City Waves

The importance of recreational activities for reestablishing the social connectivity of rivers

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Abstract

This research investigates the importance of leisure practices in bringing rivers back to cities. It explores the historical and present significance of water-based recreation and its role in urban ecosystems. The paper analyses the development of waterfronts from centres of social activity, through their industrialization and neglect, to a recent rise in interest in restoring urban waterways. It looks at the revival of waterfronts in cities through the perspective of leisure practices, showing that reintroducing the once present water-based activities and adding new ones can contribute to establishing the social connectivity of the river. The research uses two case studies based in different contexts – Copenhagen's harbour and Cheonggyecheon stream in Seoul. This allows a perspective on various approaches to urban waterfront restoration, and noticing patterns that can be applicable in other developments.

Literature search showed a gap in scholarly writing regarding the recreational use of waterfronts and its importance for establishing a connection between the river and the city. Articles that cover the topic of water-based urban leisure practices usually don't look at their historical context. This paper combines a historical study of recreational activities practiced near urban rivers with research on contemporary guidelines regarding waterfront restoration, leading to a thorough overview of the role of leisure in reestablishing the social connectivity of rivers.

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Introduction

Swimming and other leisure activities were practiced in and near rivers already in ancient times (Carr, 2022). However, the focus quickly concentrated around their more practical roles of providing water, fuelling agriculture and facilitating trade. They were also an important military asset, and since the 19th century – a sewer for industrial pollution (Timur, 2013). This led to rivers and their recreational function being forgotten for decades. The neglect of aesthetic and recreational functions of waterways in cities has led to the deterioration of their quality and waterfronts being sidestepped in urban planning.

In recent years, an increasing interest can be observed globally in bringing rivers back to cities (Bechshøft, 2023b). Leisure activities practiced in relation to urban waterfronts, such as kayaking, sailing, rowing and even swimming, are observed in a growing number of cities where only 40 years ago waterfronts were dominated by industrial practices and high-paced urbanization. Reintroducing original waterways in those areas involves considerable challenges, including providing sufficient open space and ground infiltration, structural modifications, and negotiations with multiple landowners (Guimarães et al., 2021). Cleaning urban waterways and readapting them for leisure is a costly process (The Port of Copenhagen - From a Heavily Polluted Industrial Port to a Clean and Thriving Aquatic Environment, 2009), which suggests that bringing rivers and harbours back to cities has considerable benefits for both the city's image and the wellbeing of its residents.

This research explores how bringing suppressed waterways back to cities is shaping the dynamic between water and people through leisure practices. It looks at general patterns in urban river restorations, and two particular case studies – Copenhagen's harbour and the Cheong Gye Cheon river in Seoul. Both originally functioning, inter alia, as recreation spaces, then deteriorated in the processes of industrialization and urbanization, they were subject to extensive restoration programmes. Cities such as Copenhagen and Seoul set a good example of how restoring urban waterways brings a chance for democratised leisure practices in cities and improvement in the quality of life of residents. The choice of case studies derived from different contexts is a step towards recognizing universally applicable solutions.

The first part of this paper discusses the importance of rivers for cities and highlights their often overlooked social history. It brings a context of leisure practices related to urban waterways and explains how they were a way of racial and class segregation in history. Through this, it helps outline the importance of river restoration and a new way of designing leisure infrastructures. In the second part, the case studies of Copenhagen and Seoul are analysed through the lens of a four-stepped waterfront transformation process described by Timur (2013). This part explains the steps undertaken in urban waterways restoration and the reasons behind them. Finally, findings from historical analyses inform a reflection on more universally applicable patterns and principles in bringing rivers back to cities. New developments are evaluated based on their social connectivity and contrasted with their historical counterparts.

The term “river” used in this paper is a simplification of several types of water bodies in cities. It encompasses those of elongated shape, traversing the city or its part, with a flow or access to open sea – including rivers, canals, and harbours. Although they may not be geographically identical, they play a similar role in urban development and are characterized by long and narrow waterfronts. By “water-based leisure practices” this research means all activities practiced recreationally in or near said water bodies. Due to limited literature in other topics, the paper focuses mostly on urban wild swimming. However, it is important to note that the leisure activities include also kayaking, fishing, rowing, and various water sports.

This research aims to highlight the importance of leisure practices in urban waterfront development. It looks at what lessons can be learnt from the past to better understand the interconnectivity of rivers and recreation, and which solutions proved effective for urban waterfront connectivity in different contexts.

Part One: Significance of the relationship between rivers and recreational activities in cities

Literature review:

Rivers as an integral part of cities

In a similar way to water being an integral part of human existence, rivers were fundamental for cities and their development. Water shapes cultural practices, and it is also shaped by them. Rivers in cities lay at the intersection of multiple disciplines, interconnecting culture, religion, policies, technology and crises (Watson, 2019). Rivers are the foundation of civilization, primarily because of water's essential role in agriculture, but also the trade routes that were created by rivers and connected cities to inland markets (Padawangi et al., 2022). Scholarly literature mostly focuses on the role of rivers in food production, trade, and military. The social history of urban waterways, especially their role in leisure practices, is discussed more rarely.

The history of swimming

There is not much academic literature covering the topic of the history of swimming, and in the existing publications very little attention is given to the time before the 19th century when it started becoming a competitive sport and a popular pastime among the upper classes (Vasile et al., 2023). However, swimming was a socially important activity already in ancient times. In ancient India, as well as Central and South America, swimming was a way to maintain physical and mental health. There are also multiple sources that indicate that swimming was practiced and taught to children in Ancient Egypt (Carr, 2022). Although it is not an academic paper, an article by Eszter Stricker offers a contradictory view on the topic. She argues that the sources should be interpreted differently and are not an indication that the Egyptians swam in their free time (Stricker, 2020). Whether or not, and to what extent ancient people participated in swimming or similar activities as a leisure practice remains an uncertainty and a field for further exploration. According to

Beanland, swimming was rarely seen as leisure before the 1900s, and was mostly used for maintaining hygiene (Beanland, 2020). Several sources point out that swimming and water-based leisure were first tools of segregation (Wiltse, 2007). Before the public swimming pools were open in the US, working class men and boys swam naked in rivers, playing and having fun. It was considered scandalous and immoral and public baths were supposed to stop it from happening.

A surge in interest in swimming in the 19th century

Swimming, or spending time in water, was for a long time synonymous with (what was back in that time considered) hygiene (Beanland, 2020). The swimming pools int the 19th century lacked showers, because they were in themselves a place to wash the body (Wiltse, 2007). In the 19th century natural water bodies (rivers, waterfalls) began to be romanticised and given attention by artists. Water and nudity stretched the rigid frames of the Victorian society (*History of Wild Swimming*, n.d.). After medicine advised sea baths for better health, and swimming became officially recognised as a sport, river bathing and public pools gained in popularity. Swimming pools transformed from public baths of questionable quality to spaces of leisure bringing together communities (Beanland, 2020).

Historical importance of the relationship between rivers and recreation

Swimming in rivers before the 18th century

Life on Earth is inextricably linked to water, as is human existence. Settlements historically were, and still mostly are, organised around water bodies, mostly rivers. It allowed for them to produce and transport crops, as well as to protect the inhabitants. However, besides functional purposes, water also played an important role in social life. Although academic literature on this subject is limited, it seems clear that swimming has been present in human history to some extent for thousands of years (Carr, 2022). The earliest representation of swimming humans discovered thus far is considered to be the "Cave of swimmers" - part of a large shelter with prehistoric paintings in Eastern Sahara. It contains small human figures, floating in a swimming-like posture (Avramidis, 2011). In ancient times swimming became a necessary survival and military skill for some, while it was a way of spending free time for others, mostly representing the upper classes. In ancient Egypt, recreational swimming was reserved for pharaohs and their families (Avramidis, 2011). African from other regions were good swimmers, and spending time in water was a playful activity for children. Pliny the Elder in one of his stories describes two boys racing in the water, and one of them even befriending a dolphin and spending time with the animal regularly (Carr, 2022).

Figure 1 *Youth playing the flute and riding a dolphin*

Note: Red-figure stamnos, 360–340 BC. Copyright by Marie-Lan Nguyen / Wikimedia Commons. Licenced under CC Attribution 2.5 Generic licence.

The relationship between people and swimming in rivers fluctuated in the centuries to follow. Romans in the times of the Empire preferred artificial bathing establishments, although bathing in rivers was still possible. In Middle Ages several factors caused the reluctance towards swimming. The drowning of Frederick Barbarossa made Christians believe that they should stay away from water. Additionally, nudity was in some cultures seen as a threat to personal modesty. Another concern was the threat to health and diseases spread in water. These were followed by official regulations restricting swimming in the 16th and 17th centuries (Carr, 2022).

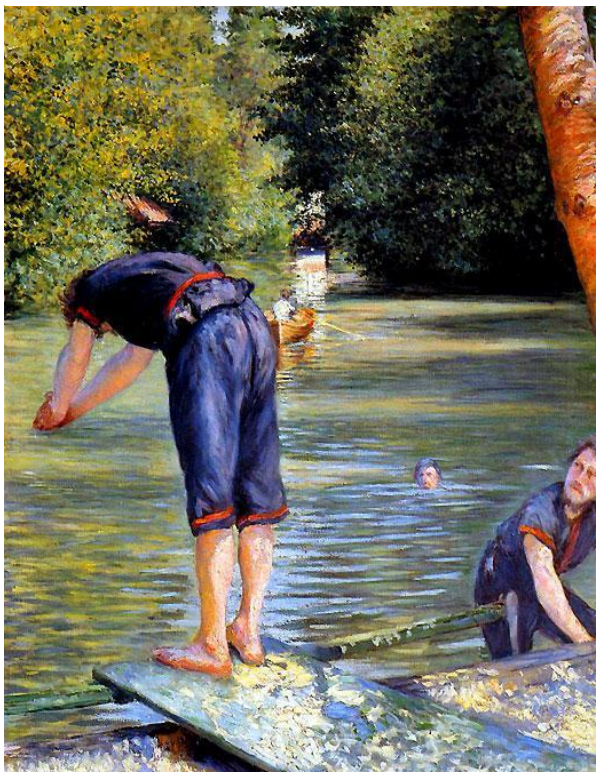
A surge in interest in aquatic activities in the 18th and 19th centuries

A new interest in swimming started emerging in Renaissance, and especially in Enlightenment period. Centering the attention around man as a harmoniously developed being led to the perception of swimming as a means of physical training (Vasile et al., 2023). European elites wanted to swim to associate themselves with the sophisticated Greeks and Romans. Swimming in rivers became a widely spread phenomenon, especially among students, who even organized competitions. Harvard students splashed in Boston's Charles River, those in Cambridge splashed in River Thames, even against the threat of penalties from the vice-chancellor (Carr, 2022).

