

The Construction of Theoretical Framework in the Interactive Study of “Water and City”

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Abstract. The formation of delta city-groups has features of particular historical water-related origins. The location of the huge city groups is the concentration area of the ancient settlements and the city relics. Delta metropolitan reflects the characteristics of long-term stability and superposition. This paper puts forward a theoretical system for the construction of the interactive study of water and city based on Chinese ancient planning theories and western theories of urban morphology. It is expected to construct the theoretical framework in the interactive study of “water and city” for the further research.

1. Introduction

Throughout the history of the world, the development of cities is inseparable from the large water system and the ocean. The Yellow River, the Yangtze River, the Indus, the Mesopotamia and the Nile Valley are the birthplaces of ancient civilizations. The developed areas of the water system can always form trade and regional centers. In the delta’s urban development, the water has the functions of consolidating the city sites, promoting the industrial and commercial development, and improving the living environment.

This paper puts forward a theoretical system for the construction of the interactive study of water and city from Chinese ancient planning theories and western theories of urban morphology. Based on the relevant theories of China and the world, this paper extracts the theories related to the research object, and constructs the theoretical support system in the interactive study of “water and city”. According to the theoretical support, the research elements are determined, it is expected that, with clarity the research route, to construct the research frame of the interaction between water and city.

2. Theory Support

2.1 Relevant theories in China--Geomancy study, “Zhou Li”, “Guan Zi”

2.1.1 Geomancy study

In ancient China, a set of theories on residential location and urban construction have been formed early on, in which the importance of water system to urban generation and development has been mentioned. Geomancy is a theory about the location and layout of Chinese towns and residents, which is summed up according to people’s long-term practice of natural living environment.

The ideal environment with mountains and water is the first choice in the geomantic theory. The location of the city should be surrounded by mountains, which is set up in the background of main mountain, Shaozu mountain and Zu mountain. Location should be around by the second peak or be aided on the left and supported on the right, and there are protective mountains outside. A variety of vegetation is been planted for the conservation of both moisture and soil and regulating the climate. Water not only provides residents with living water, but also improves traffic, purifies air, forms

broad vision and beautifies environment. Fronting water and with hills on the back, surrounded by mountains and rivers, where is the ideal location for a city. The “landscape view” (mountain and water) in Chinese geomantic science affects the location and construction of ancient Chinese cities. Xi’an, the head of the ancient capitals, is surrounded by mountains and water; Nanjing, with the location of a forbidding strategic point, is proved to be the ancient capital of Six Dynasties. During the Warring States period, Wu Zixu selected the capital of Wu State, and proposed to be acquainted with the properties of soil and water regimen, observe the astronomical phenomena and practise geomancy. It provides references for the construction of Suzhou City, Beijing City of Ming and Qing Dynasties.

2.1.2 The thought of operating capital cities from “Zhou Li”

“Zhou Li” and “Guanzi” are the main treatises of ancient Chinese urban planning thoughts, which embody the wisdom of ancient city planning and play an important guiding role in the practice of ancient city construction and development. In the Spring and Autumn and Warring States period (770BC-221BC), “Zhou Li · Kao Gong Ji”, established (Zhou) the emperor city construction system. It is about the principles and dimensions of building the city, especially the capital city. Three doors are opened on each side of the 9,000 miles city wall, and there are nine north-south and nine east-west roads in the city. Each road can hold nine tracks. To the left (east side) of the palace is the imperial ancestral temple; to the right (west side) is altar of land and grain; to the south of the palace is a court of government. Behind the palace is the market [1]. “Zhou Li · Kao Gong Ji” reflects the strict hierarchy system, political spaces (palace, etc) are in the central positions of the city. The city is a regular square, and the big city sets the double city wall structure with the inner small city. “Zhou Li” emphasizes the importance of the etiquette system and reflects the political system to the development of the urban spatial form. Suzhou City, Chang’an City of Tang Dynasty, Beijing City of Ming and Qing Dynasties and so on, the ancient Chinese cities constructions with political function are all influenced by the thought of “Zhou Li”.

2.1.3 The thought of constructing cities from “Guan Zi”

Most of the thoughts in “Guang Zi” come from the summary of the general plan of governing the country in the reign of Qi in the Spring and Autumn period (770BC-476BC), and the further exploration and study of later generations. “Guan Zi · Du Di” says that building a capital city, saints must choose a stable and reliable place and a fertile land, relying on mountains, there are rivers and lakes nearby, and the city has well-built drainage facilities. “Guang Zi” clarifies the main contents of the choice of urban land use. “City site selection should pay attention to the proper level of the terrain, neither too high nor too low ... this will not only eliminate construction of ditch defence, but also serve as a convenient water diversion”. “People should make use of the environment and nature according to the existing conditions, and do not have to copy the rules of books, so it is very important to conform to the favorable conditions and terrain of nature to create their own development.”

