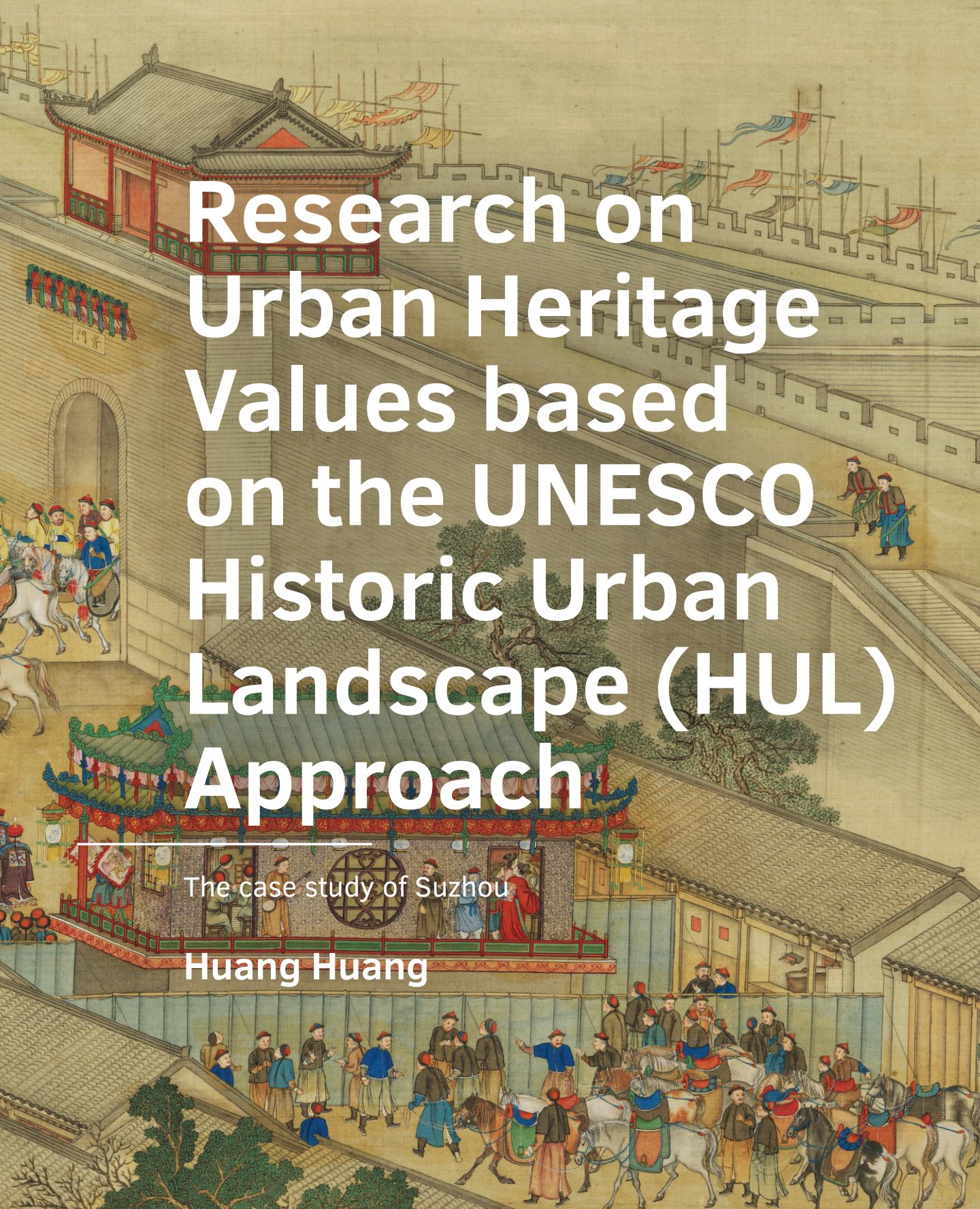

Research on Urban Heritage Values based on the UNESCO Historic Urban Landscape (HUL) Approach

The case study of Suzhou

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TOC

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TOC

Research on Urban Heritage Values based on the UNESCO Historic Urban Landscape (HUL) Approach

The case study of Suzhou

Dissertation

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chair of the Board for Doctorates
to be defended publicly on
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by

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TOC

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TOC

Contents

List of Tables

List of Figures

List of Acronyms

- **CAS** Complex Adaptive System
- **GST** General System Theory
- **HUL** Historic Urban Landscape
- **ICOMOS** International Council on Monuments and Sites
- **NFHCC** National Famous Historic Cultural Cities
- **OUV** Outstanding Universal Value
- **PRC** People's Republic of China
- **UNESCO** United Nations Educational, Scientific and Cultural Organization
- **WHS** World Heritage Sites

Important Chinese Dynasties

- Western Zhou Dynasty (1046 BCE- 771 BCE)
- Spring and Autumn Period (771 BCE- 476 BCE)
- Han Dynasty (202 BCE- 9 CE, 25 CE- 220 CE)
- Jin Dynasty (266 CE- 420 CE)
- Southern Dynasties (420 CE- 589 CE)
- Tang Dynasty (618 CE- 907 CE)
- Song Dynasty (960 CE- 1279 CE)
- Ming Dynasty (1368 CE- 1644 CE)
- Qing Dynasty (1636 CE- 1912 CE)

Summary

Currently there exist two aspects of theoretical limitations in the discourse on heritage value in contemporary China: First, the classification of heritage value is essentially established on the controversial “3+2” paradigm. Second, related studies on heritage confuse the relationship between effect and value. Heritage value is largely equated with the economic benefits of heritage in accordance with human needs.

As far as a historic city is concerned, a city is a dynamic complex which consists of many different interrelated and interactive elements. It is unreasonable to assess urban heritage by using a single value category. The evaluation of urban heritage values needs to develop a theoretical framework to represent the relationships between different elements. In view of the above issues, there is so far still a lack of systematic study on urban heritage values in Chinese academic circles. Therefore, it is necessary to construct the value system of urban heritage by adopting a scientific method.

Research gaps are reflected in two aspects: First, the gap in literature on heritage value: The *Conservation Principles, Policies and Guidance* of Historic England serves as the important theoretical source and reference in this study. Value categories in the document do not sufficiently account for the influence of the environment on cities. Second, the gap in the research method: The historic urban landscape (HUL) is selected as the research method, however, the existing HUL methods at the operational level, which includes six critical steps, cannot directly be associated with heritage value theories and value categories of urban heritage.

This study aims to build up an integrated value system to facilitate the identification of urban heritage values, so that the complexity of urban heritage values is revealed through connections of different elements. The research work includes theoretical construction and a case study. First, the HUL is interpreted as a method of spatial-temporal scale by discussing the philosophical framework of HUL. Based on this finding, the gap between HUL at the operational level and the heritage value theories is filled. Second, as a case study, the analysis of the ancient city Suzhou is a verification of the value system of urban heritage in the practical sense. It also proves that the constructed value system is reasonable and achievable for urban conservation in the Chinese context.

The research work indicates that the value system of urban heritage essentially reflects a dynamic and hierarchical structure by adopting the HUL method characterized by the spatial-temporal scale. Meanwhile, the study found that the new holistic value category is an indispensable component of the comprehensive value system of urban heritage.

The significance of this study lies in three aspects. First, the relationship between systems thinking and operational approaches can be interpreted through the relationship between commonality and individuality, which reveals the origin of diversity of HUL. Second, the research work addresses issues in the traditional "3+2" paradigm so that Chinese urban conservation work can benefit from the research result. Third, the adaptability of the value system of urban heritage is not restricted in the Chinese context, it reflects the flexible practical significance as long as the cultural characteristics and ethnic identity are interpreted in this value system.

Samenvatting

Momenteel bestaan er twee aspecten van theoretische beperkingen in het discours over erfgoedwaarde in het hedendaagse China: Ten eerste is de classificatie van erfgoedwaarde in wezen gebaseerd op het controversiële '3+2'-paradigma. Ten tweede verwarren verwante onderzoeken naar erfgoed de relatie tussen effect en waarde. Erfgoedwaarde wordt grotendeels gelijkgesteld met de economische voordelen van erfgoed in overeenstemming met de menselijke behoeften.

Voor een historische stad is een stad een dynamisch complex dat bestaat uit veel verschillende onderling samenhangende en interactieve elementen. Het is onredelijk om stedelijk erfgoed te beoordelen op basis van één enkele waardecategorie. De evaluatie van stedelijke erfgoedwaarden moet een theoretisch raamwerk ontwikkelen om de relaties tussen verschillende elementen weer te geven. In het licht van bovenstaande kwesties bestaat er tot nu toe nog steeds een gebrek aan systematisch onderzoek naar de waarden van stedelijk erfgoed in Chinese academische kringen. Daarom is het noodzakelijk om het waardesysteem van stedelijk erfgoed op te bouwen door gebruik te maken van een wetenschappelijke methode.

De hiaten in het onderzoek komen tot uiting in twee aspecten: Ten eerste dient de leemte in de literatuur over erfgoedwaarde: de *Conservation Principles, Policies and Guidance* of Historic England als de belangrijke theoretische bron en referentie in dit onderzoek. Waardecategorieën in het document houden onvoldoende rekening met de invloed van het milieu op steden. Ten tweede de kloof in de onderzoeksmethode: het historische stedelijke landschap (HUL) is geselecteerd als onderzoeksmethode, maar de bestaande HUL-methoden op operationeel niveau, die zes kritische stappen omvatten, kunnen niet rechtstreeks in verband worden gebracht met theorieën over erfgoedwaarde en waardebepalingen. categorieën stedelijk erfgoed.

Deze studie heeft tot doel een geïntegreerd waardensysteem op te bouwen om de identificatie van stedelijke erfgoedwaarden te vergemakkelijken, zodat de complexiteit van stedelijke erfgoedwaarden zichtbaar wordt door verbindingen van verschillende elementen. Het onderzoekswerk omvat theoretische constructie en een case study. Ten eerste wordt de HUL geïnterpreteerd als een methode van ruimtelijk-temporele schaal door het filosofische raamwerk van HUL te bespreken. Op basis van deze bevinding wordt de kloof tussen HUL op operationeel niveau en de erfgoedwaardetheorieën opgevuld. Ten tweede is de analyse van de oude stad

Suzhou, als case study, een verificatie van het waardesysteem van stedelijk erfgoed in praktische zin. Het bewijst ook dat het geconstrueerde waardesysteem redelijk en haalbaar is voor stadsbehoud in de Chinese context.

Het onderzoekswerk geeft aan dat het waardensysteem van stedelijk erfgoed in wezen een dynamische en hiërarchische structuur weerspiegelt door de HUL-methode toe te passen die wordt gekenmerkt door de ruimtelijk-temporele schaal. Ondertussen bleek uit de studie dat de nieuwe holistische waardecategorie een onmisbaar onderdeel is van het alomvattende waardesysteem van stedelijk erfgoed.

De betekenis van dit onderzoek ligt in drie aspecten. Ten eerste kan de relatie tussen systeemdenken en operationele benaderingen worden geïnterpreteerd via de relatie tussen gemeenschappelijkheid en individualiteit, die de oorsprong van de diversiteit van HUL onthult. Ten tweede richt het onderzoekswerk zich op kwesties in het traditionele “3+2”-paradigma, zodat het Chinese stadsbehoudswerk kan profiteren van het onderzoeksresultaat. Ten derde is het aanpassingsvermogen van het waardensysteem van stedelijk erfgoed niet beperkt in de Chinese context; het weerspiegelt de flexibele praktische betekenis zolang de culturele kenmerken en etnische identiteit in dit waardesysteem worden geïnterpreteerd.

1 Introduction

1.1 Research background and research motivation

After the 1980s, the Chinese government pushed the system of famous historic and cultural cities in the implementation of the *Cultural Relics Protection Law of the PRC*, so that monuments, cultural relics, and historic cities would be protected through renovation, restoration, and reconstruction. Nevertheless, there exist a series of issues at the theoretical level in the urban heritage conservation in contemporary China.

First, there exist vague definitions regarding heritage and value classifications in Chinese legislations. The *Cultural Relics Protection Law of the PRC* enacted in 1982 was respectively revised in 2002, 2007, and 2017; new categories of historic cities, towns, villages, and neighbourhoods have been added under the item of immovable cultural relics. However, the concept of immovable cultural relics in the Chinese context is translated as *wenwu* (文物) which simply means cultural property, which cannot reflect the connotation of urban heritage effectively. Chinese scholar Cai Dafeng deems that the definitions formulated in the Chinese legislation and UNESCO World Heritage Convention are not completely the same; the connotation of the former is fundamentally consistent with the latter. In order to find the commonalities, the concept of cultural relics is defined as valuable witnesses left over from the history of social and natural development.[1] This pursuit of commonality coordinates the relation between Chinese legislation and UNESCO World Heritage convention. However, the immovable cultural relics is a static concept which cannot be used to reflect the dynamic characteristics of historic cities, towns, blocks, and villages.

1 Museology of Fudan University (2000) *The Compilation of Cultural Heritage Study* (文化遗产研究集刊). Shanghai: Shanghai Guji Press, p. 1.

TOC

Due to the conceptual ambiguity of heritage, type enumeration is used to define heritage in relevant documents: "heritage sites are immovable heritage (aboveground, buried or submerged) that includes all officially listed protected sites at national, provincial and county levels, as well as places that have been registered as a result of national survey and inventory campaigns."[2] The protection law simply uses historic, artistic, and scientific values as the value criteria to evaluate ancient cultural relics, and ancient tombs;[3] the *Cultural Relics Protection Law* does not offer a detailed explanation regarding heritage definition and value.

Second, since the *Chinese Cultural Relics Protection Law* was officially enacted in 1982, it has lacked a native theoretical construction related to heritage value. Modern Chinese scholars and practitioners commonly regard a values-centred methodology as the foundational approach toward heritage conservation, a phenomenon largely attributed to the popularity of the World Heritage system and the formulization of various conservation charters.[4] The category of Chinese heritage value is essentially established based on the controversial "3 plus 2" paradigm. Basic categories include historic, artistic, and scientific values, which are mentioned in the national legal documents. The additional categories cultural value and social value were recently added in the China Principles.[5] Though most Chinese experts approve of the "3 plus 2" paradigm, two experts Lv Zhou and Guo Zhan, related to ICOMOS China, hold opposing views. Lv identifies the limitations of the three major values and the increasing awareness of the need to officially identify and define cultural and social values.[6] However, he does not propose a clarification on the ambiguous definitions of the two new value categories. Guo, accordingly, criticizes the concept of cultural value as redundant, because all values pertaining to heritage are in fact

2 ICOMOS China (2015) *Principles for the Conservation of Heritage Sites in China*. Beijing: Cultural Relics Publishing House, p. 58.

3 In the principle, historic value is the value that a heritage site has as a witness to history; artistic value is the value that a heritage site embodies of the artistic creativity, aesthetic preference, and representative style of a particular period in history; scientific value is the value that a heritage site manifests as physical evidence of human creativity and achievements in science and technology, as well as the creative process itself.

4 Li, K. (2019) The Contemporary Values behind Chinese Heritage. In Avrami, E; Macdonald, S.; Mason, R. (eds) *Values in Heritage Management: Emerging Approaches and Research Directions*. Los Angeles: The Getty Conservation Institute, p. 99.

5 Social value is the value that society derives from the educational benefit that comes from dissemination of information about the site, the continuation of intangible associations, as well as the social cohesion it may create. Cultural value is primarily derived from three types: i. diversity, as revealed through ethnic culture, regional culture; ii. nature, landscape and setting of a site that have been imbued with cultural attributes; iii. a site's intangible heritage.

6 Li, K. (2019) The Contemporary Values behind Chinese Heritage. In Avrami, E; Macdonald, S.; Mason, R. (eds) *Values in Heritage Management: Emerging Approaches and Research Directions*. Los Angeles: The Getty Conservation Institute, p. 101.

cultural, and presenting cultural value in the context of cultural diversity, traditions, and intangible heritage risks overlap with that of social value.[7] The above views show that not only do the three major values have limitations, but the other two value classifications also have obvious disputes and defects.

In this regard, Cai Dafeng also questions the rationality of the three major values. He considers that cultural relics reflect the relationship between witnesses and the value of the witness. Cultural relics have material value and the value of the witness, here the latter is also called the value of carrying and spreading information. As time goes by, the material value fades out and the value of carrying and spreading information occupies the main position. Therefore, Cai attributes the three values listed in the current protection law to the information value.[8] The value of the witness proposed by Cai basically equals to the evidential value in the document *Conservation Principles Policies and Guidance* of Historic England, because evidential value is the value deriving from the potential of a place to yield evidence about past human activity.[9] But Cai recognizes the historical value only from the perspective of art history and history of techniques, and finally came to the conclusion that the concept of history overlaps with art history and history of techniques, so he suggests the historical value should be replaced by the social human value. According to Austrian art historian Alois Riegl's view, the technique reflected by monuments of a certain historic era belongs to the category of historical value; artistic value is aesthetic appreciation given to people, and belongs to the present-day values. Historical value is the value deriving from the ways in which past people, events and aspects of life can be connected through a place to the present,[10] it establishes a firm association between past and present. Regardless of past and present, historical value is an indispensable value content. The value of science and techniques can be classified as the category of historical value.

As far as a historic city is concerned, a city is a dynamic complex which consists of many different interrelated and interactive elements. It is unreasonable to assess urban heritage by using a single value category. The evaluation of urban heritage values needs to develop a theoretical framework to represent the relationships between different elements. So far there is still lack of systematic study on urban

7 Ibid., p. 102.

8 Museology of Fudan University (2000) *The Compilation of Cultural Heritage Study* (文化遗产研究集刊). Shanghai: Shanghai Guji Press, pp. 2-5.

9 Historic England (2008) *Conservation Principles Policies and Guidance-for the sustainable management of the historic environment.* London: Historic England, p. 72.

10 Ibid., p. 72.

heritage values in Chinese academic circles. Therefore, it is necessary to construct the value system of urban heritage by adopting a scientific method.

Third, related studies on heritage confuse the relationship between effect and value. In the past 40 years, both the revision work of the legislation implemented by Chinese government and heritage conservation practices have expanded from a single monument unit to an entire historic city. Therefore, the content of famous historic and cultural cities, towns, and villages has been added in the national legislation. The legislation then promotes related practice around the topic of famous historic and cultural cities, towns, and villages. These practices are closely linked with function and tourism development and are titled with their mode of adaptive protection and utilization. If economic growth is seen as a snowball that gathers bigger and bigger, then the protection and utilization of the historic city are a part of this snowball. It represents how most places of heritage value are used, or are capable of being used…heritage as a learning or recreational resource, or as a generator of tourism or inward economic investment…utility, market values, and instrumental benefits.[11]

The Chinese government first promoted the urban real estate by investing in urban infrastructure, and Chinese real estate drove the development of more than 40 industries, with an input-output ratio of 1:8.2. Cultural relics in urban setting and historic cities are protected to cope with the negative impact from the exploitation of real estate. They are renovated, restored, interpreted, and finally are displayed through market needs. This process will inevitably stimulate the development of heritage tourism and other related industries.

In this context, in the early 21st century, Chinese academia's study on heritage protection and utilization mainly focuses on the economic benefits of heritage. A prevailing view in contemporary China holds that financial and human resources invested in cultural relics protection work, even the land area occupied by ancient architectures and archaeological sites, all can be measured by the money in the management.[12] The value study first aims at discussing the informative value of heritage from object attributes, it then turns to explore the interests and needs of value subjects. One view is that value evaluation of architectural heritage should not only be restricted to the recognition of the nature, attribute, and structure of the heritage object, but should also focus on whether it satisfies human benefits and

11 Historic England (2008) *Conservation Principles Policies and Guidance-for the sustainable management of the historic environment*. London: Historic England, p. 27.

12 Xue, L. (2013) *The Introduction of Chinese Architectural Heritage Conservation* (建筑遗产保护概论). Beijing: China Architecture Publishing, p. 12.

requirements. The criterion for judging the value of architectural heritage is to see to what extent it meets human needs.[13] If the value composition is analysed from the perspective of human's existence and development, functional value, environmental value, aesthetic value, cultural value, and social value are naturally proposed.[14] This viewpoint apparently concerns the human needs but neglects the worth of inherent quality of stating relevant information, which is irreconcilable with the idea of conservation. As Finnish conservation architect Jukka Jokilehto points out, the idea of conservation has been based on the recognition and protection of monuments and sites that represent specified qualities.[15] Therefore, interpreting the urban heritage values is the basis of protecting urban heritage.

In recent years, the economic value realization of heritage has been a research topic in Chinese academia. Chinese scholar Xu Jinliang sees heritage as an economic resource, in the *Valuation of Historic Buildings* (历史性建筑估价) he uses principles of economics to explore the cost of heritage conservation and the benefits of heritage utilization through input-output efficiency; scarcity and non-renewability of heritage will be considered in the market operation and management, the price formed by the small supply of heritage and the large social needs realises the economic benefits of heritage conservation and utilization. The economic value of heritage based on the principles of economics reflects social needs and considerations of the economic benefits of heritage conservation and utilization, which should be within the area of heritage economics. It can be said that the conservation and utilization of Chinese heritage has become an industry boosting economic growth. However, the problem is that the economic benefit promoted by the tourism industry is treated as a derived concept of heritage value, which is confused with the relationship between effect and value, because utility and market values, and instrumental benefits are different from heritage values in nature and effect.[16]

The research background mentioned above reflects an urgent issue to address: how to construct the value system of urban heritage in the context of contemporary

13 Jiang, N., Wang, J., (2016) *Comprehensive Evaluation of Conservation and Adaptive Reuse of Modern Architectural Heritage* (近现代建筑遗产保护和再利用综合评价). Nanjing: Southeast University Press, p. 116.

14 Ibid., p. 117.

15 Jokilehto, J. (2010) The idea of conservation an overview. In Falser, M.S. (ed) *Conservation and Preservation Interactions between Theory and Practices in memoriam Alois Riegl (1858-1905)*. Firenze: Plistampa, pp. 21-22.

16 Historic England (2008) *Conservation Principles Policies and Guidance-for the sustainable management of the historic environment*. London: Historic England, p. 27.

China? It serves the main question of this study. The main question is investigated through the following several sub-questions:

1 Why is the urban heritage selected as the research scope?
2 Which method is selected to construct the urban heritage values?
3 How is the complexity of urban heritage values revealed through the research method and related case study?
4 Can new values be proposed based on this study?
5 What kind of result does the study ultimately reflect? What is the significance of study both in the theoretical and practical sense?

1.2 Fixing urban heritage as the research scope

The foundation of human existence and development is the natural environment endowed by the earth; human existence and development are represented in the various creations and experiences in the form of material and spiritual aspects. Those meaningful natural environments, as well as the material and spiritual legacy created by people are handed down from generation to generation. In related conservation documents and charters, they are generally defined as the natural heritage, cultural heritage, and mixed heritage.

Not all legacy from the past can become heritage, for all natural, cultural, and mixed heritage need to be selected and constructed. This selective construct is bound to be influenced by human knowledge, background, cognitive ability, and social values. Thereby heritage is understood as all inherited resources which people value for reasons beyond mere utility.[17] In the *Montreal's Heritage Policy*, heritage is defined as any asset or group of assets, natural or cultural, tangible or intangible, that a community recognizes for its value as a witness to history and memory, while emphasizing the need to safeguard, to protect, to adopt, to promote and to disseminate such heritage.[18]

As the witness of history and memory, heritage means a scarce resource. The inheritance of scarce resource also indicates the temporality of the heritage. Human

17 Historic England (2008) *Conservation Principles Policies and Guidance-for the sustainable management of the historic environment.* London: Historic England, p. 71.

18 Ville de Montréal (2005) *Heritage Policy Montréal.* p. 31.

recognition, utilization, and conservation of heritage may change over time due to the evolution of material and technique, or change for the reason of uncontrollable objective factors from the external environment, because heritage affected by geographic and climate variation are especially sensitive and fragile. Additionally, changes in social and cultural context such as religion, or ethnicity also play an important role in shaping the heritage value. Therefore, heritage is a dynamic concept. This temporal dynamic not only exists in the construct period of heritage, but is also reflected in the forming period of historical relics, which represents the continuity of heritage. Heritage expresses the ethnical and cultural identity from its origin and context, which clarifies that heritage is a medium to convey identity information. As the human habitat, a historic city is held in common and seen as valuable by its ethnical groups or communities. Especially the concept of place forms the basis of a sense of belonging and identification, it establishes a prospect that the society undertakes or seeks its own identity.

Urban heritage is for humanity a social, cultural and economic asset, which traces back to the notion of the historic city. At the end of the 19th century, a historic city, as an operational concept, developed in parallel with the emerging discipline of urban planning. At the beginning of the 20th century, Italian urbanist and theorist Gustavo Giovannoni first used the concept of urban heritage as his theoretical basis. Inheriting the previous research results, urban heritage comprises of three main categories in the *Recommendation on the HUL*:

- *Monumental heritage of exceptional cultural value;*
- *Non-exceptional heritage elements that are present in a coherent way with relative abundance;*
- *New urban elements to be considered (for instance):*
  - *The urban built form;*
  - *The open space: streets, public open spaces;*
  - *Urban infrastructures: material networks and equipments.*

Therefore, urban heritage is a dynamic historic continuum, it is an important category of cultural heritage.

In recent years, the traditional classifications of the historic city are not able to reflect the strategy of sustainable development in the present and the future. On account of this, in 2013, the document of the Rio de Janeiro meeting brought forward the revision suggestions of Annex III of the Operational Guidelines:

- *Change the name of the existing category (Historic Towns and Town Centres) to become "Urban Heritage" to better reflect HUL approach.*

- *The category of sites is a more appropriate way of expressing the layering and attributes as laid out in the HUL Recommendation.*

- *Change the present sub-categories (towns which no longer inhabited, historic towns which are still inhabited, new towns of the 21st century) in the light of HUL recommendation.*

The concept of national famous historic and cultural cities (NFHCC) (历史文化名城) is another expression of Chinese urban heritage at the official level. The definition of NFHCC is a city with an unusual wealth of cultural relics of high historical value and major revolutionary significance, it may be famous city of historical and cultural value, which shall be subject to the approval and announcement of the State Council.[19] The enactment of NFHCC reflects the conceptual construct and management of urban heritage of the Chinese government. A Chinese city which is awarded as the NFHCC has the following characteristics:

1 The transformation from cultural relics units to NFHCC means that the protection measurement has shifted from individual cultural relics units to the historic cities in scope. Covering diverse elements, the historic city as a whole is concerned in the protection practice.

2 Richness and variety: these are not only the dominant characteristics of NFHCC, but also the basis of understanding of the Chinese historic cities.

