Protection against flooding risks variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1- very unsatisfied	2- unsatisfied	3- neutral	4- satisfied	5-very satisfied			
Raising the plinths for buildings with creation of different elevations (longitudinal design)	6.49% n=25	7.53% n=29	18.18% n=70	32.47% n=125	35.32% n=136	3.83	1.181	1
Integration of **waterfront greenways** with **flood control system**	7.79% n=30	5.19% n=20	23.12% n=89	27.27% n=105	36.62% n=141	3.80	1.212	2

Use of **traditional shoreline infrastructure** (such as bulkheads, seawalls, and revetments, embankments etc.)	7.27% n=28	9.09% n=35	17.66% n=68	34.55% n=133	31.43% n=121	3.74	1.202	3
Use of **temporary flood defences**	7.27% n=28	7.79% n=30	22.6% n=87	29.35% n=113	32.99% n=127	3.73	1.205	4

Appendix C2 – Table 27 Ranking the performance level of variables related to the protection against crime at SBQR

Protection against crime variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1- very unsatisfied	2- unsatisfied	3- neutral	4- satisfied	5-very satisfied			
Good maintenance and cleanness	5.71% n=22	8.57% n=33	19.74% n=76	32.99% n=127	32.99% n=127	3.79	1.159	1
Sufficient artificial lighting quality after dark	6.49% n=25	8.05% n=31	24.16% n=93	27.27% n=105	34.03% n=131	3.74	1.194	2
Provision of personalising property	7.27% n=28	7.27% n=28	21.56% n=83	34.29% n=132	29.61% n=114	3.72	1.162	3
A well-designed urban waterfront spatial layout without cul-de-sacs (natural surveillance)	6.75% n=26	6.75% n=26	24.16% n=93	31.95% n=123	30.39% n=117	3.72	1.175	4
The appropriate number of public/private guards and police	6.75% n=26	7.53% n=29	23.9% n=92	32.47% n=125	29.35% n=113	3.70	1.164	5
The appropriate number of surveillance cameras	9.61% n=37	10.13% n=39	21.04% n=81	32.47% n=125	26.75% n=103	3.57	1.251	6

COMFORT DIMENSIONS

Appendix C2 – Table 28 Ranking the performance level of variables related to the movement comfort at SBQR

Movement comfort variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1- very unsatisfied	2- unsatisfied	3- neutral	4- satisfied	5-very satisfied			
The surface condition of the waterfront pedestrian routes	5.71% n=22	10.13% n=39	19.22% n=74	29.61% n=114	35.32% n=136	3.79	1.193	1
The material of the urban waterfront promenade	5.19% n=20	9.09% n=35	23.12% n=89	28.31% n=109	34.29% n=132	3.77	1.165	2
The appropriate waterfront promenade route width	7.27% n=28	6.49% n=25	24.94% n=96	26.49% n=102	34.81% n=134	3.75	1.206	3
The appropriate cycle route width	7.53% n=20	7.53% n=20	22.6% n=87	28.57% n=110	33.77% n=130	3.74	1.215	4
The surface condition of the cycle route	5.71% n=22	8.83% n=34	25.19% n=97	27.01% n=104	33.25% n=128	3.73	1.176	5
The material of the cycle route	8.83% n=34	6.75% n=26	21.3% n=82	34.29% n=132	28.83% n=111	3.68	1.210	6
The material of the vehicular route	8.05% n=31	10.13% n=39	20.26% n=78	31.17% n=120	30.39% n=117	3.66	1.234	7
The surface condition of the vehicular route	6.75% n=26	7.01% n=27	24.16% n=93	38.44% n=148	23.64% n=91	3.65	1.117	8
The appropriate vehicular route width	10.13% n=39	10.13% n=39	22.6% n=87	31.69% n=122	25.45% n=98	3.52	1.254	9

Appendix C2 – Table 29 Ranking the performance level of variables related to the visual comfort at SBQR

Visual comfort variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1- very unsatisfied	2- unsatisfied	3- neutral	4- satisfied	5-very satisfied			