The ritual city system of “Zhou Li” applies to the plain areas, and the “Guan Zi” pays more attention to the environment, and the idea of taking measures according to local conditions is more suitable for the mountainous areas. Chinese ancient urban planning thoughts reflect the overall concept and long-term development of urban construction, and emphasize the organic unity and harmonious development of natural and artificial environment, and the urban form follows a strict urban hierarchy system.

2.2 Theories of urban morphology

Urban morphology refers to the physical space texture (urban land use, functional zoning, architectural space weaving, style and features, etc.), and the development process of invisible urban society, economy and culture.

2.2.1 Conzen School

In 1960, Conzen published his book “*Alnwick, Northumberland: A Study in Town-Plan Analysis*”, based on the urban layout analysis of Alnwick town, the research methods and framework of urban morphology were preliminarily established.

Its main features are: a). the three elements of the urban layout are the layout of town, the type of building and the use of land; b). it emphasizes the importance of the evolution process of urban form, and advocates to use a large number of historical maps and the research methods of process evolution to analyze the process of historical change; c). it shows that how to divide the “layout type unit”, that is, road, plot, architectural layout, with independent property rights as the smallest research unit; d). the importance of cartography combined with field investigation and literature analysis is emphasized; e). the following conceptual methods were established and applied: plan unit, environmental period, environmental regions, morphological frame, plot redevelopment cycles and fringe belts, etc [2,3].

2.2.2 Italian School-contextualism, Typomorphology

The genre of “contextualism” architecture, represented by S. Muratori, focused on the analysis of the natural and humanistic characteristics of the city and the architectural material space, and found out its inherent logic laws through the study of the historical evolution of the city and the architecture. So that in the future planning and design, we could continue this inherent rule, and create a continuous, running historical urban landscape. They advocated the combination of architectural typology and urban morphology. The basic idea was to construct specific urban texture through summing up the layout of urban form and architectural types in different historical periods, and to reveal the general law of urban development, which could continue the tradition in the future planning and design. Integrating into the local texture environment, its research method emphasized that the analysis of historical evolution and the classification and description of architectural types, “operative history” was the core of Muratori’s thought [4].

2.2.3 French school

Under the influence of P. Lavedan’s *History of Urban Planning* and M. Poete’s research on the history of Paris urban construction, based on a large number of studies on the historic development of French urban morphology, the basic content of the French school of thought was formed [2,4]: a). the influence of city location on urban development; b). the analysis of the main elements of urban layout: street, street texture, plot, land, architecture, architectural texture and so on; c). the analysis of the historical evolution of urban layout form and the internal dynamic mechanism, the urban sociology and historical economics, etc., including the regulation mechanism and methods in the process of urban evolution, the value of historical towns, management, protection, planning and construction, and so on; d). in the process of analyzing urban form and evolution, it described the composition of urban function, and analyzed the relationship between form and function, the transformation mode and process, the influence of decision makers, and so on; e). research on architectural type and continuous landscape, periodic landscape, etc.

3. The Construction of the Theoretical Framework

The theoretical supports of the study on the interaction of “water and city” are mainly based on the relevant theories of ancient Chinese urban planning and the views of the three major schools of urban morphology. It will also use Kevin Lynch’s five elements of “city image” as an analysis of a particular piece of land or space in a city, and political economics research methods to analyze the relevance between urban patterns and social and economic changes in water networks.

Professor Dong Wei of Southeast University in China has been committed to the study of historical urban spatial context, emphasizing the study of historical maps to extract valuable urban historical information, and promotes the use of planning and design techniques to achieve the integration of historical space and the overall protection of the historical environment. His theory is through the ancient city maps illustration, literature reading, archaeological excavation, information collection and other means, to study the gradient changes from the different periods of urban historical and cultural space network in time and space. It integrates the historical information with its evolution, and sums up the process of urban history and culture of space changes and characteristics, complete showing the context of urban development and urban function space changes in the course during

different periods, and then establishes the digital historical information system based on the historical space elements, and takes analysis and evaluation on them, for guiding the development and management of urban space with historical information [5].

In the analysis of the internal dynamics of urban form, it is also applied to the recent research results of Professor Luuk Boelens of Ghent University, who believes that urban planning is the result of the interaction of people, environment and organizers, which build a particular network that determines the dynamics of urban landscape. The urban form is shaped by continuous interaction of the human factors (rules and entrepreneurs), environment and history (soil, geography, historical events) and institutions, which is highly situational and could be developed into a “urban DNA” [6].