Soon enough, alongside the doctors' advice about bathing in seawater, the idea that swimming was healthy started being introduced to the public. It served as a way to distinguished between the "responsible, civilized" Europeans and the "irresponsible" Africans and Native Americans who would swim for fun. Eurasians tried to rethink swimming as a science and teach it according to newly published guidebooks. Those

swimming in rivers without scientific guidance, including Afroamericans or factory workers, were frowned upon (Carr, 2022).

Figure 2 *Swimmer (bather) preparing to dive (1878)*



Note: This is a faithful photographic reproduction of a two-dimensional, public domain work of art by Gustave Caillebotte. This work is in the public domain in its country of origin and other countries and areas where the copyright term is the author's life plus 100 years or fewer.

Swimming became a professional sport in the second half of the 19th century, which was met with the construction of new modern pools (Vasile et al., 2023). The pools quickly became a tool of segregation, especially in North America. While the earliest public facilities were established there in the 1850s as baths for the urban poor, they were soon followed by private pools of athletic clubs and admission fees to the public pools, which restricted the access for the lower classes. At the same time, much to the annoyance of the authorities, working class men and boys were still swimming in rivers, transgressing the Victorian culture of middle-class Americans. Wild swimming was a "favourite summer sport" for the boys, and a much needed "refreshing plunge" for the men (Wiltse, 2007).

Swimming can be considered fundamental for water-based recreation, but it wasn't the only activity historically practiced in rivers. Other aquatic activities developed as sports in the 19th century, due to a general shift in the role of rivers. Sailing, although first used for exploration, trade, transportation and warfare, was already known in Egyptian times. It became a sport in the 1800s, initially as racing for wealthy men (Jennings, n.d.). Also fishing and surfing were already practiced in ancient times. Surfing was born in Pacific cultures, with records showing Polynesians using "bellyboards" in the 1st century (Jennings, n.d.). In medieval China, surfing the tidal waves in Zhe River was a yearly event,

that drew countless spectators (Carr, 2022). Many of the current recreational water-based activities derive from indigenous practices. European leisure activities were widely spread by colonizers in the settlements they established. On the other hand, water-based sport and recreation of indigenous people were taken up by colonizers and adapted in Europe. Other activities of native people were popularised by Americans, like kayaking, which was initially a traditional Inuit mode of travel (Jennings, n.d.).

Importance of water-based recreational activities for the health and wellbeing of citizens

Water's impact on health and wellbeing

Since the 20th century water has consistently been a base for multiple leisure activities. In recent years, the outdoor ones are gaining popularity in cities. Even though swimming, kayaking or fishing have lost their primary purpose from centuries ago, they still have several benefits. Aquatic exercise has a positive impact on the overall physiological health, similarly to other physical activities. Moreover, it is a good alternative cardiovascular exercise to weight-bearing sports practiced on land (Jackson et al., 2022). Aquatic activities can also have a positive effect on mental health and wellbeing. For many, water is strongly therapeutic, thanks to the way in which it diversifies bodily sensations. Participants of studies with disabilities saw water as a more equal environment than land (Britton et al., 2018).

People have formed a deep connection with water throughout their existence as a species. This connection and inspiration can be seen in art and in everyday life, as it serves as an inspiration in a range of disciplines (Nichols, 2014). Nichols describes a state of "blue mind" that we experience when being near water – a meditative state of calm and contentment. Even being around water bodies, without immersing in them, carries benefits for mental health. It reduces stress, brings calmness and relaxation (*The Effects of Water on Mental Well-being*, 2023). In urban spaces, living near blue spaces can reduce mental health issues and mitigate the negative effect of socio-economic deprivation (Georgiou et al., 2022).

Urban recreation spaces as a way to build healthy ecosystems

A daily life cycle of most people consists of productive work, sleeping and leisure time (Mitković & Bogdanovic, 2004). The latter, which can be defined as "time when you are not working and you can relax and do things that you enjoy" ("LEISURE TIME Definition and Meaning | Collins English Dictionary," 2024), is the measure of the quality of time of a person (Mitković & Bogdanovic, 2004). Activities practiced in leisure time serve the primary purpose of relieving the physical and mental fatigue and tension after performing work or other activities continuously for several hours. In result it leads to an overall improvement in wellbeing (Gulam, 2016). Urban recreation can be defined as "a process of psycho-physical regeneration of a man in an urban environment" (Mitković & Bogdanovic, 2004), and it is practiced using the available recreational spaces and equipment in a city.

A proximity of recreational spaces is shown to increase the overall neighbourhood satisfaction, the time spent on moderate physical activity, and even a normal or low BMI. Therefore, new and restored areas supporting recreation, especially natural ones, should be considered in urban planning for residents' better health (Björk et al., 2008). Recreational spaces, which complement and enhance the dwelling function, should be properly arranged and equipped. They should be accessible and attractive in order to satisfy the users' recreational needs (Mitković & Bogdanovic, 2004). Recreation usually takes place in open spaces, leading to gathering people and strenghtening interpersonal relations. The resemblance of open spaces to natural environments builds a contrast between the closed, artificial surroundings of the majority of everyday life (Mitković & Bogdanovic, 2004).

The role of water-based recreation in the city's social life

Spaces designed to accommodate water-based outdoor leisure activities lay at the intersection of the human need for recreation and the positive impact of water on health and wellbeing. Historically a lot of social activities were associated with water, regardless of the social status. Pharaohs and their families took swimming lessons at private pools, Romans used the opportunity of using public baths to discuss current affairs. Egyptian kids played in the Nile, similarly to Irish immigrants in North America centuries later. Water bodies were a natural background, and sometimes active participants, of play, exchange of ideas, competitions, love stories and meditation.

Waterfronts nowadays have maintained their potential of contributing to the social life. They provide opportunities for on- and off-water physical activity (Schneider, 2009). Those activities can usually either be practiced in groups (swimming, fishing), or even directly require human interaction and cooperation (rowing, sailing). On the other hand, being near water can offer a benefit of solitude and disconnection from the bustling urban life for those who need it (Schneider, 2009). Modern public swimming pools offer more freedom than they did in previous centuries. Regular societal divisions and norms don't apply and, together with clothes, markers of social status are removed (Florian, 2023). This applies even more to swimming pools arranged directly in urban waterways. Recreational areas on urban waterfronts are usually accessible to all citizens and complement green spaces in providing the leisure functions for the city. They are unique through the range of activities that can be practiced only in or near water.

The significance of waterfronts in urban ecosystems

Waterfronts' influence on the identity of cities and neighbourhoods

Rivers are one of the most important factors in building the identity of cities. Historically, the connection point between water and land was functional and concentrated mostly on the operation and servicing of ships, as well as other port activities (Karas, 2019). Apart from port developments, various other unique areas emerged gradually along rivers, contributing to building the city-river relationship and the city's identity. In many cases the unique identity of urban river spaces is overlooked and not formally regulated. Long term and multidisciplinary planning of waterfront areas can raise their attractiveness,

foster sustainability and inclusivity, leading to strengthening the identity of specific places (Petrtýlová & Jaššo, 2022).

Two main approaches can be distinguished for city water management – command and control approach, and ecosystem-based approach. The first one focuses on finding simple and predictable solutions. It often involves canalizing rivers and paving riverbanks with concrete to maintain stability and homogeneity. The ecosystem-based approach, on the other hand, recognizes the river as a natural entity, and seeks to maintain its original, irregular flow. The command and control approach separates human activities from the river, while the other one treats them as its integral part (Miradyanti et al., 2021).

New waterfront developments, spanning in majority over the last 30 years, start to depart from the predominant command and control approach, in favour of using the river as a means to improve human health and wellbeing. The focus is gradually shifting from economic factors of waterfronts to their role in the ecosystem and their social connectivity (Miradyanti et al., 2021). Social connectivity can be defined as "the communication and movement of people, goods, ideas, and culture along and across rivers" (Kondolf & Pinto, 2017). It is characterised by three main dimensions. Longitudinal connectivity takes into account the communication system along the whole river. Lateral connectivity refers to the activities practiced in the river's floodplain. Lastly, vertical connectivity relates the river to the atmosphere and groundwater (Miradyanti et al., 2021). While the longitudinal dimension has been explored for many years in the use of rivers for transportation, it's the other two that mostly influence the impact of rivers on the wellbeing of citizens. This aspect creates a division between the Global North and the Global South, resulting in different roles of rivers in urban ecosystems. Vertical and lateral connectivity is present in the Global South, where riverbanks are used for social practices, including fishing, washing clothes, religious rituals and recreation. The cities of the Global North lost those social aspects in the Industrial Age, but are trying to revive them in the new waterfront developments (Kondolf & Pinto, 2017).

The social and environmental role of waterfront revival

The city understood as an ecosystem is formed by an interconnection of environmental, economic and social concerns (Laidley, 2007). Urban waterfronts play a vital role in all those fields. The river's social function is largely defined by its width and its scale in relation to the whole city. It influenced the perceived proximity of the other bank and the typologies of waterfront developments (Kondolf & Pinto, 2017). Small streams within cities often allow for conversation across their banks. They don't influence the city's streets grid and are easy to cross. On the other hand, their banks are often minimal and not suitable for waterfront developments. With increase in width and scale of the river in relation to the whole city, those parameters change gradually. Wider rivers don't allow for direct communication between people on opposite sides, they are more rarely bridged, and influence the layout of streets. They also allow for larger waterfront infrastructures, which can eventually become flagship landscapes of bigger cities (Kondolf & Pinto, 2017).

Waterfront infrastructures that allow for recreational activities have a positive impact on the citizens' quality of life. Besides the discussed improvements in health and wellness,

they entail a stronger environmental protection and economic development. Those spaces create a meaning for both local urban dwellers and visitors, which in turn influences the ecosystem of the city through the decisions of water resource managers, policy makers, and urban planners (Schneider, 2009).