3 Value: this can be reflected when a city has been a political, economic, cultural, transportation centre or an important military place in history, or has gone through important historic events, or its traditional industries or major projects built throughout history have produced important influences on the development of the local place, or it is able to collectively reflect the cultural or ethnical features of local buildings.[20]

4 Integrity: the UNESCO Operational Guidelines and some national heritage regulations often use integrity for evaluating the heritage value. For example, in the *State of Canada's Natural and Cultural Heritage Places* (2016), the integrity for the evaluation of cultural resources is distinguished into two categories: commemorative

19 State Council of the PRC (2008) *Regulation on the Protection of Famous and Cultural Cities, Towns and Villages*. Chapter 7.

20 Ibid.

integrity and ecological integrity. The commemorative integrity refers to the condition or state of a national historic site when the site retained the heritage value for which it was designated.[21] China also has its own understanding of the integrity of the historic city: traditional pattern and style in a historic city should be relatively complete, even if there are no important cultural relic units in some historic areas, the clustered historic buildings truly and completely reflect the overall condition of a certain historic stage.[22]

These characteristics indicate that the NHFCC retain significant historic monuments and inherent urban fabric during their evolution, which can be associated with the aesthetic model proposed by Camillo Sitte in the Chinese context. When a historic city is recognized as urban heritage, it is a comprehensive notion due to the historicality and complexity of the city. It refers to the relations between cultural heritage, natural heritage, historic monument, historic environment, and site. Adopting urban heritage as the research scope in this study, it is necessary to rely on urban heritage to build a corresponding value system.

1.3 Selection of research method – Historic Urban Landscape

1.3.1 Development, contribution and the gap of HUL

The urban heritage, as a research carrier of value, is characterized by historic layering of values that have been produced by successive and existing cultures and an accumulation of traditions and experiences, recognized as such in their diversity.[23] As a result, it is bound to generate an urban landscape that is continuously stratified by successive historical periods. According to the *Vienna Memorandum*, those townscapes, roofscapes, main visual axes, building plots and

21 Parks Canada (2016) *State of Canada's Natural and Cultural Heritage Places*. Gatineau (Canada): p. 57.

22 Xue, L. (2013) *The Introduction of Chinese Architectural Heritage Conservation* (建筑遗产保护概论). Beijing: China Architecture Publishing, p. 165.

23 UNESCO (2011) *Recommendation on the Historic Urban Landscape*. p. 1.

TOC

types are integral parts of the identity of the historic urban landscape.[24] The concept of urban landscape enlightens people to extend the conservation scope beyond the boundary of historic cities and urban areas. The following contents summarize the development process and contributions of the HUL method.

The *Vienna Memorandum* is considered the milestone for establishing the preliminary conceptual framework of the HUL. The memorandum initially defines the HUL as ensembles of any group of buildings, structures and open space, in their natural and ecological context, including archaeological and paleontological sites, constituting human settlements in an urban environment over a relevant period of time.[25] The definition of the HUL in the memorandum exceeds the traditional terms such as historic centre and historic area commonly used in previous charters, the research object covers a wider field and landscape context.

The document of the *Workshop on New Approach to Urban Conservation in Jerusalem* (2006) advocated that cultural influential factors such as spiritual, religious, and ethnical factors should be included in the connotation of the HUL: the HUL should consider natural elements, intangible dimensions, and cultural diversity, because these factors are all parts of a historic city.[26]

The *Regional Seminar on Historic Urban Landscapes in Central and Eastern Europe* (2007) in St. Petersburg adopts the spirit of the Vienna Memorandum and Jerusalem document, the document emphasizes how the HUL is a concept that draws from experience in urban conservation and cultural landscapes and seeks to encompass values relating to natural elements, intangible heritage, authenticity and integrity, and genius loci…and alongside intangible cultural heritage- it subsumes associative values.[27]

The document of the St. Petersburg Conference stresses that "the importance of understanding urban morphology and historic urban landscapes in historical-geographical terms that embrace town planning, building fabric, land and building utilization" and the HUL should be seen as a "continuous past-present-future cultural process that incorporates intangible values."[28]

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24 UNESCO (2005) *Vienna Memorandum on "World Heritage and Contemporary Architecture-Managing the Historic Urban Landscape"*. article 25, p. 4.

25 Ibid. article 7, p. 2.

26 *Workshop on New Approaches to Urban Conservation*, 2006, Jerusalem, Israel

27 Conference of Countries of Eastern and Central Europe on "*Management and Preservation of Historic Cities on World Heritage List*", 2007, St. Petersburg, Russia federation

28 Ibid.

The text of document also includes that "the HUL as a part of an urban system, is a means to consider the ensemble of the component individual sites, the evaluation of the historic urban landscape should include a character study through urban morphology and hierarchical visual analyses."[29]

The contribution of the above documents is that the HUL is treated as a higher-level system, people explore and recognize the relationship between the different elements in this system, and find ways to protect historic cities in these interrelationships. For example, the approach proposed in the documents of St. Petersburg Conference is derived from an interdisciplinary study, with the most prominent operative method being the HUL as a tool of bringing all the individual elements. It reflects a synchronic study based on the systems thinking.

The Olinda (Brazil) meeting in 2007 suggests that the landscape as part of the historical city, the city as a stratification of meanings, the acceptance of the multiple dimensions of cultural identity, the importance of integrating intangible aspects of urban culture, the recognition that a change is an inherent part of urban development, the need to consider environmental, economic, social and cultural sustainability in the process of conservation.[30] The contribution of the Olinda document is to view the HUL as a dynamic system.

The UNESCO Paris Conference in 2008 defines the HUL as "a mindset, an understanding of the city, or parts of the city, as an outcome of natural, cultural and socio-economic processes that construct it spatially, temporally, and experientially. It is as much about buildings and spaces, as about rituals and values that people bring into the city. This concept encompasses layers of symbolic significance, intangible heritage, perception of values, and interconnections between the composite elements of the historic urban landscape, as well as local knowledge including building practices and management of natural resources. Its usefulness resides that it incorporates a capacity of changes."[31] Here the Paris Conference underlines that the HUL is a mindset referring to all tangible and intangible factors, as well as diverse relations instead of simply being recognized as the material entity, however, the document of Paris Conference did not specify which kind of mindset is adopted.

29 Ibid.

30 Martini, V. (2013) *The Conservation of Historic Urban Landscapes: An Approach, Vol.1- urban conservation theories and history of the cities*. Venice: Graduate School of University of Nova Gorica, p. 69.

31 *UNESCO Expert Planning Meeting on Historic Urban Landscape*, 2008, Paris, France

In 2009, the *Zanzibar Recommendation on the Application of the Concept of the HUL in the African Context* further deepens the discussion of the HUL. The Zanzibar Recommendation confirms "the HUL initiative as an important process and mindset to develop new attitudes to conservation and comprehensive and integrated planning and its sustainability", which follows the spirit of the Paris Conference. Meanwhile, the Recommendation stresses that "the identification of the historic driving forces of cities, while anticipating their evolution, enhancing their connectivity…with focus on the continuity of the intergenerational links, the transmission of local knowledge… OUV of layered urban landscapes lies in the long tradition of the linkages between tangible and social-cultural heritage."[32] The contribution of the Zanzibar Recommendation is to emphasize the vertical linkage of HUL, which refers to the development process in the sense of time. Words such as "historic driving forces", "evolution", and "connectivity" in the recommendation reflect the diachronic study based on the systems thinking.

In 2010, the *Results of the Workshop to test the HUL approach to Baku's urban heritage conservation & development* concludes legislation, policies, economic instruments and communication tools can contribute to the conceptual establishment of the HUL, especially the latter three determine whether the management of urban heritage succeeds. The contribution of the Baku Workshop is reflected in the following two aspects: first, it acknowledges the HUL approach aims to "put these issues into an order as part of a process"; second, it underlines "the need to take account of the singularity of the context of each historic city, which will result in a different approach to management,"[33] namely it refers to the diversity of HUL method at the operational level.

In 2011, the UNESCO *Recommendation on the Historic Urban Landscape* defines the HUL as "the result of a historic layering of cultural and natural values and attributes, extending beyond the notion of historic centre or ensemble to include the broader urban context and its geographical setting."[34] The contribution of UNESCO recommendation is to formally put forward the HUL approach and identify six critical steps for implementing the HUL:

32 *Zanzibar Recommendations on the Application of the Concept of the Historic Urban Landscape in the African Context*, 2009, Zanzibar, Tanzania

33 *Result of the Workshop to test the HUL approach to Baku's urban heritage conservation & development.* 2010, Baku

34 UNESCO (2011) *Recommendation on the Historic Urban Landscape.* p. 1.

1 To undertake comprehensive surveys and mapping of the city's natural, cultural and human resources
2 To reach consensus using participatory planning and stakeholder consultations on what values to protect for transmission to future generations and to determine the attributes that carry these values
3 To assess the vulnerability of these attributes to social-economic stresses and impacts of climate change
4 To integrate urban heritage values and their vulnerability status into a wider framework of city development, which shall provide indications of areas of heritage sensitivity that require careful attention to planning, design and implementation of development projects
5 To prioritize actions for conservation and development
6 To establish the appropriate partnerships and local management frameworks for each of the identified projects for conservation and development, as well as to develop mechanisms for the coordination of the various activities between different actors, both public and private

In 2013, the World Heritage Centre held the international meeting in Rio de Janeiro and released the *Report on the Mainstreaming of the methodological approach related to the Recommendation on the HUL in the Operational Guidelines*. The report of Rio de Janeiro considers "bringing forward knowledge and planning tools to address HUL scope and breadth by using and innovating research study formats and contents, to include mapping the attributes and values that relate to the heritage… also to explore and refine the practices addressing impact studies to include the visual, structural and functional integrity, and for the visual considering views, axes, panoramas and silhouettes."[35] The report specifically indicates that "applying and innovating around regulatory systems that embrace the holistic constructs of HUL and the components parts" and "employ the HUL approach to improve application of the aspects of authenticity as qualifying conditions of heritage sites to convey their significance over time and to secure and sustain their significance within the integrated model of sustainability that includes environments, economy, society, with culture as a permeating aspects."[36] In terms of above six critical steps, the contribution of the Rio de Janeiro is to transform the HUL concept into a series of operative methods.

35 UNESCO (2013) *Report on the International World Heritage Expert Meeting on the Mainstreaming of the methodological approach related to the Recommendation on the HUL in the Operational Guidelines*. Rio de Janeiro, Brazil

36 Ibid.

The concept of the HUL has been constructed over the past several years since the Vienna Memorandum was initially issued in 2005. The core idea of the HUL is interpreted in the *Shanghai Agenda* (2015) that "the HUL does not refer to a heritage category to be protected, but rather to a perspective and an approach, which can be applied to deal with a balanced and sustainable relationship between the urban and natural environment, between the needs of present and future generations and the legacy from the past. HUL is a tool to understanding the integrity of urban heritage values based on the recognition of the layering of values existing in any city as the result of human presence through history, recognizing both the needs of historic environment and those of modern urban spaces and architecture."[37] The key word layering is the essential reason in the conceptual construct of the HUL, regardless of whether the HUL is understood as material entity or mindset. It covers the continuity between nature and tangible culture, and the diversity of intangible culture related to it. Not only is the continuity of urban morphology in different periods and corresponding architectural style encompassed, but the urban landscape composed of layering and the urban heritage values is as well. The HUL indicates that urban heritage is not represented as a continuous whole in the spatial structure, more importantly, it is also a temporally continuous diachronic whole. Acceptance of change as an inherent part of the urban condition depends on the continuity of diachronic structure.[38]

In view of the above background, the concept of the historic urban landscape is proposed to cope with the conflict between urban development and urban conservation, so as to promote the sustainable development of historic cities in the future. Historic urban landscape is not only an academic term, but also is treated as a research method and is expected to be put into practices and management. After the publications of the Vienna Memorandum and the HUL Recommendation, the HUL concept has attracted the attention of Chinese academia in recent years. For example, PhD thesis *Cohesion and Continuity: Tangible Elements of HUL and related Issues* (**黏聚和连续性：历史性城市景观有形元素及相关议题**) (Gong Chenxi, Tsinghua University, 2011), PhD thesis *Concept and Conservation Method of HUL within the Framework of World Heritage* (**世界遗产框架下历史性城市景观的概念和保护方法**) (Sun Yan, Tsinghua University, 2012), PhD thesis *Anchor and Stratification of HUL* (**历史性城市景观的锚固与层积**) (Liu Yifei, Tsinghua University, 2017). All these research results are analysed from the physical attribute of HUL. UNESCO World Heritage Centre promotes the HUL project at Tongji University in Shanghai,

37 UNESCO, WHITRAP (2015) *Shanghai Agenda for The Implementation of UNESCO Recommendation on Historic Urban Landscape (HUL) in China*. p. 3.

38 Martini, V. (2013) *The Conservation of Historic Urban Landscapes: An Approach, Vol.1- urban conservation theories and history of the cities*. Venice: Graduate School of University of Nova Gorica, p. 70.

and expects to apply the HUL to Chinese heritage conservation. However, it lacks the follow-up studies after the declaration of the *Shanghai Agenda.* Therefore, currently there is neither deep research result of HUL from the perspective of mindset, nor systematic study of urban heritage values based on the mindset of HUL.

The implementation of the HUL requires an overall method connected with interdisciplinary study among different research fields. Specifically, it not only adopts a comprehensive approach to urban planning and heritage conservation, but also requires multidisciplinary cooperation to solve the various values and issues that constitute the cultural system. There is a close correspondence between the systems thinking and the integrated approach, the systems thinking concerns the situation that may generate the butterfly effect. Relevant issues are needed to be coordinated by means of an integrated approach; multidisciplinary participation is the application of the systems thinking and integrated approach in the management of the historic city.

It can be seen that the HUL is an approach based on the systems thinking. All above contributions will definitively guide this study to continue the understanding of the HUL method at the level of systems thinking. In fact, in terms of system theory there are two conditions in the timeline: structural analysis under the synchronic condition refers to the grasp of the cross-section of the system; dynamic analysis, on the other side, is manifested as a concern for the behaviour pattern of the system. Structural analysis and dynamic analysis are called synchronic study and diachronic study in architectural typology and urban morphology. Systems thinking is highly relevant to the HUL concept when combining these two analysis approaches. Therefore, the gap of research method can be manifested as the lack of deep study of the HUL at the philosophical level.

1.3.2 Applicability and necessity of the HUL in this study

As far as current HUL methods are concerned, they are all identified as specific methods on the basis of a "comprehensive and integrated approach within an overall sustainable development framework."[39] In other words, these specific methods constitute a comprehensive and integrated approach in the urban context. Since they are approaches to deal with heritage management and urban conservation, characterized by diversity and flexibility. Therefore, they can be generalized as the methods at the operational level based on the physical entity. This study is relevant to the construct of urban heritage values, reflecting intangible features. The existing

39 UNESCO (2011) *Recommendation on the Historic Urban Landscape.* p. 3.

TOC

HUL methods, regardless of the six critical steps, or specific operational measures in different contexts, they cannot be used to construct the value system of urban heritage directly, because those steps and operational measures based on the physical entity are not associated with heritage value theories.

However, the entity indicated by the HUL concept not only includes specific projects related to heritage conservation, but also points to the entity of urban heritage. It means the HUL method should be concerned with urban heritage values. In this sense, it is necessary to adopt the HUL method to construct the value system of urban heritage. The question is how to build up the link between HUL method and heritage value theories.

According to the above construct process and contributions, the HUL concept is a way of mindset. Although the systems thinking is not explicitly defined in the *Vienna Memorandum* and *HUL Recommendation*, all previous contributions embody the general system concept developed by Austrian biologist L. von Bertalanffy, as well as the complex adaptive systems (CAS) created by American scientist John H. Holland.[40] Consequently, based on the duality of the HUL concept, we can explore the joint point in the HUL method that is related to value theories and categories, so as to fill the gap between the former value theories and the HUL study. In this case, the HUL method interacts with the value theories, in other words, the HUL method at the level of mindset is applicable to the construct of urban heritage values. Accordingly, interpreting the HUL method becomes an important precondition of serving the construct of value system of urban heritage.

40 Gunderson, L., Holling, C. (2002) *Panarchy: Understanding Transformations in Human and Natural Systems.* Washington D.C.: Island Press.

1.4 Development of heritage value theories and value structure

The heritage value theory is the basis for building the urban heritage values. The origin of the study of heritage value can be traced back to the theoretical debate between stylistic restoration represented by Eugène Viollet-le-Duc and anti-restoration represented by John Ruskin in the second half of the 19th century. The debate not only made European heritage conservation firmly established based on authenticity, but also offered background knowledge for the value theory proposed by Austrian art historian Alois Riegl.[41]

Riegl distinguished two categories, memorial values and present-day values in the sense of time: memorial values reflect the past in a way that people feel the past, whereas present-day values reflect the understanding of the "now", in this context "now" reveals a dynamic connotation that time always goes forward.[42] Memorial values include age value, historical value, and intentional commemorative value; present-day values include use value and artistic value.[43]

In the 1980s, English conservation architect Bernard Feilden proposed the evaluation system, which is separated into three categories: cultural values, emotional values, and use values (contemporary socio-economic value). According to different conditions, the cultural values are further distinguished as the ontological value based on identification, the artistic or technological value based on research, and the scarcity value based on statistics.[44] He concentrated his interest on the relation between historical buildings and other social factors. In his value classification, historical buildings are incorporated into a larger social system, the social-economic value is recognized as the use value, thus the category of use value expands from function to social fields. Feilden's view has an important impact on Chinese heritage conservation, there has been a trend towards viewing the economic benefits of heritage as a subcategory of heritage value.

41 Glendinning, M. (2013) *The Conservation Movement: A History of Architectural Preservation; antiquity to modernity*. London: Routledge, pp. 140-142.

42 Ibid., pp. 141-142.

43 Riegl, A., Bacher, E. (ed) (1995) *Kunstwerk oder Denkmal? Alois Riegls Schriften zur Denkmalpflege*. Vienna: Böhlau, p. 25.

44 Feilden, B. (2003) *Conservation of Historic Buildings*. London: Routledge, viii.

In the 1990s, Russian scholar O. I. Prutsin summarized the research results of European heritage conservation, combined with conservation works of historical buildings in Russia. He argued that the significance determined by related elements of historical buildings should be clarified on the basis of scientific classification. Intrinsic value can be attributed to the commemorative significance (historic, architectural aesthetic achievement, and structural characteristics); extrinsic value mainly refers to the context of urban planning and the influence of surroundings on historical buildings (architectural and historical environment, value of urban planning, value of vegetation or landscape architecture ect.).[45] The value interpretation must be placed in the established evaluation system of historical buildings. Value categories include historical value, value of urban planning, architectural aesthetic value, artistic-emotional value, value of scientific restoration, and functional value.

At the beginning of the 21st century, heritage value theory has been further expanded and given new connotation in Europe. The *Historic Buildings and Monuments Commission for England* in the *Conservation Principles Policies and Guidance* indicates that "utility and market values, and instrumental benefits, are different from heritage values in nature and effect…the high-level values range from evidential to communal value; evidential value derives from the potential of a place to yield evidence about past human activity; communal value derives from the meaning of a place for the people who are related to it, or for whom it figures in their collective experience or memory."[46] Thus, it can be seen that the social-economic value applied to historical buildings in Feilden's theory belongs to utility and instrumental benefits.

In the document, the evidential value is dependent on the inherited fabric of the place, the communal value is derived from people's identification with the place.[47] These views not only place the recognition of heritage values on the basis of authenticity and integrity, but also build up a link with cultural identity through places. Hence, evidential value and communal value establish connections with their sub-categories: evidential value is the essence of historical value; communal value is the essence of aesthetic value. Communal value is not merely represented by means of the aesthetic value, it also needs commemorative and symbolic values to reflect the meanings of a place. Likewise, the communal value is accomplished by the social value generated by the resonance between people and place, as well as the spiritual value generated by people's faith and worship.

45 Prutsin, O.I., Han L. (translator) (1997) *Architectural and Historical Environment* (建筑与历史环境). Beijing: Social Sciences Academic Press China, p. 42.

46 Historic England (2008) *Conservation Principles Policies and Guidance-for the sustainable management of the historic environment.* London: Historic England, pp. 27-31.

47 Ibid., p. 27.

The understanding of heritage value in the *Conservation Principles Policies and Guidance* means the quality of places is attached by people. This intrinsic quality of places should be understood as the intrinsic value from the perspective of heritage conservation, because historical places or sites are assumed to possess objective intrinsic value that do not change over time and disconnected from various peoples' interests in the present.[48] Since the intrinsic quality of the place is embodied through historical value and aesthetic value, the quality of place has the meaning of evidential value. The persistence of intrinsic value might be concerned with "the fear of proliferation of meaning;"[49] English heritage scholar Sophia Labadi argues if values are considered to be intrinsic, the significance of a place depends on the professionals' identification process,[50] which is the judgment of communal value by experts.

A series of value terms proposed by previous scholars are included in the categories of evidential value and communal value. Their research objects are focused on cultural relics, historical monuments and buildings; their understanding of value belongs to the sub-categories of evidential and communal values. The category of intrinsic value proposed by Prutsin belongs to the intrinsic quality of a place, which reflects the meaning of the evidential value; meanwhile, his understanding of artistic-emotional value involves the meaning of the communal value. It can also be that the value of witnesses developed by Cai is basically equal to the evidential value and intrinsic value. Thereby this dissertation constructs the theoretical framework of urban heritage based on the above theories, and clarifies relations between different value theories and categories. It also explains that the heritage value of Suzhou is the historical value in terms of the evidential value, as well as the aesthetic value and other values associated with places based on the communal value.

Evidential values must be proven through historical and aesthetic values, communal values are closely bound up with historical (particularly associative) and aesthetic values,[51] which is obtained through people's perception and experiences of a place. Especially for aesthetic value, it requires people to possess a certain aesthetic principle and preference to perceive its existence. Even if those people are without professional aesthetic training, their emotions will be affected by the beauty

48 Labadi, S. (2013) *UNESCO, Cultural Heritage, and Outstanding Universal Value: Value-based Analyses of the World Heritage and Intangible Cultural Heritage Conventions*. Lanham: AltaMira Press, p. 12.

49 Byrne, D., Brayshaw, H., and Ireland, T. (2001) *Social Significance: a discussion paper*. Hurstville (Australia): NSW National Parks and Wildlife Service, p. 57.

50 Labadi, S. (2013) *UNESCO, Cultural Heritage, and Outstanding Universal Value: Value-based Analyses of the World Heritage and Intangible Cultural Heritage Conventions*. Lanham: AltaMira Press, p. 12.

51 Historic England (2008) *Conservation Principles Policies and Guidance-for the sustainable management of the historic environment*. London: Historic England, p. 31.

originated from the art power. English philosopher Roger Scruton cited Kant's view that "the sense of beauty is a distinct and autonomous employment of the human mind comparable to moral and scientific understanding. Kant divided the mental faculties into theoretical, practical and aesthetic (understanding, practical reason, and judgment).[52] Aesthetics is not only the constituent part of philosophical category, but also becomes the methodology for judging artistic value. Inheriting Kant's theory, Scruton's monograph *The Aesthetics of Architecture* provides the theoretical basis for recognizing the aesthetic value of urban heritage: the urban heritage of Suzhou is concerned as the product of art, aesthetic value is evaluated in accordance with artistic works.

Value structure refers to the interdependence relationship, which is derived from people's understanding of value categories based on the systems thinking. In other words, the relation between part and whole is explained according to the value types of heritage. Since Riegl's contribution related to the value of monuments has been widely acknowledged, scholars such as Feilden and Prutsin are devoted to the study of heritage values, a series of value categories have been further defined and interpreted in the document of *Conservation Principles Policies and Guidance*. Just as their research scopes are different, the value categories also reflect some specific characteristics. For example, the value of scientific restoration developed by Prutsin implies the diachronic feature of urban heritage. The *Conservation Principles Policies and Guidance* not only treats the evidential value and the communal value as the value categories of the high-level, but also represents the hierarchical characteristics of heritage value based on the interpretation of secondary value categories.
All these lay the foundation for the construct of the urban heritage values. Nevertheless, these value carriers are mainly focused on the monumental heritage with exceptional cultural value including buildings, building groups, archaeological sites. Values reflecting the integration between building groups and the associated environment, as well as the description of natural heritage by using the expression of natural features, natural scenic areas, all come from the perspectives of history, aesthetics, art, and science, but do not reveal the interaction between monuments and environment from the holistic perspective. It indicates that the existing value categories and evaluation system is essentially a static structure. Most of them can only be appropriate for the evaluation of monuments without reflecting the value of the large-scale urban fabric or urban environment. Therefore, it is necessary to put forward a holistic value category to complete the integrity of the value structure of urban heritage under the dynamic view of space and time.

52 Scruton, R. (2013) *The Aesthetics of Architecture*. Princeton: Princeton University Press, p. 1.

1.5 Case selection of Suzhou

1.5.1 Reflection on Chinese cities in the UNESCO World Heritage list

In 1972, the *World Heritage Convention* adopted by UNESCO in Paris put forward the concept of world heritage for the first time. The Outstanding Universal Value (OUV) which is closely related to world heritage was placed at the centre of the convention and has since had guiding significance for heritage evaluation. The OUV is not so much an academic terminology as it is a control mechanism, for OUV must be expressed as an intrinsic quality that has been scientifically evaluated and confirmed to be prominent.

Intrinsic quality is the key factor of a place, which represents the aesthetic quality of a place through its historical value, aesthetic value, and other values related to the place. And these values must be interpreted with the support of historicality of urban heritage. Historicality is a dynamic notion that urban changes in space synchronize with the historical process on the time level. Value recognition of urban heritage is an integral analysis which considers the interaction among different tangible and intangible elements in an evolutionary stage (politics, religion, economy, ethnical group, nature, etc.). Not only the architectural style, spatial composition and urban fabric, but also cultural factors exert a continuous influence on urban development making the heritage value more complicated. At this point, urban aesthetic value in conservation planning should not be restricted to the physical form, architectural detail and definition of spatial qualities, but rather also a variety of other values and conditions that together go into making up the city must be taken into consideration.[53] In a sense, the value of urban heritage depends on diverse interactions instead of a single driving force in the historical evolution.

The World Heritage Committee uses the OUV standard to evaluate nominated Chinese cities: the old town of Lijiang, "from the 12th century onward, was an important goods distribution centre for trade, cultural and technological exchanges over the past 800 years resulted in the particular local architecture, art, urban planning and landscape, social life, customs, arts and crafts and other cultural

53 King, J. (2000) Aesthetic in integrated conservation planning: a consideration of its value. In Algreen-Ussing, G. (ed.) *Urban space and urban conservation as an aesthetic problem: lectures presented at the international conference in Rome*. Rome: L' Erma di Bretschneider, pp. 23-25.