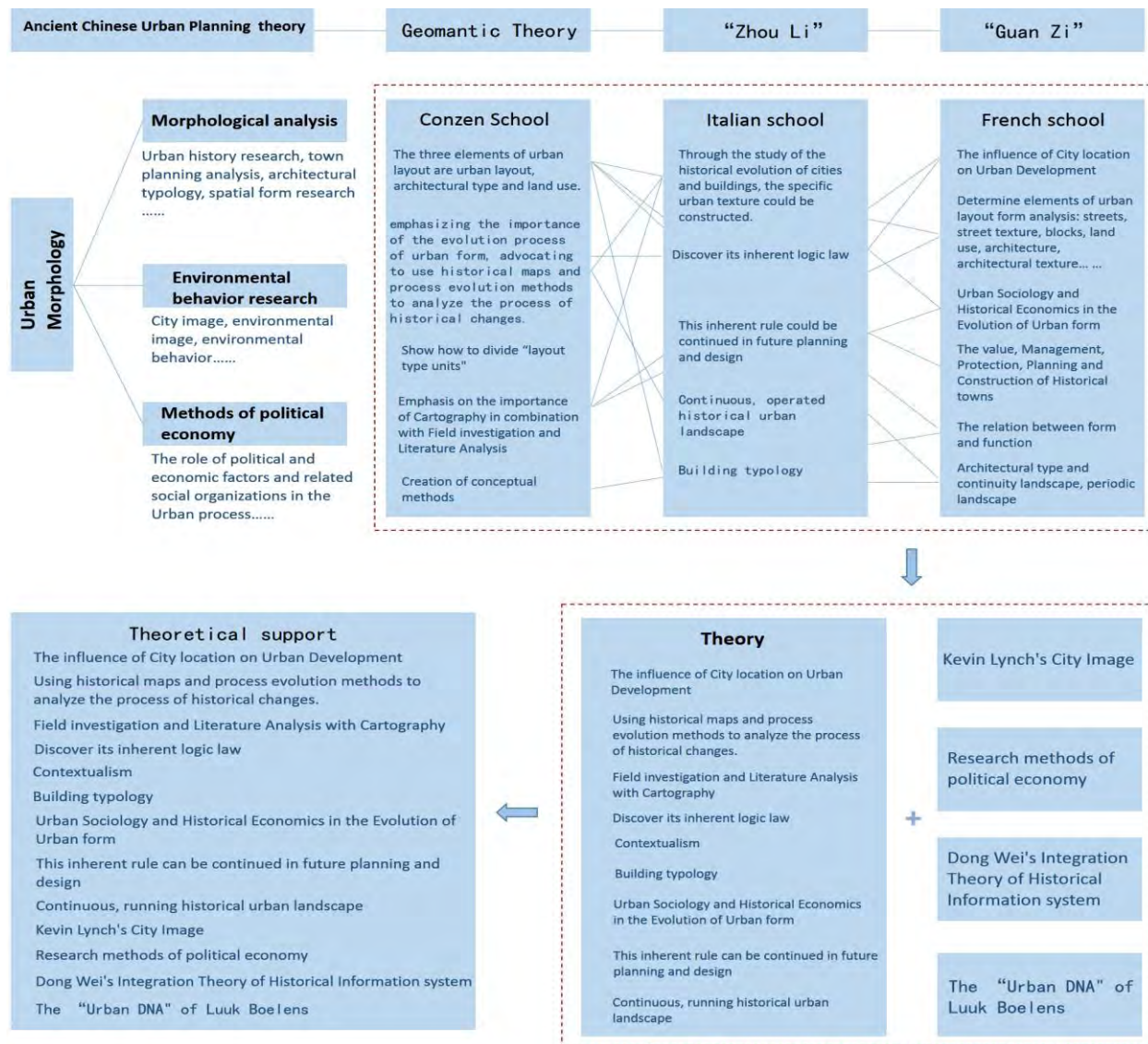


Figure 1. Theoretical support framework construction

Therefore, the theoretical supports mainly includes: “the influence of city location on urban development”, “using a large number of historical maps”, “using the method of process evolution to analyze the process of historical change”, “cartography with field investigation and literature analysis”, “find the inherent logic law of urban evolution”, “contextualism”, “architectural typology”, “urban sociology of urban morphology evolution”, “the study of historical economics”, “the continuous, and operated historical city landscape in”, “the city image of Kevin Lynch”, “the research method of political economy”, “the integration theory of historical information system of professor Dong Wei”, “the urban DNA by professor Luuk Boelens”, etc. These theoretical supports will directly affect the research framework construction (Figure 1).

4. Conclusion

According to the theoretical and research framework, through the ancient city maps illustration, literature reading, archaeological excavation, information collection and other means, it will study the gradient changes from the different periods of urban historical and cultural space network in time and space. By integrating this historical information with its evolution, it will sum up the process of urban history and culture of spatial developments and characteristics, in reference to the changing context of specific urban communities, functions and morphological opportunities during various periods. Moreover, it will establish a digital historical information system based on these elements, to guide the development and management of urban space with historical information.

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