Urban Vitality in Waterfront Spaces in the Changmen Area in Suzhou

A Historical Analysis: Reflecting on Water, Street and Building

AR2A011 Architectural History Thesis | 2023 spring | Sijie Song

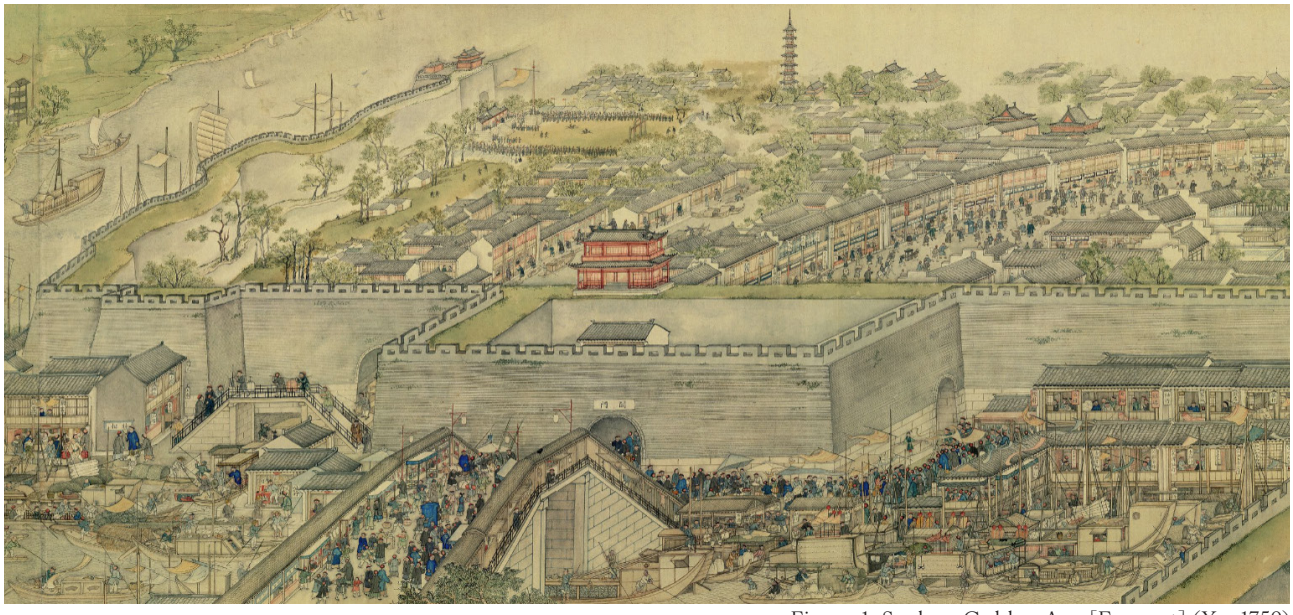


Figure 1: Suzhou Golden Age [Excerpt] (Xu, 1759)

Abstract

Suzhou, with a unique urban fabric regarding the water-land relation, has been famous as a 'water city' in China for centuries. The intertwining of the canal and street systems creates waterfront spaces, which involve waterways, streets and buildings at the same time, forming the typical image of Suzhou. Additionally, throughout history, Suzhou was usually an economically prosperous city, particularly in the 18th century, when it became both the domestic and international trading center. Within the city, the Changmen Area in the northwest corner was once the most representative trading port, where thousands of ships and people were gathering for both commercial and recreational purposes. However, due to the expanding population and fast-paced lifestyle, from the beginning of the 21st century, most of the waterfront spaces in Suzhou as Changmen Area, were turned into pure residential functions, so the problems of waterfront spaces exacerbated, such as the illegal occupation for the sake of accommodating more people and a lifeless vibe in the neighborhood. These problems negatively affected urban vitality, resulting in a completely different scene compared to that in the 18th century.

Therefore, this thesis focuses on the urban vitality of waterfront spaces in Suzhou in general and especially in Changmen Area in the 18th and the 21st centuries. The evaluation is based on three indicators: diversity, accessibility, and social interaction, and each indicator is further reflected on the condition of water and land respectively. Different approaches are used for examining the past and present, with ancient paintings and observations in fieldwork as the main source respectively. Finally, the most influential changes in urban vitality throughout the past three centuries can be concluded, served as a reference for solving existing problems and looking to the future in waterfront spaces in Suzhou.

Keywords: urban vitality, waterfront spaces, water-land relation, Suzhou, Changmen Area, 18th century and 21st century, Chinese traditional painting.

Contents

01 Introduction

1.1 Research Topic and Background

Situated along the Grand Canal, Suzhou has been called a 'water city' for centuries, where water has been regarded as one of the most significant elements. The city has a complex water network, with a moat surrounding the city wall and connecting the Grand Canal and rivers inside the city. Additionally, the two networks (rivers and streets) are intertwined, and buildings are set in between, creating the typical dwelling type in Suzhou as 'housing along the river'. However, in the recent century, the existing houses cannot accommodate the considerably increasing population, so illegal extensions in houses appeared (Figure 2), negatively affecting the image of the riverside.

The government has indeed noticed this problem and has attached importance to it. In 2007, the proposal ***Implementation of Improvement of Urban Streets*** in Suzhou planned to improve roads, landscape, and housing facades in Old Town within four years, to achieve a balance between a beautiful city image and a convenient civil life. In 2013, another regulation called ***The Mandatory Content of Urban Planning*** explicitly prohibited the establishment of large public buildings along the river and restricted the height of buildings. During the decade from 2013 to today, urban regeneration has been ongoing, especially the demolition of unauthorized buildings along the river. Based on the understanding of the long-lasting importance of waterfront spaces in Suzhou, the idea of this thesis is to examine the change of urban vitality in regenerated areas from three centuries ago to now.

The chosen site is a route on the northwest side of Suzhou Old Town (Figure 3). It belongs to Changmen Neighborhood, which covers around 0.33 square kilometers (Jiangsu Administrative Service, 2022). There are two main reasons to choose it as the site. Firstly, this area is a critical point with a changing identity, from the physical border of the inner and outer city to the trading center, and currently to a mix of tourist attractions and local residential areas. Secondly, the route not only involves water, street and buildings in a typical Suzhou way, but also comes across the aforementioned problems in recent years, so it can be a more intuitive context for the research.

Figure 2 (left): Illegal extension (Bao, 2021)

Figure 3 (right) : The location of selected route (drew over online map)

1.2 Literature Review

'Urban vitality' has been widely discussed for decades in the field of urban planning and design, and is still widely used for evaluating the livability of a city. It was first proposed by Jacobs (1961) in her book The Death and Life of Great American Cities, where she concluded four criteria to enhance it, including mixed uses, small blocks, buildings in various conditions, and high population density. Gehl (2011) stated that the essence of urban design should be public life and multisensorial experience. At the same time, he believed that only the accessibility of public transportation may contribute to urban vitality. In 1981, Lynch defined 'vitality' in a completely different way related to the healthy existence of species. In the book Good City Form, he pointed out five primary dimensions to evaluate the quality of settlement, one of which was vitality. Additionally, three terms were used to judge 'vitality', namely sustenance, safety and consonance, which he further explained as an adequate supply system, prevention from hazards and motivating human uses respectively.

Based on these pioneer theories, more evaluation research was conducted in diverse contexts and methods. For instance, according to the observation in four districts in Vancouver, 'vitality' was positively impacted by the type and density of residents, the type of land use, and the relation between humans and the environment (Maas, 1984); in the case of Chicago, accessibility and diversity were two most influential factors on its vitality assessed by calculating spatial indices and big data (Zeng et al., 2018); the improvement of urban attractiveness was another way to increase urban vitality in the case of Milan (Liang et al., 2022). As the most frequently mentioned indicators in theories and previous studies, diversity, accessibility and social interaction will be used as the criteria to evaluate urban vitality in this research.

Although the term 'urban vitality' originated in the West, there are abundant applications in the East as well, especially in China. In terms of space, urban vitality was analyzed in multiple cases, such as a historical city with the problems of aging and low income (Wang et al., 2022), rapidly developing metropolis (Zeng, et al., 2018), cities with different scenarios in day and night (Wu et al., 2022) and so on. However, the research related to the waterfront area was much less compared to the one on terrestrial sites. Furthermore, a large percentage of existing research was targeted at the urban scale and especially the public spaces. There was little research taking the private dwellings and the transitions between public and private spaces into account. For instance, Zhang et al. (2020) explored the relationship between the type of riverside spaces and their functions in cases where the façades of houses were situated exactly at the riverbank; while Zhang (2016) summarized the solutions to recover the river-street space correlation, without mentioning buildings. However, in the context of Suzhou, the canal, streets and residences are all fundamental elements that together form the picture of the waterfront area. Thus, this thesis will include all of them in the discussion.

Moreover, regarding the time, since 'urban vitality' is a concept from the 20th century, few considerations have been given in the earlier periods. Nevertheless, the decrease of vitality along the waterway in Suzhou from ancient times to now is evident, with the peak in the 18th century when Suzhou was one of the national economic centers. Hence, it is worth exploring the possibility to take history as a reference for future improvement.