View of clear information board and maps	7.01% n=27	8.83% n=34	19.48% n=75	34.55% n=133	30.13% n=116	3.72	1.186	1
View of good skyline	6.23% n=24	7.01% n=27	23.12% n=89	36.62% n=141	27.01% n=104	3.71	1.124	2
View of clean water body	9.87% n=38	6.49% n=25	20.52% n=79	32.73% n=126	30.39% n=117	3.67	1.247	3
View of rich flora	6.23% n=24	8.31% n=32	23.9% n=92	36.36% n=140	25.19% n=97	3.66	1.128	4
View of clear visual axis	8.57% n=33	7.01% n=27	27.27% n=105	29.09% n=112	28.05% n=108	3.61	1.207	5
View of rich fauna	8.31% n=32	7.79% n=30	25.97% n=100	31.69% n=122	26.23% n=101	3.60	1.193	6
The readability of transport schedule	9.35% n=36	14.55% n=56	22.08% n=85	27.53% n=106	26.49% n=102	3.47	1.279	7

Appendix C2 – Table 30 Ranking the performance level of variables related to the climatic comfort at SBQR

Climatic comfort variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1- very unsatisfied	2- unsatisfied	3- neutral	4- satisfied	5-very satisfied			
Good air quality	5.97% n=23	7.53% n=29	21.3% n=82	26.75% n=103	38.44% n=148	3.84	1.190	1
Appropriate water surface humidity	9.35% n=36	6.75% n=26	25.45% n=98	29.87% n=115	28.57% n=110	3.62	1.228	2
Presence of temperature-regulating shade by provided by natural vegetation	8.31% n=32	10.91% n=42	24.42% n=94	29.35% n=113	27.01% n=104	3.56	1.228	3
Provision of artificial shelter from wind, rain, and sun	12.73% n=49	12.47% n=48	18.44% n=71	30.65% n=118	25.71% n=99	3.44	1.334	4

Appendix C2 – Table 31 Ranking the performance level of variables related to the seating comfort at SBQR

Seating comfort variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1- very unsatisfied	2- unsatisfied	3- neutral	4- satisfied	5-very satisfied			
An adequate number of sitting arrangements	5.97% n=23	9.09% n=35	24.16 % n=93	29.09% n=112	31.69% n=122	3.71	1.175	1
Good seating placement, preferably with good views	9.35% n=36	7.79% n=30	18.44 % n=71	33.51% n=129	30.91% n=119	3.69	1.246	2
Appropriate size of seating areas	10.91% n=42	6.23% n=24	19.74 % n=76	31.43% n=121	31.69% n=122	3.67	1.280	3
A variety of formal and informal seating options, combining primary and secondary seating	7.79% n=30	11.95% n=46	22.34 % n=86	29.09% n=112	28.83% n=111	3.59	1.236	4
Low noise level during seating and resting	8.05% n=31	10.91% n=42	21.82 % n=84	32.73% n=126	26.49% n=102	3.59	1.215	5
Arrangement of moveable/flexible seats	7.53% n=29	12.47% n=48	25.71 % n=99	27.79% n=107	26.49% n=102	3.53	1.218	6
Materials for seats with insulating and water-repellent properties	8.57% n=33	15.06 % n=58	24.16 % n=93	28.57% n=110	23.64% n=91	3.44	1.240	7

SPATIAL AESTHETICS DIMENSIONS

Appendix C2 – Table 32 Ranking the performance level of variables related to the sensitivity to harmonic relationship at SBQR

Sensitivity to harmonic relationship variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation
	1- very unsatisfied	2- unsatisfied	3- neutral	4- satisfied	5-very satisfied		
Richness and coordination of building facade styles	8.05% n=31	6.49% n=25	23.38% n=90	36.36% n=140	25.71% n=99	3.65	1.149

Harmonic spatial hierarchy and organisation	7.27% n=28	5.97% n=23	25.97% n=100	36.62% n=141	24.16% n=93	3.64	1.216
Articulation of the historical and contemporary building styles	7.27% n=28	15.06% n=58	25.97% n=100	28.57% n=110	23.12% n=89	3.45	1.205

Appendix C2 – Table 33 Ranking the performance level of variables related to the appreciation of rhythm at SBQR

Appreciation of rhythm variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1- very unsatisfied	2- unsatisfied	3- neutral	4- satisfied	5-very satisfied			
The **rhythm** of **facades** (ratio of solid to void in facade) **above ground floor**	5.97% n=23	9.09% n=35	27.01% n=104	30.65% n=118	27.27% n=105	3.64	1.165	1
The **rhythm** of **active frontages at the ground floor level**	8.57% n=33	12.73% n=49	25.19% n=97	30.65% n=118	22.86% n=88	3.46	1.128	2
The **rhythm** of **colonnades in semi-public realm**	11.95% n=46	8.57% n=33	25.71% n=99	30.39% n=117	23.38% n=90	3.45	1.268	3