Social revival of waterfronts is often intertwined with the ecological one. River waters need to be depolluted before they can accommodate aquatic activities. The cleaning of rivers is a venture requiring both extensive funding and policy making, which attracts public attention. In result, it raises the general awareness of the environmental role of rivers in cities. The appearance of salmon and otter species after cutting pollution levels in the Thames was widely covered by media and received a lot of public attention (Watson, 2019). Urban waterfronts should be designed with the aim of mitigating the negative impacts of urbanization through the application of infrastructure that supports their ecological function. This will result in preserving and restoring existing habitats, as well as a possibility for a bigger diversity in urban waterfront ecosystems (Dyson & Yocom, 2014).

Part Two: the transformation of urban rivers

Literature review:

The changing role of rivers in cities

The role of the river in cities has changed throughout centuries – Pindo and Kondolf describe seven stages named consecutively River Destroyer, Tamed, Conveyor, Bridged, Unhonoured, Forgotten and Waiting (Pinto & Kondolf, 2015). They describe a universal principle according to which rivers were first a necessary, yet feared, element of human settlements, then they became the main route for trade and military activities, underwent pollution ("transformation of rivers into open sewers"), to become detached from cities, and in recent years slowly reintroduced again. This research and its case studies focuses mostly on the last three steps, encompassing the industrialization processes and urban river restorations. A similar pattern, strengthening this approach is described by Pekin, who depicts four stages of a typical waterfront development: Emergence of Waterfront Cities, Growth of Waterfronts, Deterioration of Waterfronts, and Rediscovery of Waterfronts (Pekin, 2013).

First case study – the urban regeneration of Copenhagen harbour

As its name suggests (Danish København means "the harbour of merchants"), Copenhagen was a flourishing fishing village, which later developed its military forces and trade to strengthen its position on the merchant scene. Similarly to other European countries, Denmark's 19th and 20th centuries were marked by industrialization processes, which happened gradually between 1840 and 1914 (Vleuten, 1992). After that, the harbour established its primary function of facilitating transportation of goods and collecting industrial wastewater (Jensen et al., 2015). In the article, Jensen et al. argue that the process of transformation that followed is not well aligned with the established

practices in the field. This is an interesting point of view, especially given the positive reception of the new Copenhagen harbour (Covatta, 2018). It also highlights the complexity of the transformation. In Copenhagen the process took ten years and included big financial investments, as well as changes in the water management system, and building new infrastructures (Yumpu.com, n.d.).

Second case study – restoration of Cheonggyecheon river in Seoul

The Cheonggyecheon River restoration project follows a similar timeline as the Copenhagen harbour, proving the accuracy of Pekin's typical waterfront development diagram. First a natural stream, it was covered by a 10-lane highway in the urbanization process of Seoul, to later be rediscovered and brought back to the citizens (Inaya, 2021). The announcement of the project was met with doubt from the public, however in the end the 6km long road was reborn as a stream flourishing with urban and natural life (Lee, n.d.). Literature includes works by In Keun Lee, the director general of the Cheong Gye Cheon restoration project. This suggests possible bias, however with his PhD and visiting professor titles, and after a critical look at the papers, it can be seen that they are written in an academic manner and contain extensive information useful for this research. Interestingly, the Cheong Gye Cheon restoration project was used as an ideal precedent by Miradyanti et al. and described as a "river-space that successfully develops and implements social connectivity to create a lively and connected river-space in the urban fabric" (Miradyanti et al., 2021).

A four-step waterfront transformation process

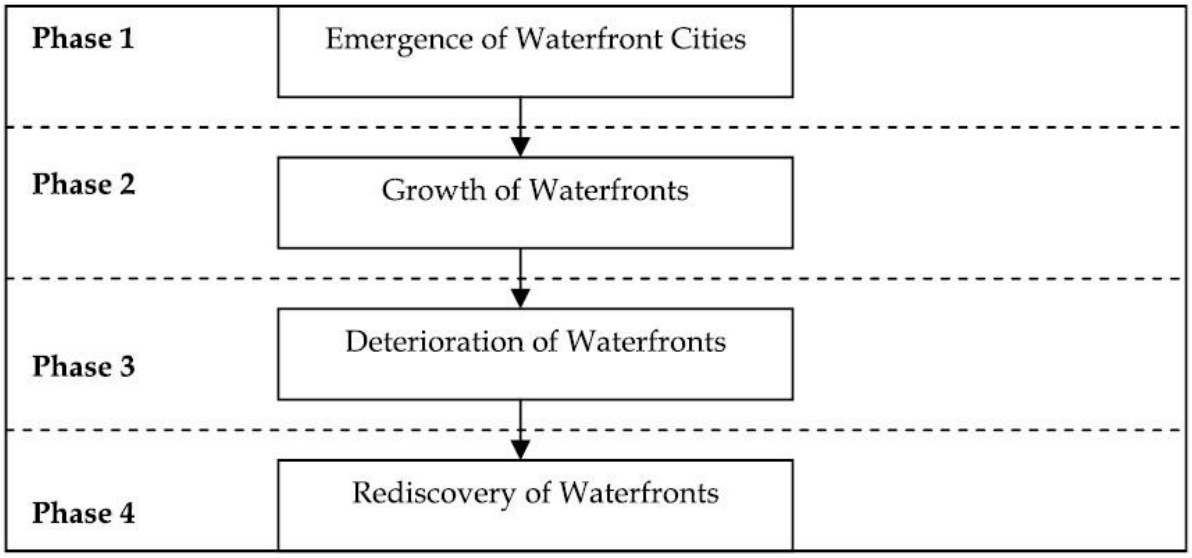
Emergence, Growth, Deterioration, Rediscovery

Recreation was historically an important factor in creating the dynamic between water and people in cities. At first, especially those with limited free time and financial resources used rivers as an accessible space for play and social exchanges. Later, the waterfronts became used in more organized, and therefore segregated, way (Wiltse, 2007). Even with all those shifts in the purpose and recreational use of rivers, before the industrial revolution waterfronts were thriving thanks to their intensive use and social importance. The industrial era brought a disruption to this close relationship between cities and their waterfronts, caused by activities and infrastructures such as huge ports, transportation and warehouses (Pekin, 2013).

Although historically not much urban planning of waterfronts didn't receive that much attention and they were rather a result of coexistent practices than architectural visions, there is still a common pattern of their development that can be seen in most cases (Pekin, 2013). Wrenn, interpreted by Pekin, distinguishes four stages: emergence of waterfront cities, the growth of waterfronts, their deterioration, and rediscovery. As shown in the first part of this paper, thanks to their trade and food production opportunities, the proximity of rivers was a predominant factor in the choice of site for urban developments – the first phase. The growth of waterfronts was marked by their increasing importance in economic activities (Pekin, 2013). Pekin then argues that this stage culminated with the invention of steamships that led to more industrial port infrastructures, and the

introduction of railroads, which pushed the cities away from their waterfronts. The third stage, "Deterioration", was a natural result of the new industrial practices. Firstly, bigger ships and warehouses needed bigger spaces, and industrial ports moved outside of the city, leaving old infrastructure not taken care of. Secondly, the public started becoming more aware of the dangers of pollution. The last step, "Rediscovery", started in the second half of the 20th century, and is still happening today. Where the obsolete industrial ports gradually left the stage, municipal and private investors started finding their opportunity to provide urban citizens with what they needed – proper management of natural resources and leisure spaces in the city (Pekin, 2013).

Figure 3 Typical fragment of waterfront development phases



Note: From "Urban Waterfront Regenerations" by Pekin, U. (2013). Diagram based on the four periods of waterfronts' historical evolution listed by Wrenn et al. (1983).

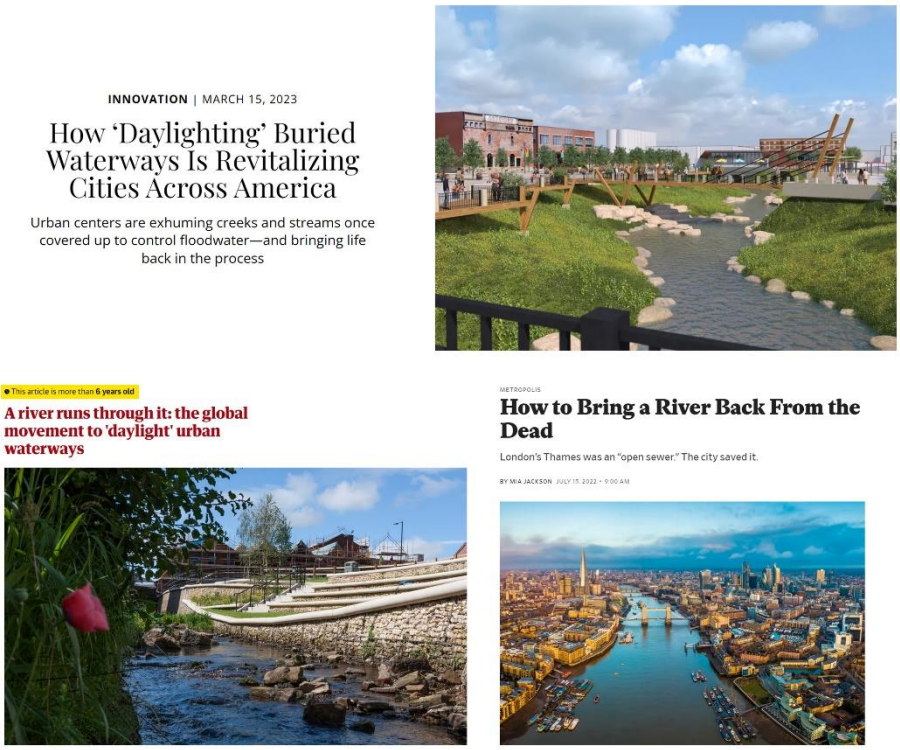
In discussing the relationship between rivers and people, Pinto and Kondolf outline the same pattern, highlighting the loss of social connectivity of rivers caused by industrialization processes (Pinto&Kondolf, 2015). Finally, in the 1970s, the perspective began to shift from rivers being neglected to their new role in urban planning. It is important to note that while the described phases work as a general pattern for most rivers, all urban waterfronts have their own unique history influenced by specific geographic conditions and a lack of unified planning strategies (Pekin, 2013). There are multiple factors that led to the neglect of rivers in different cities, ranging from heavy industries, through inefficient sewage systems and pollution, to rapid urbanization. Though the interest in bringing back urban rivers began globally at a similar time, each case study has a slightly different timeline depending on many local conditions.