1.3 Methodology and Research Methods

Since this research included two time periods, two methodologies, historical-interpretive research and ethnography, were adopted. In both periods, there were literary and visual resources, but they were analyzed in different approaches. As for ancient times, several local archives such as Qianlong Yuanhe Archive (Xu, 1761) and Wu County Archive (Cao et al., 1933) were used as the main literary source. Visually, the research looked closely into two traditional Chinese paintings, Suzhou's Golden Age (1759) and Qianlong Southern Inspection Tour (1751), both created by Xu. The paintings were 12.3 and 7.6 meters long respectively, depicting in extreme detail a prosperous picture in the 18th century of the western part of current Suzhou city. With more than 12 thousand figures clearly illustrate in each painting, they could be an intuitive and authentic reflection of the society in the era without a camera.

For the contemporary part, ethnography was an approach focusing on humans and society on the basis, and required active participation and interaction with the site. Due to the physical constraints, the fieldwork was conducted remotely*. A plan was made first to propose the focus during fieldwork. Afterward, photos were taken by someone currently in Suzhou at the given locations toward specific views. Moreover, government documents, such as meeting decisions, demographic reports and regulations, were also necessary and helpful.

*Regarding the remote collaboration work, the site photos used below were taken by the author and Chen, S. together.

02 Diversity

2.1 Diversity in the 18th Century

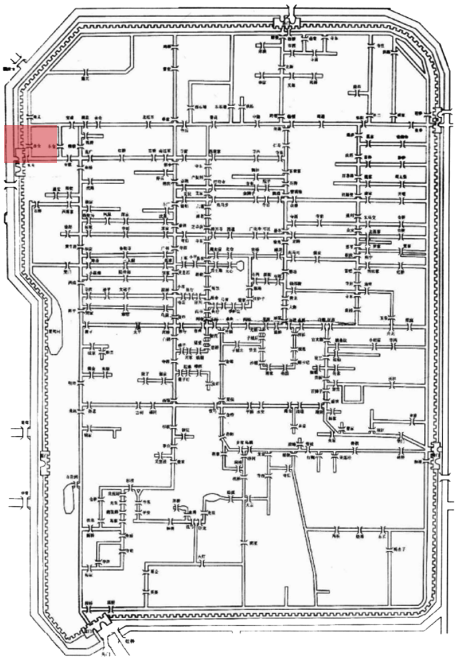
2.1.1 Political and Economic Background of Suzhou in the 18th Century

In the 18th century, as one of the economic and trading centers nationwide, Suzhou became increasingly diverse in terms of both production and social life. After a series of political turmoil in the second half of the 17th century, from 1700, the national central government took control again, realizing stability throughout the country. Although the highest administration was located in the northern part of China, the southern region was more economically and productively prosperous. In order to consolidate the unification and show concern for the South, the emperor made several southern tours passing through Suzhou during the 1660s to 1790s. The ancient paintings Qianlong Southern Inspection Tour (Xu, 1751) and Suzhou's Golden Age (Xu, 1759) intended to show the scenes during the emperors' journey. According to Wu County Archive (Cao et al., 1933), until the beginning of the 19th century, the population in Suzhou doubled compared to a century ago, and the amount of land development was at an all-time high. Both agriculture and handicrafts were promoted, through which the sale of products, such as silk, paper and clocks, contributed to the budding of capitalism. Therefore, Suzhou developed into a trading center within a century from a self-sufficient town.

2.1.2 Diversity of Waterways

The aforementioned surge in production and trade benefited from the sophisticated water system in Suzhou, and thereafter, a high diversity can be seen regarding the function and form of both the waterway itself and its subsidiary construction. The system was called 'three horizontal, four vertical and two circles' in the 18th century, and one of the circles referred to the outer city flow, with a length of 15.3 km, a width of 30-100 meters and an average depth of 2.8

meters (Lin and Ye, 2019). On the one hand, it formed an enclosure as the border of the city; on the other hand, it connected with the most important waterways in China, including the Yangtze River, Taihu Lake and the Grand Canal. As a constituent part of the Great Canal, the Suzhou section played a significant role in transportation, especially for grain. 大清会典 ('The Great Qing Canon', 1763) recorded the amount of grain produced at that time, which showed that Jiangsu Province ranked the first among all provinces, and three-quarters were transported to the capital through the canal. In terms of the inner-city part, the grid system was consisted of three east-west directional and four north-south directional waterways as the basis and extended through tributaries. Comparing the waterway distribution diagrams in the 1640s (Figure 4) and 1760s (Figure 5), multiple waterways had been filled by the mid-18th century to extend the land and accommodate more population. The site was situated at the northwest of the whole system, and confined by four waterways, namely The First Horizontal River on the north, Zhongshi River on the south, The Outer-city River on the west and Cangqiao Bang on the east. The area was a transitional space between the inside and outside city, functioning for both goods transportation and daily use.



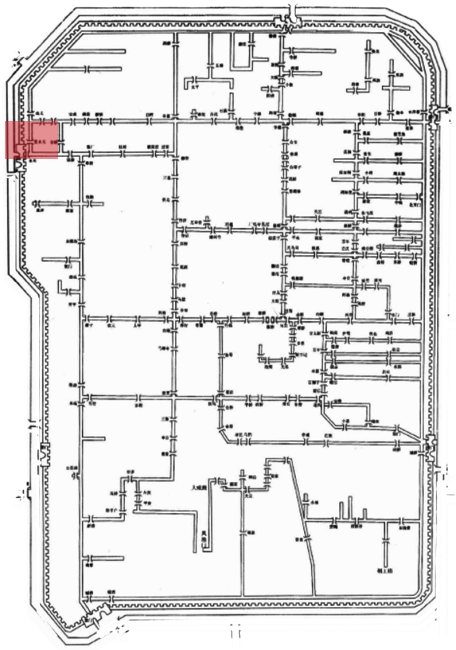


Figure 4 (left): waterway diagram in the 1640s (Lin and Ye, 2019)

Figure 5 (right): waterway diagram in the 1760s (Lin and Ye, 2019)

Along the rivers, there were different types of subsidiary construction, such as bridges and docks. As for the bridge, the ones above the outer-city river (Figure 6) were relatively wider and higher than the others, while the more the bridges were closed to the city center, the lower they were in height, since there were fewer and smaller boats going through. All of the bridges were made of stone but differed in overall shape and handrails (Figures 7 and 8).

Besides the bridges, the transition between water and riverbank was diverse as well. In Suzhou's Golden Age (Xu, 1759), in most cases, the boats were expected to approach the bank with a temporary board or ladder for stepping on (Figure 9). However, there was evidence showing the stairs leading directly into the water (Figure 10-11), but they were primarily for getting water or washing, not for transport.

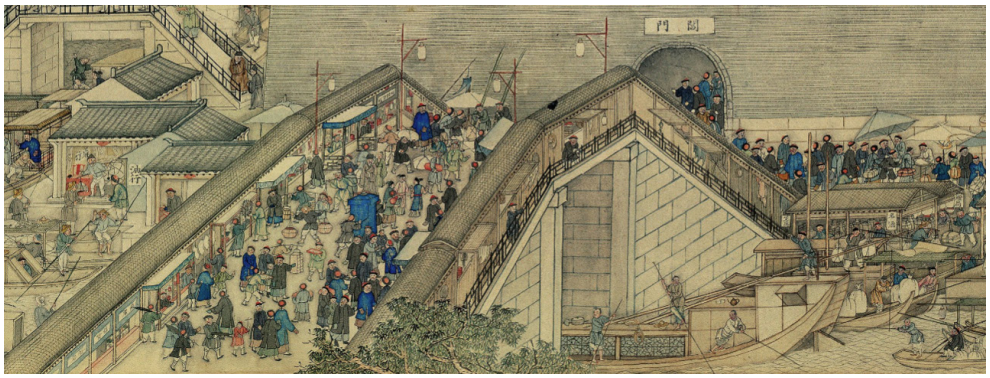
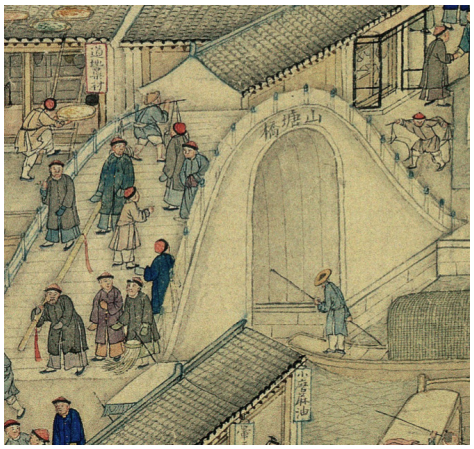


Figure 6:
bridge in the front of
Changmen (Xu, 1759)



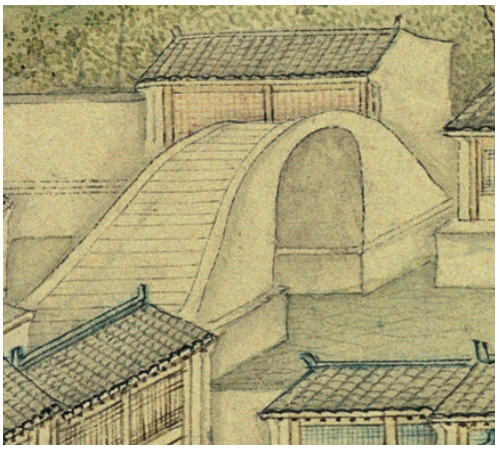


Figure 7 (left):
Shantang Bridge
(Xu, 1759)