Appendix C2 – Table 34 Ranking the performance level of variables related to the appreciation of rhythm at SBQR

Proportions and scales variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1- very unsatisfied	2- unsatisfied	3- neutral	4- satisfied	5-very satisfied			
The appropriate scale of **leisure areas**	4.16% n=16	8.83% n=34	23.38% n=90	36.36% n=140	27.27% n=105	3.74	1.081	1
The appropriate scale of **office areas**	6.49% n=25	9.35% n=36	25.54% n=98	35.32% n=136	23.38% n=90	3.60	1.135	2
The appropriate **ratio** of **waterfront promenade**	8.83% n=34	8.05% n=31	22.6% n=87	35.84% n=138	24.68% n=95	3.59	1.195	3

width to building height								
The appropriate scale of **commercial areas**	7.53% n=29	7.27% n=28	30.65% n=118	28.31% n=109	26.23% n=101	3.58	1.170	4
The appropriate scale of **residential blocks**	7.79% n=30	11.69% n=45	22.86% n=88	31.95% n=123	25.71% n=99	3.56	1.211	5
The appropriate scale of **cultural venues**	7.79% n=30	10.39% n=40	26.23% n=101	31.69% n=122	23.9% n=92	3.54	1.186	6
Sense of enclosure	11.43% n=44	9.61% n=37	24.42% n=94	34.55% n=133	20% n=77	3.42	1.235	7

PLACE IDENTITY DIMENSIONS

Appendix C2 – Table 35 Ranking the performance level of variables related to the distinctiveness of natural landscapes at SBQR

Distinctiveness of natural landscape variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1- very unsatisfied	2- unsatisfied	3- neutral	4- satisfied	5-very satisfied			
Distinctiveness of local plants	6.75% n=26	8.83% n=34	25.71% n=99	32.47% n=125	26.23% n=101	3.63	1.159	1
Distinctiveness of water body shapes	8.31% n=32	10.65% n=41	19.74% n=76	32.47% n=125	28.83% n=111	3.63	1.235	2
Distinctiveness of shoreline forms	5.97% n=23	9.61% n=37	25.97% n=100	34.55% n=133	23.9% n=92	3.61	1.127	3

Appendix C2 – Table 36 Ranking the performance level of variables related to the urban memory at SBQR

Urban memory	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1- very unsatisfied	2- unsatisfied	3- neutral	4- satisfied	5-very satisfied			
Cultural and digital heritage interpretation and presentation	8.05% n=31	9.35% n=36	24.16% n=93	32.21% n=124	26.23% n=101	3.59	1.200	1

Lifestyle transformation shaped by embodied personal memory	8.05% n=31	9.09% n=35	26.23% n=101	33.51% n=129	23.12% n=89	3.55	1.174	2
Historical preservation of adaptively re-using existing built form as an embodiment of collective memory	5.97% n=23	10.13% n=39	31.43% n=121	32.21% n=124	20.26% n=78	3.51	1.104	3
Place names and their symbols	8.31% n=32	8.05% n=31	31.69% n=122	29.09% n=112	22.86% n=88	3.50	1.171	4

Appendix C2 – Table 37 Ranking the performance level of variables related to the distinctiveness of urban furniture at SBQR

Distinctiveness of urban furniture variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1- very unsatisfied	2- unsatisfied	3- neutral	4- satisfied	5-very satisfied			
Distinctiveness of benches	6.23% n=24	9.61% n=37	25.45% n=98	33.51% n=129	25.19% n=97	3.62	1.143	1
Distinctiveness of banners/digital billboards	7.01% n=27	11.43% n=44	25.19% n=97	34.03% n=131	22.34% n=86	3.53	1.161	2
Distinctiveness of lamppost	8.57% n=33	12.47% n=48	22.86% n=88	32.21% n=124	23.9% n=92	3.50	1.22	3
Distinctiveness of transit shelter	7.53% n=29	14.03% n=54	23.64% n=91	30.91% n=119	23.9% n=92	3.50	1.23	4
Distinctiveness of artificial terraces leading towards water	8.83% n=34	11.43% n=44	25.71% n=99	28.57% n=110	25.45% n=98	3.50	1.210	5
Distinctiveness of fountains	5.45% n=21	16.1% n=62	27.27% n=105	26.49% n=102	24.68% n=95	3.49	1.223	7
Distinctiveness of monuments	9.87% n=38	11.43% n=44	29.61% n=114	24.94% n=96	24.16% n=93	3.42	1.246	6
Distinctiveness of water-related design installations	10.13% n=39	11.69% n=45	27.27% n=105	30.39% n=117	20.52% n=79	3.39	1.223	8