A common raise in interest in bringing rivers back to cities

Looking at both academic literature and popular media leads to a conclusion that the topic of bringing rivers back to cities is gaining increasing attention in recent years.

Note: From "Urban Waterfront Regenerations" by Pekin, U. (2013). Diagram based on the four periods of waterfronts' historical evolution listed by Wrenn et al. (1983).

Figure 4 Bringing rivers back to cities in public media



Note: The collage was made using headlines from magazines' websites discussing the topic of bringing rivers back to cities. The articles were written in 2017, 20222 and 2023.

And although some still classify restoring urban waterways as "Innovation" (Morrison, 2023), the interest in waterfront regeneration emerged already in the 1960s in North America, when the city of Baltimore decided to restore its Inner Harbour (Pekin, 2013). The *Inner Harbour Project* was adopted in 1967 with the idea of restoring public access to water and recreation. The plan, executed with unprecedented success, was a pioneer in its vision, components, and implementation process (del Rio, 2018). Baltimore's Inner Harbour received multiple awards and became a worldwide model for waterfront revitalization.

One of the main reasons behind this new interest in waterfront revitalization was the need for more recreational area resulting from a shift in work models and an increase in in the amount of free time (Pekin, 2013). As Jones points out, new waterfronts became dominated by residential, recreational, tourism and commercial land use. The ideas born in the USA in the 1970s became a model for the regeneration of urban waterfronts globally and got popularized in Europe mostly in the 1980s and 1990s (Jones, 2006). Although a lot has already been done in the field of river restoration, it is still an ongoing process. While the principles established 50 years ago are widely applied in Europe, North America, and globalized cities on other continents, still a lot of rivers in Asia are socially and environmentally neglected (Padawangi et al., 2022). And even in Europe waterfront regeneration remains a prevailing topic in the debate on urban planning and new leisure spaces in cities. A clear example are the upcoming Olympic Games in July 2024 and Paris's efforts to make the Seine River swimmable again (TIME, 2023).

The case studies of this research were chosen from relatively new projects, realized at least partially in the 21st century. Their different cultural and historical contexts offer a broader perspective on bringing rivers back to cities.

Historical overview of social functions of the Copenhagen harbour and the Cheonggyecheon river

Water-based activities as part of the Copenhagen's harbour identity from the 1850s onwards

Although the beginnings of Copenhagen's history remain unclear, it's long river-like harbour played an important role in the city's development. In the first written records the names used for Copenhagen are either 'Købmannahafn' or 'Hafn' and their variations, meaning "the merchants' port", or simply "port" (Dahlström et al., 2018). Early in the 17th century Copenhagen was planned as a port city, with the purpose of making it suitable for becoming a base for a rising sea power (Konvitz, 2019).

Figure 5 Plan of Copenhagen in 1649, print by Dahlberg

Note: Public domain image of the vintage map from Norman B. Leventhal Map Center, free to use, no copyright restrictions

The plans for the city, especially the Ny-København (New Copenhagen) project, were concentrated around the use of the harbour. Smaller canals were planned for trading ships to dock and exchange goods with trade houses. There was even an entirely new district, Nyboder, built for sailors. The plans for Copenhagen as a port empire were never

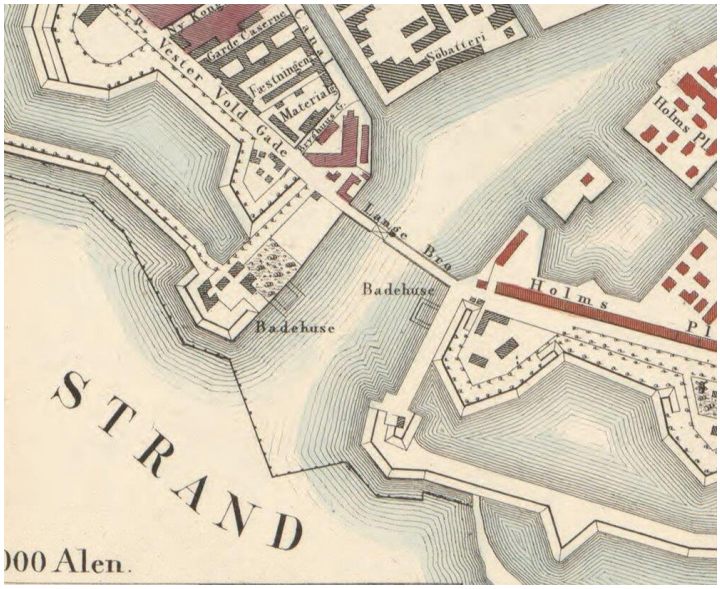
fully realised, and in result some of the districts meant for maritime trade became used for residential and commercial purposes (*Ny-Københavns Historie – KEND KØBENHAVN*, n.d.). However, very little information can be found on the recreational use of the harbour in its early years. Looking at the plans from the 17th century, it was clearly used for sailing, possibly some of it recreational, but mostly trade. Queen Sophie Amalie chose a plot facing the harbour to build her new summer residence, which later became the Amalienborg castle (*Ny-Københavns Historie – KEND KØBENHAVN*, n.d.).

Figure 6 View of Larsen Square near Copenhagen Harbor (1840)

Note: This painting by Carl Dahl shows part of the harbour with timber yards in 1840. Two men in their shirts only seem to be preparing for a swim or chatting after one. This work is in the public domain.

Some accounts suggest that in Copenhagen the harbour was used for swimming by dockyard workers – both to cool off and to wash their bodies. Small bathhouses on the waterfront are visible on the city maps already in the 1860s, although the harbour had its bathhouse already in the 1780s, with separate entrances for men and women (Heward, 2021).

Figure 7 South entrance to the Copenhagen Harbour in the 19th century



Note: The map shows bath houses (Badehuse) on each side of the harbour.

Swimming establishments in the harbour were in their full glory in the first half of the 20th century. Copenhageners enjoyed a dip in the water before or after work, and it was followed by harbour baths architecture. One of the prominent examples was the large swimming establishment next to the Langebro bridge – with changing rooms built on decks, surrounding four swimming areas (Heward, 2021).

Figure 8 Langebro (1955)

Note: In the foreground Rysensteens Badeanstalt (built 1905) under demolition. Photo taken for the Stadsarkivet's photographic studio by Mogens Falk-Sørensen. Distributed under CC-BY licence.

Figure 9 Copenhagen, aerial photograph

Note: Photograph by Eduard Spelterini taken between 1905 and 1924. The Rysensteens bath house is visible next to the Langebro bridge. Swiss National Library, EAD-WEHR-32046-B, this work is under public domain.

A search in the archival images from Copenhagen shows that Copenhageners repeatedly made use of their most valued resource – water, in multiple ways. Photographs reaching as early as the 1860s show people swimming, sailing, rowing, diving, visiting the city on tourist boats, sunbathing, beauty contests, playing water sports or even a sort of wrestling on a wooden deck. It is also visible that the place gathered not only the amateurs of spending their free time in the water, but also numerous fully dressed spectators.

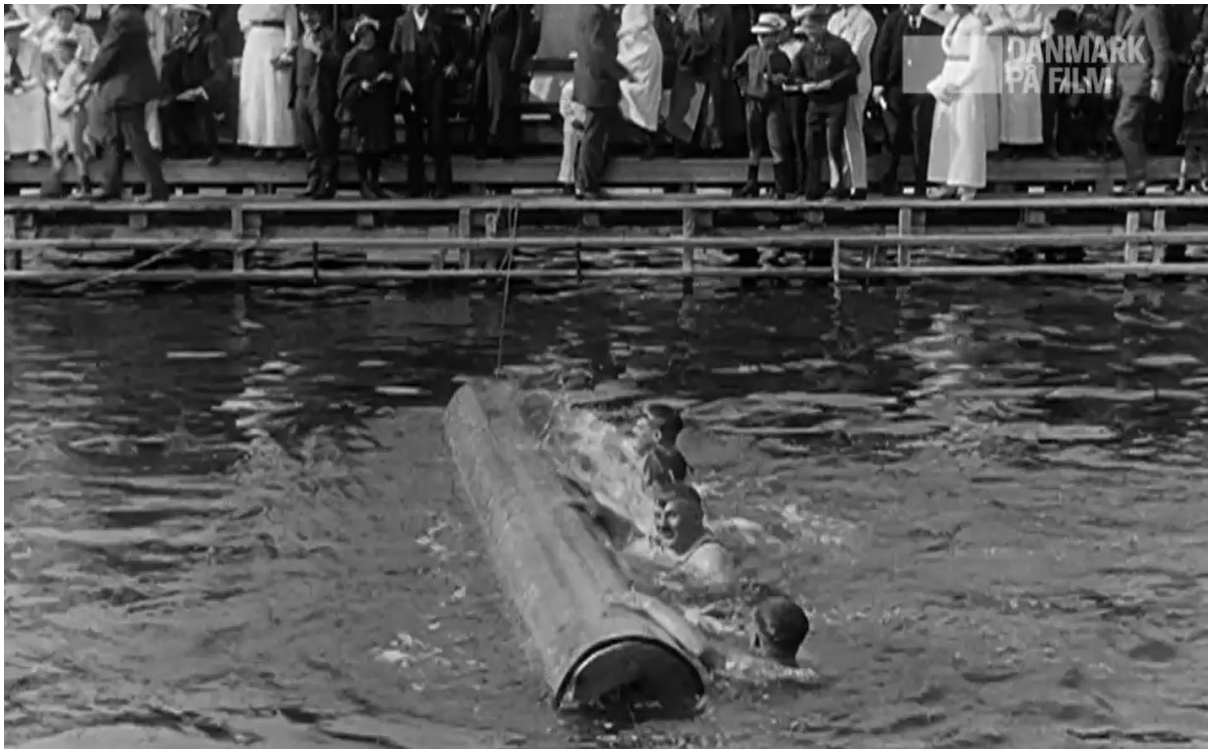
Figure 10 Girls rowing (1951)

Note: Girls rowing in the harbour, sailboats visible in the background. Photo taken for the Stadsarkivet's photographic studio by Mogens Falk-Sørensen. Distributed under CC-BY licence.