Figure 8 (right):
a bridge inside city
(Xu, 1759)

Figure 9 (left):
temporary ladder
(Xu, 1759)

Figure 10 (right):
Stairs along the river
(Xu, 1759)

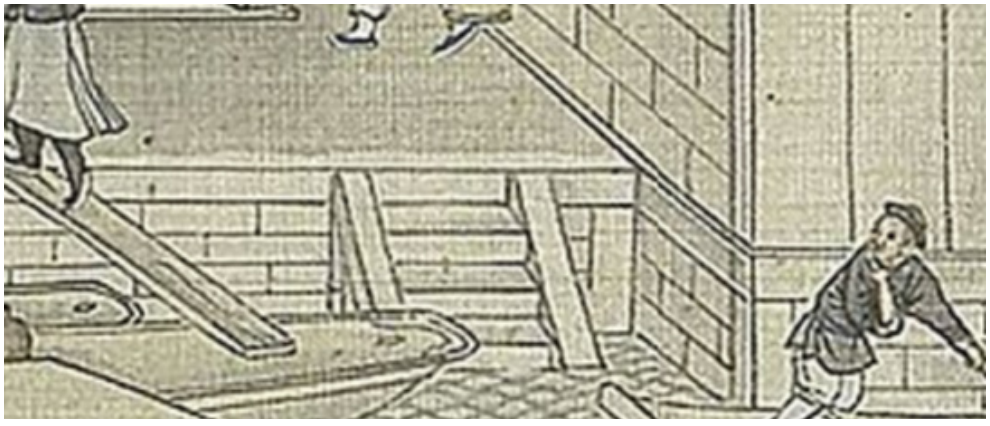


Figure 11 (right):
Stairs along the river
(Xu, 1751)

2.1.3 Diversity of Street and Buildings

2.1.3.1 Identity of People

Apart from the waterway, according to Suzhou Golden's Age (Xu, 1759), the figures and buildings along the street also impacted the diversity. In 1712, the policy of 'no tax increase for the new population' was promulgated by emperor Kangxi, which referred to a fixed amount of tax for each family, no matter how many family members were included. After that, the population in Suzhou grew dramatically. According to the Suzhou Archive (Tongzhi) (Li et al., 1882), in 1795, the population exceeded 3 million, which was more than six times compared to that in 1711. Within Suzhou, Jinchang District (where the site belongs) was even more crowded than the other districts because of the trading activities. Furthermore, Yuanhe archive (Xu, 1761) recorded frequent commodity trading, showing that people were engaging in a variety of occupations, especially textile-related ones. Unfortunately, there were no detailed demographic records before the 20th century, so we can only imply the general proportion.

2.1.3.2 Street and Buildings

The flourishing of commercial trade led to several special features of the waterfront area in the 18th century in Suzhou, namely multi-functional streets, buildings and street-building interfaces. Firstly, the streets in the Changmen area usually involved buildings with different functions. For example, in Suzhou's Golden Age (Xu, 1759), more than 20 types of stores can be recognized from the street right outside of the Changmen (Figure 12-14), including restaurants, jewelry stores, banks, copper shops, silk shops with workshops and so on. Additionally, the waterfront buildings were one-storey store or two-storey mix-used buildings. There were two mixing types: store-residence (Figure 15) and store-workshop (Figure 16). On the ground floor, stores always had the most direct relationship with the street but in different gestures, with either residence or workshop on the top. For instance, the copper store (Figure 14) was open completely to the street, while the restaurant (Figure 13) was open but with a baffle to prevent the dishes from falling out. The building in Figure 15 appeared more private, with most parts of the façade closed and only one door can be opened temporarily. Thus, combining the abundant types of water-related elements, buildings, and social groups, the Changmen Area in the 18th century was rather diverse.

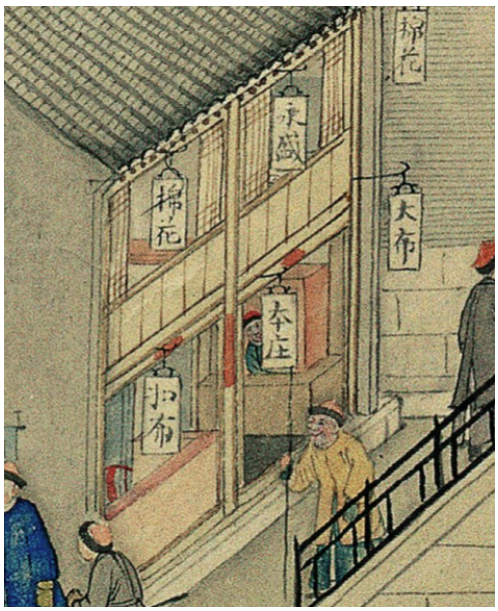


Figure 12 (left): cotton store (Xu, 1759)

Figure 13 (right): restaurant (Xu, 1759)

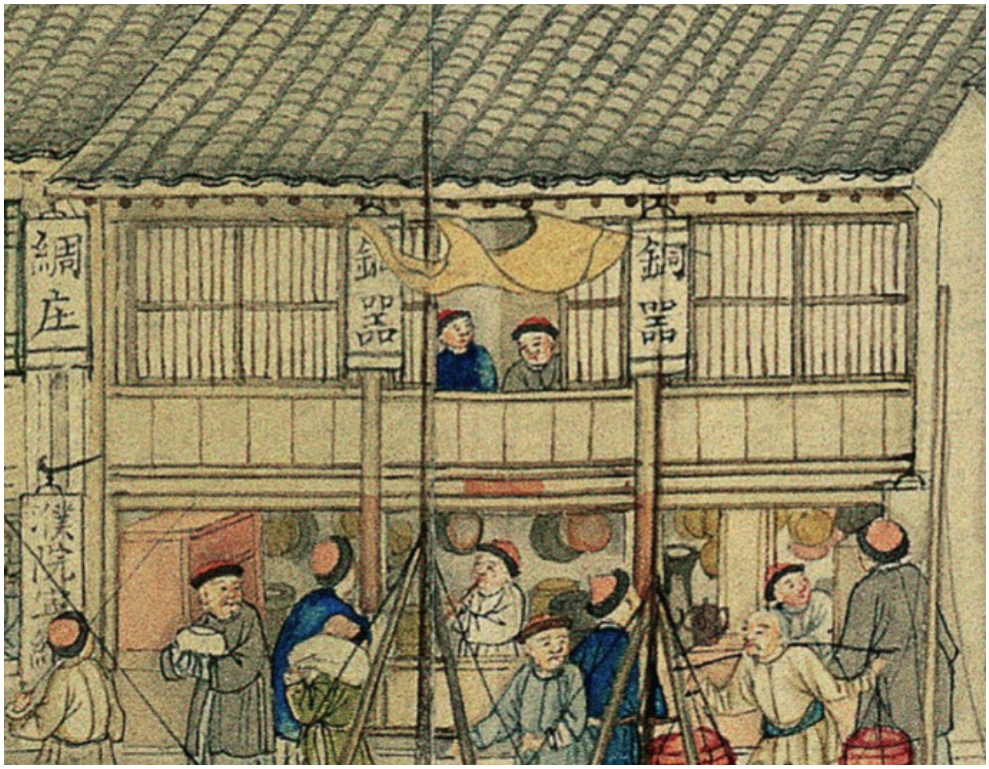


Figure 14 :
copper store (Xu, 1759)

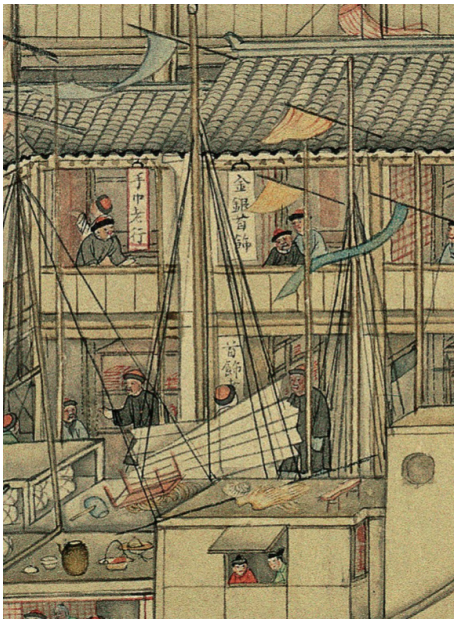


Figure 15 (left):
residence & store
(Xu, 1751)

Figure 16 (right):
workshop & store
(Xu, 1759)

2.2 Diversity in the 21st Century

In general, most of the significant physical elements remain similar in the 21st century in the Changmen Area, such as Changmen heritage, inner and outer city canals and bridges. However, the way people used them has changed greatly, which possibly influences the diversity of the waterfront area. This chapter will mainly show the discoveries during fieldwork with the support of statistics, demonstrating the current construction on the site.