Distinctiveness of bins	11.95% n=46	11.17% n=43	26.23% n=101	29.09% n=112	21.56% n=83	3.37	1.268	9

Appendix C2 – Table 38 Ranking the performance level of variables related to the distinctiveness of architectural elements at SBQR

Distinctiveness of architectural elements	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1- very unsatisfied	2- unsatisfied	3- neutral	4- satisfied	5-very satisfied			
Distinctiveness of balconies	5.19% n=20	10.65% n=41	25.97 % n=100	30.39% n=117	27.79% n=107	3.65	1.145	1
Distinctiveness of facades	5.97% n=23	10.39% n=40	26.75 % n=103	29.61% n=114	27.27% n=105	3.62	1.162	2
Distinctiveness of building material	7.79% n=30	8.57% n=33	24.42 % n=94	31.95 % n=123	27.27% n=105	3.62	1.193	3
Distinctiveness of roofscapes	9.35% n=36	6.23% n=24	27.27 % n=105	33.25% n=128	23.9% n=92	3.56	1.189	4
Distinctiveness of structure of buildings	8.57% n=33	7.79% n=30	28.31 % n=109	30.13% n=116	25.19% n=97	3.56	1.194	5
Distinctiveness of decorative elements	8,05% n=31	7.01% n=27	32.73 % n=126	27.79% n=107	24.42% n=94	3.54	1.168	6
Distinctiveness of outdoor elevated walkways	7.53% n=29	9.35% n=36	29.87 % n=115	29.87% n=115	23.38% n=90	3.52	1.166	7

Appendix C2 – Table 39 Ranking the performance level of variables related to the diversity of users at SBQR

Diversity of users variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1- very unsatisfied	2- unsatisfied	3- neutral	4- satisfied	5-very satisfied			
Mix of community groups	6.75% n=26	8.57% n=33	23.9% n=92	29.35% n=113	31.43% n=121	3.70	1.191	1
Variety in gender	7.53% n=29	7.27% n=28	23.64% n=91	31.43% n=121	30.13% n=116	3.69	1.190	2
Variety in age range	8.83% n=34	7.27% n=28	27.01% n=104	28.83% n=111	28.05% n=108	3.60	1.217	3

Appendix C2 – Table 40 Ranking the performance level of variables related to the diverse user-activity pattern at SBQR

Diverse user-activity pattern variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1- very unsatisfied	2- unsatisfied	3- neutral	4- satisfied	5-very satisfied			
Range of behaviours (if granted a public licence)	5.45% n=21	11.17% n=43	21.04% n=81	34.03% n=131	28.31% n=109	3.69	1.156	1
Land-use diversity	7.27% n=28	9.87% n=38	21.56% n=83	36.62% n=141	24.68% n=95	3.62	1.169	2

Appendix C2 – Table 41 Ranking the performance level of variables related to the equitable access and use at SBQR

Equitable access and use variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1- very unsatisfied	2- unsatisfied	3- neutral	4- satisfied	5-very satisfied			
Equitable access to key destinations along waterfront for all social group	6.75% n=26	8.05% n=31	23.9% n=92	34.03% n=131	27.27% n=105	3.67	1.224	2
Equitable access to community-led events/activities for all social groups	7.01% n=27	11.69% n=45	19.48% n=75	30.91% n=119	30.91% n=119	3.67	1.156	1
Presence of accessible ramps on the urban waterside for people with disabilities	9.35% n=36	7.79% n=30	21.56% n=83	31.17% n=120	30.13% n=116	3.65	1.245	3
Presence of accessible lifts on the urban waterside for people with disabilities	8.05% n=31	6.23% n=24	28.05% n=108	29.35% n=113	28.31% n=109	3.64	1.153	4
Equitable access to water's edge for all social group	6.49% n=25	10.13% n=39	21.3% n=82	36.88% n=142	25.19% n=97	3.64	1.187	5