Figure 11 Diving in Helgoland (1915)

Note: The image has been retrieved from a short documentary video "Vandpolo Helgoland" from 1915. The video was produced by Nordisk Films Kompagni and is available in public domain.

Figure 12 Water games in Helgoland (1915)



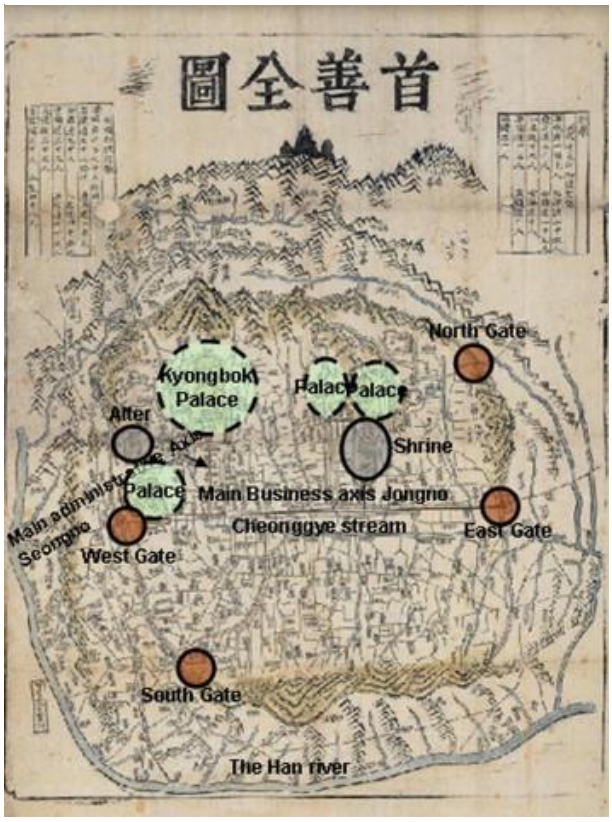
Note: "Crazy water games" involving a wooden cylinder and floating beer crates in Helgoland bathing establishment. The image has been retrieved from a short documentary video "Vandpolo Helgoland" from 1915. The video was produced by Nordisk Films Kompagni and is available in public domain.

Although it may seem that bathing in Copenhagen's harbour was a new idea introduced in the early 2000s with the design of the famed harbour baths, the tradition was actually established decades ago.

The social history of Cheonggyecheon

Seoul's history reaches as long as 4000 years ago, with its beginnings as a settlement along the Han river (*Seoul | History, Population, Climate, Map, & Facts*, 2024). It became the capital of South Korea in 1394, under the name 'Han Yang'. The spatial organization of Seoul followed the principles of feng shui, "the way of wind and water", surrounded by four inner mountains and four outer mountains (Kim & Han, 2012) . Although in modern times it's the Han River that is considered the central waterway of Seoul, initially it was used mostly for an easy access to the rural areas, and as a way to facilitate the collection of taxes. When the city became the capital, it was organized around Cheonggye stream, which was the main business axis (Kim & Han, 2012).

Figure 13 Location of main features in the old Seoul Han Yang.



Note: Adapted by Kim & Han (2012). The base map Suseon jeondo was drawn by Kim Jeong Ho in 1840s.

The social practices related to the Cheonggyecheon river were significantly different from those in Copenhagen in the 19th and 20th centuries. One of the reasons was a slower urban development of Seoul, and a lower financial status of the area's residents. While the elegant clothing of spectators in Copenhagen's bathing establishments suggests their high social position, archival images from Seoul depict rather a natural, intrinsic connection of working-class people with water. Another factor that influenced the

differences was a different typology of the water bodies. In Copenhagen the harbour and adjacent canals were deep and regulated for ships going into the see – this scale and consistency made it possible to dive and play sports in the harbour's waters. At the same time the Cheonggyecheon stream was unregulated and at times unpredictable. Its dynamics differed according to seasonal changes and heavy rainfalls (Whitehouse, 2022).

In the first half of the 20th century a lot of foreigners came to Seoul, and the Cheonggyecheon banks filled with a landscape of frail wooden houses inhabited by immigrants. When Korea was under Japanese rule, the original name of the stream, Gaecheon (meaning "open stream"), was replaced by Cheonggyecheon ("clear water stream") (*Urban Design Case Study Archive*, n.d.). Although the river didn't live up to its name because of growing pollution, developing industries and diseases transmitted by water, it was still an integral part of the social life of the nearby residents.

Archival photographs from the first half of the 20th century show Cheonggyecheon as a lively space, bustling with activity. They usually depict women doing laundry in the river, and children playing in the sand or shallow water. Scenes from the social life of the neighbourhood are portrayed in Pak T'ae-wŏn's 1938 modernist novel Scenes from Ch'ŏnggye Stream. He puts women in the center of local life, and shows how the river is not only functional, but it also builds a community around itself (Whitehouse, 2022). He shows the gossiping while doing laundry – an image that can also be read from the smiling faces of women in archival photographs. Contrastingly to a calm laundry day, Pak also describes a scene from a rainy day, when the neighbourhood gathers to cheer on young men trying to retrieve various items brought by the river with long bamboo sticks. Cheonggyecheon is more alive than ever, it becomes an active, complex character of the local story (Whitehouse, 2022).

Figure 14 Women washing laundry in stream

Note: Next to women washing laundry in Cheonggyecheon stream, children are playing in the water (between 1890 and 1923). Author unknown, the photograph comes from the Frank and Frances Carpenter Collection. This work is in the public domain.

Figure 16 Frame houses along Cheonggyecheon (1940)

Note: Author unknown. The photograph is in the public domain.

Figure 15 Cheonggyecheon in 1904

Note: Children playing in the almost dry stream bed of Cheonggyecheon. Author unknown. The photograph is in the public domain.

Withdrawal of recreational activities from urban waterfronts

The industrial character of activities in the Copenhagen harbour

The industrial revolution, which dominated Europe in the 19th century, had a huge impact on the development of Denmark, its society, landscape and distribution of people between urban and rural areas. The 1970s showed a significant increase in Copenhagen's industrial labour force (Vleuten, 1992). Already in the 1920s the main function of the harbour was to provide infrastructure for industry in the city, such as transportation of goods and raw materials by ships, and disposing of industrial wastewater (Jensen et al., 2015). The search in the archives shows that swimming in the harbour was a popular pastime in the beginning of the 20th century, which suggests that the industrial activity in itself wasn't the main deterrent to use the city waters.

The direct reason meant to stop Copenhageners from swimming in the harbour was a ban imposed by the authorities in the 1950s, justified by public health reasons. The industries had produced a layer of noxious sediments at the bottom of the harbour, resulting also in unpleasant and harmful odours (Jensen et al., 2015). Another aspect that caused the concern about the impact of harbour water on public health was the inadequate sewage system. Although since the 1930s wastewater didn't go directly into the harbour on a daily basis, it still happened relatively often when the sewage system was overflown during heavy rainfalls (Jensen et al., 2015). The waterfront was unattractive and distanced from the city by industrial infrastructures and railroads, which is perfectly aligned with the third step of waterfront transformation pattern described by Pekin.

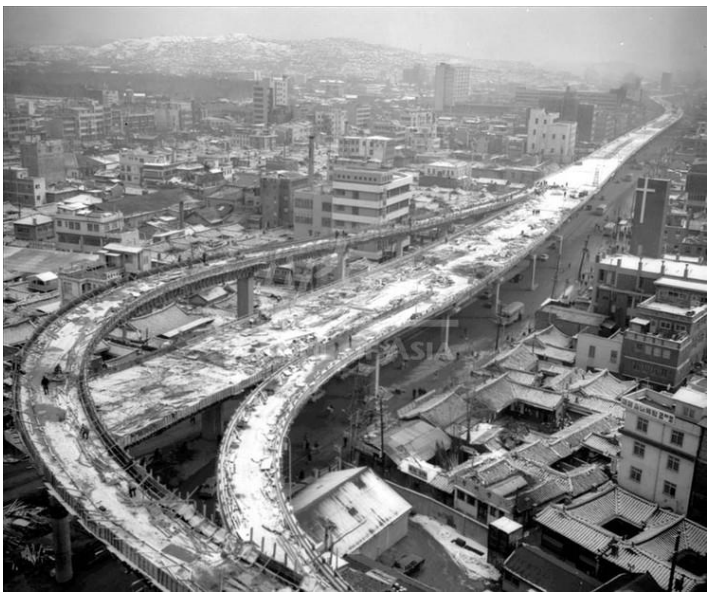
The rapid urbanization of Seoul

After the Korean war ended in 1953, the country was focused on alleviating poverty, and the development of labour-intensive export-oriented light manufacturing industry. In the 1960s the only asset that Korea could use for their economy was cheap labour. Light manufacturing became the main export and income sector, with products such as shoes, clothes, and textile (Kim & Han, 2012). The area around Cheonggye stream was developed into a cluster of textile industries.

Meanwhile, the Cheonggye stream itself was rapidly deteriorating, accumulating trash, sand and waste. Overpopulation of the area and a terrible quality of water posing a threat to the public health led to the decision to cover the stream (Seo & Kwon, 2018).

In the 1970s Seoul entered the era of dynamic industrialization and a rapid urbanisation that followed. The government focused on still labour-intensive, but this time heavy manufacturing industry for export of goods such as steel and chemicals (Kim & Han, 2012). To accommodate an increasing demand for transportation, the construction on a 10-lane elevated highway started in 1967, under the authoritarian rule of Chung-Hee Park (*Urban Design Case Study Archive*, n.d.). The new highway was an impulse to construct new modern buildings in its proximity, and it soon became the symbol of Seoul's industrialization and modernization (Ryu & Kwon, 2016).

Figure 17 Construction of Cheonggye highway



Note: The Samil Overpass under construction around July 1968.

What was not fully taken into account during the construction process of the highway was the life of the urban poor who got marginalized during the process (1972-1976 청계천. . .그리고 도시빈민의 친구 제정구, n.d.). Work on covering of the Cheonggye stream continued even after the opening of the highway (*Urban Design Case Study Archive*, n.d.). During the process, the residents of the wooden shanty houses were forced to relocate. As the covering of the river started upstream, they were gradually moving downstream, building makeshift shacks.

Figure 18 Living in a tent at a shantytown demolition site (1975)

Note: Image from the collection of Cheonggyecheon Museum.