2.2.1 Diversity of Waterways and Between Water and Street

From the 18th century to the 21st century, both the total length and number of waterways decreased, and the basic system changed into 'three horizontal, three vertical and one circle', losing one vertical way and one circle (Figure 17). The narrow and shallow tributaries were severely silted due to natural disasters, so the river system shrank evidently. In 2021, the government of Gusu District announced the completion of the rehabilitation of four rivers (Zhongshi River, Changmen Inner River, Taowu River and Cangqiao Bang, exactly the ones beside the site), including the demolition of unauthorized buildings, repair of riverside constructions and sewage treatments. Hence, the selected site was already in the situation after a recent regeneration.

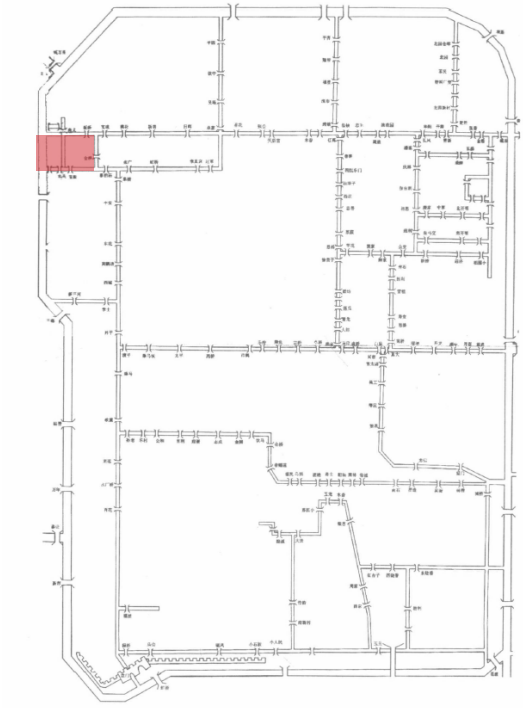


Figure 17:
waterway diagram in the 21st century
(Lin and Ye, 2019)

The fieldwork was done in the morning (taking around 4 hours) on a sunny day in March with a mild temperature, so the physical condition of the environment was generally suitable for hanging out. However, during the whole visit, no boats were seen passing through the waterway. In terms of the riverside elements, the stairs still existed, but were now considered private construction. Through observations, more than half of the waterfront buildings had their own stairs leading to the water (Figure 18-19), narrow and without handrails. Although no one was using them at that time, it was reasonable to assume that they are used for washing activities according to the pot and mop there (Figure 20). Since the only way to the stairs was from the backdoor of the building and there was no connection between each set of stairs, this construction looked more like a repetition from one building to another, lacking the diversity as in the 18th century.

Figure 18 (left): Stairs toward water (photograph by author, 2023)

Figure 19 (middle): Stairs toward water (photograph by author, 2023)

Figure 20 (right): pot and mop on the stairs (photograph by author, 2023)

2.2.2 Diversity of Street and Buildings

2.2.2.1 Identity of People

The Seventh Population Census (2021) indicated that there were 12.75 million permanent residents in Suzhou, ranked first in the total population, population increment, and increasing speed within Jiangsu Province. Compared to 3 million at the end of the 18th century, there was another triple growth. Nevertheless, due to the expansion of Suzhou, more working people were concentrated in the periphery rather than the Old Town (the area within the city wall). Therefore, the residents in the Old Town contained a large aging group, with the population over 60 and over 65 taking up 17 percent and 12.5 percent respectively. Both of them increased by approximately 4 percent compared to the last census in 2010. Besides the elderly permanent residents, temporary ones (basically the young workers) were also a large constituent, with an almost equal number as permanent, making Suzhou the biggest migration city. The elderly usually lived on their own without company from their children, while the working hour of the young workers varied greatly, therefore, it was unlikely for them to meet each other. Hence, the diversity was hard to be generated with a non-overlapping schedule.

2.2.2.2 Buildings

Not being a commercial center anymore, Changmen Area was no longer served for large groups of people. The buildings were mostly residences, all with white stucco walls and tile roofs sloping to the river, but varied from the material of the bottom part of the exterior wall (Figure 21-23), the windows, and the use of the space between water and buildings. Since these buildings were not reconstructed but only renovated, the stone foundation was mostly kept, and the new constructions were built on the top. Cracking and mold could be seen on the surface of all materials, including stone, stucco and brick, especially on the north façade (Figure 24). Mechanical equipment such as air conditioner units, water pipes and electrical wires were randomly attached to the façade, visually disrupting the overall view of the waterfront area. Regarding the windows, it was understandable that the renovation aimed to unify their forms, but currently they neither presented as a unified scene nor differed in a satisfactory way. For example, some were extruded from the façade, occupying parts of the river from above; while some were strange in size (Figure 25) or with staircases being exposed (Figure 26).






Figure 21-23 (top): Buildings with different materials at the bottom part (photograph by author, 2023)

Figure 24 (bottom left): cracking and mould (photograph by author, 2023)

Figure 25 (bottom middle): a small window hole (photograph by author, 2023)

Figure 26 (bottom right): staircase seen from façade (photograph by author, 2023)

The use of the waterfront space depends on the type of dwelling along the river, and is further associated with the relation between river, street and building. There are three main traditional dwelling types in Suzhou, namely ' 面水 ' ('facing the water', no space between water and residence), ' 临 水 ' ('beside the water', a space left between water and residence), and ' 跨 水 ' (a bridge-like part going over the water and connecting two residences on both sides). Since the third one is rarely seen in Suzhou now, the discussion will only focus on the former two types. On the site, both types exist but the 'facing' type is much more common. Specially, there are a few houses with half 'facing' and half 'besides', in which case, the house either is connected to the street on river side or has a courtyard along the river. Thus, the alteration of the house type may possibly enhance the diversity of building on the site.

03 Accessibility

3.1 Accessibility in the 18th Century

As described in the previous chapter, Suzhou in the 18th century was diverse and prosperous, and one of the factors that contributed to this diversity was the well-developed transport system. In general, Suzhou was an 'amphibious city' due to its special geographical relation with water. Therefore, this chapter will explore both water and land transport more detailedly, examining how they provided sufficient accessibility for boats and humans on foot in history and for modern vehicles currently, and thereafter forming a smooth circulation from water to building and vice versa.

3.1.1 Water Transport in the 18th Century

With a special position and topographical feature, Suzhou was accessible from all directions through the waterway. According to the map of Jiangsu Province in the 1710s (Figure 27), Suzhou, was surrounded by rivers connected to major lakes in China (Tai Lake and Dongting Lake) on the west and the sea (Huang Hai) on the East in general. Hence, it played a significant role in both inland river transport (for domestic transport) and maritime (for international trading).

In the 18th century, the core of Suzhou within the city wall was called 'Suzhou Fu'. It included three counties, namely Wu, Changzhou and Yuanhe. Each of them had its own bureau but they were all controlled by the same higher government. The outline of 'Suzhou Fu' was almost a rectangle, and there were on average two rivers on each side (three on the east) leading from outside to inside the city, and most of them went through City gates (Figure 28). On the southwest around 40 kilometers away from Suzhou Fu, Tai Lake was known as the third largest freshwater lake which was beneficial for irrigation and plantation (Figure 29). Besides the traditional grains, the production of cash crops including cotton and mulberry increased incredibly as well, promoting cloth and silk production accordingly. Thus, these agricultural and economic products were then transported through rivers towards the north. On the northwest, the mainstream was the Grand Canal from the northern part of China, so it was the crucial route that served for the highest hierarchy, the Central Government. The aforementioned products from the Tai Lake region as well as from Suzhou Fu itself would be sent to the political center (Beijing) as national supply. Although the transport on the canal was busy especially near the city gates as shown in Suzhou's Golden Age (Figure 30), there were regulations made at that time trying to confirm the order among boats. The Government Decree in 1770 stated that if congestion happened, priority would be given to the boats with a starting point closer to Beijing (Li and Jiang, 1995). Therefore, the canal was basically well-accessible for domestic transport at the Suzhou section. However, on the east side of Suzhou, due to the maritime prohibition policy before 1727, water transport was developed much later than on the west, but extremely fast. The boats overseas could approach Suzhou through the Wusong River (called 'Suzhou River' as well, because its destination is Suzhou), but since part of this river belonged to Shanghai, this thesis will not go into it in detail.