TOC

features."[54] The ancient city of Pingyao is "an outstanding example of the Han Chinese city of the Ming and Qing Dynasties (14th–20th centuries) that has retained all its features to an exceptional degree, it was a financial centre in China from the 19th century to the early 20th century; the townscape of Pingyao excellently reflects the evolution of architectural styles and town planning in Imperial China over five centuries."[55]

Nominated Chinese historical cities such as Lijiang and Pingyao on UNESCO World Heritage list show that the official evaluation is devoted to reflecting the evolution process, characteristics, and significance of historical cities in ancient China. Since the 19th century, these cities, towns, and villages have hardly received external influence and evolved extremely slowly, which generally maintained the historical material elements, life and production modes of ancient times. Emerging architectural styles, land use pattern which are closely connected with the modern era, were rarely involved in the urban development over the past two centuries. Thereby the current statements and conservation practices more regard them as reborn historic containers that are dedicated to restoring the past splendor of the city on the basis of existing material fabric, which indicates the identification with past memories and emotional nostalgia. They keep a dormant state and the interaction between history and the present can hardly be seen from existing urban elements. After Lijiang and Pingyao were registered on the World Heritage list, their urban functions only serve the tourism industry; the local inhabitants' lives are largely affected by the heritage tourism, they can either earn their living by tourism or move away. The Chinese historical cities listed in the World Heritage focus on the background that reflects the splendor of the city in a specific period. Although the enrollment of Kulangsu Island in 2017 successfully attracted international scholars' attentions to the Chinese modern built heritage,[56] in view of the short development history, the Kulangsu Island is still not qualified to serve as a typical case to connect the ancient and modern in the studies of Chinese urban heritage. The continuous association from ancient to modern not only reveals the significance of historic sites, but also, more importantly, contemporary interventional influence, interactions between various factors and persistent changes in a historic city are given enough concern in explaining the connotation of HUL.

54 whc.unesco.org/en/list/811

55 whc.unesco.org/en/list/812

56 With the opening of Xiamen as a commercial port in 1843, and Klangsu as an international settlement in 1903. According to the official OUV statements from UNESCO, Kulangsu Island exhibits in its architectural features and styles the interchange of Chinese, South East Asian and European architectural and cultural values and traditions produced in this variety by foreign residents or returned overseas Chinese who settled on the island.

In the cases of Lijiang, Pingyao, and the ancient villages of Southern Anhui, it is difficult to identify the evolutionary traces originating from the fierce social change of modernization since the mid-19th century; whereas the Kulangsu Island and the historic centre of Macao are known for their built heritage under the influence of foreign colonialism in the modern period, which reflects the cultural fusion between vernacular and overseas conditions. As the case in this study, the historic significance of Suzhou lies in its historic continuity and the city provides a great deal of historical evidence: the history of Suzhou dates from its role as the capital of the state Wu in 514 BCE; though the city experienced several considerable destructions and reconstructions, the urban site did not change and urban development did not break off. Suzhou has not only a rich variety of ancient architecture and cultural relics, but also witnesses the results generated by the interventionist modern factors rooted in the past two centuries: modern architectures, public transportation, large-scale land exploitation, changes in the canal system and the decline of inland ports, war damages and urban renewal under the context of colonial and industrial times. These are exactly the contents that Lijiang and Pingyao cannot reflect for the case of urban heritage. On the other side, compared with other Chinese cities, Suzhou is an example of a perfect integration between natural environment and planning ideas. The urban layout, fabric, and transportation are closely associated with the local natural conditions, values of urban planning, gardens and other urban elements are affected by rich canal system to a large degree. The ancient city of Suzhou possesses features that reveal the interaction and fusion between natural and cultural factors over two thousand years. Therefore, the complexity of urban heritage values and interrelation between city and nature are well interpreted through the case study of Suzhou.

European historic cities such as Prague and Vienna play a relatively harmonious role that presents the stratification attribute between past and present, well-conserved old buildings generate new values through functional transformation in order to cope with contemporary daily-lives, they do not only attract tourism. Meanwhile, the embedded historical value does not fade with time. The city, as a specific heritage that witnesses the progress of human society, establishes a dynamic dialogue through time and space. The most critical issue of urban heritage is how could we understand the relation between history and modern, what could we preserve for our future and even expect something valuable that is handed down from generation to generation. The ancient city of Suzhou does possess these precious attributes that potentially reveal the interaction and fusion between natural and cultural factors over two thousand years.

1.5.2 Advantages of the ancient city of Suzhou in an urban heritage study

According to the official statistic catalogue collected by the Chinese government in 2018, in Suzhou there are a total of 620 cultural relics units and buildings under controlled protection: 8 World Heritage sites; 33 national protection units (including 8 World Heritage sites), 60 provincial protection units, 219 municipal protection units, 308 buildings under controlled protection (FIG. 1.1). Apart from the buildings under controlled protection, all belong to heritage by designation that are registered on the list by experts.

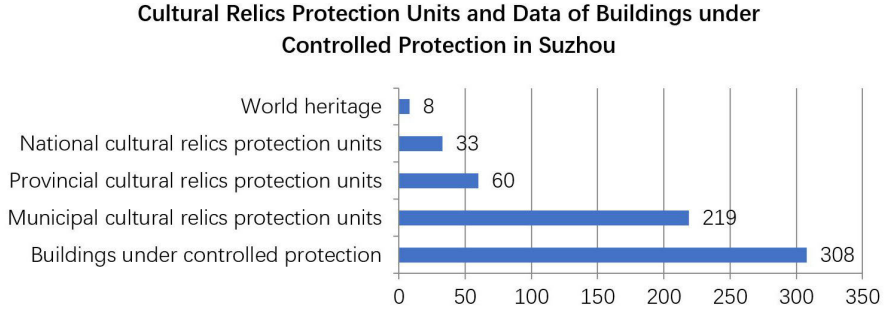

FIG. 1.1 Cultural Relics Protection Units and Data Buildings under Controlled Protection in Suzhou (Huang Huang)

In view of the numerous heritages by designation in the ancient city, a total of 93 cultural relics protection units at the national and provincial level are classified in accordance with the nature of architectural heritage developed by the Chinese architectural historian Pan Guxi (FIG. 1.2).

1. 19 residential buildings from late 16th to early 20th century (including 4 official residences, 2 former residences of celebrities, 13 residences of landlords and wealthy merchants).
2. 5 political buildings from the mid 19th to early 20th century.
3. 8 feudal ethic buildings from the late 10th to early 20th century.
4. 15 religious buildings from the early 10th to early 20th century.
5. 3 commercial buildings from the late 16th to early 20th century.
6. 2 educational buildings in the early 20th century.

7 12 classical gardens from the 11th to 19th century, the Humble Administrator's Garden, the Lingering Garden and another 8 gardens are registered on the World Heritage list.

8 10 municipal buildings and defence facilities from the late 13th to early 20th century.

9 4 ancient archaeological sites from the Spring Autumn period.

10 7 stone inscriptions.

11 8 ancient tombs.

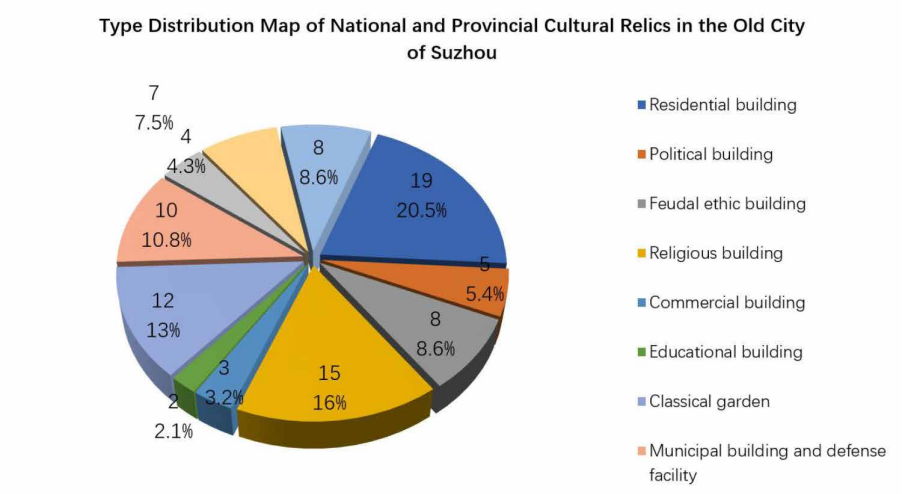

FIG. 1.2 Type Distribution Map of National and Provincial Cultural Relics in the Ancient City of Suzhou (Huang Huang)

The above quantitative analysis diagram visually shows all important cultural relics of Suzhou chronologically, it indicates the ancient city of Suzhou is a continuous evolutionary process that integrates past history with forming history. The oldest stratification dates back to the archaeological site from the 6th century BCE, then the specific urban fabric characterized by the grid canal network, and relics of ancient city walls evolved from the 6th century BCE to the 7th century, followed by a great number of traditional architectures, pagodas, and classical gardens from 10th century to 19th century. These ancient urban elements reflect the historical characteristics of urban heritage through the stratification of different periods. Those buildings constructed in the middle of or late 20th century are elements that are forming the history. There exists a sustainable period of transition when the new urban elements are introduced according to the requirements of social-economic development.

TOC

Therefore, the historical continuity of Suzhou's urban heritage and related statistics reflect how Suzhou occupies a leading position in the fields of architectural history, urban planning and heritage conservation. In particular, the ancient city of Suzhou, which has not been moved for more than 2,500 years, is not only a unique case in China, but also quite rare worldwide, because it "provide a direct indication of the characteristic features of a town of exceptional interest."[57] The superior of Suzhou indicates that the selected case has the condition to verify the value system of urban heritage. This condition is able to satisfy the verification of various value categories.

57 UNESCO (2015) *Operational Guidelines for the Implementation of the World Heritage Convention*. Paris, p. 73.

1.6 Research outline

Chapter 1 introduction serves as the fundamental layout of the study, which refers to research background, research motivation, research gaps, questions, and case selection. Based on the research background, issues existing in Chinese heritage values lead to the research motivation for the construction of a value system of urban heritage. The introduction requires researchers to consider the value carrier, research object, as well as the applicability of research method. Furthermore, this part also has to clarify the reason for the case selection.

Chapter 2 concentrates on exploiting the essence of research method, which aims to cope with the applicability of the HUL method in this study. As far as a historic city is concerned, a city is a dynamic complex which consists of many different interrelated and interactive elements. However, the HUL at the operational level cannot directly be associated with heritage value theories. At this point, the idea of system theory as the philosophical framework of the HUL method is adopted, the HUL is interpreted as a method of spatial-temporal scale based on two aspects: material basis and scientific basis. The essence of the HUL method under the philosophical framework indicates that the spatial-temporal scale reflects the unity between synchronic study and diachronic study. On the other side, the scientific basis of HUL implies an innovative inheritance of multidisciplinary research approaches. Therefore, the HUL method at the philosophical level is applicable to the construction of a value system of urban heritage.

Chapter 3 is to apply the HUL method to construct the value system of urban heritage. First, based on the diachronic study, representative heritage value theories and related literature are regarded as a system, which is divided into three stages: theories in the early stage, theories in the middle stage, and theories at the present stage. In the chapter three, historical value, aesthetic value, and value of scientific restoration are sorted out based on a series of scholars' value theories, so that the similarities and differences in the discourse of the same value category are interpreted according to each stage. Additionally, the Chinese traditional aesthetics based on Confucianism and Taoism is added to the aesthetic value category so as to adapt the value assessment of urban heritage to the Chinese context.

Second, based on the synchronic study, this study takes the *Conservation Principles Policies and Guidance* of Historic England as reference and basic framework. Value categories are regarded as different system elements; interdependence of different elements reflects a hierarchical structure from two aspects: the vertical structure

between different levels of value categories and the horizontal structure between value categories at the high-level.

Third, when the synchronic and diachronic studies are applied to this study, the holistic value category which is specifically appropriate to the context of urban heritage is put forward. The holistic value category includes three subcategories: value of traceability associated with natural environment, value of urban planning associated with cultural perspective, integrated value of urban planning based on complex system theory and the scientific model of urban ecosystem.

Chapter 4 is to analyse the case of Suzhou by adopting the constructed value system of urban heritage. In this process, the HUL method plays a role of information dissemination between value object and value criteria, which contributes to the identification of urban heritage in the theoretical and practical sense. The following tables (TABLE 1.1-TABLE 1.3) can help readers grasp the contents of chapter 4.

Chapter 5 refers to the evaluation of the research results. The applicability of the HUL method includes two aspects: first, applicability of the HUL method to academic research; second, applicability of the HUL method in the Chinese context. The applicability of the value system of urban heritage lies in that it solves issues of heritage theory in contemporary China. On the other hand, the value system of urban heritage is appropriate to the similar cultural and different cultural contexts.

Chapter 6 concludes the contribution of this study to the HUL method. It not only reveals the essence of the research method of this study, but also explains the reasons for the diversity of the HUL method at the operational level. The system theory acts as the philosophical framework of the HUL method in response to the relationship between systems thinking and HUL. On the other hand, the contribution of this study is reflected in the value system of urban heritage. Based on the notion of place, the holistic value category is derived by applying the HUL method according to the intrinsic holistic characteristics of urban heritage. Therefore, the holistic value category reflects the integrity of value structure of urban heritage under the dynamic view of time and space.

TABLE 1.1 Identification of Historical Value

Value object	Historical value	Value criteria: Evidence	HUL method
Dougong (wooden brackets) of traditional wooden architecture	Dougong evolves from a structural component to a decorative component	Past evidences of a series of monumental wooden architecture (Sanqing Hall, Dacheng Hall, Quanjin Guild House)	Synchronic study: combined relationship of components of Dougong Diachronic study: the evolution of Dougong in history
The Beamless Hall of Suzhou	It is mainly manifested in technique: the possibility of engineering technology in line with the architectural historical period	Design, technical evidence: Double-heart arches, buttresses, vaults	Synchronic study: structure of arches in the historical period Diachronic study: mature period of Chinese brick arch technology

(Huang Huang)

TABLE 1.2 Identification of Aesthetic Value

Value object (representative cases)	Aesthetic value	Value criteria 1. Communal ethnical identity as the basic criterion 2. Influence of art design as the classification criterion	HUL method
Design of traditional building roof	It offers an image of birds flapping wings, which reminds people of ancient Chinese ancestors' worship of the phoenix totem	1. The collective memory of Chinese ethnical groups: it is derived from the influence of ancient Chinese astronomy 2. Design value with aesthetic quality: roof curves and eaves	Synchronic study: combination between eaves curve and roof curve Diachronic study: formation of roof curve and eaves curve
Decoration of traditional building roof	It reflects the hierarchy of the ancient Chinese ritual system	1. The collective memory of Chinese ethnical groups: the ritual hierarchy is represented by rooftop beasts 2. Design value of art work: decorative components in the shape of various rooftop beasts	Synchronic study: material, colour, and quantity of rooftop beasts Diachronic study: rooftop beasts initially originate from the waterproof components
Classical gardens	The artistic conception of harmony between human beings and nature based on scenes and emotion	Classical gardens reflect the design value associated with traditional Chinese landscape paintings	Synchronic study: diverse garden elements and layout, the layout is derived from the composition of the Chinese landscape painting Diachronic study: evolutionary process of gardens

(Huang Huang)

TABLE 1.3 Identification of Holistic Value Category

Value object	Holistic value category	Value criteria	HUL method
Double chessboard pattern of water and land	Value of traceability: 1. Based on system structure, three kinds of neighbourhoods and the layout of bridges depend on the local canals characterized by grid pattern 2. Based on system functions, the significance of double chessboard pattern includes: water transportation, flood control, fireproof, cultivation of gardens	1. System structure: hierarchical structure based on the relation between system and subsystem 2. System function: an evolutionary process that the natural environment influences the city	1. Synchronic study: double chessboard pattern of water and land and associated structure 2. Diachronic study: dynamic functions of the double chessboard pattern of water and land
Urban fabric and urban environment	Value of urban planning: 1. Value of urban planning in the pre-canal period: shape of city, setting of city gates, layout of water and land routes 2. Value of urban planning in the grand canal period: the maturity of water diversion and drainage, symmetry and unity on the basis of the urban central axis, hierarchy of urban landscape 3. Value of urban planning in the post canal period: the holistic value formed by the renovation of Ganjiang Road, the holistic value from the protection of urban fabric, and the holistic value formed by continuous urban planning in the contemporary	1. Historic significance of urban planning 2. Diverse value compositions of urban planning 3. Reasons for the value of urban planning	1. Synchronic study: the holistic value of urban planning from the perspective of the spatial layout of diverse urban elements 2. Diachronic study: continuous influence of urban planning based on human needs throughout history, which is reflected in the urban fabric

(Huang Huang)

2 Interpretation of the HUL method

Considering the contemporary multidisciplinary collaboration, people's understanding of the HUL concept is essentially a progressive development process. It was first defined as the entity concept in the article 7 of the *Vienna Memorandum*. The HUL was further understood as a mindset in the UNESCO Paris Conference in 2008. The *UNESCO Recommendation on the Historic Urban Landscape* (2011) clearly proposed the HUL method. The progressive cognition by means of interdisciplinary study reflects an important process from the entity concept to the method. The interpretation of the HUL method includes three contents: first, the urban heritage is used as the material basis of the HUL; second, the relevant disciplinary theories serve as the scientific basis of the HUL; finally, it is proved that the HUL method under the influence of systems thinking is not only the inheritance of previous research results, but also reflects the innovativeness and foresight in some degree.

2.1 Importance of the HUL concept

The HUL concept as a professional term first appeared in the document of *UNESCO Vienna Memorandum* in 2005. It was proposed because the central area of a heritage site was visually affected by the surrounding modern high-rise buildings. In order to better deal with the relationship between heritage sites and modern architecture, article 11 clearly states that the meaning of HUL goes beyond the traditional terms of "historic centres", "ensembles", or "surroundings" often used in charters and protection laws, to include the broader territorial and landscape context.[58] The HUL "is embedded with current and past social expressions and developments that

58 UNESCO (2005) *Vienna Memorandum on "World Heritage and Contemporary Architecture-Managing the Historic Urban Landscape"*. article 11, p. 2.

TOC

are place-based."[59] Not only does the HUL include tangible cultural heritage, but also intangible cultural heritage. It is essentially a complex concept that integrates subjectivity with objectivity in the philosophical sense. The visual representation of HUL plays an intermediary role on a human's perception and mind. Thereby, the connotation of HUL has transformed from the entity concept to the mindset. Its importance can be revealed as follows:

First, the importance of the HUL concept is to guide people's recognition of the authenticity and integrity of urban heritage. The authenticity of urban heritage reflects the depth of urban heritage, which indicates the truth of the information source, and layering characteristics under the diachronic condition. The integrity reflects the width of urban heritage, which reveals the structural characteristics under the synchronic condition. Both are related with each other to form the basic standard of urban heritage. As far as the integrity of the urban heritage is concerned, it refers to a concept associated with spatial integrity. First, HUL reflects the integrity in the sense of urban territory. Both the *Vienna Memorandum* (2005) and *Recommendation on the HUL* (2011) put forward "the broader territorial and landscape context" and "the broader urban context and its geographical setting". The document of Olinda meeting considers the landscape as a broad construct to extend conservation beyond the accepted boundaries of historic cities and urban areas.[60] All these statements are concerned with the boundary expression of spatial integrity. However, the spatial integrity essentially refers to a synchronic structural relation, which consists of various interconnected parts. Therefore, all documents repeatedly emphasize that HUL includes all elements of the historic city, covering not only the tangible cultural heritage, but also the related intangible cultural heritage, cultural diversity, and natural aspects. It aims to guide people's recognition of the integrity of urban heritage from the systems thinking synchronically. While the authenticity of urban heritage contains the diachronic systems thinking, it is also reflected in the document of the *Zanzibar Recommendation* (2009) that "the identification of the historic driving forces of cities, while anticipating their evolution, enhancing their connectivity…with focus on the continuity of the intergenerational links, the transmission of local knowledge",[61] which involves the associative value. The associative value is an integral part of the historical process, often confirmed as an important source of historical information and also related to the authenticity

59 UNESCO (2005) *Vienna Memorandum on "World Heritage and Contemporary Architecture-Managing the Historic Urban Landscape"*. article 8, p. 2.

60 Martini, V. (2013) *The Conservation of Historic Urban Landscapes: An Approach, Vol.1- urban conservation theories and history of the cities*. Venice: Graduate School of University of Nova Gorica, p. 69.

61 *Zanzibar Recommendations on the Application of the Concept of the Historic Urban Landscape in the African Context*, 2009, Zanzibar, Tanzania. p. 2.

of information source. The layering of human activities in urban space mentioned in the *Shanghai Agenda* can be understood as the quality criterion of recognizing the authenticity of urban heritage. In short, the authenticity and integrity reflected by the HUL concept is an objective representation of the historic city under the condition of time-space interweaving. Hence, the report of Rio de Janeiro in 2013 specifically indicates that "applying and innovating around regulatory systems that embrace the holistic constructs of HUL and the components parts" and "employ the HUL approach to improve application of the aspects of authenticity as qualifying conditions of heritage sites."[62]

Second, the importance of HUL is to understand the city in holistic terms, and it calls for an integrated approach to urban planning and heritage conservation.[63] The integrated approach under the influence of the systems thinking of HUL reflects the synergy study in a multi-disciplinary collaboration advocated by the conference documents, which is mainly manifested in "the understanding of urban morphology and HUL in historical-geographical terms…including town planning, building fabric and building utilization". It also shows that "the HUL as a part of an urban system, is a means to consider the ensemble of the component individual sites". The report from Rio de Janeiro considers "using and innovating research study formats and contents, to include mapping the attributes and values that relate to the heritage… also to explore and refine the practices addressing impact studies to include the visual, structural and functional integrity, and for the visual considering views, axes, panoramas and silhouettes."[64] From the perspective of the urban management, this multi-disciplinary collaborative study is the utilization of the integrated approach based on the systems thinking of time-space interweaving.

Third, the importance of the HUL concept is also to emphasize the spirit of place. Although HUL and cultural landscape are both on a continuum of time-space formed under the condition of sufficient time, HUL is different from cultural landscape, because it has the "genius loci embraces key components of the sustainability agenda."[65]

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62 UNESCO (2013) *Report on the International World Heritage Expert Meeting on the Mainstreaming of the methodological approach related to the Recommendation on the HUL in the Operational Guidelines*. Rio de Janeiro, Brazil, p. 6.

63 Martini, V. (2013) *The Conservation of Historic Urban Landscapes: An Approach, Vol.1- urban conservation theories and history of the cities*. Venice: Graduate School of University of Nova Gorica, p. 68.

64 UNESCO (2013) *Report on the International World Heritage Expert Meeting on the Mainstreaming of the methodological approach related to the Recommendation on the HUL in the Operational Guidelines*. Rio de Janeiro, Brazil, p. 6.

65 Conference of Countries of Eastern and Central Europe on "*Management and Preservation of Historic Cities on World Heritage List*", 2007, St. Petersburg, Russia federation

Norwegian architectural theorist C. Norberg-Schulz deems that a place not only has the external expression of space and material entities, but also geographically contains the identifiable landmark, the environmental atmosphere, and all related spiritual emotion reflecting humans' mental feelings.[66] People establish connections with the world through places, which help people gain the basis for existence and reflect the scale and significance of the living environment in the world. The spirit of the place refers to both the physical and mental aspects of the human being, corresponding to humans' spatial orientation and cultural identities. Orientation is spatial, it creates a site where the individual is located, thus gain a sense of security. Identity is related to culture, and individuals can connect their own existence with the environment by recognizing and grasping the culture in which they live so as to get a sense of belonging. This sense of security and belonging is achieved by the city providing space for living, working, traffic and leisure activities. The urban landscape is a record of the continuous process of economic prosperity, decline, innovation, and regeneration in a specific place; it definitely has a unique spirit of place. With time elapsing, the urban social spirit lies in pursuing humans' characteristics based on the influence of the local historical-geographical environment. This goal makes social individuals and groups deeply take root in this region, and obtains a historic sense of survival; this spirit and goal encourage historical comparisons, break historical limitations, and develop more integrated approaches when dealing with contemporary issues.[67]

66 Schulz, N. C. ; Shi, Z.(translator) (1984) *Genius Loci: Towards a Phenomenology of Architecture*. Taipei: Shanglin Publishing.

67 Whitehand, J. W. R. (1993) *The Making of the Urban Landscape*, *the Institute of British Geographers Special Publications Series No. 26*. Oxford: Blackwell Publishers.

2.2 Material basis of the HUL method: systematicity of urban heritage

General system theory (GST) is a science investigating general laws for arbitrarily complex arrangements— "system" —which constitute functional integrities.[68] A system is defined as a group of components or subsystems that integrate and function together in order to achieve a specific goal.[69] Therefore, a system is an organic whole with certain structure and specific functions in GST; it is composed of a series of elements that are interdependent and interact with each other.[70] A system is a description of the wholeness, the systematicity refers to the holism, which includes three aspects: elements, structure, and function. Since the scientific exploration and theory of system in the various sciences and general system theory as doctrine of principles apply to all systems (or defined subclasses of systems),[71] the concept of urban heritage is considered as a system so as to introduce the associated thinking.

2.2.1 Origin and composition of the urban heritage concept

The word "heritage" in European languages indicates the things that are passed on to future generations and the descendants of the original owners that are therefore worthy of respect. Similarly, the word "heritage" (遗产) traces back to the southern dynasties (420-589) in China, which means the familial property handed down from ancestors.[72] Such assets, as recognized by linguistics, make the concept of heritage as something obtained from one generation to the next.

The definition of heritage in modern legislation documents reflects complexity and diversity. Heritage in the *UNESCO World Heritage Convention* is simply defined as the material object which mainly refers to monuments, building groups, sites, and other expanding types. Heritage in Canadian *Heritage Policy Montreal* is defined as "any assets or group of assets, natural or cultural, tangible or intangible, that

68 Sieniutycz, S. (2019) *Complexity and Complex Thermo-Economics Systems*. Amsterdam: Elsevier, p. 1.

69 www.biologyonline.com/dictionary/system

70 Procacci, S. (2003) Holism: some historical aspect. In Benci, V. (eds) *Determinism, Holism, and Complexity*. Springer, p. 381.

71 managingresearchlibrary.org/glossary/general-systems-theory

72 Fan, Y. *Book of the Later Han*, *Biography of Guo Dan*, "丹出典州郡，入三公，而家无遗产，子孙困匮"

TOC

a community recognizes for its value as a witness to history and memory;"[73] in England, heritage is defined as "all inherited resources which people value for reasons beyond mere utility."[74] Ana Roders believes that "every resource could become listed as heritage, as long as they are held in common and deemed valuable by their communities. There is no limit to their attributes and values, only the common aim to conserve them for future generations. Heritage can refer to a variety of heritage resources, such as tangible, intangible, movable, immovable, natural, cultural, digital, analogue, urban or rural."[75]

However, heritage cannot be simply understood as the material substance or resource. Things inherited do not become heritage until they are recognized as humans' subjective feelings of motivation, volition, and desire.[76] Consequently, inheritance is related to the history, but when the historic record, regardless of physical or spiritual, is transformed into heritage, which implies a changing process of selection, society filters the heritage in terms of a certain evaluation system. In this regard, the cognition of the heritage concept appeared to be a spectrum in different research fields accompanied by diversification over past decades: Lowenthal argues that heritage is largely the result of our creative construction;[77] Smith considers heritage to be neither a "thing" nor a "site", but rather a cultural process that engages with the present;[78] heritage seems to be a discursive construction with material consequences.[79] Harvey deems the definition of heritage, not as the result of a movement or project, but as the product of a present-centred process.[80] In spite of diversification and vagueness in different fields, heritage has still been widely accepted as a dynamic process that is characterized by a social construct. The process of selection indicates that heritage is constructed by human cognition, it is an external outcome of identification.