A new interest in water-based leisure practices in the 21st century

The cleaning of Copenhagen's harbour

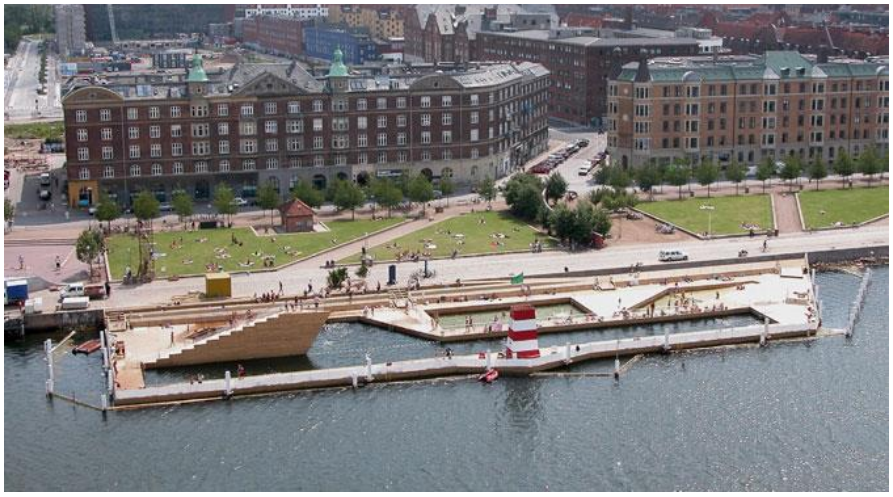
In the beginning, recreational function wasn't the main driving force of the Copenhagen harbour revival. The first motivation for new infrastructures was preventing sewage system odours, replacing visibly outdated infrastructures, and fighting rats that were becoming an increasing problem (Jensen et al., 2015). Only in 1990s did more specific ideas for using the harbour for recreational activities emerge, when the efforts to make it as neutral as possible for the environment started to bear fruit. The visions weren't initially concentrated around swimming itself, which only later became the symbol of Copenhagen's harbour. First ideas included fishing, hoped to be made possible by a biological preservation program, then followed by sailing and canoeing. There even was an idea to build an underwater aquarium, in which Copenhageners would walk below the water level and observe wildlife (Jensen et al., 2015).

Another important factor that led to the harbour's revival was the change in employment patterns and suburbanization. In the years 1950-1980 a sharp decline in employment in manufacturing happened in Copenhagen, and at a similar time the city observed the numbers of population dropping yearly. On top of that, inaccurate financial reforms led to the municipality struggling with increasing social needs with decreasing taxable incomes (Andersen & Jørgensen, 1995).

Facing the challenges resulting from deindustrialization, including the economy becoming stagnant, the city authorities had a strong motivation to attract residents and stimulate economic growth (Katz & Noring, 2017). Apart from selling some land to private owners, the municipality focused on transforming the waterfront and giving it a more leisure-oriented profile. The initial idea of building an aquarium was changed to the one that influences Copenhagen's landscape until this day – the harbour baths. They were seen as a solution that would become a more integrated urban practice, "become 'nature for the city' rather than 'nature as an alternative to the city'" (Jensen et al., 2015).

In 2002, a swimming facility designed by BIG and JDS architects was opened as an extension of the Islands Brygge park. The Harbour Bath was a critical and symbolic element in the evolution of the previously industrial city to its current shape. Since its opening, it became an exposed visual landmark, as well as it has led to an increase in prices of nearby properties (Signe Moeslund Mains, 2022). According to the architects, "People go to the Harbour Bath in the way that people go to the beach rather than the indoor swimming baths. Not necessarily to exercise, but primarily to socialize, play and enjoy the sun." (Saieh, 2020b).

Figure 19 Aerial view of Havnebadet, by the Grand Canal.



Note: Author unnknown, image retrieved from an article by David Bravo Bordas. Photograph taken between 2003 and 2018.

Soon after the first harbour bath new establishment followed, transforming the waterfront and making swimming in the harbour a symbol of the city. Harbour water buses, running on electricity, ensure a good quality of water, which is monitored daily. In present day, Copenhagen's waters are bustling with activity, like they did in the first half of the 20th century. The harbour is used for swimming, but also kayaking, rowing, paddle boards, countless tourist boats and cultural events on the embankments. Interestingly, while some online articles describe the Islands Brygge harbour bath as "the city's first swimming facilities" (*Harbor Baths — Biophilic Cities*, n.d.) or "the first harbour bath" (Munch, 2020), information about the decades-long tradition of swimming in the harbour is nowhere to be found. Which strikes especially when one realizes that the Islands Brygge establishment is meters away from the Rysensteens Badeanstalt that was demolished in 1955.

Figure 20 Christianshavns Canal

Note: The Danish capital has an industrial harbour that people can both swim and fish in without health risks. Image by Daniel Rasmussen

Demolition of the highway covering Cheonggyecheon

The first plans to restore the river were discussed in 1992, when the Korean Society of Civil Engineering established that the elevated highway was no longer safe to use, due to corroded steel beams and the poor condition of top plates (Ryu & Kwon, 2016). At the same time, the development of the Central Business District stopped along the highway, industries lost their competitiveness, and business headquarters were moved to the new sub-centre in Gangnam (Lee, 2006).The discussion about the possible restoration of Cheonggyecheon was first raised by academics and environmentalists, but it soon became also an element of political debate. In the mayoral election of 2002, the two candidates had opposing views on the project. Myung-bak Lee made the restoration of Cheonggye Stream the top priority of his campaign, and when he won, the works started already in the same year (Ryu & Kwon, 2016).

The Cheonggyecheon restoration project was the central element of Seoul's ambition to become a green, environmentally friendly city. A paradigm shift could be observed in urban planning – from a focus on constant development, to prioritizing a high quality of life. The living conditions around the deteriorating highway were poor, due to the noise, pollution, and bad maintenance of the stream buried underneath the concrete. Restoring Cheonggyecheon was seen both as a fundamental solution to the safety issues, and a way to rediscover the history and culture of the neighbourhood (Lee, 2006).

Figure 21 Demolition of the concrete deck of the 10-lane highway

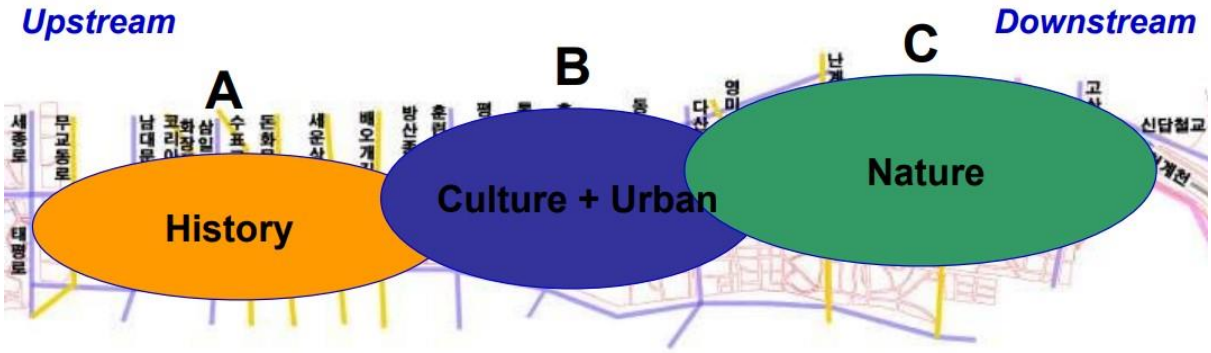
Note: From Shin & Lee (2015)

The main challenges of the process were the heavy traffic, the negative effects on the local commerce during the restoration works, and the fact that Cheonggye had dried almost completely under the concrete road. The strongest argument of the opponents of the project was the fear of the road becoming even more congested after the removal of four elevated lanes. However, an efficient system of public transport resulted in almost no change in the traffic intensity (Ryu & Kwon, 2016). Meetings were held with local

merchants to find the best solutions to support them in the transition process. As the stream was neglected and almost completely dry, the project had to include pumping substantial amounts of water from the Han River to maintain a consistent flow, regardless of the season (Seo & Kwon, 2018).

At the very beginning, an organization was established to help with the development of the project, consisting of a citizens' committee and a research centre. There were multiple community-involvement programs which resulted in developing the main principles for the restoration – maintaining a two-lane road on each side of the river, and completing the works as soon as possible to reduce the impact on local businesses (Shin & Lee). In the next step, the works were carried out almost simultaneously on the road and embankments, new sewer system, landscaping, and the construction of 22 bridges distributed along the river (Shin & Lee).

Figure 22 Zoning of the new Cheonggyecheon stream



Note: From Lee (2006)

The new Cheonggyecheon is divided into three sections, from "History and tradition" in the west (upstream), through "Culture and modernity", reaching "Nature and Future" in the east (downstream). The 5,8km long park gradually transforms from an urban landscape to a more natural environment. The project includes multiple thematic places, including restored historical elements, sculptures, bridges, and various recreational areas (Lee, 2006). Despite the initial concerns and critiques, the project proved to be a great success. The evaluations carried out in the last almost twenty years after its completion certainly bring up some issues that should, or could have been fixed, but unquestionably the Cheonggyecheon restoration changed the image of the neighbourhood and Seoul. The project became a good example of successful project management and coordinating multiple stakeholders at a large scale (Lee, 2006). Moreover, it recovered the biological and social ecologies of the city, stimulating local business and making Cheonggye stream a popular destination among tourists and nearby residents. The new stream regulated the microclimate of the area and increased biodiversity, while an efficient transport strategy introduced a shift towards a more sustainable and equally efficient mobility (*Urban Design Case Study Archive*, n.d.).

Besides the ecological and economic benefits of the Cheonggyecheon restoration, the project also focused on reviving the traditions and highlighting the history of the river. The narrative of bringing the stream back was centred around the intertwining of heritage and nature as elements that build the identity of the space, and connecting the past with the present (Kim, 2020). The history is thoughtfully incorporated into the new park and its visual narrative. Walking downstream, the visitors are first presented with a gallery of photographs and images depicting the history of Korea with an emphasis on the Joseon dynasty. A few steps later, they reach the restored Gwanttongyo Bridge, which, as Kal describes, played a significant role in stimulating the public imagination and advocating for the importance of bringing back local history. When the 600 years old structure was discovered almost intact during the excavation works, it sparked hope and excitement in the public, seen as an element that was waiting to be brought back to life (Kal, 2011). The park also includes artifacts from the more recent history of industrial times, including some of the pillars that supported the elevated highway. At the end of the stream, there is a possibility of visiting the Cheonggyecheon Museum to learn about its history and development, and experiencing it in the restored wooden huts.