Figure 27:
map of Jiangsu Province
(Map of Jiangsu Province, 1895,
cited in Xu and Xu, 2019

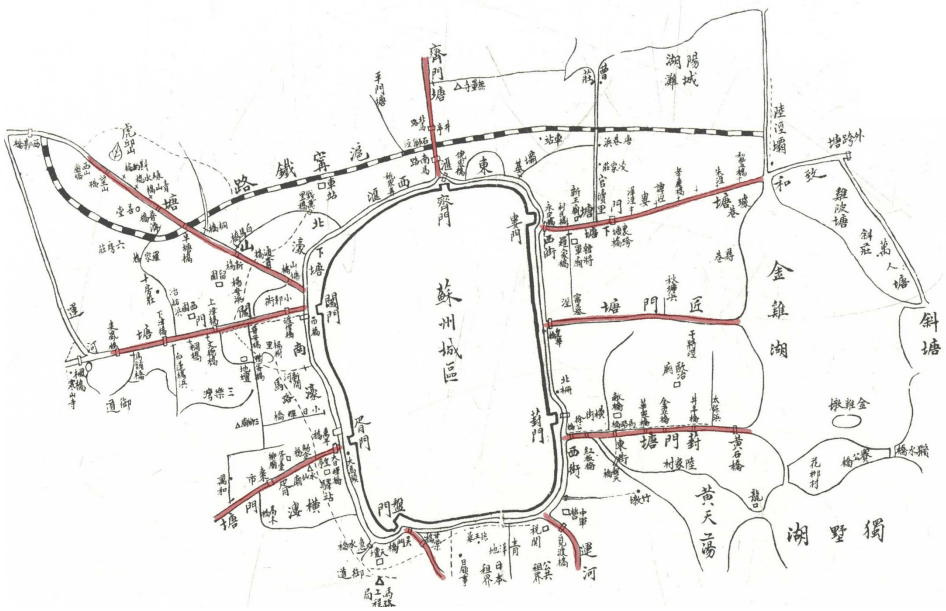


Figure 28:
Rivers from outside to inside city
(Map of Jiangsu Province, 1895,
cited in Xu and Xu, 2019

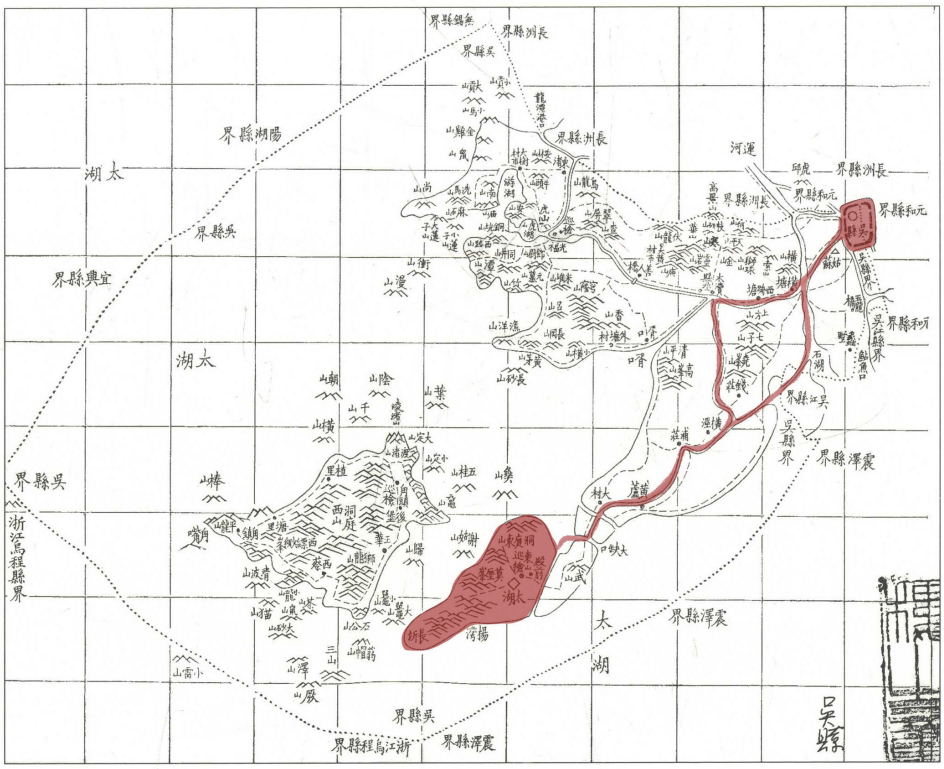


Figure 29:
Tai Lake and Suzhou Fu
(Map of Jiangsu Province, 1895,
cited in Xu and Xu, 2019

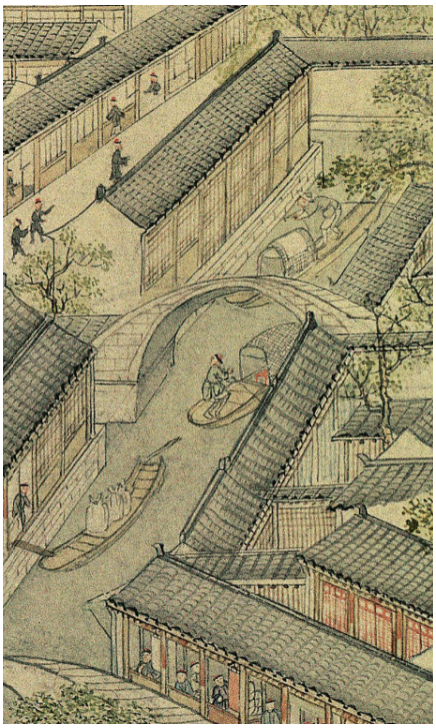


Figure 30 (left):
busy transport near city gate
(Xu, 1759)

Figure 31 (right):
smaller boats inside city
(Xu, 1759)

More specific to the site, after entering from Changmen, boats could continue north, south, or east, but the width of the waterway decreased evidently. As mentioned in 2.1.2, the outer city river was 30-100 meters wide, but the four rivers surrounding the site were all nearly 5 meters wide (Lin and Ye, 2019). According to the official standards raised in 1724, the boats used for domestic transport in Suzhou should be 23.7 meters with a capacity of more than 60 tons (Li and Jiang, 1995). However, the boats traveling inside the city for visiting or inner-city transport were much smaller in size (Figure 31). Therefore, by controlling the permission of boats of different sizes according to the width of the river, accessibility can be basically maintained.

3.1.2 Walkability of Street and the Accessibility of Buildings in the 18th Century

3.1.2.1 The General Condition of the Street System in Suzhou

In the introduction, it mentioned that both the street and river in Suzhou formed their own network, and since there were usually streets along rivers (but not always rivers along streets), the network of the street appeared similar to that of the river but denser. In ancient Chinese culture, there were two essential elements for forming a place, namely ' 坊 (Fang)' and ' 巷 (Xiang)'. Fang refers to the collection of buildings, while Xiang means the street connecting different Fangs, so the accessibility on land generally depends on Xiang. According to the official plan of Suzhou by Xu (1745, cited by Cao et al., 1933), there were 612 Xiangs with clearly indicated names and further remarks. With the largest population, Wu County (the western part of Suzhou Fu) had the most streets, where the east-west directional streets were much more than the north-south ones (Figure 32). Regarding the relative position to the river, two types of streets were shown in the site through Xu's paintings (1751&1759), with one along the river and the other on the another side of building away from the river. The former may not always be considered as a street, since some of them were so narrow that only allowed one person to pass at a time (Figure 33), but they were wider at the ends for storing goods or stabling horses temporarily (Figure 34). On the contrary, the streets between two rows of buildings were more spacious, especially the ones directly connected with the city gates, because they functioned as the major land transport routes. Additionally, these two types were connected through super narrow alleys between houses (Figure 35), realizing a continuous circulation between land and water.

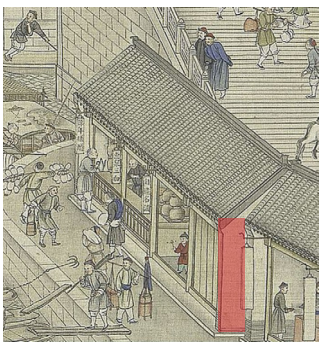


Figure 32 (left): Xiang in Wu County (Cao, 1933)

Figure 33 (right top): Narrow streets along river (Xu, 1759)

Figure 34 (right middle): Stabling horses at the bank (Xu, 1751)

Figure 35 (right bottom): Small alley between houses (Xu, 1751)

3.1.2.2 The Accessibility of Buildings

Another important factor of accessibility is the way to approach buildings from street or river. Depending on the street types mentioned above, the facades of a building showed a different level of accessibility. As for the side facing the river, for example, buildings with commercial uses appeared more accessible to the public, since they intended to attract more people and facilitate the transport of goods. However, for the buildings which were more private, there were two cases. One was by making the façade more closed (Figure 36), and the other by setting only the entrance along the street but hiding the residential part behind (Figure 37). In both cases, the buildings were still easily accessible, but privacy could be kept as well. In terms of the sides facing the side away from the river, they demonstrated a high degree of openness and accessibility on the ground floor. The doors of stores were usually almost one-floor height and could be fully opened (Figure 38), forming a natural transition from outside to inside.

3.2 Accessibility in the 21st Century

During the three centuries from the 18th, the changes of both the water and land transport systems in Suzhou did not follow a continuous increase or decrease, but an undulation. Multiple reasons may contribute to this result, including the implementation of different measures by the government and the development of vehicles. Hence, this chapter will look at the changes in the accessibility of both transport systems.