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73 Ville de Montréal (2005) *Heritage Policy Montréal*. p. 31.

74 Historic England (2008) *Conservation Principles Policies and Guidance-for the sustainable management of the historic environment*. London: Historic England, p. 71.

75 Roders, A., Bandarin, F. (2019) *Reshaping Urban Conservation: The Historic Urban Landscape Approach in Action*. Berlin: Springer, p. 22.

76 Howard, P. (2003) *Heritage: Management, Interpretation, Identity*. New York: Continuum International Publishing Group, pp. 7-8.

77 Lowenthal, D. (1998) *The Heritage Crusade and the Spoils of History*. Cambridge: Cambridge University Press, p. 226.

78 Smith, L. (2006) *Uses of Heritage*. New York/Oxon: Routledge, p. 44.

79 Ibid., pp. 11-13.

80 Harvey, D.C. (2008) The History of Heritage. In Graham, B. and Howard, P. (eds) *The Ashgate Research Companion to Heritage and Identity*. Farnham: Ashgate Publishing, p. 20.

With the expansion of heritage types, and the different aspects of heritage involving the interpretation of history, use of nature, influence of material culture and belief, political and economic pressure, their interactions become mutual dialogues and an inseparable network.[81] Recently, heritage is generally acknowledged as the contemporary use of the past, or a contemporary product shaped by history.[82] The explanation for history, conservation for existing antiquities and old buildings, and collective and individual memories become important solutions to meet the needs of contemporary society. This includes an individual's need for social and ethnic identity and the need to provide economic resources for commoditization of the heritage industry.[83] Thereby heritage should be defined as a social product, an instrument of social development that deals with the interaction between human society and nature.

Urban heritage is the most important resource in the heritage category. The concept of the historic city was initially adopted in the urban planning before the emergence of urban heritage. In 1889, Austrian architect and urban theorist Camillo Sitte published *City Planning according to Artistic Principles*. Sitte evaluated a city on a historic continuum and that it must be understood from morphological meaning. His contribution is that a historic city is confirmed as having an appropriate aesthetic mode, which promotes the inspiration for modern urban design, consequently the urban monument and fabric in this aesthetic mode become a concrete anchor for modern design.[84] This is the first time that urban conservation has been addressed from an operational perspective.

German urban planner and architectural critic Werner Hegemann inherits Sitte's idea, he stresses the relationship between the tangible substance and the intangible void that constitute the continuity element of the city in the process of harmonious development; the city should be understood as a continuous and incremental collage, all constituent parts interact to create new spatial meaning while maintaining their identity. The significance of a city with a long history lies in the process of long-term evolution. English biologist and urban planner Patrick Geddes published his book *Cities in Evolution* in 1915; he deems that the historic city can be understood as a model that is studied to understand its functions and design

81 Tunbridge, J. E. and Ashworth, G. J. (1996) *Dissonant Heritage: The Management of the Past as a Resource in Conflict*. Chichester: Wiley, pp. 1–3.

82 Ibid., p. 20.

83 Ashworth, G. J. and Tunbridge, J. E. (1999) Old cities, new pasts: Heritage planning in selected cities of Central Europe. *GeoJournal*, (49), pp. 105–116.

84 Bandarin, F. (2012) *The historic urban landscape: managing heritage in an urban century*. Chichester: Wiley-Blackwell, pp. 10–11.

principles, and to determine management practices in consideration of collective space.[85] Since their studies on the city are based on the "figure-ground" relation of urban space, they are all the consequences drawn after exploring the urban fabric. On the basis of the former contributions, the Italian urban theorist and planner Gustavo Giovannoni put forward the prominent urban heritage theory. He argued "the connection between the elements of the urban fabric constituent a whole that is the urban context, this context is assumed to be urban heritage."[86] This kind of whole could be understood as "the complexity of the urban organism with its dual nature of place, containing monuments of great symbolic and artistic value, as well as a fabric of minor architecture, the vernacular, which is much more exposed to transition and substitution."[87]

Giovannoni's urban heritage not only represents the physical remains of the ancient, but also its values and meaning. The historic city is seen as part of a network of urban functions, not just as a model for the creation of new urban centres, as in Camillo Sitte's view, but as an area where new functions compatible with traditional urban morphology can be absorbed, the aesthetic function, the beauty of the historic city, is an element that further strengthens this role and establishes a hierarchy and dialogue between the old and modern urban forms.[88]

In practice, Giovannoni also developed an integrative planning to reasonably connect the historic city with the new urban fabric and the communication system to preserve the social structure of population.[89] More importantly, he established a crucial principle, that is to protect the holistic built environment, not just the individual monument. Its significance is to reflect the layers of time with the urban fabric, indicating that the historic city is a dynamic continuum, he clearly opposes the "dismemberment" of the relation between monument and context. He has recombined the romantic, memorial function rooted from John Ruskin's thought with Camillo Sitte's rational, model approach, which is able to integrate the range of social needs into one comprehensive view.[90] In this regard, Giovannoni's theory and practice have a profound impact on the protection of urban heritage in later period.

85 Ibid., p. 12.

86 Esposito, A. (2010) *The Cultural Heritage of Asia and Europe: global challenges and local initiatives.* Fourth ASEM Cultural Ministers' Meeting, Background Document. Amsterdam, p. 16.

87 Bandarin, F. (2012) *The historic urban landscape: managing heritage in an urban century*. Chichester: Wiley-Blackwell, p. 10.

88 Bandarin, F. (2012) *The historic urban landscape: managing heritage in an urban century*. Chichester: Wiley-Blackwell, p. 14.

89 Ibid., p. 15.

90 Ibid., p. 14.

In 2004, the European Commission presented No. 16 research report *Sustainable Development of Urban Historical Areas through an Active Integration within Towns* (SUIT). The SUIT report uses Michel Rautenberg's perspective of heritage protection to distinguish two different types of heritage: the first category is heritage by designation, which means all cultural candidates are registered, designated and listed by experts for protection after assessment; the second category is heritage by appropriation, namely, social or ethnic heritage, including landscapes, townscapes, living places, and buildings without prominent landmarks.[91] Since the heritage by designation mostly refers to historic monuments; the heritage by appropriation is generally composed of non-exceptional heritage elements, and new urban elements. The three categories are confirmed according to the SUIT report, which are also inherited in the *Recommendation on the HUL*: monumental heritage of exceptional cultural value, non-exceptional heritage elements that are present in a coherent way with a relative abundance, new urban elements (FIG. 2.1). Obviously, the SUIT report unambiguously categorized the types of urban heritage on the basis of inheriting Giovannoni's urban heritage theory.

From the systematicity of urban heritage perceived by Giovannoni to the three categories of urban heritage in the SUIT report, it indicates that urban heritage is a material system. Based on the structure and the function of system, the materiality is reflected as the sustainability of urban heritage.

91 Dupagne, A., Ruelle, C., Teller, J. (2004) *Sustainable development of urban historical areas through an active integration within towns, research report Nr. 16*. Brussels: European Commission. http://www.lema.ulg.ac.be/research/SUIT/.

FIG. 2.1 The Tiananmen Square of Beijing: monumental heritage includes the Forbidden City, Monument to People's Heroes; large-scale fabric and new urban elements are located behind the Forbidden City (Wenxiao Ma)

2.2.2 Sustainability of urban heritage

2.2.2.1 From the perspective of system structure: urban fabric serves as the basis of sustainability of urban heritage

From Sitte to Giovannoni, their theories conduct research on the urban fabric, then plan a blueprint for urban development. In the course of exploration, Giovannoni concerned the value carried by the whole of the interconnected elements of the urban fabric, and creatively proposed the urban heritage concept. Therefore, urban fabric serves as the basis of urban heritage, whereas urban heritage is the sublimation of urban fabric.

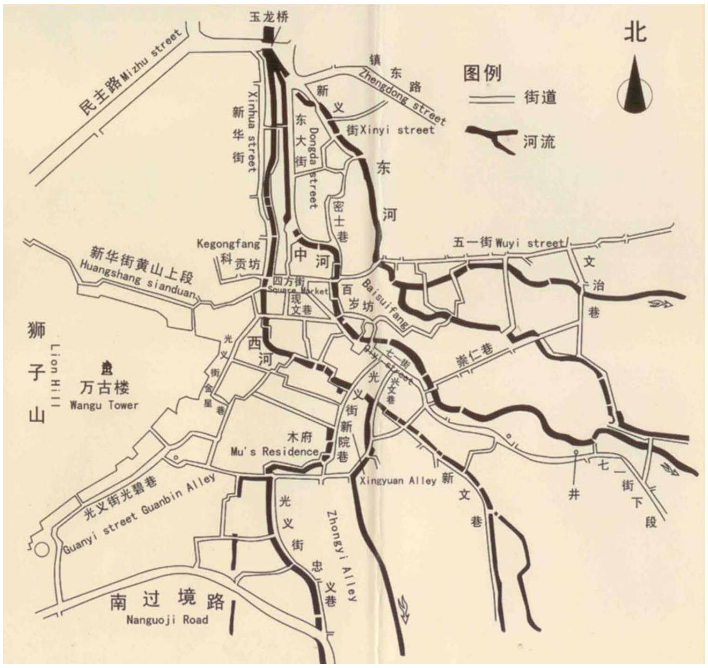

FIG. 2.2 The town plan of the old city Lijiang (Bureau of Surveying and Mapping of Yunnan Province)

Fabric means "the material substance of which places are formed, including geology, archaeological deposits, structures and buildings, and flora."[92] In this regard, the material elements that form places can be perceived, they constitute a holistic landscape in human vision. Therefore, fabric is closely associated with the notion of landscape, fabric and landscape are two different understandings of the same thing. The townscape or urban landscape in the geographical definition, according to English geographer M.R.G.Conzen's terminology, is the combination of three systematic form complexes: town plan, pattern of building forms, and land use,[93] which represents the visual appearance of a town. This definition is derived from the material elements that constitute the place, so that the definition of the urban landscape is conceived from another angle: material elements formed by town plan, building forms, and land use are the urban fabric. The urban landscape defined in the sense of geography is homogeneous with the urban fabric. Its three components are also the composition of the urban fabric.

92 Historic England (2008) *Conservation Principles Policies and Guidance-for the sustainable management of the historic environment*. London: Historic England, p. 71.

93 Conzen, M.R.G. (1969) *Alnwick, Northumberland: a study in town-plan analysis*. Institute of British Geographers Publication 27 (second revised edition). London: Institute of British Geographers, pp. 1-2.

TOC

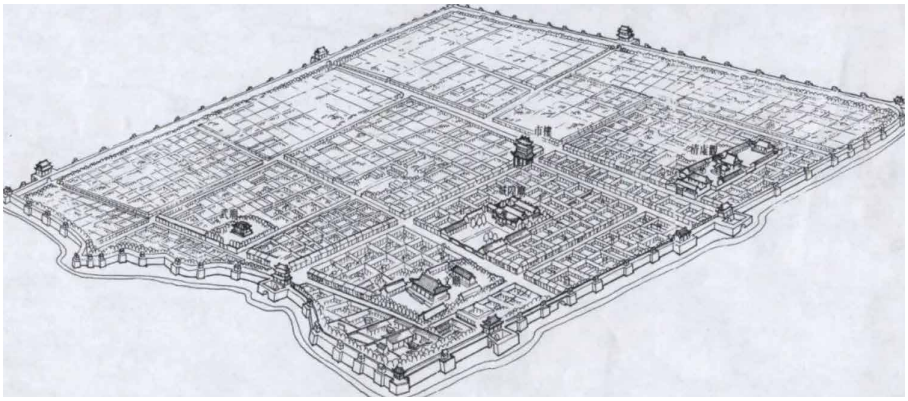

FIG. 2.3 The town plan of the ancient city Pingyao: aerial view (Qingzhou Wu)

FIG. 2.4 The town plan of the ancient city Pingyao: basic structure (Dengfei Li)

Both Conzen's and his successor of the Anglo-German school of urban morphology J.W.R.Whitehand deem that the town plan remains the dominate element and provides the framework for the other two elements: pattern of building forms and land utilization (FIG. 2.2, FIG. 2.3, FIG. 2.4). As it establishes the pattern that defines other artificial features in the town, it also forms the link between these artificial features, site, and the past existence of the town. The town plan serves as the basis of the whole urban structure, which is fundamentally composed of three element

complexes: first, streets and their arrangement in a street-system; second, plots and their aggregation street blocks; third, block plans of buildings. These three plan elements constitute a complex, constructing the core of the urban fabric. The town plan plays an essential role in shaping the urban fabric, whereas the pattern of the building forms and land use exist as the outward expression of the urban fabric.

FIG. 2.5 The aerial view of the old town Lijiang: the town plan adapts the local complex geographical environment characterized by mountains and rivers (CGTN)

The urban landscape of a city is concretely manifested by the town plan. Those plots aggregated in blocks are the fundamental source of land use. The block plans of buildings serve as the basis of the building fabric. That is to say, both the pattern of building forms and land use are dominated by the complex of town plan. Among the various material elements encompassed by the urban fabric, the most important thing is the streets and their arrangement in a street-system. Regardless of urban fabric or urban texture, as expressed in English, it indicates a concept related to the organised texture. It can be presented as a regular grid form on the flat ground (FIG. 2.4), it can also adapt the complex geographical environments characterized by mountains and rivers (FIG. 2.5), urban spatial features can be shaped in terms of various natural factors.

FIG. 2.6 The Sifang Street of Lijiang: some kinds of building types based on orientation constitute the clear fabric of an area (www.trip.com)

The relationship between core and outward expression in the urban fabric is constructed by building pattern. As far as the building pattern is concerned, it is defined as "the arrangement of existing buildings, i.e., their block-plans in a built-up area viewed as a separate element complex of the town plan[94]" in Conzenian terminologies. Building unit can be distinguished by different models and sizes in the building pattern. The building groups composed of single unit form the textural structure in accordance with orientation. The orientation reflects a certain regularity on the ground, which is dependent on the direction of street, sunshine, and other factors. Once the orientation is confirmed, building groups appear to be more stable in the spatial sense, then finally develop into the fabric. For example, the street system of the old town of Lijiang is derived from the roads generated by horse running. This specific street system formed in historic development will inevitably exert influence on the orientation selection of building groups. Building groups or built-up areas dominated by some kinds of building types and orientations constitute the fabric of an area (FIG. 2.6). As a result, "the juxtaposition, commonly within the same street front, of buildings belonging to different morphological periods[95]"indicates architectural incongruence (FIG. 2.7).

94 Conzen, M.R.G. (1969) *Alnwick, Northumberland: a study in town-plan analysis*. Institute of British Geographers Publication 27 (second revised edition). London: Institute of British Geographers, p. 123.

95 Ibid.

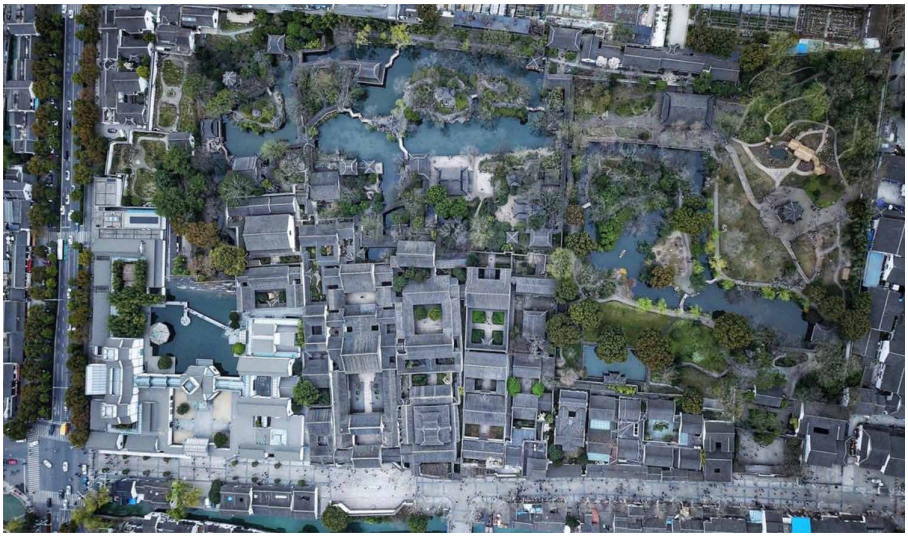

FIG. 2.7 The architectural incongruence reflected in the Grand Northeast Street of Suzhou: bottom left is the Suzhou museum (modern architecture), bottom centre is the Zhongwang mansion (ancient architecture), top is the Humble Administrator's Garden (cultural landscape) (Wei Lv)

In Conzen's theoretical system, plan division means "a geographical group of morphogenetic plan-units, a morphogenetic plan 'region' within the town. Urban plan divisions are arranged in a hierarchy of two or more orders depending upon the size and complexity of the town."[96] If a single building is seen as the morphogenetic unit, building group composed of single building form a series of morphogenetic units, finally multiple units form a plane area. In China, Chinese traditional architecture generally takes the courtyard as a basic unit; therefore, the building groups composed of courtyards as morphogenetic units are also plane units of a group of morphological genes (FIG. 2.8). Because the same gene is attributed to the building material and architectural style in which a structure or group structures is constructed,[97] the fabric it forms is building fabric. The building fabric of a city is understood as the diversified levels formed under the plot mode (FIG. 2.9).

96 Conzen, M.R.G. (1969) *Alnwick, Northumberland: a study in town-plan analysis*. Institute of British Geographers Publication 27 (second revised edition). London: Institute of British Geographers, p. 128.

97 www.urbanform.org/glossary.html

TOC

FIG. 2.8 Wang's grand courtyard in Lingshi, Shanxi Province (Zhugang Zhang)

There exist important a control line and a control point of fabric in a plane area. The linear element that affects the length and width of the building pattern is the control line of fabric. For example, canals, axes, roads in the sense of geography are seen as the line (FIG. 2.4, FIG. 2.12, FIG. 2.13), which has a potential relation with the Conzenian terminology "building line."[98] Correspondingly, the punctate element that exerts the influence on the building pattern is the control point of fabric; for example, landmarks of a certain height can play a dominant role in controlling the fabric evolution in an urban historic area, such as a tower, pagoda, victory column, triumphal arch, obelisk, or an ancient tree (FIG. 2.9). These control points connect to each other, often present an irregular and closed circular line on the plane, which restrain the street system and building pattern in some degree.

The fabric produced by the building pattern should be understood as a complex, changing, interactive concept. The categories of urban heritage thus represent

98 A line, usually roughly parallel to the street line, which follows the alignment of building front walls. In central areas the building line is often the street line. The Conzenian building line is an "irregular geographical…line" and is distinct from the line introduced by town planners to control the siting of new buildings.

diversity, the reason largely depends on the correlation between the core and the outward expression of fabric.

FIG. 2.9 The hierarchy of urban fabric represented in the old town Lijiang: different plots and building forms constituent diverse urban fabric (m.yunnan.com)

This correlation can be explored through the principle of urban development presented in the Conzen's study: first, there is a significant difference in the degree of change between land use and building fabric. Although many new buildings may appear in the centre of town, most of the block plans of buildings are often restricted in their plots, some plots have lasted for several centuries…the pattern of the blocks as a whole still represents the characteristics of the early times. Second, streets and street systems are the most difficult to change of all elements of the town plan. Even though the buildings and plots have been changed in the process of urban evolution, the form and orientation of the streets are relatively difficult to change. This correlation embodies two aspects (FIG. 2.2, FIG. 2.4): first, the building pattern is restricted by the plot in an urban area; second, the road network structure that links to the plot and building pattern is the most stable element, which hardly changes over the historic development.

The town plan represents a high degree of stability and durability, which is difficult to disturb or change by external interventional factors. This high degree of stability indicates that the urban heritage placed in the town plan is sustainable. In particular, the street system and plot units are the most primitive and eternal context of urban life. What they carry is not only the concrete spatial form, more importantly, the value of city is placed in the context of history and culture, which makes it further develop and flourish in the constant changes over time.

2.2.2.2 From the perspective of system function: human needs are the reasons for the sustainability of urban heritage

Cities are the habitats of human life. Chinese architectural scholar Zhang Song believes a large number of elements in urban heritage, especially open spaces in public, are considered to be an appropriate habitat that sets up the ideal environment for human life.[99] Thus, sustainability of urban heritage is the basic pursuit of human survival.

American urban theorist and planner Kevin A. Lynch regards "city forms, their actual function, and the ideas and values that people attach to them make up a single phenomenon, the history of city form cannot be written just by tracing the diffusion of the rectangular grid street pattern…the form of a settlement is always willed and valued, but its complexity and its inertia frequently obscure those connections."[100] Kevin Lynch's view reveals the impetus of the sustainability of urban heritage. As long as human needs and creative activities are persistent, the urban fabric and urban heritage will be sustainable.

Conzen clearly points out the town plan is a cumulative result of a diversified process, which is affected by both successive functions and development scheme of morphological periods. It represents a profound institution in the urban structure. This institution reflects human's motivation, involving the nature of urban land ownership, land market, land acquisition, the fund for urban renewal. In a sense, this institution is a real sustain factor of urban heritage.

The sustainability of urban heritage is operational under the influence of profound institution. Focused on the topic of protective rehabilitation of the urban historic

99 Zhang, S. (2017) On the Invention of Urban Built Heritage Concept in Europe and Its Reference Significance for China (城市建成遗产概念的生成及其启示). *Heritage Architecture* (建筑遗产) , (03) pp. 1-4.

100 Lynch, K. (1984) *Good City Form*. Massachusetts: MIT Press, p. 36.

centre, the Italian *istruzioni per la tutela dei centri storici* has the following rules: first, the overall structure of the road-building must be maintained (keep the layout, protect the road network and boundary of blocks); second, the overall characteristics of the environment must be maintained to meet the needs of modern life, which includes both the most significant monumental environment and individual building or other elements; only exceptional and partial substitutions of these elements can be considered, and the degree of substitution must be coordinated with the overall characteristics of historical centre.[101]

The sustainability of urban heritage also connects with some social and ethic factors. American urban sociologist Robert E. Park considered a city to be rooted in the customs and habits of the people who inhabit it, while possessing a physical organization, the city also maintains a moral organization, these two mutually interact in characteristic ways…once it is formed, it will be added to them as an external fact of natural existence, and in turn shape these inhabitants in accordance with its design and interests.[102]

Therefore, when the urban heritage is considered as a material system, elements that interact with each other form the structure, and the specific functions manifested by the structure are closely associated with needs and mechanism. In fact, the sustainability of urban heritage can be understood as the result of the relationship between system structure and system function. Visually, it reflects the historicality in the form of two different historical forms: past history and forming history, thus all elements are dynamic and evolutionary under the condition of sustainable urban heritage. On the other side, the integrity of urban heritage can be reflected through interdependence of monumental heritage, large-scale fabric, and new urban elements. The material aspect of urban heritage undoubtedly occupies the dominate position, the material basis of HUL is urban heritage. The material basis of the HUL method is the systematicity of urban heritage.

101 Brandi, C., Lu, D.(translator) (2016) *Teoria del Restauro*. Shanghai: Tongji University Press, p. 278.

102 Park, R. E. (1925) *The City: Suggestion for Investigation of Human Behavior in the Urban Environment*. Chicago: The University of Chicago Press, p. 4.

2.3 Scientific basis of the HUL method: theoretical sources of HUL

2.3.1 Research history and related methods of cultural landscape

The concept of landscape didn't become a scientific issue and wasn't given new content in the geographical field until the 19th century. The interpretation reflects the modernity, which is strongly connected to 19th century nation-building and to the related mapping of national territories as well as to the sciences dedicated to that mission.[103] Under the new background, landscape has emerged as an academic terminology in geography, and cultural landscape has been a central concept in geography for more than one century.[104]

In the early 19th century, the German geographer Alexander von Humboldt distinguished sixteen zones on earth, each zone has its own physiognomy.[105] He tended to see the landscape as a holistic object, as he wrote in the *Cosmos*: "terrestrial nature was conceived in its generality."[106]

In 1906, the German geographer Otto Schlüter argued that the external forms, roles, class groups, and related elements of different levels of regions are the central topic in the study of geography. He emphasized that landscape should be analysed from a comprehensive physiognomy associated with nature and human phenomena and historically explored the changing process from *Urlandschaft* (original landscape) to *Kulturlandschaft* (cultural landscape). Schlüter's method was more inclined to discover the cultural levels of the landscape. Under Schlüter's influence, Leo Waibel recognized the importance of immateriality and incorporated it into the landscape

103 Sonkoly, G. (2017) *Historical urban landscape*. Cham: Palgrave Macmillan, p. 12.

104 Dilsaver, M. (2009) Cultural Landscapes: Balancing Nature and Heritage in Preservation Practice. *Journal of Historical Geography*, 2009 (6), p. 787-789.

105 Chunglin, K. (2005) Alexander von Humboldt's invention of the natural landscape. *The European Legacy: Towards New Paradigms*. (10), pp. 149-162.

106 Pagden, A. (1994) *European Encounters with the New World*. New Haven: Yale University Press, p. 111.

research system, thus giving the landscape a double research object: the natural pattern and the cultural pattern.[107]

The American human geographer Carl O. Sauer (1889-1975) further guided the cultural geography to the field of cultural landscape. Sauer regarded cultural landscape as a complex of natural and human factors that reflects the basic characteristics of a given region at specific historical period; landscape is continuously changing due to human activities on the earth's surface; cultural landscape is the result of the interaction between human culture and natural landscape. In 1927 he explained the cultural landscape is the formation of human activity attached to the natural landscape. In order to clarify the concept, he pointed out that the cultural landscape is a product in which a cultural community takes advantage of its natural environment; culture is the driving force, natural environment is medium, and cultural landscape is result.[108]

The most important thing with which Sauer was concerned was the transformation process from natural landscape to cultural landscape. It manifests the landscape as a cultural construct. It not only contains the existing natural environment, but is usually interpreted and classifies on the cultural level. If there is a structural relation between nature and culture, culture not only changes the landscape, but it is also reflected through the landscape; if the duration of its role is long enough, then the emergence of the cultural landscape will be witnessed. The interaction between humans and the environment creates a new feature and customs. Therefore, the cultural landscape is interpreted as "cultural properties and represent the combined works of nature and of man."[109]

107 Dickinson, R. Ge, Y. (translator) (1980) *The Makers of Modern Geography*. Shanghai: The Commercial Press, p. 11.

108 Sauer, C. (1927) Recent Development in Cultural Geography. In Hayes EC (ed.) *Recent Development in Social Science*. New York: Lippincott.