Free use of play areas on the urban waterside for all social groups	8.57% n=33	8.57% n=33	23.9% n=92	30.13% n=116	28.83% n=111	3.62	1.225	6
Free use of movable benches for all social groups	6.23% n=24	11.17% n=43	26.75% n=103	32.47% n=125	23.38% n=90	3.56	1.147	7
Free use of flexible spaces for all social groups	9.87% n=38	11.17% n=43	21.56% n=83	31.17% n=120	26.23% n=101	3.53	1.262	8
Free use of Internet service (Wi-Fi) for all social groups	8.83% n=34	13.25% n=51	23.12% n=89	26.49% n=102	28.31% n=109	3.52	1.271	9
24/7 operational availability of urban waterfront open spaces	7.79% n=30	12.99% n=50	27.27% n=105	28.05% n=108	23.9% n=92	3.47	1.208	10

Appendix C2 – Table 42 Ranking the performance level of variables related to the social cohesion at SBQR

Social cohesion variables	Frequency of responses (%) (n=385)					Mean	Std. Deviation	Rank
	1- very unsatisfied	2- unsatisfied	3- neutral	4- satisfied	5-very satisfied			
An effective community engagement in decision-making process and planning	4.94% n=19	9.61% n=37	24.68% n=95	36.62% n=141	24.16% n=93	3.65	1.096	1
Cooperation of public and private partnership	7.01% n=27	6.75% n=26	32.99% n=127	28.57% n=110	24.68% n=95	3.57	1.130	2
Rational and transparent distribution of public funds and infrastructure service	6.75% n=26	8.83% n=34	27.27% n=105	34.81% n=134	22.34% n=86	3.57	1.139	3
The length of social interaction	7.79% n=30	8.83% n=34	29.87% n=115	31.17% n=120	22.34% n=86	3.51	1.159	4

Appendix D- Semi-structured interview consent form and questions

Consent Form

Description: This research of the relationship between the quality of urban waterfront open spaces and use experiences in the context of urban waterfront regeneration is conducted by Zilun Shao, a PhD student from the Department of Architecture and Built Environment, University of Nottingham. I am currently conducting in-depth interview to fulfil the requirements of the PhD research project. The findings may influence future people-led urban waterfront regeneration strategies and inform urban waterfront design principles to improve the quality of public spaces on the urban waterfront. Participation is completely voluntary, and you can withdraw at any time or refuse to answer any question without any consequences of any kind. Your answers will be anonymous, and you will not benefit directly from participating in this research. The PhD research will not quote your identifying information (such as your name, position, etc.). The content of interview could be recorded in two ways: audio recording or make notes by hands. If you do not want to be audio-recorded, then I can make notes by my hands for recording. All data will be transferred to the UK and subsequent data-processing operations will comply with General Data Protection Regulation (GDPR). You can accept or reject the invitation. If you change your mind during or after the interview, all collected data will be permanently deleted.

If you have any questions, please do not hesitate to contact me via: zilun.shao@nottingham.ac.uk

This study is supervised by Dr Amy Tang and Dr Laura Hanks, and they can be contacted at yue.tang@nottingham.ac.uk and laura.hanks@nottingham.ac.uk. This study has been approved by the Faculty Research Ethics Committee, University of Nottingham.

Please carefully read the following statements and tick if you agree with the following statements:

- ☐ I understand that my participation is completely voluntarily, and I can withdraw at any time or refuse to answer any question without any consequences of any kind.
- ☐ I understand that all information I provide for this study will be treated as confidential.
- ☐ I understand that all my identifying information (name, position) will be anonymous. This will be done by disguising any detail of my interview which may reveal my identity or the identity of people I speak about.
- ☐ I understand that disguised extracts from my interview may be quoted in dissertation, conference presentation, or published papers.
- ☐ I understand that I will not benefit directly from participating in this research.
- ☐ I agree to my interview being audio-recorded.
- ☐ I agree to my interview being making notes by hands.
- ☐ I agree to my interview being audio-recorded and making notes by hands.
- ☐ I understand that my data will be transferred to the UK and subsequent data-processing operations will comply with General Data Protection Regulation (GDPR).
- ☐ I understand that all my data from the interview in which all identifying information has been removed will be kept securely for seven years flowing the research publication in accordance with GDPR data security legislation, after that, all the data will be permanently deleted.

☐ I understand that I am free to contact any of the people involved in the research to seek further clarification and information.
☐ I understand that that all data and information I provide can be withdrawn within 14 days after the interview, in which case all relevant materials will be deleted.

☐ I understand that I am a local resident (18 years old or older) of the core district of Hangzhou Heritage Canal in China, who once has been to the urban waterfront open spaces along the core district of Hangzhou Heritage Canal and am willing to participate in the interview.