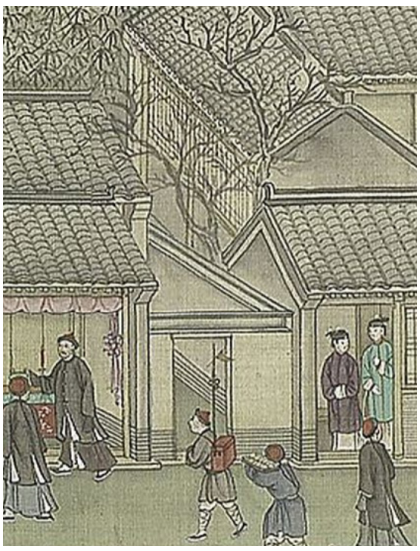
3.2.1 Water Transport in the 21st Century

In general, water transport experienced a significant decrease at the beginning of the 21st century and before, followed by a promising growth till now. According to Lin and Ye (2019), due to the accumulation of sediment caused by natural changes, the total length of the waterway in Suzhou in 2005 was almost half of that in the 18th century, decreasing from 62 km to 35 km. At the same time, there were 16 east-west directional rivers missing. Thus, at the beginning of the 21st century, the transport volumes were reduced, showing a less accessible city view. Both the provincial and the central government noticed this problem and put waterway remediation on the agenda. In the online conference on The Promotion of Inland Waterway Construction in Jiangsu Province held in December 2022, it said that the inland waterways in use reached 2700 km, and the volume of vessels

Figure 36 (left): Buildings with more closed façade (Xu, 1759)

Figure 37 (middle): Residences hidden behind stores (Xu, 1751

Figure 38 (right): Shops along street (Xu, 1759)



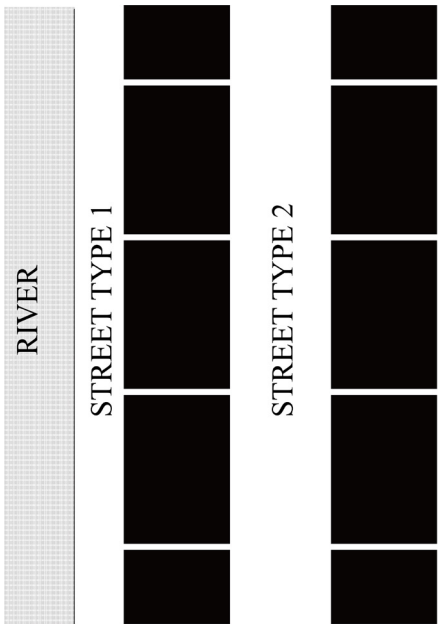
exceeded 394,000. The encouraging growth largely benefited from the political and economic input of the government in recent years. In the last decade, in order to achieve the goal of a three-dimensional transport network, 11.5 billion RMB was invested in the construction and maintenance of the inland waterway, and more than 210 km was added to the main network (Xu, 2022).

Indeed, the main functions of rivers in Suzhou are still cargo and passenger transport, but they differed from those in the 18th century in the operating way of the port. Regarding the cargo transport, the ***Inland Water Transport Development Report*** published in 2021 described that both the infrastructure of the inland waterway and the port capacity of Suzhou was ranked first in Jiangsu Province. The river freight volume reached 251 million tons, accounting for 14.8% of the overall freight volume in Suzhou (Suzhou government, 2021). Meanwhile, the port handling capacity of Suzhou was 560 million tons, with an increase of 2.16% compared to 2020. Although the absolute percentage was less than one-fifth due to the development of land and air transport, the increase in accessibility can be still seen through its growth compared to the beginning of the 21st century.

As for passenger transport, firstly, as stated in 2.2.2.1, the population was over three times more than in the 18th century, so the overall number of passengers increased, and so did that through river transport. The passenger turnover by waterway was around 3 million people per kilometer, at the top of all cities around the country. Moreover, after the promulgation of ***The Management of Method of the Cultural Tourism Landscape Belt Around the Ancient City River*** in 2014, the route of the Canal tour was confirmed, improving the possibilities of accessing the city at specific points. From the experience at Cangqiaobang and Zhongshi River (two important rivers at the site), they were accessible for small tourist or maintenance boats with a width of 4-4.5 meters, but not many boats were actually accessing there.

3.2.2 Walkability and Accessibility for Vehicles of Street in the 21st Century

Since the two types proposed in 3.1.2.1 (Figure 39) still exist now, the discussion can continue on the basis of them in the current situation. About the first type, except for the several main roads, the average width in Suzhou Old Town is 4-4.5 meters, so the problems of street blockage occurred because of parking violations. In order to address the problem of the street together with the renovation of the residences, ***The Adjustment of the Detailed Control Plan for the 7th and 15th Neighborhoods of Suzhou Old Town*** was proposed (the 7th neighborhood is the site) in 2019 (Figure 40), in which it stated that the alignment and width of Changmen Neixiatang (the street on the south side of the site) kept the same as before. Therefore, the streets of the site were still not intended for accessing cars. In December 2022, the act called ‘净美街巷‘ (clean up and beautify the streets) at Changmen Area was completed, where more detailed adjustments, such as adding the greenery and fences and planning of the area for electric vehicle parking, could be seen on the streets (Changmen Xiatang, Cangqiao Bang and Xinma Street) (Shen, Ding and Zhu, 2022). After the implementation of these measures, the streets on the site were more accessible for people on foot or by non-motorized vehicles.



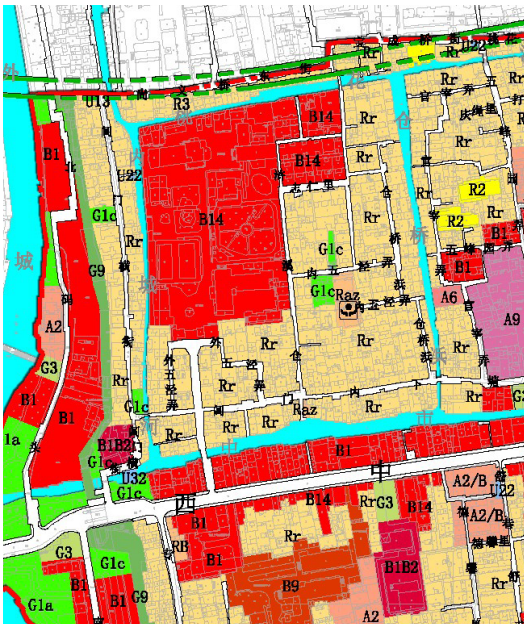


Figure 39 (left): diagram of two types of street (drew by author)

Figure 40 (right): The Adjustment of the Detailed Control Plan for the 7th and 15th Neighborhoods of Suzhou Old Town (Suzhou Natural Resources and Planning Bureau, 2016)

Based on the observation during fieldwork, most of the type 2 streets were wide enough for a car to pass, but there were also narrower alleys with the width of one bicycle (Figure 41), and most of these alleys were leading from the first street type to the second type. Indeed, few cars were seen on site, instead, the residents relied mainly on e-bikes. Though parking was limited in certain areas, some of the residents still prefer to park in the closest alley to their house (Figure 42). In general, the site was accessible but not that easily. The space along the river was not continuous but divided into segments, so after walking through the narrow alleys, the destination was private houses rather than spaces open to the public (Figure 43).

Furthermore, the transition between the street and the buildings was direct and clear. Since most of the buildings were for private use, they were extremely closed compared to the case in the 18th century, even for the windows and doors along the street. Although the entrances were simple, their position could be confused as they did not usually appear on the same side of a building.

Figure 41 (left): narrow alley (photograph by author, 2023)

Figure 42 (middle): Electric vehicles parking in alleys (photograph by author, 2023)

Figure 43 (right): Waterfront area as a part of private house (photograph by author, 2023)

04 Social Interaction

4.1 Social Interaction in the 18th Century

In addition to the physical environment discussed in the previous two chapters, human activities constitute a large part of urban vitality as well. One of the most evident features of Suzhou's Golden Age (Xu, 1759) was the numerous figures depicted in different scenes, showing an active social interaction among people. On the one hand, social interaction is positively correlated with the previous two indicators, on the other hand, it can be examined independently in terms of the scenarios. Thus, this chapter will discuss the social interaction through activities on water and land in both the 18th and the 21st century through the interpretation of paintings, texts, and experiences.

4.1.1 Water Activities in the 18th Century

Based on the most typical transportation at that time (by boat and on foot), the two common places for holding water activities were boats and bridges. As for boats, since the shipbuilding industry was under the control of the central government, there were hundreds of detailed classifications. Here, only the three most representative categories were discussed, namely cargo, touring, and private boats. Cargo boats were the biggest among all types, because they were highly required on capacity and duration. According to Li and Jiang (1995), in the 1750s, the number of cargo boats in use nationwide reached its peak at nearly 7,000. The boats manufactured and used in Suzhou were called 'Jiangnan boat', whose dimension was supposed to be 80 meters in length, 15 meters in width, 6 meters in depth below water, and 2.8 meters in height. As shown in Qianlong Southern Inspection Tour (Xu, 1751), a large number of cargo boats docked outside Changmen (Figure 44) in a disorderly manner, and the boatmen were climbing up and down to assure the process of unloading. At the same time, two interactions were generated, between boatmen (Figure 45) and between boatmen and people on the bank (Figure 46).