109 UNESCO (2015) *Operational Guidelines for the Implementation of the World Heritage Convention*: annex 3, p. 71.

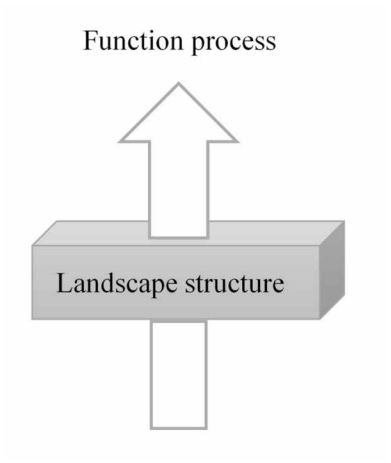

FIG. 2.10 Diagram of spatial-temporal scale reflected in the landscape ecology (Huang Huang)

The research methods of landscape geography in this period mainly adopted cartographic analysis to describe and explain the elements of landscape classification, which reflects the horizontal connection in mindset. With the further recognition of the landscape concept, given the limitation of landscape study from the perspective of geography, ecology theory is introduced into the landscape study. Landscape ecology integrates the ecology into traditional geography study, and becomes an interdisciplinary study across natural sciences and social sciences. The German geographer Carl Troll proposed a new direction that combines regional spatial analysis of geography with structural and functional studies of ecology. He combines the geographers' horizontal approach which solves the spatial relationship of natural phenomena with the ecologists' vertical approach which is focused on analysing the functional relationships within ecological regions to explore the structure and function of landscape (FIG. 2.10). This interdisciplinary method aims at studying the holistic function, heterogeneity and diversity of landscapes.[110] The method of landscape ecology is a huge advancement, because human's perception towards the landscape is initially incomplete through description and observation. The traditional description and classification methods can only tell the differences in landscape characteristics at the horizontal level, then analyse the energy transfer process among diverse landscapes, which is not enough to understand the dynamic characteristics of landscapes. Due to the introduction of ecological theory, and with the help of the computer and the 3S technique, landscape study is promoted

110 Wu, J. (2000) *Landscape Ecology: structure, process, scale and grade.* Beijing: High Education Press, pp. 1-20.

from empirical and qualitative description to quantitative analysis and dynamic research.[111] On the basis of interdisciplinary study, landscape has transformed from visual art into a comprehensive scientific method (FIG. 2.11); this method has been widely used in landscape ecology which takes land as the main research object after the Second World War. To this point, the spatial-temporal scale of landscape method provides a comparative way for the HUL method at the level of mindset.

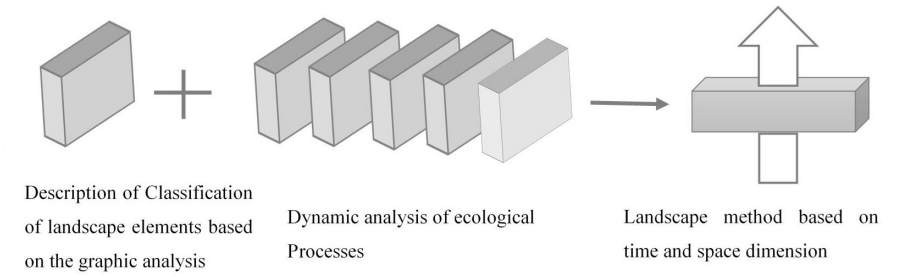

FIG. 2.11 Diagram of research method of landscape ecology (Huang Huang)

2.3.2 Methods and reflection of urban landscape theory

The definition of urban landscape varies by different disciplines.

The geographical features of a city can be reflected in the urban landscape. Urban landscape in the geographical definition, according to English geographer M.R.G.Conzen's terminology, is the combination of three systemic form complexes: town plan, pattern of building forms, and land use.[112]

From the perspective of landscape ecology, urban landscape is composed of various heterogeneous landscape units that form the city. Each landscape unit is relatively independent and can perform certain functions. Consequently, the spatial composition of the urban landscape is expressed in ecological terms: first, streets and blocks; vegetation and water; linear landscapes such as traffics and canals.

111 Fan, J. (2007) Retrospect and Prospect of the Development of Landscape Geography in Europe and America. *World Reginal Studies*, 16 (1), p. 86.

112 Conzen, M.R.G. (1969) *Alnwick, Northumberland: a study in town-plan analysis*. Institute of British Geographers Publication 27 (second revised edition). London: Institute of British Geographers, pp. 1-2.

TOC

In the field of landscape architecture, the urban landscape refers to the visual totality composed of various visual things in the city.[113]

It means that all definitions of the urban landscape in different disciplines must be understood according to the organic wholeness. The system thought of urban landscape interpreted by urban morphology reveals representative significance.

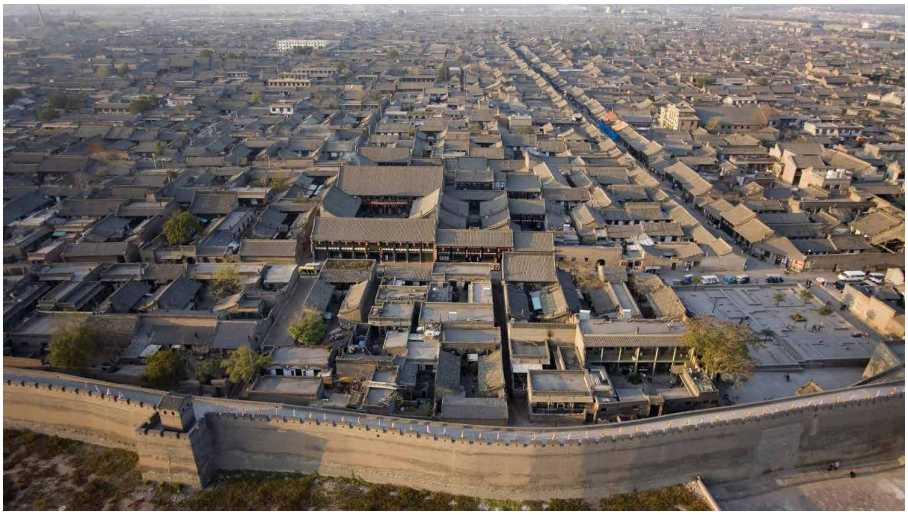

FIG. 2.12 The urban landscape of the ancient city Pingyao: the whole city is dominated by the urban axis and related grid network pattern (news.cgtn.com)

In the urban morphology, the urban landscape is an external and concrete representation that integrates space with material entities,[114] which refers to the artificial landscape that consist of buildings, space (street and square), and related accessories of the environment. The artificial landscape directly constructed by human activities is completely different from the natural elements, their location and interrelationships are accepted in a natural environment and constitute an organic whole. Material entity and space are the two basic elements that form the organic whole of urban landscape, which are composed of streets, squares, blocks, neighbourhoods, and buildings that surround the streets and squares.

113 Yu, Y. (2000) The Characteristics and Shaping of Urban Landscape (城市景观的特性及塑造). *Chinese Landscape Architecture*, 2000 (4), p. 53.

114 Wei, X. and Song, Y. (2005) *Urban Landscape* (城市景观). Beijing: Chinese Forestry Publishing House, p. 1.

The overall framework of the urban landscape formed by these sub-parts includes: (1) urban morphology, referring to the urban form and layout, structure and development trend; (2) urban skyline, which is a panorama of the city from a certain height; (3) urban axis is an important tool of urban space organization, the various elements of the urban landscape are integrated into one organic whole through the axis (FIG. 2.12); (4) urban colour, which is the comprehensive reflection between the artificial decoration colour of buildings, roads, squares, advertisements, etc. and the natural colour of forests, green land, sky, water; (5) urban mass, mainly refers to urban scale, including plane scale, three-dimensional scale, and building scale.[115] It can be found that several sub factors within the framework form a whole complex of the secondary class due to the organic connection of their existence. This framework indicates that urban landscape described by urban morphology reflect the systematicity. Since the panorama and urban skyline depend on the landscape structure, landscape structure relies on the urban axis. The axis serves as the link between part and whole in different elements. For example, the grid network pattern of the ancient city Pingyao (FIG. 2.4) and the irregular pattern of the old city Lijiang (FIG. 2.2), both reflect an organic whole visually in terms of panorama and urban skyline (FIG. 2.12). Therefore, the urban landscape interpreted by urban morphology is consistent with the content of the Rio de Janeiro report, which explores "the visual, structural and functional integrity, and for the visual considering views, axes, panoramas and silhouettes",[116] more importantly, the Austrian biologist L. Bertalanffy's general system theory (GST) can also be represented through the composition of urban landscape. In this regard, the urban landscape is highly expressive, symbolizing the systemic holism.

The earliest description of the urban landscape was in the Old Testament of the Bible, it was defined as "*noff*" in Hebrew language and related to "*yafe*" from the etymology. In this context, urban landscape refers to the whole beauty of the holy city of Jerusalem, which includes Solomon's Temple, castle, palace, and other diverse material entities.[117]

In the mid-19th century, the urban renewal project of Paris by Georges-Eugène Haussmann is considered to be the origin for the transition from tradition to modernity in the history of European urban construction. The focus on the renewal is seen in the public artificial landscapes characterized by squares, parks, and

115 Ibid., pp. 3-8.

116 UNESCO (2013) *Report on the International World Heritage Expert Meeting on the Mainstreaming of the methodological approach related to the Recommendation on the HUL in the Operational Guidelines*. Rio de Janeiro, Brazil, p. 6.

117 Naveh, Z. and Lieberman, A. (1984) *Landscape ecology: theory and application*. New York: Springer.

boulevards; such artificial elements form a whole, which are unified in an urban complex. In particular twelve boulevards are centred on the Arc de Triomphe become an outstanding feature from aerial view and lay the foundation of the modern urban landscape of Paris.

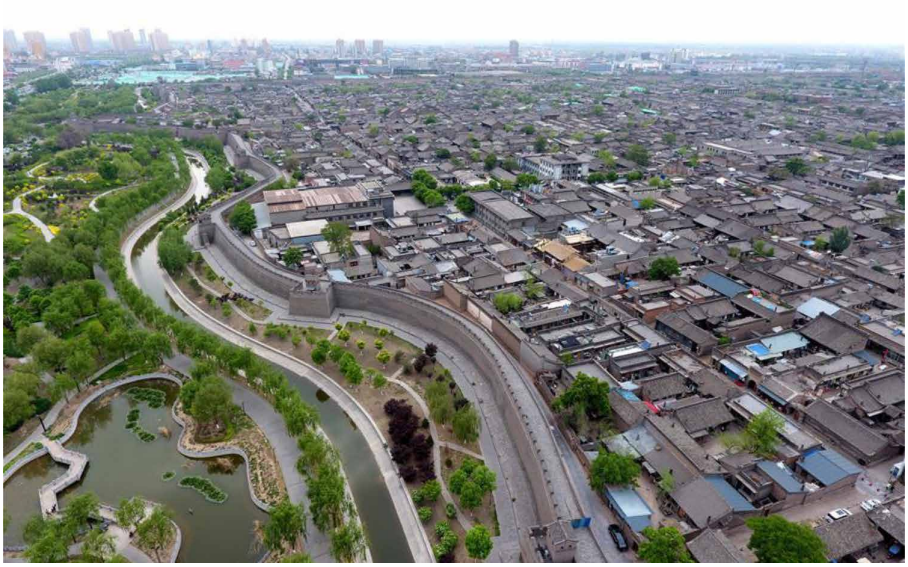

FIG. 2.13 City wall and moat of ancient city Pingyao: moat and city wall serve as the edge of city (www.news.cn)

The diversity of the landscape is reflected through the constituent element of the landscape in different geographical areas; it contains site, structure, function and complexity along with changes over time. It represents the diversity between land use and non-biological elements. The diversity of landscape elements, landscape patterns and landscape types can be often reflected from the heterogeneity of elements based on spatial units of a certain scale.[118] American urban theorist Kevin A. Lynch concludes that the urban landscape has five elements: paths, edges, districts, nodes, and landmarks from the perspective of the image of the city.[119] These urban elements, which physically occupy a large area in urban territory, not

118 Antrop, M. (1997) The concept of traditional landscapes as a base for landscape evaluation and planning. The example of Flanders Region. *Landscape and Urban Planning*, 38 (1-2), pp. 105-117.

119 Lynch, K. (1960) *The Image of the City*. Massachusetts: The MIT Press

only represent the heterogeneous diversity of city scape, but also form an integral urban complex on the basis of mutual interconnections.

As the first element in the image of the city, paths linked with the urban landscape have the characteristics of recognizability, continuity and directionality; the architectural function and artistic style of building facades on both sides of the paths, continuous patterns generated by road greening, as well as seasonal variation form a sub-whole, which constitute the basic framework of the urban landscape.

Edges are linear elements in a city, which usually includes the entrance of the city, the dividing line of the blocks, the boundaries of different types of urban landscape, and the edge of the water landscape (FIG. 2.13). The edges shaped by the coastline of rivers, lakes and seas are landscapes with extremely high quality, and the topographical changes, such as the topography of mountains and seas, often form the most specific urban landscape.[120]

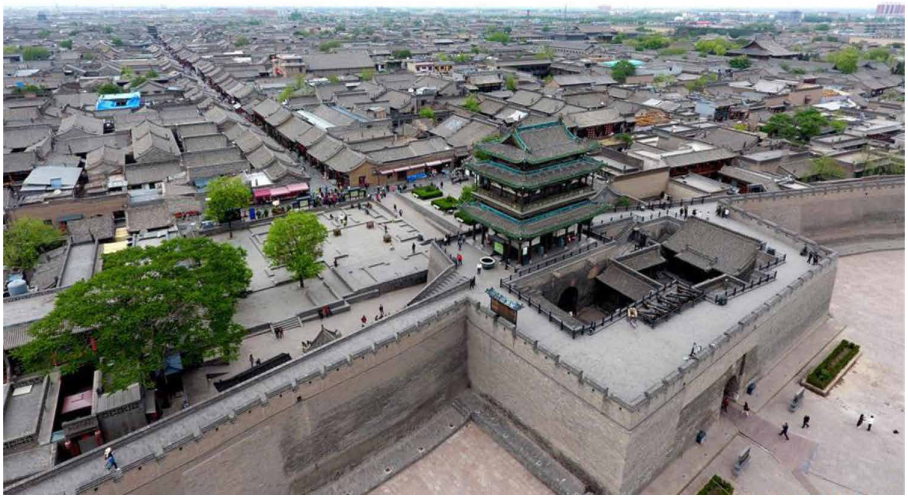

FIG. 2.14 Landmark in Pingyao: the Yingxun Gate (www.news.cn)

120 Zhou, W. (2010) *Urban landscape research based on multiple perspective.* Nanjing: Southeast University Press, pp. 32-35.

A district tends to be a cluster notion, which are usually consisted of residential building groups without intentional planning in a historic city. It is closer to a natural evolution under the influence of economy and politics in the urban development. Each district appears to be diverse, but is still unified in the holistic urban landscape in a harmonious style.

Landmarks, like nodes, usually mean an easily identifiable physical object in the urban landscape, it often indicates commemorative monuments or buildings in a certain urban area (FIG. 2.14). Under the reasonable urban management, landmarks not only have economic attraction, which can be regarded as an important tourism resource, but also ethical factors, cultural identity are included as well. Urban development in the form of landscape management does not have exclusively economic purposes, but rather also manifests as moral and ideological contents.[121] These conditions often closely involved the status that landscapes play a role in recalling local or regional memories.[122] Current usage of urban landscape is more determined by memory laden projects such as new urbanism, postmodern historicism, site remediation, activist historic preservation, ecological re-creation.[123] The individual landscape, which is characterized by a landmark, integrates into the whole city with its distinctive feature.

121 Sonkoly, G. (2017) *Historical urban landscape.* Cham: Palgrave Macmillan, p. 13.

122 Treib, M. (2009) *Spatial Recall: Memory in Architecture and Landscape.* New York: Routledge, XII.

123 Sonkoly, G. (2017) *Historical urban landscape.* Cham: Palgrave Macmillan, pp. 11–14.

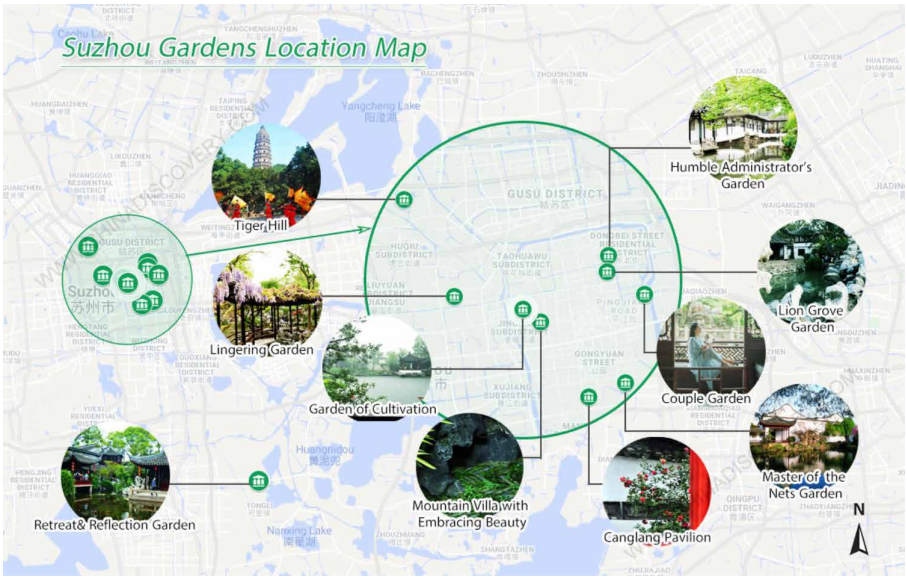

FIG. 2.15 Distribution of classical gardens of Suzhou: as cultural landscape, gardens are seen as integral parts of urban heritage (chinadiscovery.com)

Additionally, classical gardens, hills, woods, and water areas which in urban area belong to cultural landscape that have intensive interactions between human activities and natural environment. As some kinds of cultural landscapes are rooted in the urban area, they are mostly integrated into the urban landscape due to its diversity (FIG. 2.15).

The five elements proposed by Kevin Lynch are the city image that Conzen's town plan is perceived by human in the spatial sense. The paths and nodes can be understood as streets and streets systems; the edges are associated with the Conzenian terminologies fringe belt;[124] whereas landmarks and districts are buildings in an urban plot. The urban fabric in the sense of geography is the urban landscape.

124 Conzen describes the fringe belt as "a belt-like zone originating from the temporary stationary or very slowly advancing fringe of a town and composed of a characteristics mixture of land use units initially seeking peripheral locatin…In towns with a long history this geographical result emerging gradually from these dynamics is often a system of successive, broadly concentric fringe belts more or less separated by other, usually residential integuments".

TOC

The above urban landscape theory and urban morphology adopt buildings and spatial elements to construct the whole urban landscape. Buildings and space, these two factors are rationally accepted by the natural environment as the subsystems at the first level. And their elements, at the same time, serve as the following subsystems at the second level. The axis is used to deal with the hierarchical relationship, it then organises different elements to form the complete landscape structure. The urban landscape, according to Kevin Lynch, is essentially a complex whole which is composed of interdependence of lines, points, and planes presented by the five representative elements. Therefore, urban landscape theory is a structural analysis under the synchronic condition, this spatial relationship reflected through the urban landscape and related elements is an integral part of HUL method.

2.3.3 Methods of building typology and urban morphology

When the urban landscape is associated with urban morphology, building types are the precondition for the study of urban form, the discussion regarding urban morphology must rely on building typology. Type plays a central role in constructing the urban form. According to Italian art historian Giulio Carlo Argan's interpretation, the type is "formed through a process of reducing a complex of formal variants to a common root form…it has to be understood as the interior structure of a form or as a principle which contains the possibility of infinite formal variation and further structural modification of the type itself."[125] He believes "if the final form of a building is a variant of a type deduced from a preceding formal series, the addition of another variant to the series will necessarily determine a more or less considerable change of the whole type."[126] As a result, though there exist an infinite number of classes and sub-classes of "types". Formal building typology is always classified into three categories: configuration of buildings, structural elements, and decorative elements. "It is clear that a classification so constituted follows the succession of the architect's working process (plan, structural system, surface treatment) and that it is intended to provide a typological guide for the architect to follow in the process of conceiving a building."[127] This connects the architect's creative work with history.

The urban morphology is dominated by the building typology. The urban form is composed of the organization structural of the city and the organization structure

125 Nesbitt, K. (1997) *Theorizing a New Agenda for Architecture: An Anthology of Architectural Theory 1965-1995.* New York City: Princeton Architectural Press, p. 243.

126 Ibid, pp. 243-244.

127 Ibid, p. 244.

contains several basic urban elements: blocks, streets, squares (urban spaces), and the buildings that enclose streets and squares. The urban morphology depends on blocks and urban districts. Specifically, a city can usually be divided into several urban districts, and the main district consists of several sub-blocks. In each sub-block, there exist several dominate residential types, thus becoming the dominate building type in the macroscopic level. A large number of repetitive building types dominate urban form (FIG. 2.12), which generates a unified and complementary relationship. Conversely, the urban form that already exists in a city has a limited range of selections for a large number of residential types, for the selection must link the building types to the urban form. Therefore, it establishes an inseparable exterior-interior relation and causality between urban form and building types. Italian architect Aldo Rossi deems that urban morphology focuses on the study of urban form, while building typology concerns the analysis of types, because "between two facts of building typology and urban morphology a revealing binary relationship exists."[128]

Although there are a large number of repetitive residential buildings of one or several types in a city or block (FIG. 2.16), each building is not invariable. Each concrete expression of a building type is not simply replicated from a unified mode, rather reflects the relationship between prototype and variant on the basis of unity and change. This mindset enables the study on morphology to be interpreted in two aspects: architecture and organization of city. Urban morphology considers the influence of building types on urban form, the composition of urban space and structural organization, it also considers how the block form is shaped by residential types. The interactive relationship between the city and its related construct deserves more consideration in the whole process, because this interactive relationship contains the complementarity between urban morphology and building typology, which depends on the synchronic and diachronic research perspective and strategy.

128 Rossi, A. (1984) *The Architecture of the City*. Cambridge (MA): The MIT Press, p. 64.

FIG. 2.16 The building types in the old town Lijiang: residential houses and bureaucratic building Mufu (www.visityunnanchina.com)

Synchronicity refers to the building forms of how various historical period coexist in the same phase.[129] Synchronic study is a structural analysis that crosses time; type is a structural unit with the ability to cross history. As an expression of a precise collectivity, the residential type is based on local building features.[130] According to Swiss psychologist Jean Piaget's view, structure refers to a self-developing whole with a set of transformation rules.[131] Due to the relationship between prototype and variant, the study of building types implies a kind of structural study. Diachrony means the association with historicality. Diachrony aims to study building and city by means of the historical method, which concerns historical representation and the evolutionary process. Type in the diachrony constantly evolves in time, following the evolutionary and involutionary phases of its society, reflecting a dynamic process.[132] As a result, the complementarity between synchrony and diachrony reflects the methodology of the systems thinking. Synchrony and diachrony correspond with

129 According to Attilio Petruccioli, "phase" is defined as the period of time needed to allow the clear identification of changes in the built object.

130 Petruccioli, A. (1999) Historical Processes of the Building Landscape. in O'Reilly, W. (ed) *Architectural Knowledge and Cultural Diversity*. Lausanne: Comportements, p. 40.

131 Calloway, B. (2001) *Jean Piaget: A Most Outrageous Deception*. Hauppauge (NY): Nova Science Publishers, p. 215.

132 Petruccioli, A. (1999) Historical Processes of the Building Landscape. in O'Reilly, W. (ed) *Architectural Knowledge and Cultural Diversity*. Lausanne: Comportements, p. 4

the spatial scale and the temporal scale in the architecture and urban organization respectively, which objectively reveals a kind of complementary relationship. The causal relationship between building typology and urban morphology is complemented through urban design so as to achieve the harmony and unity of the city.

Italian architect Saverio Muratori (1910-1973), who is acknowledged as the father of Italian architectural structuralism, is the first theorist who was dedicated to the study of the evolution of Italian cities by using the synchronic and diachronic studies. He was keenly aware of the significance of urban morphology, and probed into the rules of typology, urban form and circulation by means of urban organizations in Venice and Rome. His work *Studi per una operante storia urbana di Venezia* re-evaluates the type concept and value, his experience in Venice was the trigger for his idea of operative history, which aims at understanding the various values inherent in urban formation phases.[133] Muratori investigated and explored the "historical rationalism through reconstruction of the process of derivation of both architectural and urban form, from past building structure, to more recent, complex configurations. This evolution process retains the traces of a form's inception in simple original arrangement by updating them over centuries according to a handicraft approach to tectonics."[134]

In this process, type acts as the logical structure and inner rationality of form, has no necessary link to the function, it is closely related to the evolution of urban system.[135] Urban morphology interprets the urban form mainly through the instrumental use of the type concept. Morphological study is carried out at two structural levels: synchronic and diachronic. The relationship of synchronic-diachronic interweaving can ultimately reveal the formation process of the urban form. The present status of the urban form enables people to compare the diachronic phenomena of building types in a synchronic system. The concept of synchronic system is important because the complementarity generated by the two methods is implemented in the synchronic system of city.

Synchronic system refers to a system formed by the coexistence of various building forms of different historical periods in the same phase. The synchronic study and diachronic study existing in the synchronic system can be regarded as the profile analysis and dynamic analysis of system respectively. The difference between

133 Catakdi, G. Maffei G. L. and Vaccaro, P. (2002) Saverio Muratori and the Italian school of planning typology. *Urban Morphology* 6(1), pp. 3-14.

134 Marzot, N. (2002) The study of urban form in Italy. *Urban Morphology* 6(2), p. 63.

135 Ibid., pp. 59-73.

diachronic study and synchronic study lies in the difference between process description and structural description. When this dualistic opposition is introduced in the building typology, the “dichotomy” and “polarity” included in the complementary relationship must be realised through the synchronic system of city. As the urban form is not only dependent on traditional buildings, but also on new buildings that need to be embedded in the system. The true historical continuity can be obtained through the idea of “dichotomy” and “polarity” to restore the original paradigm of urban architecture. Thereby the synchronic system of the city is the medium between synchronic and diachronic studies.

If the building type is understood as partial component, the urban form is an organic whole constituted by coordinating component through complementarity of synchrony and diachrony. This organic whole is mainly manifested as urban form composed of building types, and visually represents as urban landscape in the manner of urban form. The HUL method based on urban heritage is highly bound up with the research methods of urban morphology and building typology. In fact, the research method, which adopts landscape as the medium, is necessarily a method based on the interdisciplinary spatial and temporal scale. Even in the study of urban ecology, a multiscale method needs to be introduced to understand the structure and the function of urban landscape (FIG. 2.17).