Figure 23 Washing boards

Note: These abstract washing boards are an element of landscaping that reminds of the history of the stream. Photograph by Mina Oh.

It is clear that Cheonggyecheon's heritage was an important axis in its restoration. However, the project doesn't forcibly historicise the place, in fact, it is rather a sign of modernity and new paradigms in urban design. The beginning of the stream, in its "History" section, is actually a space that follows a vision of modernity and cleanliness (Kim, 2020). The new Cheonggyecheon, while having a significant environmental impact, is primarily a leisure space. A variety of stimuli attract visitors, who can relax in the proximity of nature, take in the sight of sculptures, painted tiles, fountains and lighting of the stream at night, or take part in multiple activities organized to promote the place, including concerts, traditional performances and an annual light festival (Lee & Anderson, 2013). Although the Cheonggyecheon park is subject to rather strict rules and

programmed activities (Kal, 2011), the images of children wading and playing in the river, just like they did a century before, is a sign of success in bringing the spirit of Cheonggye back to Seoul.

Figure 24 Remaining bridge piers from the highway

Note: Photograph by Oh Se-hoon.

Challenges and criticism of the projects

Copenhagen

The new waterfront already took roots in the identity of the city and became a flagship example for other developments. Although the process was divided into several parts spatially and temporally, it managed to build a consistent scheme thanks to efficient transportation, continuous circulation, and well linked landmarks (urbanNext, 2024). What to some may seem like a slight shift of attention from land to water through small-scale interventions like floating swimming pools, was in fact a long and complicated process. Redeveloping Copenhagen's harbour was an enormous undertaking for the city, both financially and in terms of policy making and coordinating a variety of stakeholders. The renovation has been a long process, spanning over almost 30 years, and it continues until this day. The new social functions weren't realized immediately, but only after the complicated process of cleaning the harbour's water (urbanNext, 2024). Improving the quality of water was the main challenge of the harbour revival. Until the 1990s, a lot of the city's greywater was discharged into the harbour. The water was heavily polluted with oil spills, industrial waste and algae. It cost Copenhagen 3 billion Danish kroner to rebuild the whole sewage system and clean the harbour (Bloomberg, 2015).

The aim of the redevelopment was to construct the harbour's new identity by creating a new type of public space for the city. The architectural interventions, rather than looking

back at the history of the place, try to add a new quality to the space (urbanNext, 2024). This research shows that recreational activities, including swimming, were practiced in the harbour at least almost two centuries ago. Moreover, the typology of bathhouses and decks was part of Copenhagen's waterfront already in the 19th century. It can therefore be argued that the harbour's revival reintroduces a previously existent type of public space, rather than inventing a new one. There are certainly several differences between the modern development and the historical one, however similarities between them are evident and can be informative for other waterfront redevelopments. A vast majority of scholarly literature and media coverage portrays the Copenhagen harbour revival in a way which suggests that the leisure activities are newly introduced to the waterfront. It is unclear whether this reflects the actual intentions of the planners, or the design initially took into account drawing inspiration from historically documented practices.

The harbourfront has become one of the most popular places to spend free time among Copenhageners and tourists alike. The new recreation areas attract visitors throughout the whole season. This sometimes causes complaints from local residents who no longer feel that the space belongs to the neighbourhood (urbanNext, 2024). However, even though the harbour's redevelopment faced significant challenges, it still managed to become a recognizable landmark, a vibrant place of social interaction, and received several prizes for its landscape design.

Seoul

The Cheonggyecheon restoration was a reason of heated debates in Seoul before, during, and after it was executed. It became of the main axes of the mayoral election campaign in 2002 (Ryu & Kwon, 2016). The project had to face two main concerns raised by the local citizens – the fears of traffic intensification after the removal of the highway and pushing local merchants away from the area. They were resolved by introducing a new efficient public transport system and conducting multiple meetings with local stakeholders (Lee, 2006). The initial estimated cost of 357 million dollars was exceeded by 29 million dollars due to measurements aiming at improving the water quality, monitoring devices and adjusting the budget for inflation (Lee, 2006).

Most of the arguments raised by critics of the project concern its environmental side. Some argue that the new development doesn't take into account the original natural stream, and pumping substantial amounts of water into it is an overengineered artificial solution (Jeon & Kang, 2019). Due to using concrete as the main construction material for some parts of the stream, the water can't be naturally purified. Because Cheonggye is no longer a natural stream, it is also not systemically restored. The water's cleanliness worsened over the years, with an increasing algae problem, which resulted in an increase in maintenance cost by 30% each year (Marshall, 2020).

In terms of the social impact of bringing activities back to the river, Cheonggyecheon restoration was a very successful undertaking. There were some debates on whether it included the historical aspect properly. The project's storytelling, expressed through images presented on the wall, focuses on the distant dynastic era, while more recent history and industrialization is omitted (Jeon & Kang, 2019). Some state that the project, rather than being a restoration, was a historical and environmental reimagining (Lee &

Anderson, 2013b). Cheonggyecheon is at least in part responsible for the gentrification of the area. The restoration led to the emergence of new commercial departments and luxury apartment complexes along the banks of the river. Land prices increased by 30-50% within 50m of the project (Lee & Anderson, 2013b).

Part Three: the importance of water-based recreation in reestablishing the social connectivity of urban waterfronts

Literature review:

Infrastructures and architectural elements related to water-based leisure

The literature study shows that there aren't many academic resources covering the topic of waterfront leisure infrastructures. Literature usually describes the restoration projects in a broader perspective of municipal policies or developments of whole districts. For this reason primary sources including photographs and illustrations will be used to analyse the shifts in waterfront infrastructures. As argued by Hein, although water is an indispensable element of urban ports and waterfront designs, it receives attention almost exclusively through the lens of pollution, and its social aspect is omitted (Hein, 2016). Good urban planning in river spaces should connect them with a larger urban fabric (Miradyanti et al., 2021). Miradyanti et al. apply the approach of analysing the longitudinal, lateral and vertical connectivity of a river (adapted from Schmutz). This approach will also be applied in this research.

Similarities and differences of two case studies based in different contexts

Planning and processes

When looking at the two case studies, it is important to keep in mind the differences between the contexts they were realized in. Copenhagen is the capital of a relatively small Scandinavian country, and operates at a much smaller urban scale than Seoul – an Asian capital with over 10 million inhabitants (*Largest Cities by Population 2024*, n.d.). Denmark is consistently ranked one of the happiest countries to live in, and it was already the case in the 1990s, before the major redevelopment of the harbour (Veenhoven, 2004). South Korea ranked much lower, with one of the reasons of this score being one of the worst work-life balance factors in OECD countries (*S. Korea Ranks Near Bottom of OECD for Work-life Balance, Study Shows*, n.d.). It can be argued that the Copenhagen's harbour revival was an additional investment in a city whose residents were already satisfied with their quality of life. On the other hand, one of the main goals of the Cheonggyecheon restoration was an improvement of the quality of cultural and environmental life in the congested and polluted city of Seoul (Lee & Anderson, 2014). Another difference was the scale of the water body on its own and in relation to the whole city. The harbour is the central part of Copenhagen, and has long fuelled its economy and influenced the landscape of the city. Cheonggyecheon, although historically important, is not the main

river in Seoul nowadays. Unlike Copenhagen's harbour, it doesn't allow for water transportation.

The case studies differ largely in terms of policies and procedures that accompanied them. Although there was a significant number of meetings with residents and other stakeholders, the Cheonggyecheon restoration project is considered by most a project related to one person – the then newly elected mayor of Seoul, Myung-bak Lee. He made it the main election promise and managed to execute it during his tenure. Lee actively advocated for the restoration throughout the duration of the project. He was under a lot of pressure to lead the project to completion – firstly as the first conservative mayor after the rule of liberalists, and secondly because of the rising national pride of Koreans and efforts to make Seoul more visible on the international scene. The overall success of the project is considered to have led Lee to winning the presidential election in 2008 (Lee & Anderson, 2014).

Restoring Copenhagen's harbour was a long-term process, which took almost 30 years and spanned over the tenures of several lawmakers. The main reason behind the revival is an effort to clean the harbour's waters, and the recreational activities naturally followed as a result. Since the 1970s Copenhageners have been taught about environmental responsibility. Now the water in the city is a subject of a reciprocal settlement – residents conserve water and pay high taxes, and in return they get a harbour adapted to swimming and a supply of clean tap water (Bloomberg, 2015). Restoration of the harbour was accompanied by a dialogue between various stakeholders. A special "Vision Group" was established with the aim to accommodate global market tendencies, interests of governors on different levels, and the needs of citizens. The group underlined the importance of learning from other European examples and studied carefully the waterfront developments in cities such as Amsterdam, Hamburg and Oslo (Desfor & Jørgensen, 2004).

Both case studies show the complexity of policies that need to be applied and the variety of stakeholders that have to be taken into account in such undertakings. Both the more bottom-up approach of Copenhagen and the typically top-down one of Seoul required high organizational efforts and appropriately compromising the needs of all sides to achieve a satisfactory outcome. Both projects involved substantial financial investment, which suggests that cities should carefully consider the desired effects of bringing rivers back to cities and carefully plan the process.

Approach to bringing waterways back to cities

The cities approached bringing their water bodies back in significantly different ways, partially due to the dissimilarity of their contexts. The "disappearance" of waterfronts in Copenhagenin the 19th and 20th century was caused by the pollution of water, or even more by the raising awareness of the dangers for health that it entails. The recreational aquatic activities might have been reduced or moved further from the main harbour, but they never fully disappeared from the city. Seoul, on the contrary, witnessed a complete disappearance of the Cheonggye stream, when it was covered by the new road and elevated highway in the 1970s.Cheonggyecheon's revival was truly bringing the stream back onto the map of the city.