Figure 44 (left): cargo boats outside Changmen (Xu, 1751)

Figure 45 (middle): Interaction between boatmen (Xu, 1751)

Figure 46 (right): Interaction between boatman and people on bank (Xu, 1751)

The second type was touring boats, traditionally called ‘Huafang’, and used for recreational purposes. Besides being smaller in size, they were much more elegant in decoration compared to cargo boats. The windows were in exquisite patterns and embedded with marble and Mingwa (a traditional translucent material before glass was invented) (Figure 47), making the boats especially fascinating at night when lit up. In terms of the function, they could be single- or multi-functional, including dining, sightseeing, and performances. Basically, the main users of touring boats were scholars, noble people and officials, and there were servants especially taking care of them. For example, in the traditional engraving work three hundred and sixty occupations (Master of Baohuixuan, 1734, Figure 48), it showed a scene before the boats passing through the bridge in front of Changmen, where the mast was pulled down and several boatmen stood and whistled at the bow, while inside the boats, the officials were chatting and enjoying the view. Boats were also popular as private means for goods transport and family travel. They were usually simple in structure and compacted in space, so that they could be parked right in front of houses without blocking the waterway (Figure 49&50).

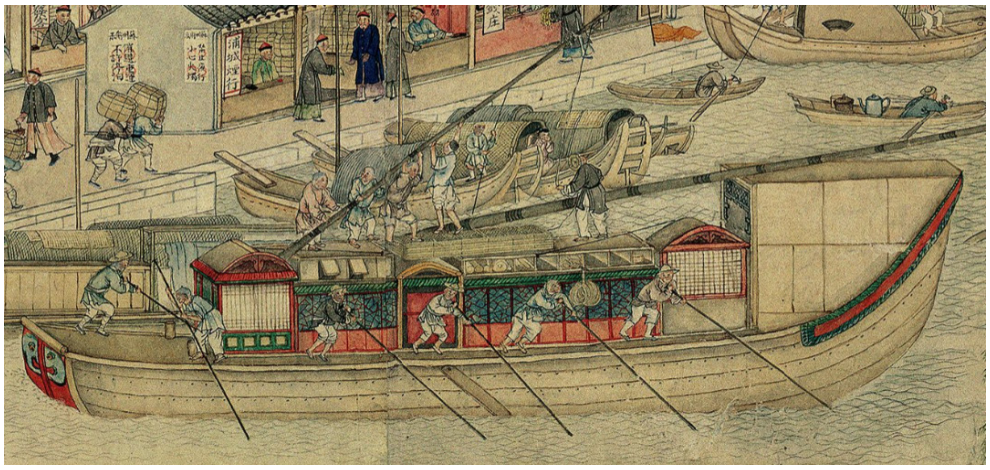


Figure 47:
Touring boat (Xu, 1759)

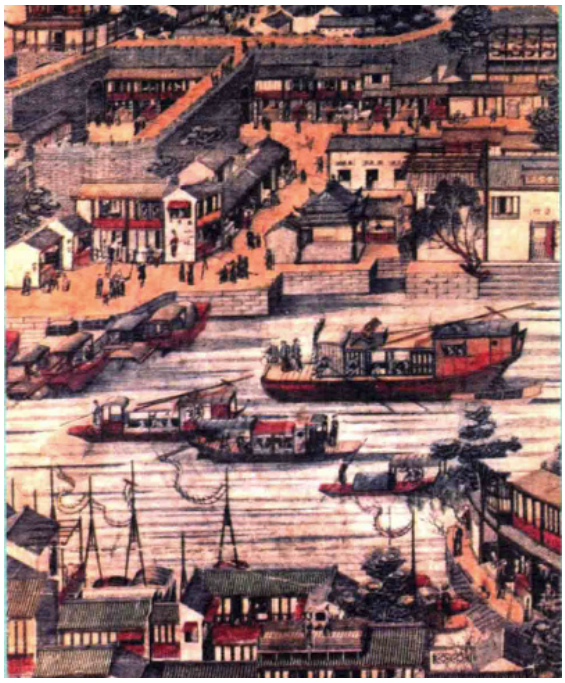


Figure 48 (left):
three hundred and sixty occupations
(Master of Baohuixuan, 1734)

Figure 49&50 (right):
private boats
(Xu, 1759)

Bridge was another essential place for social interaction. In 2.1.2, several forms of bridges were introduced, and accordingly, the activities on them were different as well. In general, bridges provided a place for encounter and gathering, but in the case of wider bridges, more activities could be held. For instance, there were covered booths on both sides of Guangji Bridge, so the bridge turned into a market, where active social interaction was enhanced (Figure 51).

Figure 51:
Bridge as a market (Xu, 1759)

4.1.2 Activities on Street in the 18th Century

The various identity of people resulted in not only the diversity of building types as mentioned in 2.1.2.3, but also the ways people interacted with each other. The most significant social event every year was the emperor's inspection tour. As the emperor passed by, all people along the street should kneel on the ground to show their respect. It was a rare chance to see the interaction between the emperor and civilians (Figure 52). Besides the special events, the routinary activities were more vivid in Suzhou's Golden Age (Xu, 1759). Taking Changmen Xiatang (the street name remained the same currently) as an example (Figure 53), on the street, people were traveling in different modes, such as riding a horse, by palanquin, or simply walking (Figure 54). People carried goods with a carrying pole, where either the two baskets were on the ends and a person in the middle, or two people carrying the two ends with the goods in the middle (Figure 55).

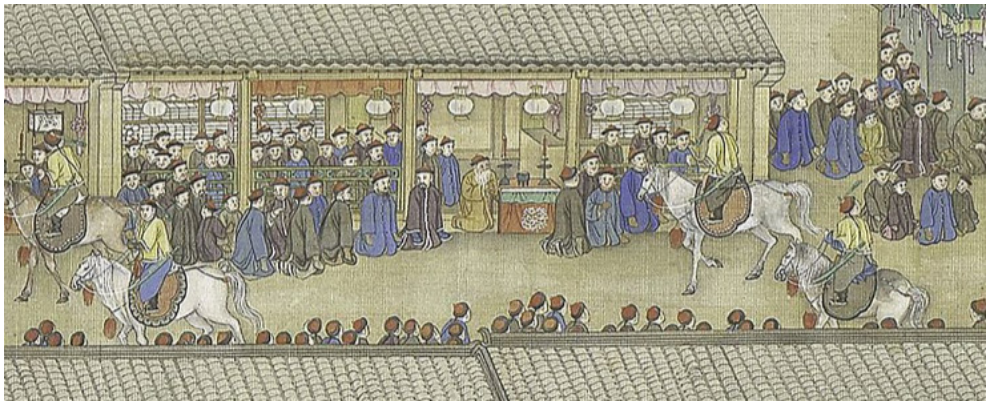


Figure 52:
People kneeled on the ground when emperor came (Xu, 1751)

Figure 53:
Changmen Xiatang (Xu, 1759)

Figure 54 (left):
Different traveling modes (Xu, 1759)

Figure 55 (right):
Ways to carry goods (Xu, 1759)

As for the buildings along Changmen Xiatang, there were totally 12 shown in the painting (two at the end are not recognizable, so only the recognizable ten will be mentioned below). The ground floor of all were with commercial functions, including 4 silk stores, 2 cloth stores, 1 pharmacy, 1 leather store, 1 foreign goods store and 1 hat store. Since they were all rather open to the public, they could be considered as an extended space for social interaction. So both the interaction between passers-by and house owners and between owners of neighboring buildings were direct and frequent. In the stores related to the textile, such as silk and cloth stores, there was usually a counter in the front, physically separating the selling and producing spaces (Figure 56). On the contrary, the other stores were more ambiguous in boundaries, where both the seller and the customer sat and chatted together (Figure 57). The part of Changmen Xiatang outside Changmen was even more varied in human activities. From the engraving Gusu Changmen (Master of Baohuixuan, 1734, Figure 58), some of the houses were also open on the first floor as service spaces, so that the interaction was no longer limited on the ground but permeating the buildings more deeply.

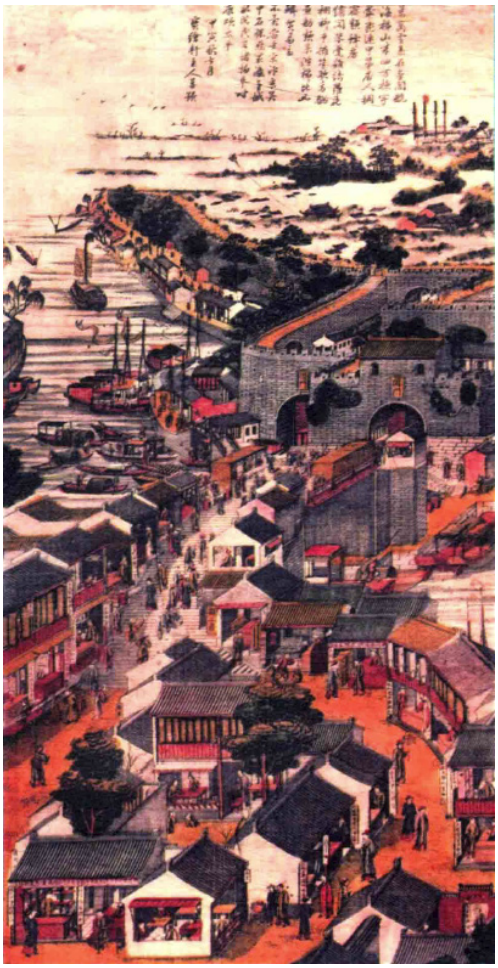


Figure 56 (left top): silk store (Xu, 1759)

Figure 57 (left bottom): pharmacy (Xu, 1759)

Figure 58 (right): Outside Changmen (Master of Baohuixuan, 1734)

4.2 Social Interaction in the 21st Century

Compared to the prosperous scenarios shown in Suzhou's Golden Age, the activities both on water and land decreased in the 21st century since people preferred a more closed space for everyday life, so the most common social interaction is mainly between neighbors, increasing the level of privacy.