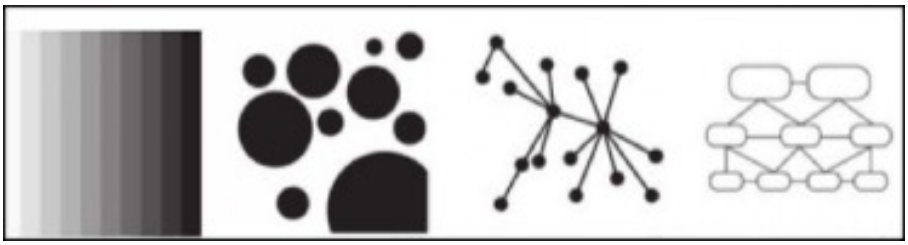

FIG. 2.17 Urban ecologist Marina Alberti’s multiscale methods: gradient, patch, network, and hierarchy (from left to right) (Marina Alberti)

2.4 Rediscovery of the HUL method

2.4.1 Spatial-temporal scale method derived from the urban heritage

The associated intangible culture must be concerned as the important factor of enhancing the resource capacity of tangible urban heritage in a changing global environment. Therefore, urban heritage in a broad sense include tangible and intangible components, both of them constitute a key resource in enhancing the liveability of urban areas and sustaining productivity.[136] It is an expanded concept urban heritage.

Since the tangible urban heritage is located in the urban ecosystem, which is closely related to the natural environment. Thus, the visual perception of the combination between tangible urban heritage and natural environment is the urban landscape. It indicates that the natural environment is another aspect of enhancing the resource capacity of the tangible urban heritage. With the increase of urban population, climate change, potential political and economic pressures and challenges, all dominate and recessive factors exert a changing influence on the urban heritage. In this regard, humans need to construct a higher-level system to improve the use efficiency of related resources, so that the city can keep harmonious and sustainable development in the future. This higher-level system is represented by the HUL concept, which consists of tangible, intangible, natural, cultural, and other elements that interact with each other. Essentially this complex system can be understood as an organic whole with a certain structure and specific functions. In a sense, the duality of HUL refers to the objective existence including various elements and the mindset system that encompasses the objective existence.

Since the mindset system relies on the objective existence, the urban heritage occupies a dominate position in the objective existence. Thus, the material basis of the HUL concept is the physical urban heritage. When the HUL concept is transformed from entity to HUL method, the systematicity of urban heritage serves as the material basis of HUL method. The systematicity of urban heritage lies in the organic wholeness of the combination of structure and function. To this point,

136 Martini, V. (2013) *The Conservation of Historic Urban Landscapes: An Approach, Vol.1- urban conservation theories and history of the cities*. Venice: Graduate School of University of Nova Gorica, p. 117.

the structure composed of interdependence of monuments, large-scale fabric, and new elements implies a spatial concept, while the function related to the needs represented in the historial (past history) and historical (forming history) building forms reflects a temporal concept. The spatial concept of urban heritage is derived from the urban scale, the temporal concept of urban heritage is realised through layering and change. Consequently, the scale of urban heritage, including plane scale, three-dimensional scale, and building scale, can be described as the spatial scale of mindset in the HUL method, and stratification and change of human activities in different historical periods in urban space can be described as the temporary scale of mindset in the HUL method.

Generally speaking, as a higher-level concept, HUL reflects the spatial-temporal scale of urban heritage based on the systems thinking, HUL method means the reflection of the spatial-temporal scale of HUL.

2.4.2 Inheritance and innovation of the HUL method

Before the HUL concept came into being, the spatial-temporary method has been applied in many disciplines such as landscape ecology, building typology, urban morphology, and urban ecology, which has been proved as a scientific method in practice. This study summarizes the involved spatial-temporal scale method and operational measures by adopting landscape as the medium, a continuous development process chronologically presents:

Landscape geography in the early 20th century mainly used the research method of cartographic analysis to describe and explain the elements of landscape classification, which reflects the horizontal connection of mindset. Landscape ecology, which was proposed by Troll based on the interdisciplinary study between geography and ecology in 1939, reflects the integration of horizontal and vertical mindset. In his study, the spatial scale was used to express the landscape pattern, the temporal scale was used to express the evolutionary process of landscape, both of which implied the application of the spatial-temporal method. From 1940s to 1980s, both Muratori and Rossi highly concerned the connection between building typology and urban morphology. They used building type as a tool to explain urban form. Issues concerned by building typology transform into urban morphology study in the urban form. Therefore, the thought of synchrony and diachrony develops into a scientific method of combining synchronic and diachronic studies in terms of internal complementary strategy. In the 1960s, Conzen introduced three terms town plan, building fabric, and land use to represent the formation of townscape. His

research method is seen as a diachronic analysis which is composed of synchronic study in multiple historical periods. In the early 21st century, urban ecology regards urban landscape as a complex adaptive system, a multiscale method needs to be introduced to understand the structure and the function of urban landscape.

TABLE 2.1 Methods based on the spatial-temporal scale and related operational measures

Time	Discipline	Figures	Interdisciplinary collaboration	Operational measures	Research method	Characteristics
Early 20th century	Landscape geography	Carl O. Sauer		Cartographic analysis	Static spatial scale	Qualitative analysis
1939	Landscape ecology	Carl Troll	Geography and ecology	Technical measures	Spatial-temporal scale	Quantitative analysis
1940s-1980s	Building typology and urban morphology	S. Muratori, A. Rossi	Building typology and urban morphology	Integration between synchrony and diachrony	Spatial-temporal scale	Adopting building type as a tool of urban form
1960s	Geography	M.R.G. Conzen	Geography and urban planning	Evolutionary analysis	Spatial-temporal scale	Deep exploration of urban fabric
Late 20th century	Urban planning	Kevin A. Lynch	Urban planning and general system theory	Image of the city	Spatial scale	Complex whole composed of five elements
Early 21st century	Urban morphology	Wei Xiangdong	Urban morphology and general system theory	Structural analysis	Spatial scale	Relationship between whole and parts
Early 21st century	Urban ecology	Marina Alberti	Multi-disciplinary collaboration	Gradient, patch, network, and hierarchy	Multi-scale	Urban landscape model

(Huang Huang)

TABLE 2.1 shows that researchers are inspired by the systems thinking to seek breakthrough from interdisciplinary study. Interdisciplinary studies can contribute to the formation of the method of spatial-temporal scale. The research method of spatial-temporal scale reveals the universality, which links different disciplines to conduct multi-scale study on the same research object. The spatial-temporal scale exists in both above disciplines and the HUL method. The various operational measures serve as the concrete instrumental strategies. Therefore, "there is not one HUL approach but as many approaches as different as different contexts demand."[137]

137 Roders, A, Bandarin, F. (2019) *Reshaping Urban Conservation: The Historic Urban Landscape Approach in Action.* Springer, p. 26.

TOC

It can be seen that the HUL method is inherited from the spatial-temporal scale method.

In fact, previous research methods based on the spatial-temporal scale are applied to different physical entities. The innovation of the HUL method indicates that it expands to the intangible cultural field. Not only the HUL method based on the spatial-temporal scale is applied to the management and conservation of tangible urban heritage, but also the HUL method is applied to the intangible aspects of urban heritage. Since the HUL is a higher-level system, the spatial scale of the HUL method is synchronic study at the operational level, namely the structural analysis; the temporal scale of the HUL method of the HUL method is diachronic study at the operational level. The synchronic study determined by the HUL method not only includes tangible and intangible elements; but also covers natural, cultural elements, as well as the cultural diversity. The diachronic study determined by the HUL method also includes two aspects: stratification of tangible cultural heritage in different phases and continuous process of intangible culture. Considering type is a structure that crosses history, regardless of tangible or intangible elements, the correlation constitutes a systemic structural relationship as long as they coexist in the HUL. The evolution of each type is the reflection of the system function of HUL. Hence, HUL is a scientific method based on the systems thinking. The spatial-temporal scale method that can best reflect systems thinking is the combination of synchronic and diachronic studies. The innovation of the HUL method indicates that it expands to the professional knowledge of urban conservation, heritage policy, experience in practice, and intangible cultural aspect. A given system is always based on the principles of further analysis, the form of a system becomes the content of a higher-level system.[138] Therefore, the HUL method can serve the construction of the value system of urban heritage.

The prerequisite for applying the HUL method is to establish a synchronic system. It contains many sub-systems under the synchronic condition, such as a historical area, a theory related to a city, or a representative case in a specific cultural background, which provides the context for structural analysis and diachronic study. The focus of the HUL method varies in terms of different disciplines and conditions.

138 Li, Y. (2007) *Introduction of semiology*. (理论符号学导论) Beijing: China Renmin University Press, pp. 137-138.

Summary

The HUL method essentially reflects the systems thinking. The spatial-temporal scale of the HUL method, as well as the combination of synchronic and diachronic studies, all of which can be applied not only to the urban management and the urban heritage conservation in the tangible sense, but also to the study of urban heritage value. When the HUL method is associated with value theory, it has changed the separation between value theory and HUL method in the past. Therefore, the HUL method is appropriate for the construction of value system of urban heritage.

3 Value System of Urban Heritage based on the HUL Method

Philosophically, value is understood as the usefulness of things (physical or spiritual phenomenon) to human needs, and has a positive meaning to the lives and activities of individuals, groups, and the whole society.[139] Heritage value refers to an aspect of worth or importance, here attached by people to qualities of places.[140] Therefore, the evaluation system related to heritage value is the intangible form of society. The various social manifestation and development process coexisted in an integrated system that can be analysed through synchronic-diachronic perspective of HUL method. Chapter three applies the HUL method to construct the value system of urban heritage.

3.1 Fundamental structure

HUL, as a kind of systems thinking of time-space interweaving, indicates the heritage value literature collected since the 19th century and is confirmed as the sub-system in HUL synchronic system. Value theories of different historic periods are compiled and sorted out so that the research results of each period form a

139 Li, X., Wang, Y. (1995) *Dialectical Materialism and Historical Materialism* (辩证唯物主义和历史唯物主义原理). Beijing: China Renmin University Press, p. 306.

140 Historic England (2008) *Conservation Principles Policies and Guidance-for the sustainable management of the historic environment*. London: Historic England, p. 72.

TOC

continuous development process. In this study, value theory created by Austrian art historian Alois Riegl is confirmed as the early stage; the heritage value study from different fields after the 1970s is the intermediate stage; the heritage value theory represented by the Historic England document is deemed as the mature stage. In this process, German philosopher Walter Benjamin, British conservation architect Bernard Feilden, Russian architectural scholar O. I. Prutsin exploit the value theories and evaluation system. Associative value of heritage, rooted from English philosopher R. Scruton's architectural aesthetics, natural value, developed by American philosopher H. Rolston III, as well as American urban ecologist Marina Alberti's urban modeling value contribute to the rich contents of the heritage value study. In particular, the *Conservation Principles, Policies and Guidance* from Historic England, as a comprehensive conceptual compilation, makes a system interpretation on heritage value after reflecting on all of the above theories, which has become a milestone of heritage value study in recent years. Thereby the documents of Historic England can be regarded as a fundamental framework, and the value system appropriate to urban heritage is established on this basis. Correspondingly, the value categories interpreted in the Historic England document can be deemed as the basic categories of value system of urban heritage, thus basic categories and holistic value together constitute the value system of urban heritage.

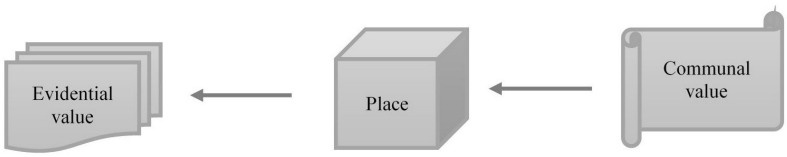

FIG. 3.1 Relationship between the high-level values and place (Huang Huang)

The analysis of the relationship of basic value category is a synchronic study, which refers to as basic structural analysis. The basic value category contains the relation between unity and change, prototype and variant, and can derive many sub-categories. Consequently, the basic value category of urban heritage not only cover the relationship between high-level value types, but also the relationship between high-level types and their subordinate subcategories, as well as the internal structural relationship of subcategories. As a result, layer upon layer of progressive and interconnected basic values constitute the first level in the value system of urban heritage.

In the *Conservation Principles, Policies and Guidance* of Historic England, in terms of high-level evidential value and communal value (FIG. 3.1), the evidential value refers to "the value deriving from the potential of a place to yield evidence about past human activity;"[141] while the communal value is defined as "the value deriving from the meanings of a place for the people who related to it, or for whom it figures in their collective experience or memory."[142] Consequently, "the high-level values range from evidential, which is dependent on the inherited fabric of the place, through historical and aesthetic, to communal values which derive from people's identification with the place."[143] To this point, the evidential value indicates that heritage value has an objective basis, whereas the communal value is affected by time as well as cultural, intellectual, historical, psychological factors that are held by a particular group.[144] Heritage value is given specific meaning by people. It can be seen that the evidential value and communal value reflect the value relationship between object and subject.

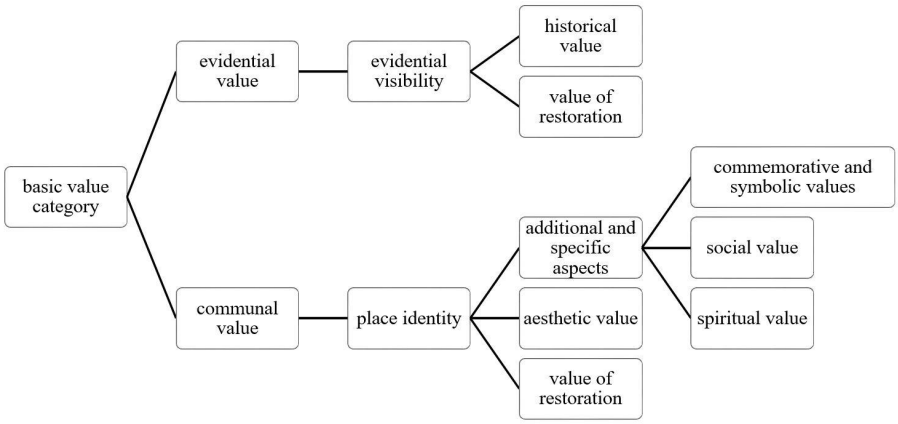

FIG. 3.2 Structural diagram of the basic value category of urban heritage (Huang Huang)

141 Ibid., p. 72.

142 Ibid., p. 72.

143 Ibid., p. 27.

144 Labadi, S. (2007) Representations of the nation and cultural diversity in discourses on World Heritage. *Journal of Social Archaeology*, 7 (2), pp. 147-170.

The relationship between high-level value categories and their related sub-categories are addressed in the following chart (FIG. 3.2): as far as the urban heritage is concerned, the evidential value often provides the visible evidence for the historical value and value of scientific restoration. Thereby the evidential value of the place is closely associated with the historical value and the value of scientific restoration. The aesthetic value, the value of scientific restoration, and the additional specific aspects (commemorative and symbolic value, social value, spiritual value) indicate the place identity. These expanding value categories are more bound up with the communal value. Accordingly, the exploitation on the heritage value in the field of specialization is mainly based on the understanding of evidential value and communal value, and the evaluation process sets up a connection between history and present in the same place from the interior to the surface; the inhabitants perceive the history of human activities in a site in which history and present are connected through diverse mediums and memory.

Evidential value serves as the origin of heritage value among all categories. According to the interpretation of Historic England, "physical remains of past human activity are the primary source of evidence about the substance and evolution of places, and of the people and cultures that made them. These remains are part of a record of the past that begins with traces of early humans and continues to be created and destroyed. Their evidential value is proportionate to their potential to contribute to people's understanding of the past. In the absence of written records, the material record, particularly archaeological deposits, provides the only source of evidence about the distant past."[145]

Therefore, the essence of heritage value is dependent on evidential value and communal value; the historical value, aesthetic value, value of scientific restoration, as well as the commemorative, symbolic value, social value, and spiritual value associated with the place, which are shown by the visible evidence of the place, are all different manifestations of the evidence value and the communal value in the place.

145 Historic England (2008) *Conservation Principles Policies and Guidance-for the sustainable management of the historic environment*. London: Historic England, p. 28.

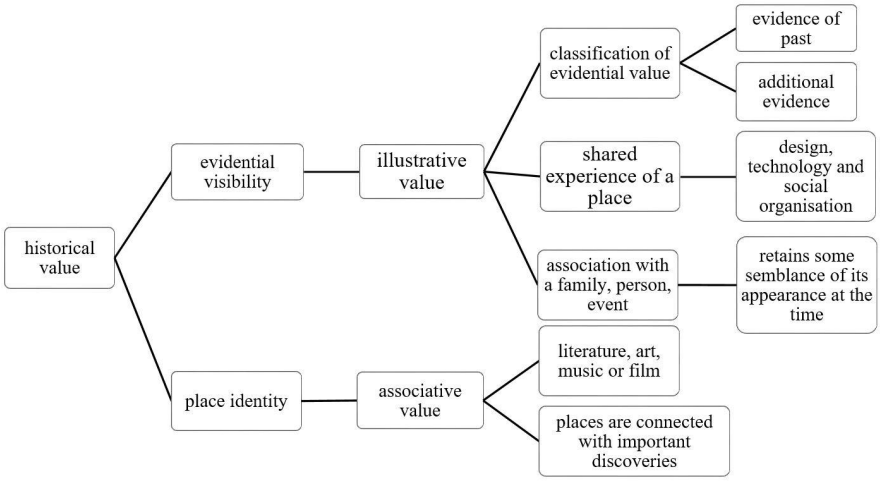

FIG. 3.3 Structural diagram of historical value (Huang Huang)

The FIG. 3.2 reflects the relationship between high-level evidential, communal values and the value sub-categories of the first level. Based on this structural framework, historical value is placed in the first value sub-category, which consists of illustrative value and associative value. Both illustrative value and associative value belong to the value sub-category of the second level relative to the high-level values. The historical value which is established through the place is called the illustrative value; whereas the value of architecture or landscape which is expressed through literature, art, music, and film is associative value.[146] Therefore, illustrative value interprets the historical value in terms of the visibility of evidence, while the associative value interprets the historical value based on the place identity (FIG. 3.3). Furthermore, the illustrative value of the historical value interweaves with the evidential value, and the associative value of the historical value interacts with the communal value. This value structure not only reflects the one-to-many relationship between high-level value categories and their sub-categories, but also reflects that the historical value and its sub-categories share the relationship between unity and change, as well as prototype and variant. It follows that the illustrative value is appropriate to the analysis of historical value of urban heritage.

146 Ibid., pp. 28-29.

TOC

3.2 Basic value category based on the HUL method

Under synchronic condition, the value system is an organic whole composed of different value categories. Meanwhile, as a component of the subsystem, each value category consists of value sub-categories at different levels. Each value sub-category exists as an integral part of the high-level category, which reflects the hierarchy of value. Humans' understanding of value categories experiences a progressive diachronic process. In other words, the value system is a dynamic complex from the vertical perspective. The recognition of value categories is a structural analysis. Thereby both diachronic analysis and structural analysis are applied into constructing the value categories based on the HUL method.

Specifically, the diachronic analysis implies the development process of value theory, while the structural analysis reflects the interconnected relationship of value categories. The same value category of different periods defined in A. Riegl and O. I. Prutsin's theories, and the document of Historic England is selected to construct the basic value category of heritage, which indicates the continuous development of intangible value.

3.2.1 Historical value

In the 19th century, the historical value (*Der historische Wert*) emerged in Austrian art historian Alois Riegl's theoretical work *The Modern Cult of the Monument: Its Character and Its Origin* (German: *Der Denkmalkultus: Sein Wesen und Seine Entstehung*). Riegl's historical value refers to a specific historical stage that is inscribed on old buildings representing human activities, it has time-uniqueness and recordability. The connotion of historical value goes far beyond the time domain between new and old, which considers the influence of historicity on monuments: *nämlich die Geschichtlichkeit als die zentrale geistige Dimension des Denkmals und trägt so dem Anspruch der modernen Geschichtswissenschaft auf einen universellen Charakter der Historie Rechnung.*[147] (namely the historicity as the central spiritual dimension of the monument and carries so the requirement of modern historical

147 Riegl, A., Bacher, E. (ed) (1995) *Kunstwerk oder Denkmal? Alois Riegls Schriften zur Denkmalpflege.* Vienna: Böhlau, p. 25.

TOC

science on a universal character of historical calculation). The historical value of preserving an old building in a particular historical period can be understood to preserve its original state and related authentic information (characteristics of architectural structure, component, and style in the particular historical period) (FIG. 3.4). The purpose of preserving historical value is not to keep traces that time enacts upon the building, but to maintain its authenticity as historical evidence, so it is necessary to maintain its original state as much as possible on the basis of the perception of historicity. Accordingly, there exists a potential correlation between meaning of historical value and European stylistic restoration of the 19th century. It can be deduced that Riegl's concept of historical value was affected by stylistic restoration represented by Viollet-le-Duc, for "the sequential relation between historical value and feeling-based age value corresponded approximately to that between Viollet's restorationism and Ruskin-Morris's anti-restorationism."[148]

FIG. 3.4 Potala Palace of Lhasa in Tibet, since it was initially built in the 7th century, the building groups have preserved the authentic information through design, layout, materials, craftmanship, and, decoration (reviewofreligions.org)

Russian architectural scholar O. I. Prutsin's definition of historical value is divided into two categories: first the historical value is based on a specific historical event,

148 Glendinning, M. (2013) *The Conservation Movement: A History of Architectural Preservation; antiquity to modernity*. London: Routledge, p. 142.

figure, and fact, it is represented by three factors: first, historical buildings are involved in historical events; second, the building location is linked to historical events (FIG. 3.5); third, a meaningful place and environment enter into the historical society.[149] The authenticity of historical buildings, places, and environments connected with historical events are verified by the historical reliability and accuracy. This category is the same as the interpretation of historical value in *Principles for the Conservation of Heritage Sites in China*. The second category defines historical value from the historical building itself: first, the historical significance of architectural elements (FIG. 3.6), including urban planning and layout patterns, interior decoration and design (FIG. 3.7), architectural professional composition that reflect the style of a particular historical period, and historical value of architectural details; second, the possibility of accidental change in historical value, such as the restoration of a historical building into a museum, but the evidence of the significance of the historical building and academic significance (history and culture) depend on the historical value system and quantity to which it is adapted.[150]

FIG. 3.5 The Great Wall of China, as an ancient military defence infrastructure, the Great Wall is closely associated with historical events over two thousand years (Danny Ballan)

149 Prutsin, O.I., Han L. (translator) (1997) *Architectural and Historical Environment* (**建筑与历史环境**). Beijing: Social Sciences Academic Press China, p. 42.

150 Ibid., p. 45.

Prutsin defines the historical value from the perspective of the historical building, and the historical value is interpreted on the basis of disciplinary study. It refers to a study of historical value in terms of design and technology, which includes the architectural elements, structure, design, style, form, artistic taste and characteristics of a particular period and the possibility of engineering technology in accordance with the historical development of architecture. The study of historical value not only reveals the level of architectural technology in a specific historical stage, but also provides a site with unique evidential value in the past.

In the document *Conservation Principles Policies and Guidance-for the sustainable management of the historic environment* of Historic England, the historical value is defined as "the value derives from the ways in which past people, events and aspects of life can be connected through a place to the present."[151]

FIG. 3.6 Chinese traditional architectural elements: Dougong (wooden brackets) and Caihua (colour painting) (www.photophoto.cn)

The document interprets the historical value on the basis of the evidential value: the illustrative value can be summarized in three aspects: first, different order of importance of evidential value. "Illustration depends on visibility in a way

151 Historic England (2008) *Conservation Principles Policies and Guidance-for the sustainable management of the historic environment*. London: Historic England, p. 28.

that evidential value does not. Places with illustrative value will normally also have evidential value, but it may be of a different order of importance."[152] As "a historic building that is one of many similar examples may provide little unique evidence about the past, although each illustrates the intentions of its creators equally well. However, their distribution, as well as demonstrating, for instance, the distinctiveness of regions and aspects of their social organisation."[153] Second, "illustrative value has the power to aid interpretation of the past through making connections with, and providing insights into, past communities and their activities through shared experience of a place. The illustrative value of places tends to be greater if they incorporate the first, or only surviving, example of an innovation of consequence, whether related to design, technology or social organisation."[154] Third, "association with a notable family, person, event, or movement gives historical value a particular resonance…the place still retains some semblance of its appearance at the time. The way in which an individual built or furnished their house, or made a garden, often provides insight into their personality, or demonstrates their political or cultural affiliations."[155] Thus, according to the above interpretations, the historical value of urban heritage is understood and explained by virtue of the evidential value. It needs to be pointed out that the design and technology referred in the shared experience in item 2 are identical to that of the Prutsin's understanding of historical value from the historical building itself; the historical value in item 3 given by family, person, event, and movement is also the same as Prutsin's definition of historical value based on specific historical event, and figures.

152 Ibid., p. 28.

153 Ibid., p. 28.

154 Ibid., p. 29.

155 Ibid., p. 29.

FIG. 3.7 The Hall of Supreme Harmony: interior decoration (Morio)

Though the historical value of places can be interpreted through the illustrative value, an indispensable precondition is required in which the historical value depends on "both sound identification direct experience of fabric or landscape that has survived from the past, but is not as easily diminished by change or partial replacement as evidential value. The authenticity of a place indeed often lies in visible evidence of change as a result of people responding to changing circumstances."[156]

The relationship between the three can be found from the above interpretation: first, the research object from Riegl and Prutsin can be understood as a specific form of heritage site. Riegl's viewpoint of maintaining the original state of a historical building is a statement that emphasizes the evidential value, which probably serves as the original source of the evidential value. The concept of architectural period proposed by Prutsin is also related to the evidential value of places. Second, when those historical buildings can provide the other aspects of evidential value without specific evidence of the past, the value of scientific restoration can be integrated into the evidential value. As the restoration activity is regarded as the process of

156 Ibid., p. 29.

place identity, not only the creator's intention is represented, but also the value of scientific restoration in different stages can be confirmed as the evidential value of heritage in dynamic development. But those works that violate the principles of original authenticity cannot be used as the evidential value. Therefore, the evidential value of urban heritage can be treated as a complex which is composed of original evidential value and evidential value based on dynamic processes. In this sense, Prutsin's theory of scientific restoration is a supplement to the evidential value in the document of Historic England. Third, in spite of different interpretations on the historical value, these three share the same position which illustrates the historical value of places at the level of design and technology by incorporating experiences and establishing connections with places. The scientific value does not become an independent value category because it is replaced by the historical value on the basis of disciplinary study.

In China, the evidential value is not directly defined in both *Cultural Relics Protection Law of the PRC* and the *Principles for the Conservation of Heritage Sites in China*, however, the evidential connotation and requirements are stipulated in the categories of historical value and scientific value: first, all aspects of building technique are recorded and interpreted by architectural heritage; second, it is a site or space for certain scientific and technical activities, which have witnessed the occurrence and progress of such activities; third, important scientific and technical resources are recorded and preserved; fourth, physical production, life style, ideology, social customs in a certain historical period.[157]

3.2.2 Aesthetic value

Artistic creation is a shaping activity of ideology. When the design thought, theories are transformed into artistic form, design will inevitably become an important category of art. As a result, the aesthetic value of urban heritage is classified as the result of conscious design and non-formal design, as well as the action of natural influence on human works.