The waterfront developments in Copenhagen, although often described as introducing new ideas for leisure time, in fact restored activities that were practiced in the city for decades or even centuries. Swimming in the harbour was the focal point of the initiative, and various archival records show that it was already popular in the previous century, similarly to rowing, sailing, and playing water sports. Cheonggyecheon represents a diametrically different example in terms of the relationship between present and past activities. While historically it was a place of social importance for poorer communities with water-based activities more characteristic of the Global South (laundry, meeting point for women and children), it became a vibrant landmark in the modern city, popular among residents and tourists. Out of the original activities, only strolling along the riverbanks remained, however the experience differs from the one a century ago. The stream itself is mostly engineered and the area gained a new prestige, as opposed to immigrant houses once present there. However, the project still introduced multiple references to its historical heritage, including the restored bridge, the museum and the walls decorated with archival images.

This becomes interesting when combined with the approach to water itself in the project. Copenhagen didn't change the layout of its harbour and still uses its natural water. The only, yet very significant, difference is that the water was thoroughly cleaned, and sewage was redesigned to not flow into the harbour. In Seoul, the original flow was substituted with water pumped from the Han River. It creates a contrast between the two case studies. Copenhagen's harbour maintained its natural water source and historical activities, but the historical aspect was rarely mentioned in the storytelling of the redevelopment, while Cheonggyecheon introduced a new water source and new activities, at the same time highlighting the heritage of the past. Still, both case studies follow the steps of waterfront regeneration described by Pekin (2013).

Activities and typologies

Introduction of recreational activities was one of the main goals in both case studies and is reflected in urban and architectural typologies of the projects. New waterfront infrastructures were meant to attract both locals and tourists, and succeeded in fulfilling this ambition. However, the chosen approaches vary between the two cities, and again it is partially caused by the differences in context and the scale of the rivers.

Copenhagen's new waterfront consists of several independent interventions distributed along the harbour's banks. They are linked to their strategically chosen locations and focus on adding specific activities to those particular places. The interventions are rather scenographic, like the floating swimming pools, than theatrical (urbanNext, 2024). The new harbourfront includes however also a big architectural project, the Black Diamond library, which is a recognizable building and social space in the city. The waterfront often blends with the neighbourhood, the parks stretch into living areas and the swimming places are often situated between buildings. The approach in Seoul was almost the opposite. The interventions were carefully planned to form a storytelling experience along Cheonggyecheon stream. The waterfront is divided into three main sections, each with its own theme and visual narrative. The architectural expression of the place, as well as the artifacts that accompany it, are rather sculptural and artistic than utilitarian.

The difference of scale and typologies of the projects entail different recreational practices on the waterfronts. Copenhageners make use of their wide harbour, and multiple aquatic activities can be observed in the city on a daily basis. Those include the ones already present before the transformation – swimming, diving, rowing, water polo and motorboats, as well as new ones – paddle boards and green kayaking (kayaking and collecting waste from the water). The scale of the harbour also allows for touristic cruises and docking sailboats. The waterfront itself is partially transformed into urban parks and equipped with decks that are a popular place for summer sunbathing and informal meetings. In case of Cheonggyecheon, recreational activities are in a vast majority practiced near water, rather than in it. Locals and tourists can walk along the stream and admire artistic installations distributed on the waterfront. Attention is drawn to the stream itself, with many sitting areas, where visitors can relax, eat and meet, looking at the water. It is theoretically forbidden to walk in the stream (Kal, 2011), however photographs from Cheonggyecheon show people, especially children, splashing in the water on sunny days. The area is not directly connected with its surroundings, as it is lowered in relation to the adjacent road. It is an enclave of greenery in a densely built neighbourhood.

What connects the two case studies is the importance of circulation, which makes them easily accessible. Both projects involved rethinking the transportation system. In Copenhagen it resulted in a network of water buses and taxis, in Seoul in designing new public transport to accommodate the traffic from the highway. The development of both waterfronts included integrating pedestrian circulation, and thus attracting users and catalysing activities. The banks of both Copenhagen's harbour and Cheonggyecheon stream are connected with bridges that increase accessibility and attractiveness.

Successful waterfront developments

Social connectivity of the case studies

The case studies in this research represent different approaches to bringing rivers back to cities. They show that a revival of recreational activities can be reached through various strategies and on multiple scales. This section will explore the social connectivity of Copenhagen's harbour and Cheonggyecheon stream, looking at its longitudinal, lateral and vertical dimension.

The longitudinal connectivity has always been more present in Copenhagen, as its harbour functioned as a merchant route and was used for sailing, and Copenhagen was planned as a port city already in the 17th century (Konvitz, 2019). Despite the shift in the use of the harbour towards recreation, it is still technically possible even for bigger ships to swim in it. However, it requires some technical effort and occurs a lot less often. A good illustration can be the frequency of opening the Langebro Bridge, situated right next to the famous Islands Brygge pools, for ships. The bridge opens less than 200 times a year, compared to 12 000 times in the year of its opening – 1954 (Mathilde, 2023). It can be argued that the longitudinal connectivity of the harbour is maintained through water buses and cycling paths along the banks. In Seoul, Cheonggyecheon wasn't a river used

for transportation and thus its longitudinal connectivity historically was, and still is, expressed only through the paths along the stream.

The lateral dimension of social connectivity was often lost in the Industrial Age, when urban fabric was pushed away from the water, and leaving space for heavy industries and port activities. This was true in some parts of Copenhagen in the 19th century. In others the connection was broken due to the poor quality of water and the rising environmental awareness of citizens and authorities. Similarly in Seoul people were moved away from the stream because of its pollution and a threat to health. In both cases the lateral connection was restored in the process of the waterfront revival, and is maintained through recreational practices. The banks of both the harbour and the stream are linked with several bridges. Additionally, the attractiveness of possible recreational activities offered by the waterfronts draws people and builds a connection with the neighbourhood.

Lastly, the vertical connectivity was also established in the restoration process in both case studies. Both waterfronts are equipped with stairs and decks allowing for direct contact with the water. It is especially evident in Copenhagen, where leisure activities often take place in the water. But even in Seoul, where the stream is a landscaping element rather than an active actor in the urban recreation, the water can still easily be seen and touched.

Factors influencing a successful waterfront regeneration

Undeniably, both restoration projects bring water bodies and their active use back to cities. They (re)introduce recreational practices to the waterfronts, resulting in reestablishing the social connectivity of both the Copenhagen's Harbour and the Cheonggyecheon stream. As stated by Miradyanti et al. (2021), current and future riverfront developments should consider social planning in order to become integrated in the urban fabric. This was true for both case studies and it can be argued that leisure activities were crucial for attracting local residents and foreign visitors. Vertical connectivity can be achieved with a sufficiently good quality of water (Kondolf & Pinto, 2017). In Copenhagen, cleaning the harbour proved to be an efficient strategy to raise a new wave of interest in aquatic activities, and thus reestablishing the vertical connectivity of the waterfront.

The transformations in Copenhagen and Seoul follow most of the guidelines for successful waterfront developments mentioned by academic literature. Scholars highlight the importance of establishing a clear masterplan, the cooperation of stakeholders and a joined work of public authorities, private organizations and community groups (Pekin, 2013). In this aspect the revival of the harbour was more successful. Even though in both cases the process involved discussions with stakeholders and community groups, in Seoul it concerned more the execution phase than the actual planning.

Principles for sustainable development of waterfronts listed by Pekin (2013) include good quality of water and environment, identity given by the historic character, a diversity of uses, accessibility, and seeing waterfronts as long-term projects. Especially the last aspect was not a part of the Cheonggyecheon restoration, as mostly for political

reasons it was realized in less than 2,5 years. The lack of time might have led to concerns about accuracy of the environmental design of the new stream. In Copenhagen on the other hand, the new waterfront draws on its historical industrial identity only in a small fragment. However, in both case studies most of the prerequisites of a successful waterfront development are met. Throughout the years from the execution of the projects they have proven to be attractive places for local residents and visitors, and the recreational activities they introduced contributed to the increase in social connectivity of both Copenhagen's harbour and Cheonggyecheon stream.

Conclusion

Water is a necessary element of human existence. Already thousands of years ago its presence dictated the development of settlements, rituals, and recreational practices. While the role of rivers in facilitating trade and food production in cities is widely discussed, their function as a space of relaxation, sport and recreation is rather set aside in literature. The role of rivers varied throughout different cultures, but historical images and sculptures show that leisure activities were practiced in rivers before they were popularized in the 19th century. Swimming and spending time in water was once a way of segregation – wild swimming was a way for the poor to maintain basic hygiene when they couldn't access closed public baths. Later, when swimming establishments started opening on urban waterfronts, they were first reserved for white people from the upper classes. Nowadays, leisure has been democratised and everyone can have access to urban open swimming pools or simply take a dip in the urban rivers.

Although the changes differ in time, most waterfronts follow a similar pattern of transformation – from being the driving force of urban development, through becoming the central point of industrialisation, their neglect after industries move out of cities, and finally a focus on their environmentally friendly restoration. A shift in urban development paradigm can be observed, where an aspiration for architectural modernity and growth is replaced with the one for interconnectivity of tradition, nature and society. Almost all restorations of urban waterfronts take into account their social connectivity, usually in more than one dimension. This results from a change in the modes of consumption, an increase in the amount of free time, and a better awareness of factors influencing human wellbeing.

Case studies analysed in this research, even though coming from different contexts, and representing different restoration strategies, both are an example of eventually coming back to initial recreational activities, but in a modern form. However, only in case of Cheonggyecheon it was highlighted as a design principle, while in Copenhagen leisure activities in the harbour were discussed as a fresh start. This can be an indicator for other cities planning similar developments of the importance of thoroughly researching the past of the rivers, as it has a high chance of becoming the final urban waterfront.

It is important to consider other factors that have to be taken into account in the process of bringing rivers back to cities. Even though what is seen as a final result are the recreational spaces used for swimming, sailing, sunbathing, and various other activities, the process of creating them requires a perfect coordination of multiple stakeholders,

long-distance planning, and taking into account the impact of the final effect and the construction process itself.

Many rivers in cities were forgotten and neglected due to industrialization and urbanization. Or, in other words, neglecting the recreational function of rivers led to the deterioration of their quality and a loss of connectivity between people and the water. Clean water and socially active waterfronts are not necessary for industrial activities, but they are crucial for including rivers in the urban leisure scheme. Therefore, reintroducing the recreational function of urban rivers leads to their revival, with significant environmental, economic and social benefits.

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