4.2.1 Water Activities in the 21st Century

The social interactions on water and between water and land have been influenced by several factors. Firstly, due to the decline in the status of water transport in the 21st century, although cargo and touring boats still existed, both of them reduced much in number and ran according to a fixed schedule. In other words, during a single cruise, one boat may only come across few other boats, or not at all, so little interaction can be made between boats. Additionally, compared to the historical cases, where most of the space was outdoor or semi-outdoor, the boats now are commonly closed with people sitting inside (Figure 59). In this case, the boat seemed like an isolated island, especially considering the large width of the canal. The form of the third category, relatively simpler in manufacture and smaller in size, remained as well. However, they were not for private use, instead, they functioned for sightseeing or the maintenance work of waterway constructions in narrow tributaries (Figure 60). The analysis in 2.2.2.2 demonstrated that the façades of residences facing the water were monotonous due to the unified main surface material and window shapes. When looking closer at the windows, there was a metal structure attached from outside for safety purposes (Figure 61), which on the other hand, showed a rejected gesture by the residents to people traveling on the river. Admittedly, there were special cases, such as the restaurant right beside Changmen (Figure 62), where the traditional architectural features of waterfront buildings were intentionally preserved, such as the large windows and putting dining tables beside the window. Nevertheless, they were not in use currently, and thereafter, they acted as a reminder of the active interaction in history but revealed a sense of decay in reality.

Indeed, there were places possibly to enhance the interaction between residents or between residents and passers-by. The most evident case was the stairs leading to the river. Since almost every house had this construction (Figure 63), and the distance between each house was reasonable (the house was relatively narrow in width), if two people stand on the stairs of two neighboring buildings, the interaction could happen. Besides, another possible way is through balconies and roof gardens towards the river (Figure 64), where the activities were directly exposed to the outside.

Figure 59:
Touring boats in 21th century
(photograph by author, 2021)

Figure 60 (top left):
Sightseeing boats
(photograph by author, 2022)

Figure 61 (top middle):
Façade facing water
(photograph by author, 2023)

Figure 62 (top right):
Abandoned restaurant
(photograph by author, 2023)

Figure 63 (bottom left):
Steps leading to river
(photograph by author, 2023)

Figure 64 (bottom right):
roof garden
(photograph by author, 2023)

4.2.2 Activities on Street in the 21st Century

Starting from Changmen, where the historical North Pier was located, different social groups were seen. As shown in Figure 65, on the left, there were tourists visiting the heritage, while on the right, along West Zhongshi Street going through Changmen, it was busy with cars and people passing by, and construction workers were sitting along the street for a rest. However, no interaction was made among any groups. Compared to West Zhongshi Street (14 meters wide), Changmen Xiatang, 75 meters to the north of it, was much narrower (4.5 meters wide) and more secluded. This waterfront street was equipped with infrastructure, such as greenery and benches, and people did use them, especially the elderly. However, interestingly, at the point in Figure 66, three people sat on three benches separately, and after the benches were all occupied, none of the later passers-by stopped and shared a bench with either of them. Consequently, though the common space was specially designed, it did not arouse an active interaction.

Stepping into the neighborhood, most of the residences were built along the river, but they were arranged in different ways. The connection between the main street and the river relied on multiple narrow alleys. There were two cases at the end of the alley which led to different levels of publicness. The first case ended with an open area (Figure 67), which had direct access to the river. Therefore, public activities, such as chatting and fishing, appeared (Figure 68). The second one led to a wall with only holes remaining for a visual connection with the river (Figure 69), so even though the alley was supposed to be public, few people from outside would walk into it. Expectedly, it was jointly occupied by the owners of neighboring buildings for washing or other household activities, making it a place for interaction only between neighbors. Another communal space for neighbors was inside the outmost door of a building block. Looking through several open doors, the residential areas were surrounding a shared courtyard (Figure 70), some of which might have had access to the river in the past, but were now blocked by a clutter of stuff.

Figure 65:
Outside of Changmen
(photograph by author, 2023)

Figure 66 (left):
People sitting along river
(photograph by author, 2023)
Figure 67 (right):
Alley ended with an open space
(photograph by author, 2023)

Figure 68:
Fishing
(photograph by author, 2023)

Figure 69 (left):
alley ended with a wall
(photograph by author, 2023)
Figure 70 (right):
shared space inside residence
(photograph by author, 2023)

05 Discussion

As mentioned in the literature review, few previous research focused on the urban vitality in the waterfront space, neither did they explain its relation with water, street and building per se. Thus, this research discusses this topic in the current situation and in three centuries ago, based on the selected site at Changmen Area in Suzhou.

The results show, on the one hand, an evident decrease in urban vitality, in the scope of diversity, accessibility and social interaction. Regarding the water, since the important position of water transport has been replaced by other modes, the number and type of waterways and the area they can reach gradually decreased. Thus, this may weaken the activities and interactions that occurred on the water before. Similarly, on land, as the buildings have been altered to a more private function, population, traveling modes and architectural form are adapted accordingly, and thereafter, this area and the residents tend to be isolated from the urban context. On the other hand, findings reveal the potential to improve the situation as well. Firstly, since the government has embarked on waterfront area remediation in recent decades, including making regulations and new patterns, a promising foundation for development has already formed. However, more detailed strategies need to be considered by getting insight into people's life. Though some of the changes are inevitable, caused by social policies and the positioning in urban planning, the feasible interventions may start simply from the existing structure. For instance, the stairs toward the water which are currently private construction can be redefined to promote communication. As it impacts both the city's image and personal life, this should be done with collaboration between the government and individuals. Additionally, it is also worth considering why the newly-built infrastructure, such as parks, did not play its part as expected in improving urban vitality.

Therefore, this research is supposed to be an overview of the topic of urban vitality in waterfront spaces in Changmen area, trying to inspire thoughts, but research with a narrower scope should follow. There is still uncertainty left on multiple levels, from a macro regeneration in line with the social environment to accordance with every routinary event.

06 Conclusion

In general, this research demonstrates a decline of urban vitality in waterfront spaces in the Changmen area from the 18th century to the 21st century and its manifestation through two different approaches. The ancient paintings were used as the main sources reflecting the history, while fieldwork was conducted to understand the current situation of the site.

Three indicators were used to evaluate urban vitality, namely diversity, accessibility and social interaction. Diversity was reflected in three aspects, first of which, the water system was more sophisticated in the 18th century, and was accompanied by more auxiliary structure. Secondly, although the population increased dramatically in the 21st century, it appeared a trend of homogenization in identity, with mostly the elderly and migrant workers. Additionally, since the site became a predominantly residential area, the function and appearance of riverside buildings were restricted to a uniform style. Admittedly, buildings and water constructions should satisfy modern mechanical requirements, but they could be intentionally designed for different social groups, being more attractive for both the residents and outsiders.

The change in accessibility impacts urban vitality as well. In the 18th century, Changmen Area was easily accessed through both water and land transport. It acted as a transportation hub, linking the agricultural origin and transporting these products to the Central Government on the west. At the same time, it was also a connection with the sea promoting the maritime trade and making Suzhou an economically prosperous city. However, with the spread of more advanced transport, the ratio of using water transport decreased in the 21st century. Fortunately, the government has noticed the problem and restoration works have been conducted, but the parts physically accessible for boats were still underutilized. Generally speaking, streets and buildings were accessible both in the past and present, but currently, the occupation of public spaces appeared more frequent than in the past, especially obstructing the accessibility of narrow alleys.

Based on the environmental conditions, the social interaction on water and street was weakened. One feature that hinders the interaction is the closed gesture of the places for activities, including boats and riverside buildings. Though the basic functions of boats still remain in the 21st century, they become much more spatially isolated, preventing conversations between boatmen and between people inside the boat and on the bank. Similar situations happen to the buildings, which used to be open to the public at least on the ground floor, but now with a clear division between inside and outside. Moreover, the street turns more private, so that it is basically shared among neighbors. Although there are common spaces designed for interaction, such as the park and benches, they are not used properly as expected.

Thus, from all three aspects, the problem of regression in vitality is exposed, but at the same time, the constant efforts from governments to address it cannot be neglected as well. There are several promising measures that have led to a potential increase in urban vitality, such as dredging the waterways, the promulgation of policies to improve the street order and the specially designed common spaces, though the expected result is not achieved yet. Indeed, by looking into history, the point is not to reproduce the approaches in the past, since the social background is completely different, but more importantly, to learn to adapt the current conditions to the maximum. As a reflection on the topic of urban vitality in waterfront spaces, this research intends to trigger thoughts in more detailed aspects in future research and practice, such as the reasons behind the failed strategies or the contemporary reuse of the historical structure.

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