157 ICOMOS China (2004) *Principles for the Conservation of Heritage Sites in China*. Los Angeles: The Getty Conservation Institute, pp. 15-16.

3.2.2.1 Structural analysis of the aesthetic value categories

The design value is the sub-category of the aesthetic value. "The design value relates primarily to the aesthetic qualities generated by the conscious design of a building, structure or landscape as a whole. It embraces composition (form, proportions, massing, silhouette, views and vistas, circulation) and usually materials or planting, decoration or detailing, and craftsmanship. It may extend to an intellectual programme governing the design, and the choice or influence of sources from which it was derived. It may be attributed to a known patron, architect, designer, gardener, or craftsman or be a mature product of a vernacular tradition of building or land management."[158] American scholar George Dickie defines two preconditions of art work in his book *Art and the Aesthetic*: a work of art is (1) an artifact (2) a set of the aspects of which has had conferred upon it the status of candidate for appreciation by some person or persons acting on behalf of a social institution (the art world).[159] Therefore, design work may transform into works of art and be given artistic value. As Historic England points out indicators of importance of artistic value are quality of design and execution, and innovation, particularly if influential. The technical skill of creating artwork is inscribed in the place, as it is related to the place, which is the associative value emphasized by HUL in the document of the St. Petersburg conference.[160] When the art works arouse people's joyful, amazing, respectful emotions in a specific context, they represent the aesthetic value (FIG. 3.8).

Some aesthetic values are not substantially the product of formal design, but develop more or less fortuitously over time, as the result of a succession of responses within a particular cultural framework.[161] In China, Confucianism and Taoism form a specific cultural framework with the specificity of its internal factors regulated by the original nature of culture,[162] which has a profound impact on aesthetics of Chinese classical gardens. The design value of Suzhou classical gardens is represented in an art form of *the world in pot*, which is actually the result

158 Historic England (2008) *Conservation Principles Policies and Guidance-for the sustainable management of the historic environment*. London: Historic England, p. 30.

159 Dickie, G. (1974) *Art and the Aesthetic: An Institutional Analysis*. Ithaca: Cornell University Press, p. 34.

160 Conference of Countries of Eastern and Central Europe on "*Management and Preservation of Historic Cities on World Heritage List*", 2007, St. Petersburg, Russia federation. The original text "genius loci embraces key components of the sustainability agenda such as sense of place and community belonging, cultural identity and cultural diversity, and – alongside intangible cultural heritage-it subsumes associative values".

161 Historic England (2008) *Conservation Principles Policies and Guidance-for the sustainable management of the historic environment*. London: Historic England, p. 31.

162 Liu, T. (2015) *The Confucian gene of Chinese classical gardens* (**中国古典园林的儒学基因**). Tianjin: Tianjin University Press, p. 20.

of reflection within the framework of Confucianism and Taoism. Other aesthetic values derive from natural influence on human works, especially enhancement of the external features and style of a certain place over time. This aesthetic value is manifested in the ponds, rockeries, as well as the vegetation distribution, all of which root from the garden designer's skill. As time goes by, the natural power makes the garden appear naturally formed, like natural landscape scenery.

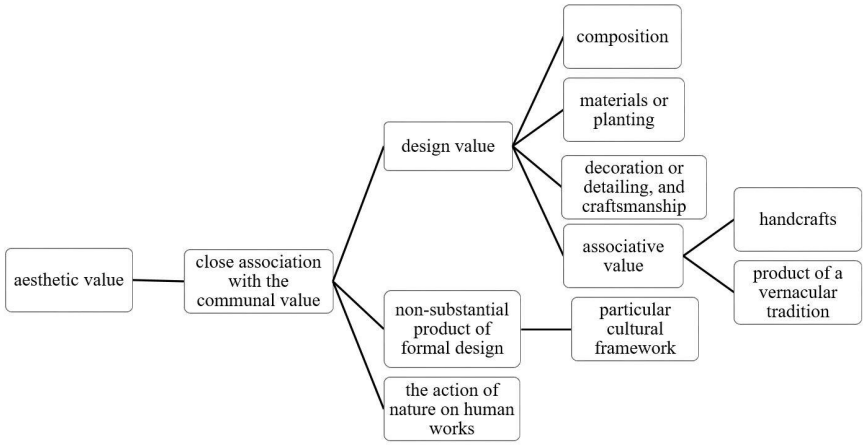

FIG. 3.8 Structural diagram of aesthetic value (Huang Huang)

It can be seen that the aesthetic value can be understood from three influential aspects: product of conscious design, product of non-formal design, and the influence of nature on human works. They reflect the meaning of a place and specific aesthetic quality due to different levels of design value and thereby people's sensual experiences. Consequently, the aesthetic value categories are closely bound up with communal value, whereas the latter derives from collective experience or memory in a certain cultural context.

3.2.2.2 Diachronic process of aesthetics of urban heritage

Aesthetic value belongs to the field of aesthetic study. The aesthetic thoughts and principles related to heritage can be studied as the aesthetics of urban heritage. This part regards the aesthetic thoughts of pioneers, successors, and developers of heritage value as the origin and composition of the aesthetics of urban heritage.

Architectural aesthetics, garden aesthetics, and the aesthetic value defined in the document of Historic England are incorporated into the study content of aesthetic value of urban heritage. Thereby, there are two development tracks (FIG. 3.9): line one summarizes the aesthetic theoretical development of European urban heritage over the past century; line two focuses on the aesthetic development of Chinese urban heritage.

Riegl's aesthetic thought reflected on the monument conservation

Artistic value belongs to present-day values (*Gegenwartswerte*) in Riegl's value system, which refers to the owner's aesthetic value. The understanding of artistic value depends on the development of contemporary artistic ideological trends, evaluating historical buildings from the perspective of contemporary art will weaken the artistic value originated in history. In Riegl's idea, the artistic value of a historical building must be kept in its place or environment, not restored to its perfect and immoral status. Artistic value is composed of newness-value (*Neuheitswert*) and relative artistic value (*Der relative Kunstwert*).

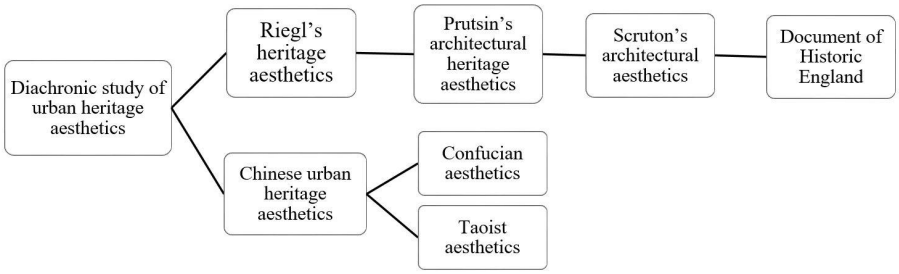

FIG. 3.9 Development process of urban heritage aesthetics (Huang Huang)

The newness-value refers to a new state of a work, which expresses itself clearly through visual perception, namely a brand-new condition of reconstruction. Newness-value requires that historical buildings are renovated to meet the artistic will (*Kunstwollen*) of modern people. Riegl opposed the newness-value, because the newness-value reshapes the connotation of historical buildings and eliminates the original artistic value of its historical evolution. When a historical building accords with its contemporary aesthetic standard and has not been destroyed or forgotten into oblivion by the time, the newness-value based on the modern period will

TOC

cover-up the old artistic value. On the other side, relative artistic value refers to the value of historical buildings for today, emphasizing the relation between historicity and modernity. Riegl's relative artistic value reflects the authentic principle of the heritage value, he argued that predecessors' works are not only appreciated from the perspective of human creation, but also their specific forms and colours.[163] The influence of relative artistic value on the aesthetics of urban heritage is reflected in the respect for history, as well as the aesthetic standard of each period, so that obtaining the aesthetic value of urban heritage is a visible and continuous process.

The aesthetic value of urban heritage involves the perception of beauty. The document of Historic England defines that aesthetic value derives from the ways in which people draw sensory and intellectual stimulation from a place.[164] British conservation architect B. Feilden understands this stimulation directly in terms of emotional values which originates from wonder, identity, and adoration.

This perception of beauty is obviously influenced by the concepts of *Einfühlung* and *Gestalt* in psychology. According to the former theory, an art work is contagious when the experiencer feels as if he/she is living in the life of art work. Thereby, beauty is the result that people find joyful experience in an object. The latter believes that each self-conscious experience or perception is a complex incident, and beauty is therefore an ensemble of emotions, associations, memories, impulses, perceptions, stripping any element would destroy the whole. According to American architectural scholar Talbot Hamlin's view, the aesthetic intensity of art work lie in this huge collection of different reactions.[165]

In fact, before the psychological influence on aesthetics, the experience effect of Riegl's age value is quite similar to the definition of aesthetic value of heritage. Age value is described as like a catalyst that triggers viewer's sense of a life cycle, the acquisition of this instant emotion neither relies on academic knowledge nor on professional education, because it is simply triggered by senses and perception.[166] Regardless of experts or general public, they can perceive this emotional power which is as universal as the sentiment aroused by religion. This power across time

163 Riegl, A. (1982) *The Modern Cult of Monuments: Its Character and Its Origin.* Massachusetts: MIT Press, p. 647.

164 Historic England (2008) *Conservation Principles Policies and Guidance-for the sustainable management of the historic environment.* London: Historic England, p. 72.

165 Hamlin, T. (1952) *Forms and Functions of Twentieth-Century Architecture, volume: The Principles of Composition.* New York City: Columbia University Press, pp. 8-12.

166 Riegl, A. (1982) *The Modern Cult of Monuments: Its Character and Its Origin.* Massachusetts: MIT Press, p. 624.

satisfies humans' emotional needs in modern times. However, the age value is a double-edged sword. While people are astonished that the age value has shaped the transformation process of historical buildings, the buildings themselves also decline gradually. This power that arouses the emotional resonance will finally vanish until the decline goes beyond a certain limit. Thereby, the age value is replaced by the patina of age, according to Historic England, when the patina of age enhances the appearance of a place, it has the aesthetic effect of stimulating people's sentiments. The experience effect of age value is the original source of aesthetic value.

Aesthetics of architectural heritage developed by Prutsin is an integral part of urban heritage aesthetics

Russian architectural scholar O. I. Prutsin studies the value based on the conservation of historic buildings. He believes that artistic value is the form determined by the architecture or building groups, which reflects the architectural style and architectural era. Since the construction period of architectural works acts in cooperation with a particular age, the restoration of a historical building to its original state has significance for the division of the architectural era. It not only reflects the architectural aesthetic value of confirming the historical period and the mode, interest, technical process of the architectural works during construction, but also represents the development level of the building materials in a specific historical period.[167]

Architectural work which belongs to an architectural era will represent an architectural style. Accordingly, the maintenance of the architectural style of a specific architectural era means that a historical building is restored to its original time to express its style characteristics, detailed decorative elements, and the most original representatives of the architectural era.[168] Likewise, a deep understanding of the original status of the architectural style can help related stakeholders (architects, restorers) better conduct the restoration process, and get additional beneficial information about the specific architectural era. It can be seen that the concept of the architectural era proposed by Prutsin is complementary to the architectural style: architectural era determines the architectural style; architectural style reflects the architectural era. Here the value based on the architectural era and style is similar to the Riegl's historical value, the difference is that Prutsin proposed it as an architectural aesthetic value. Historical value and artistic value interact and

167 Prutsin, O.I., Han L. (translator) (1997) *Architectural and Historical Environment* (建筑与历史环境). Beijing: Social Sciences Academic Press China, p. 50.

168 Ibid., p. 51.

permeate mutually; historical value can reflect artistic connotation; artistic value must be interpreted through historicity.

If the concept of architectural era developed by Prutsin offers the chronological order of determining historical buildings in architectural history, the architectural aesthetic standards in terms of engineering structure and architectural art elements reflect the stylistic characteristics of the architectural era. Characteristics of the architectural engineering structure, according to his idea, is considered to be the unique feature; characteristics of architectural art elements means that historical architecture often maintains unique architectural details or decorative elements, which is the reflection of aesthetic theory in renovation and restoration.

If Prutsin's architectural aesthetic thought is considered to be the inner standard of aesthetic value, the artistic-emotional value is manifested the external standard of aesthetic value. He believes that the value of historical buildings, groups as a whole is beneficial to people's sentiments and thereby responds to people's emotions. Aesthetic value can be identified based on the existing colourful or monochrome sculpture, decorations, semi-relief, and relief.[169] He believes that the colour, decorations of building form, and the interconnection between the decorations not only better represent the architectural significance, but also greatly influence on human's mentality.[170]

It can be seen that there is a certain connection between aesthetics, artistic-emotional value developed by Prutsin and aesthetic value interpreted in the document of Historic England. Due to different scope of research object, Prutsin's study is dedicated to explore the value of historical buildings during the conservation process, and value evaluation is more specific in the field of architecture. The document of Historic England covers a broader scope, not only focused on historic buildings, but also extending to heritage of place. Therefore, the two theories can be combined to build up the framework of aesthetic value of urban heritage.

The influence of Scruton's architectural aesthetics on the aesthetic value of urban heritage

The above theory is derived from the aesthetic value aroused by the result. English scholar R. Scruton is engaged with the study of architectural aesthetics to guide

169 Ibid., p. 54.

170 Ibid., p. 55.

people in how to understand architectural aesthetics, which is namely associated with value judgements.

As the beauty of architecture exists in the form that is adapted to the utility function, the purpose of architectural art is obviously different from the practical function, and the relationship between different goals and methods thus emerges. In this regard, Scruton introduces English philosopher R. G. Collingwood's discovery: the truth of architecture is an indistinguishable synthesis of art and craft, and it is reasonable to incorporate architecture into a certain form of art for study so as to make architecture has the main aim of art: expression. To this point, the roof of traditional Chinese building shows a form of artistic expression, which implies ancient Chinese worship of phoenix bird through cornices and eaves (FIG. 3.10).

FIG. 3.10 Cornice of the Hall of Supreme Harmony (www.teenfolklore.com.cn)

Based on Collingwood, Scruton acknowledges that it is the fundamental idea of expression as characteristic, or even principal, aim of art.[171] If art and craft are

171 Scruton, R. (1979) *The Aesthetics of Architecture*. London: Methuen Publishing, p. 13.

distinguished by expression, then the craft in building activities can only be the medium of artistic expression. Moreover, the expression takes place after the entire art work is completed. Consequently, the expression of architecture is part of the realization of the inner life, through the act of expression, just what the feeling is.

Meanwhile, Scruton points out that a more important distinguishing feature of architecture is provided by its character as a public object.[172] Hence the expression of architecture is different from other artistic expressions: other arts not only become objects of people's free choice, but also acquire much of their expressive character from the personal manner in which we may approach them.[173] However, the expression of architecture is not of this private kind, because they consist rather in the objective representation of style and manner, in impersonal and unspecific meanings that speak to us as though from far away and with a public voice.[174] Consequently, architecture is classified by Scruton as pure symbolism, and the concept of style and manner is considered as the general refinement of his objective expression of architectural art.

Generally speaking, the expression of architecture not only exists in the objective representation, but also is reflected in the experiencer's subjective perception. This objective expression contains the evidential value of urban heritage; while the experiencer's perception acts as the foundation of the communal value aroused by the people's memories; these two values are reflected in the same place through the aesthetic value.

The aesthetics of a place originates from the identification of the aesthetic quality of place. Scruton deems that humans, as rational beings with a past, a present, and a future, recall those things that are placed in central to the experience of architecture. We will allow no question of function to be answered independently of the appropriateness of a building, not just to its function, but to a style of life.[175] This appropriateness refers to the harmony, symmetry, and appropriate balance between different components, which can reflect the beauty of architecture; this appropriateness represents the aesthetic value of the place in terms of order, harmonious state between the whole and details. As the aesthetic thought is incorporated into design, so buildings and places can reflect the corresponding aesthetic quality. For example, Plato's thought that proportionate form is beautiful

172 Ibid., p. 13.

173 Ibid., p. 13.

174 Ibid., p. 14.

175 Ibid., p. 36.

and Hegel's thought that beauty is included in volume and order these two can be proved in buildings and places through design. The style of life not only refers to people's daily activities, but also includes labour, consumption, and spiritual life. It shows people's need for living amenity and aesthetic mentality. Essentially, the aesthetic value is understood as people's experience and possession of the aesthetic quality of a place. Therefore, the urban heritage, regardless of present-day or future, should satisfy the need of life style, society, and harmony with nature. It can be seen that Scruton's aesthetic thought serves as a methodology for identifying the aesthetic value of urban heritage, and objectively lays a foundation for the study on the aesthetic value of urban heritage.

Aesthetics of urban heritage in the Chinese cultural context

The aesthetics of Chinese urban heritage traces back to Confucianism and Taoism. The Confucian and Taoism culture are established by the framework of traditional Chinese imagery thinking. This imagery thinking initially came into being as the original Confucianism. This original Confucianism of ancient times- *Wu* (shaman), acted as the interactive medium between human and heaven in the activities of ritual and divination. Therefore, original Confucianism forms a specific poetic way of thinking in the recognition of the relationship between human and heaven.[176] The book *I Ching* (Books of Changes), which was written in the late Shang and early Zhou dynasties, was compiled on the basis of two ancient divination books *Lian Shan Yi* and *Gui Zang Yi*. *I Ching*, essentially is a summary product of Chinese people's imagery thinking. The ancient literature *Ten Wings*, which was compiled in the late Warring States Period, is the earliest commentary on the *I Ching*. From the poetic thinking of original Confucianism to the *I Ching*, the evolution reflects the formation process of Chinese mind pattern.

The cognitive method of *I Ching* is based on the understanding of images abstracting from viewing (观物取象). In the text of *I Ching*, "heaven hangs down celestial phenomena, upon observing what is auspicious and inauspicious in them, the sages represented it (天垂象，见吉凶，圣人象之)."[177] Here the word images refer to two aspects: (1) natural images; (2) images created by wise men and expressed through symbols. The "Bagua is ordered, and the image is covered in it", the hexagram is a kind of image which expressed through symbols.

176 Liu, T. (2015) *The Confucian Gene of Chinese Classical Gardens* (中国古典园林的儒学基因). Tianjin: Tianjin University Press, p. 20.

177 O'Neill, T. (2016) *Ideography and Chinese Language Theory: A History*. Berlin/Boston: De Gruyter. Footnote 1046.

Another derived concept of observing the image and taking the idea (观象取意) is the further interpretation of *Ten Wings* on the basis of *I Ching*. The *Ten Wings* explains the abstract affair in terms of hexagrams and lead to the transition from substance to rational thinking. This thinking process uses analogy, association, comparison, and exaggeration to formulate a symbolic relationship between image and idea, skipping the intermediate reasoning process and drawing the final conclusion, so as to achieve the goal of expressing the society with the approach exploring the idea/meaning through images (立象尽意).[178]

The rational spirit of the pre-Qin philosophers was formed in this period. The Confucianism and Taoism promote the greatest influence in the process. Essentially, Confucianism and Taoism share commonalties in origin,[179] that is, the thinking mode and the procedure of images abstracting from viewing are basically the same. However, in terms of the strategy of governing the state, Confucianism aims to regulate the family and rule the state orderly, which reflects realistic and practical characteristics, Confucian thinking emphasizes social order and rectifies negative aspects. The strategy of Taoism is conducted by considering the relationship between people and the universe. Chinese Taoism represented by Laozi and Zhuang Zhou keeps a huge sense of reverence for the vast and complex universe, they advocate that all things are nourished together without interfering with one other so that people's minds are calmed and achieve the aim of stopping war. Therefore, Confucianism and Taoism are different in observing the image and taking the idea.

In spite of their differences, the same way of thinking brings about the same effect. Confucianism found balance, harmony and beauty in the design of social management. Taoism, on the other hand, rejects conflicts of interest and takes the coexistence between people and universe into consideration, the harmony and beauty are discovered by means of this interaction. The ideas of Confucianism and Taoism were applied into the early literature and art works, which forms the origin of Chinese aesthetics. Both architecture and garden landscaping belong to the art category. Consequently, the aesthetics shaped by Confucianism and Taoism serves as the important foundation of aesthetics of Chinese urban heritage.

The contribution of Confucianism to Chinese aesthetics is reflected through Confucius's aesthetic thought of the sages made their emblematic symbols to set forth fully their ideas (圣人立象以尽意). It is manifested as an evolutionary process

178 Yang, Q. (2017) The Introduction of mindset of *I Ching* (周易思维方式概论), in Liu, D. (ed.) *The Compilation of I Ching* (大易集成). Shanghai: Shanghai Scientific and Technological Literature Press, p. 352.

179 Liu, T. (2015) *The Confucian Gene of Chinese Classical Gardens* (中国古典园林的儒学基因). Tianjin: Tianjin University Press, p. 18.

from a thinking mode to an aesthetic principle, advocating the unity between art form and content. This established image takes the image symbol as an indication, which can be found in architecture, gardens, as well as all levels of social culture. Architectural forms, roof decorations, and decorative patterns can represent the faith, hierarchy, and the ideas related to health, longevity, prosperity in the personal life.

The aesthetic principle of exploring the idea through images is not only reflected in the unity of art form and content, but also deepened into the beauty of images and artistic conception. From the understanding of mindset, image and idea are separated: image acts as the medium or instrument for exploring the idea, while the idea or meaning is identified as the sage's mind that transcends the image. For example, animal ornaments on ridges is a kind of ritual expression of sage's mind. In the 5th century, the concept of image proposed by Chinese literacy critic Liu Xie's work *The Literacy Mind and Carving of Dragons* was the first compound word that was included in the aesthetic category. He believed that when you climb a mountain, the emotions expand to fill a mountain; when you gaze out over the ocean, its meaning overflows the ocean,[180] such statement reflects the combination between mind and substance, it is a perceptual world created by aesthetic activities. Therefore, from the mindset to aesthetic category, and even the highest level of aesthetics- artistic conception, all satisfy the aesthetic principle of exploring the idea through images advocated by Confucianism. Chinese aesthetician Zong Baihua believed that artistic conception is to discover the richest emotion in the fusion of feelings with the natural setting, and at the same time, penetrating into the scene, a scene that is more crystal clear than one layer; the scene is full of emotion, the emotion is made concrete as the scene. It can be seen that this specific aesthetic logic is rooted in the Chinese imagery thinking. Deduced from the description, the artistic conception of classical gardens serves as a new image generated in the realm of the fusion between emotion and scene. Specifically, the artistic conception is the result based on the relationship of scene, realm and emotion.

180 Williams, M. N. (2014) *Imitations of Self: Jiang Yan and Chinese Poetics*. Leiden: Brill Publishers, p. 198.

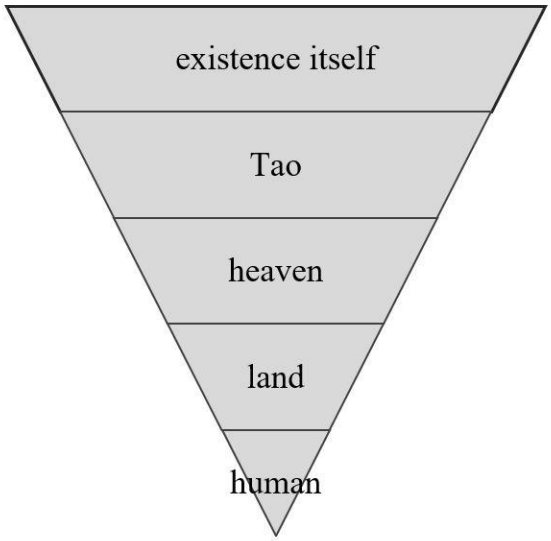

FIG. 3.11 Laozi's cosmic hierarchy (Huang Huang)

The contribution of Taoism is reflected in the aesthetic standard which is based on philosopher Laozi's *Tao follows Zi Ran* (自然,meaning: existence), as well as the influence from Zhuang Zhou's romantic thought on art.

In the Laozi's *Tao Te Ching*, he proposed the way that can be articulately described is not the unchanging way (道可道，非常道).[181] Here Tao refers to the recognition of the law of nature and substance. The Tao must follow the principle of doing nothing that goes against nature. Furthermore, he believed that human lives according/on the land, the land lives according/on heaven, heaven lives according/on Tao, Tao lives according/on Zi Ran (人法地，地法天，天法道，道法自然), which represents the relationship between orders in the universe (FIG. 3.11). Tao lives according/on Zi Ran means Tao is manifested as the natural formation, which serves as the basis of aesthetics of Chinese classical gardens.

Humans are insignificant compared to the vast and complex universe. However, Laozi's thought of coexistence between human and universe directly affects the ancient Chinese urban planning and residential layout so as to reflect the cosmic pattern that correspond to the starry sky. Therefore, British sinologist Joseph Needham deemed that the Chinese vernacular dwellings in urban and rural areas,

181 Wilson, W. S. (2013) *Tao Te Ching: A New Translation*. Boulder: Shambhala Publications, p. xxx.

regardless of whether centralized or scattered in the field, often reveal a distribution corresponding to the cosmic pattern, as well as the symbolism of direction, season, wind direction and constellation, because he characterizes the Chinese worldview as seeing a "harmonious cooperation of all beings… they were all parts in a hierarchy that formed a cosmic pattern."[182]

FIG. 3.12 Scroll About in Spring, diverse spatial proportions and rules were applied into the painting, which deeply affected the Chinese garden landscaping in the following periods (Ziqian Zhan)

Zhuang Zhou, the follower of Laozi's thought, confirmed that images abstracting from viewing indicate the relationship between the vast universe and the insignificant human. He enlightened us with a sharp contrast: compared to the universe, all interests and greedy desire are absurd. As a result, the aesthetic value from Zhuang Zhou is shaped as a romantic style, which has influenced Chinese landscape poetries and paintings (FIG. 3.12).

Landscape painting is freehand work instead of figurative work, so the method of small by the grand sight (以大观小) is applied into the design of painting and garden, seeing bigger from small matters (小中见大) is the feature. Garden designers use the method of small by the grand sight to arrange the spatial layout of classical gardens, conceived as a kind of picturesque scene and further integrated into garden. In the process of gardening, rockery is used to symbolize mountains, and ponds are used

182 Ronan, C. A. (1978) *The Shorter Science and Civilization in China Volume I.* Cambridge: Cambridge University Press, p. 306.

to symbolize the lake and sea, all approaches aim to reflect the indication of seeing bigger from small matters.

Since the essence of Chinese classical gardens is a spiritual residence filled with deep social significance and aesthetic value, the layout and artistic technique are the external forms and expressions of the essence. Therefore, gardens can adopt all artistic measures such as literature, painting, and calligraphy to serve the essence of the spiritual residence.