Signature of research participant

Please select a suitable date and time for Interview …… …….

Signature of participant (please type your initials) …… …….

Thank you very much for taking the time to consider this invitation and willingness to participate in the PhD research project.

Questions for visitors

What is your primary purpose when visiting the urban waterfront open spaces in this area?

What did you do when you visiting the urban waterfront open spaces along the core district of Hangzhou Heritage Canal in China?

Which key nodes of urban waterfront open spaces in this area have left a strong impression on you—whether positive or negative? Please explain your reasons with reference to specific experiences or features.

In your opinion, which elements related to access and linkage are most important in the urban waterfront open spaces of this area and how well do you think these elements are currently performing? Please explain the specific reasons.

In your opinion, which elements related to safety and security are most important in the urban waterfront open spaces of this area and how well do you think these elements are currently performing? Please explain the specific reasons.

In your opinion, which elements related to comfort are most important in the urban waterfront open spaces of this area and how well do you think these elements are currently performing? Please explain the specific reasons.

In your opinion, which elements related to spatial aesthetics are most important in the urban waterfront open spaces of this area and how well do you think these elements are currently performing? Please explain the specific reasons.

In your opinion, which elements related to place identity are most important in the urban waterfront open spaces of this area and how well do you think these elements are currently performing Please explain the specific reasons.

In your opinion, which elements related to inclusiveness are most important in the urban waterfront open spaces of this area and how well do you think these elements are currently performing Please explain the specific reasons.

Would you like to add or provide more insights about the interview topic?

Questions for residents

How long have you lived in this area?
What did you usually do in the urban waterfront open spaces in this area?

Which key nodes of urban waterfront open spaces in this area have left a strong impression on you—whether positive or negative? Please explain your reasons with reference to specific experiences or features.

In your opinion, which elements related to access and linkage are most important in the urban waterfront open spaces of this area and how well do you think these elements are currently performing? Please explain the specific reasons.

In your opinion, which elements related to safety and security are most important in the urban waterfront open spaces of this area and how well do you think these elements are currently performing? Please explain the specific reasons.

In your opinion, which elements related to comfort are most important in the urban waterfront open spaces of this area and how well do you think these elements are currently performing? Please explain the specific reasons.

In your opinion, which elements related to spatial aesthetics are most important in the urban waterfront open spaces of this area and how well do you think these elements are currently performing? Please explain the specific reasons.

In your opinion, which elements related to place identity are most important in the urban waterfront open spaces of this area and how well do you think these elements are currently performing? Please explain the specific reasons.

In your opinion, which elements related to inclusiveness are most important in the urban waterfront open spaces of this area and how well do you think these elements are currently performing? Please explain the specific reasons.

In your view, to what extent do you think over-commercialisation and gentrification (leading to social exclusion or spatial inequality) are present in the urban waterfront public spaces along Hangzhou’s heritage canal core area, compared to other public spaces?

Would you like to add or provide more insights about the interview topic?

Questions for designers and managers

What are the specific responsibilities of your job description? How to carry them out?

What challenges do you encounter when managing/designing the urban waterfront open spaces? How do you resolve them?

In your opinion, what is the relationship between the design quality and the management and operation methods of urban waterfront public spaces

In your opinion, which elements related to access and linkage are most important in the urban waterfront open spaces of this area and how well do you think these elements are currently performing? Please explain the specific reasons.

In your opinion, which elements related to safety and security are most important in the urban waterfront open spaces of this area and how well do you think these elements are currently performing? Please explain the specific reasons.

In your opinion, which elements related to comfort are most important in the urban waterfront open spaces of this area and how well do you think these elements are currently performing? Please explain the specific reasons.

In your opinion, which elements related to spatial aesthetics are most important in the urban waterfront open spaces of this area and how well do you think these elements are currently performing? Please explain the specific reasons.

In your opinion, which elements related to place identity are most important in the urban waterfront open spaces of this area and how well do you think these elements are currently performing? Please explain the specific reasons.

In your opinion, which elements related to inclusiveness are most important in the urban waterfront open spaces of this area and how well do you think these elements are currently performing? Please explain the specific reasons.

In your view, to what extent do you think over-commercialisation and gentrification (leading to social exclusion or spatial inequality) are present in the urban waterfront public spaces along Hangzhou’s heritage canal core area, compared to other public spaces?

Would you like to add or provide more insights about the interview topic?