3.2.3 Value of scientific restoration

3.2.3.1 Structural analysis of the value of scientific restoration

The value of scientific restoration is an important category in Prutsin's value concepts. The process of scientific restoration covers the identification of the evidential value and the common value of places, which includes the renovation of the historical value and the aesthetic value of places. The generation of this type of value is related to the work of restoration, renovation and reconstruction. Depending on the period of restoration and the type of restoration work, the scientific restoration value has the following types:

Value of add-on architectural form

Although the purpose of restoration is to protect the building's comprehensive system, its detailed decoration or the resetting of its pure function will also change the appearance of the building. These changes form an add-on architectural form system, and this hierarchical system embraces the order of the form of add-on components, such alternation or restoration may have positive or negative academic evaluation.[183]

183 Prutsin, O.I., Han L. (translator) (1997) *Architectural and Historical Environment* (**建筑与历史环境**). Beijing: Social Sciences Academic Press China, pp. 56-57.

Value of the initial form change of the historical building

The change of the initial form of the historical building completed in its last year of construction still represents a fixed historical, engineering or aesthetic meaning.[184] Prutsin takes the famous Russian architectural heritage Cathedral of Vasily the Blessed of Moscow as an example (FIG. 3.13). Although the cathedral completely loses its original form from the 16th century, the domes built with other architectural materials in the later period has made this magnificent masterpiece become a spiritual symbol of Russian nationality. Now it is not only unnecessary to restore it to the original form of the 16th century, but also it is totally unreasonable to transform its current closed windowless corridor into an open penetrating porch of that time.

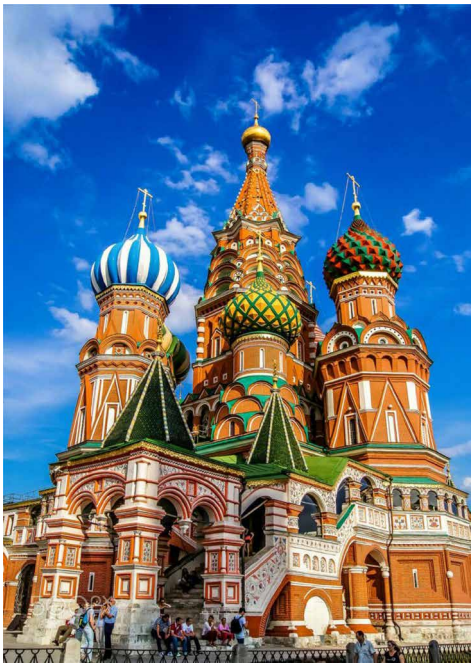

FIG. 3.13 Russian architectural heritage: Cathedral of Vasily the Blessed of Moscow (fanpop.com)

184 Ibid., p. 58.

TOC

Value of the historical building during renovation/restoration

Since the restoration period protected the original details, partial forms, and even created the conditions for confirming the system of historical buildings,[185] this is the meaning and value during the process of restoration. Therefore, in Prutsin's theory, the restoration or renovation actions completed in each historical period should be evaluated with scientific evidence, just like discovering the architectural design, style, form, and characteristics of a specific historical period. Not only does the architectural restoration reflect the artistic taste of that time, it also shows the ability of engineering technology in accordance with the historical development of architecture.

The value of scientific restoration emphasises the original attributes of the historical value without rigidly adhering to the original attribute. It acknowledges the relationship between values during the historical restoration and the modern restoration, especially the quintessence part left in the historical restoration. His scientific restoration value not only reflects Riegl's relative artistic value, but also resolves the contradiction between artistic value and historical value in Riegl's value system, which has theoretical significance. In practice, the value connection of monument protection between contemporary and history was established.

3.2.3.2 Diachronic discussion related to restoration and reconstruction

For a long time, the protection of Chinese architectural heritage tended to restore or reconstruct the historical buildings. The first reason is that most Chinese historical buildings are wooden structures, and there are very few wooden structures that have been preserved for more than five hundred years. The second reason is that Chinese people always prefer newness value but neglect the historical value and age value as far as Riegl's concepts are concerned. Consequently, the phenomenon of demolishing the old and rebuilding the new once extremely prevailed from the 1980s to 2000s. Afterwards, under the influence of the conservation of cultural heritage from western world, it has been gradually realised that it is meaningless to get the newness value through reconstruction based on the damage to the original value of historical buildings. But there has been one-sided negative criticism about restoration and reconstruction, which totally denies their positive significance.

185 Ibid., p. 59.

In fact, the restoration approach in some cases could be rational and feasible. The Pantheon of Rome restored by Gustavo Giovannoni is such a typical successful case. Such restoration is to keep the historical value and the unity of artistic style of the Pantheon in the classical antiquity. Another case is Great Buddha Hall of Nanchan Temple of Wutaishan (FIG. 3.14), built in the Tang dynasty (782 CE), which is currently the oldest timber building in China. However, the changes over a thousand years completely covered the original appearance of the hall; chaotic architectural style make the building nearly lose its aesthetic value. The hall was restored in the 1970s, and the historical value and artistic value of the Tang dynasty are clearly reflected after the restoration.

FIG. 3.14 The Great Buddha Hall of Nanchan Temple of Wutaishan (Zhugang Zhang)

As far as the reconstruction, Riegl argued that the cult of historical value, although only acknowledges that the original work has documentary meaning, it is willing to reluctantly acknowledge the value of the reproduction if original work irretrievably lost. Riegl's thought endowed reconstruction with the meaning of reduplication, however, the reconstruction must be conducted based on some certain conditions, just Riga Charter points out, in exceptional circumstances, reconstruction of cultural heritage, lost through disaster, whether of natural or human origin, may

be acceptable.[186] Reconstruction is acceptable only if it is based on a complete and detailed literature on the original state and without any subjective conjecture. Take the reconstruction of the ancient city gates of Suzhou as an example. Since the year 2000, a series of ancient city gates of Suzhou have been rebuilt under the official guidance and implementation, these water and land gates are surely not the replica of ancient city gates. But the most important is that the reconstructed city gates corresponds to that of ancient *Map of Pingjiang*. Moreover, it is beneficial for the canals to draw water and control flood from the sense of natural environment; the reconstruction activities do not just consider the function of city, as urban monuments left to future generations, but the city gates also reflect people's recollection of history at present.

The value of scientific restoration not only retains the evidential value of places in the restoration activities, but also indicates the communal value that reflects the place identity. Restoration and reconstruction mean people adopt a kind of historical reproduction to pursue past memories, so that ethnic cultural identity is inherited in the future. Hence, the value of scientific restoration is closely bound with the communal value and it can be fully understood as the latter for a long time.

3.2.4 Additional and specific aspects of communal value

Structurally, additional and specific aspects of communal value consist of a series of sub-wholes which contains commemorative/symbolic values, social value, and spiritual value.

186 ICCROM, Latvian National Commission for UNESCO (2000) *Riga Charter on authenticity and historical reconstruction in relationship to cultural heritage.*

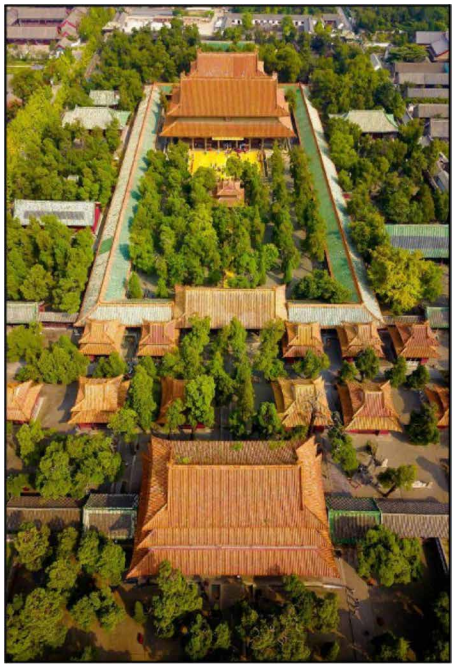

FIG. 3.15 The Temple of Confucius in Qufu (Xulei Guo)

3.2.4.1 Commemorative and symbolic values

Commemorative and symbolic values reflect the meaning of a place for those who draw part of their identity from it, or have emotional links to it.[187] The memories that are rooted in places evoke past lives and events. From the diachronic perspective, commemorative value can be traced back to Alois Riegl's value classification: intentional and unintentional.

An intentional historical monument is constructed to keep a significant historical event or a figure's story or, achievement in the memories of future generations; this represents a people's psychological need for memory of major events. The intentional commemorative value is closely related to nationalism and ethnic groups to reflect national identity and pride. The Temple of Confucius in Qufu is the largest and highest- standard Confucian worship architecture in China (FIG. 3.15). It was

187 Historic England (2008) *Conservation Principles Policies and Guidance-for the sustainable management of the historic environment*. London: Historic England, p. 31.

first built in 478 BCE, most of building groups in contemporary are relics from the 14th to the 19th century. An unintentional historical monument is not left with the aim of acting as authentic evidence of art and culture for later periods, but rather because of the precious historical value at the present; it becomes a masterpiece that is worthy of passing onto future generations. For example, the Temple of Heaven in Beijing (FIG. 3.16), due to its symbolic meaning of interaction with the heaven, it becomes a specific place where emperors of the Ming and Qing dynasties sacrificed for the heaven, prayed for blessings and rain.

FIG. 3.16 The Temple of Heaven (Fong Chen)

3.2.4.2 Social value

"Social value is associated with places that people perceive as a source of identity, distinctiveness, social interaction and coherence. Some may be comparatively modest, acquiring communal significance through the passage of time as a result of a collective memory of stories linked to them. They tend to gain value through the resonance of past events in the present, providing reference points for a

community's identity or sense of itself."[188] It can be seen that social value needs to be understood in terms of diachronic perspective. Although British conservation architect B. Feilden recognizes the historical building from the wider social and economic benefits, he still believes that the social value of historical building acts as the identity of social groups and cultural continuity. Furthermore, the concept of social value in the *Principles for the Conservation of Heritage Sites in China* is interpreted as the value that society derives from the educational benefit that comes from dissemination of information about the site…as well as the social cohesion it may create, which more emphasizes the potential effect that influences society.[189] However, the inherent value of urban heritage is overwhelmed by its extensional social effect. Just like Harrison points out that heritage has little to do with the past in China, but is actually a practice of shaping the future.[190] In the document of Historic England, utility and markets values, and instrumental benefits, are different from heritage values in nature and effect.[191]

3.2.4.3 Spiritual value

Spiritual value is often associated with places sanctified by longstanding veneration or worship, or wild places with few obvious signs of modern life. Their value is generally dependent on the perceived survival of the historic fabric or character of the place, and can be extremely sensitive to modest changes to that character, particularly to the activities that happen there.[192] The recognition of spiritual value of urban heritage depends on the impact of major events of urban history on future generations; as well as the faith of ethnic groups in this area. However, it should be noticed that not all urban heritage categories have powerful historical events or inherited faith.

The relationship between the above value-subcategories and places, may relate to an activity that is associated with the place, rather than with its physical fabric, social

188 Ibid., p. 32.

189 ICOMOS China (2015) *Principles for the Conservation of Heritage Sites in China*. Beijing: Cultural Relics Press, p. 61.

190 Martinez, P. G. (2018) Social Values and Urban Heritage Authenticity: A Perspective from China. In Zhu, W. and Zhou, J. (eds) *Sustainable and Inclusive Development, Diversified Practices in Global Cities* (**可持续与包容性发展，全球城市的多元实践**，2017**年同济大学城市与社会国际学术论坛论文集**). Shanghai: Tongji University Press, p. 153.

191 Historic England (2008) *Conservation Principles Policies and Guidance-for the sustainable management of the historic environment*. London: Historic England, p. 27.

192 Ibid., p. 32.

values tend to be less dependent on the survival of historic fabric.[193] Therefore, according to the classification of Historic England, these belong to the additional and specific aspects of communal value. In summary, the basic value category based on the HUL method includes historical value, aesthetic value, value of scientific restoration, and additional specific aspects of communal value.

3.3 Holistic value category based on the HUL method

From the general system theory proposed by Austrian biologist Ludwig von Bertalanffy to American scientist John Henry Holland's Complex Adaptive System (CAS) theory, all stress the totality of the system, namely, a whole which is greater than the sum of its parts. This view indicates that a system has holistic value.

The urban heritage, according to the *UNESCO Recommendation on the HUL*, includes monumental heritage of exceptional cultural value, non-exceptional heritage elements that are present in a coherent way with a relative abundance, new urban elements. Urban heritage in broader sense includes tangible and intangible components. Thereby, the concept of urban heritage is a complex system composed of various elements that interact with each other. Its holistic value not only serves as historical context of a state or an area, but plays an important role in urban development and urban sustainability.

193 Ibid., p. 32.

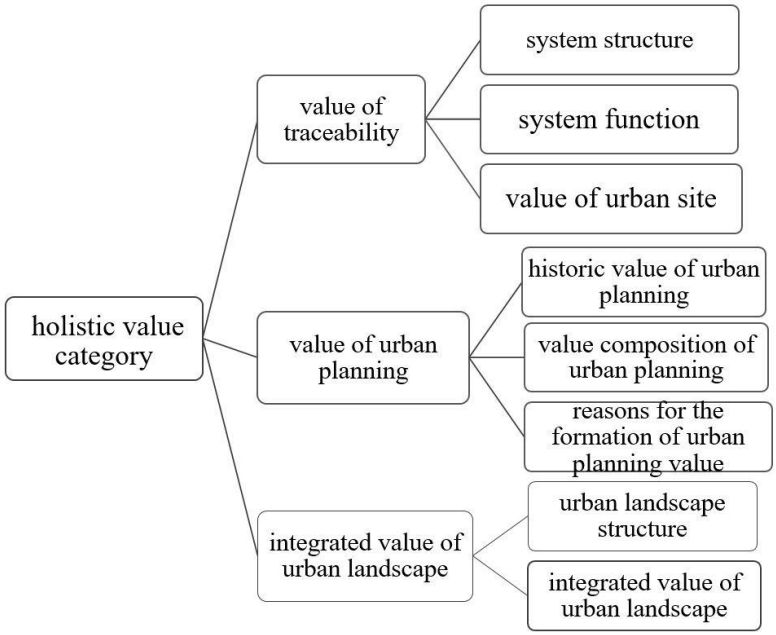

FIG. 3.17 Structural diagram of holistic value category of urban heritage (Huang Huang)

The unity between urban heritage and urban landscape indicates that urban heritage is an integral part of the urban ecosystem. American urban ecologist Marina Alberti believes that the urban ecosystem as a coupled human ecological system that evolves through the dynamic interactions between human and ecological functions.[194] Meanwhile, she further proposes that urban ecosystem are complex adaptive systems with multiple equilibria.[195] As a result, urban heritage covers two implications: it acts as an integral part of this complex adaptive system; for another, urban heritage is also a self-contained system. Correspondingly, the study on the holistic value not only should be placed in the urban ecosystem, but also be treated as an independent whole, so that the holistic value related to urban heritage is explored from many aspects.

In this study, the holistic value of urban heritage is presented through three aspects: value of traceability, value of urban planning, and integrated value of urban landscape (FIG. 3.17).

194 Alberti, M. (2008) *Advances in Urban Ecology: Integrating Humans and Ecological Processes in Urban Ecosystems.* New York: Springer Science+ Business Media, p. 269.

195 Ibid., p. 15.

3.3.1 Value of traceability

The value of traceability of urban heritage constructed by the HUL method implies that the place where urban heritage is inscribed, is in the city plan. It is not only an integral part of the organic whole of the urban ecosystem, but also acts as the fundamental level of urban heritage. Therefore, the city plan has the holistic value of urban heritage in the sense of basic hierarchy.

Value of traceability refers to the primary source value relative to other values, which is transformed from American philosopher Holmes Rolston III's idea that the creativity of the natural system is the mother of value.[196] Based on this perspective, patches and plots in the urban ecosystem are created by the natural system. The basic city plan, to which the urban heritage is attached, is shaped and influenced by the urban ecosystem. According to Alberti's view, human beings serve as the controlling factors in the urban ecosystem, the current city or town plan inherits the urban design and layout which were created by people in the early stage. Based on the city plan, people arrange and adjust the layout in terms of the partial function and metabolism of carrier. The built blocks, streets, squares, and buildings that enclose street and squares become the basic elements of urban organization, the structure of urban organization is formed by the interrelationships between these basic elements, which is manifested in that the urban structure is characterized by street network, subject to city plan, as it establishes the pattern that defines other artificial features in the town. It also forms the link between these artificial features, site, and the past existence of the town. Therefore, the relation between city plan and urban organization actually represents the idea of holism. This organic whole not only includes the whole of the city plan created by the urban ecosystem, but also includes the whole of urban organization composed of the basic elements of the city plan. Therefore, the value of traceability which dominates the city plan refers to the causal relationship rooted from the influence of the whole on the parts/components.

The value of traceability is reflected as a generative whole at the level of systematic function of urban heritage. Because the nature in the urban ecosystem is a whole that precedes the part, and the whole creates the part, the part constitutes the whole. Thereby the organic whole of the urban ecosystem is a generative whole. Urban heritage is a sub-system of the urban ecosystem, which is also a generative whole through the interconnection and interaction with the natural environment. Here the holism of system is identified based on the functions.

196 Rolston, H., Yang, T. (translator) (2000) *Environmental Ethics* (环境伦理学). Beijing: China Social Sciences Press, p. 10.

System function resonates with system value. The system function is represented as a process, whereas the system value is a kind of creative process.[197] System value manifests vitality and creativity, only the operation of the system can produce those resources of biological and instrumental value.[198] It reflects the generating effect of whole on part. The city plan coupled by the patches (ecological units) and plots (economic units) is a complex whole integrated with the ecological environment, which can promote, coordinate, couple, and nourish the "parts" of urban system. For example, the importance of water resource and vegetation in a city reflects the generating effect of whole on part.

This chapter adopts the HUL method to understand the value of traceability in terms of system structure and function, which indicates that the holistic value is bound to be greater than the sum of its parts after analysing the cross-section structure and functions of the system. From this perspective, the value of traceability is sustainable.

In fact, the value of traceability of urban heritage is related to the urban site selection in the Chinese context. The ancient literature *I-Ching* believes heaven and earth are in order, all things are well arranged (**天尊地卑，乾坤定矣**), which initially originated from astrology of ancient astronomy. This idea taking heaven and earth as a reference for positioning has profoundly affected the politics and culture of ancient China, as well as the selection of city sites. Thus, the specific landscape enclosure model emerged and was popularized in many ancient Chinese cities (FIG. 3.18).

Chinese philosopher and politician Guan Zhong in the Spring and Autumn period suggested an important principle for urban site selection and construction: a capital city should be built near the large river instead of the location at the foot of mountain; the sufficient water supply must be guaranteed to prevent from drought; the embankment construction can be saved, if the urban sites keep distance from the flood (**凡立国都，非于大山之下，必于广川之上。高毋近旱而水用足，下毋近水而沟防省**[199]). The urban site of Suzhou is located on the south bank of the lower reaches of the Yangtze River, which not only accords with Guan Zhong's idea of urban site selection, but also includes the advantageous natural conditions such as fertile soil, pleasant climate, and convenient water transportation. Therefore, the selection of

197 Rolston, H. (1989) *Environmental Ethics: Duties to and Values in the Natural World*. Philadelphia: Temple University Press, p. 188.

198 Palmer, C., McShane, K. Sandler, R. (2014) Environmental Ethics. *The Annual Review of Environment and Resources.* (39), pp. 419-442.

199 Li, X. (2004) *Collation and Annotation of Guanzi* (**管子校注**). Beijing: Zhonghua Book Company, p. 82.

city site undoubtedly has a natural advantage for the value of traceability of urban heritage in the aspects of system structure and function.

FIG. 3.18 A traditional Chinese village in southern Anhui: the whole village is enclosed by mountains and water, the value of traceability of a city or a village depends on the its site (Yu Dao)

3.3.2 Value of urban planning

Austrian urban planner Camillo Sitte proposed that the historic city carried with it a specific aesthetic value which is superior to that of the modern city, Sitte's contribution is manifested in: it establishes the historic city as an aesthetic model, a source of inspiration for modern design.[200] After the Second World War, the concept of urban planning was mainly understood as an act of planning and related to physical design of built form, as well as a natural extension on the basis of architectural art and civil engineering.[201] It contains three interrelated contents: urban planning is the planning of physical and spatial form, urban design is the core of urban planning, the preparation of overall plans and detailed layout.[202] From Sitte's contribution to the urban planning theory after the Second World War, their research methods are all based on the system approach integrating morphology with typology, which considers the city as an independent system.

200 Bandarin, F. (2012) *The Historic Urban Landscape: managing heritage in an urban century*. Chichester: Wiley-Blackwell, pp. 10-11.

201 Taylor, N. (1998) *Urban Planning Theory since 1945*. London: SAGE Publications Ltd., p. 8.

202 Ibid., pp. 8-11.

According to the HUL method, urban planning is hierarchically organised based on the existing urban fabric and layout. The planning map that depicts the future development of a city is regarded as a blueprint, the value of urban planning is realised ultimately when the historic fabric keeps harmony with the life style, production, function of future. Therefore, the urban planning indicates a progressive process that turns systems thinking into holistic value. Since urban planning expresses the land utilization, only the urban planning combined with the urban ecosystem can transform the systems thinking into the holistic value of physical spatial form. It can be seen that the perspective of the HUL method includes two aspects: the holistic value of urban planning based on synchrony, and the holistic value of urban planning based on diachrony. The latter refers to the sustainability of the value of urban planning, as well as the persistent influence on the urban development.

In the early 1990s, Russian architectural scholar Prutsin proposed that the value of urban planning should be attributed in the conservation theory. According to his viewpoint, the value of urban planning involves the planning system associated with buildings, the historical environment in which the building is located, as well as the division of the spatial system.[203]

Furthermore, Prutsin classified four aspects of the value of urban planning: historical value of planning system, the scale of architectural space in historical cities, the significance of historical buildings in the conservation of architectural historical environment (architectural composition, building colour), the panoramic townscape formed by combining different periods with different styles of buildings.[204] It can be seen that Prutsin puts forward the category of the value of urban planning in combination with the value composition of urban design. In addition to the historical value of planning system, the other three aspects can be understood as the value composition of urban planning. Since urban design serves as the central topic of urban planning, the value of urban planning is naturally reflected through the value composition of urban design. Correspondingly, the proportional relation, composition, colour, and the formation of panoramic outlines in the urban design represent the interconnection between the part and the whole from different angles. When the interconnection is applied into the urban heritage composition, the non-exceptional heritage elements constitute the first level, the monumental heritage serves as the second level, and the new elements are adopted as the third level. This hierarchical relationship regards a city as a whole, which not only satisfies the urban

203 Prutsin, O.I., Han L. (translator) (1997) *Architectural and Historical Environment* (建筑与历史环境). Beijing: Social Sciences Academic Press China, p. 46.

204 Ibid., p. 48.

function, but also represents a complete and harmonious urban fabric. Therefore, the value composition of urban planning is the holistic value which is achieved through the planning system at the level of physical spatial form.

Here the origin and influential factor of the value of urban planning should be explained. As the holistic value of urban planning is dominated by the culture in a certain historical context, the urban planning shaped by the ethnic culture can be reflected in the value composition of urban design. For example, the influence of ancient Chinese astronomy on the urban pattern shapes the specific street layout of magic square as well as related proportion and scale, which still has been left in some cities for a long time.

Based on Prutsin's urban planning theory, the historical significance of urban planning, the value composition of urban planning, and the reasons constitute the value of urban planning. These three parts are seen as the holistic value of diachronic structure in the evolution of urban heritage.

When urban planning is associated with the urban landscape of the urban ecosystem, the holistic value of urban heritage can also be conveyed by the role of urban landscape.

3.3.3 Integrated value of urban landscape

Integration generally means the process of collecting elements or things together through aggregation so that an interconnected organic whole is formed. The integration of urban landscape means that the interdisciplinary collaboration brings the interconnection between human and ecosystem, which is possible to occur at the level of integration.[205] Therefore, the holistic value of urban heritage can be conveyed by means of the integrated value of urban landscape.

The integration of urban landscape acts as the result of applying the hierarchical theory of complex system to urban landscape. Since the complex system is represented as a hierarchical structure, the subsystems consisted of lowest level parts become the components of higher level system. Therefore, hierarchical theory is appropriate for the simulation and evaluation of urban landscape from different fields and perspectives.

205 Alberti, M. (2008) *Advances in Urban Ecology: Integrating Humans and Ecological Processes in Urban Ecosystems*. New York: Springer Science+ Business Media, pp. 47-49.

When the decomposable principle is used in the analysis of urban landscape, the vertical structure of urban landscape is regarded as the hierarchy, and the horizontal structure of urban landscape is regarded as a subsystem. Hierarchical level is consistent with structural and functional units that operate on spatial-temporal scale. Subsystem of horizontal structure are formed by the coupling between patches (ecological units) and plots (economic units).[206] This simulated urban landscape with hierarchical patches can explicitly represent hierarchy of interactions between human and biophysical agents, further identify multiscale patterns and processes (bottom-top drive and top-bottom restriction).[207] The bottom-top drive in the process indicates that urban landscape originates from the coupling of plots and patches. The top-bottom restriction refers to the urban management. Therefore, an urban landscape model with a clear spatial-temporal scale is a comprehensive integrated model. This integrated model contains sub-models based on the interdisciplinary collaboration, which necessarily reflects corresponding integrated value of a city.

The integrated value of the urban landscape is a new value category in this study. This concept is inspired by the "UrbanSim" model of American ecologist Marina Alberti's research team, adopting the urban landscape as an approach of aggregating all individual elements. The Alberti research team connects "UrbanSim" with the Land Cover Change Model (LCCM) based on microsimulation of human activities to predict the environmental pressure, including land conversion, resource use and pollution emission (FIG. 3.19), which makes the comprehensive integrated model of urban landscape become an approach of aggregating all individual elements.

The structure of integrated model treats the principal objects as households, businesses, buildings, land, infrastructure, natural resources, and various biophysical components. In particular, the production and consumption activities are added into the input criteria so that changes of ecological influence and land cover can be predicted. According to Alberti's research result, the integrated value of the model includes: 1. the business productivity and the consumption activities of the household link together through land use and land cover, as well as explicit characterization of infrastructure and biophysical process; 2. coupled with human models are a series of biophysical and resource models, resource demand and supply models can be integrated to provide predictions of water, energy, and material usage, which will then be linked to coupled models of consumption and infrastructure

206 Ibid., 63-69.

207 Ibid., 63-69.

capacity; 3. mass-balance models will simulate pollution loads into atmosphere, water, and soil, and estimate the ratio of various pollution sources; 4. feedback mechanisms, which mean that ecological changes will have two-way feedback on the location choices of households and businesses, and the availability of land and resources. Its role has two aspects: the attractiveness of social functions and related economic value; ecological function of vegetation cover: removing air pollution, improving climate, absorbing rainfall, which offers ecological services for urban residents.[208] Therefore, the model integrates city and the functions of ecological components into the interaction process between different levels; the integrated value is greater than the sum of the parts.

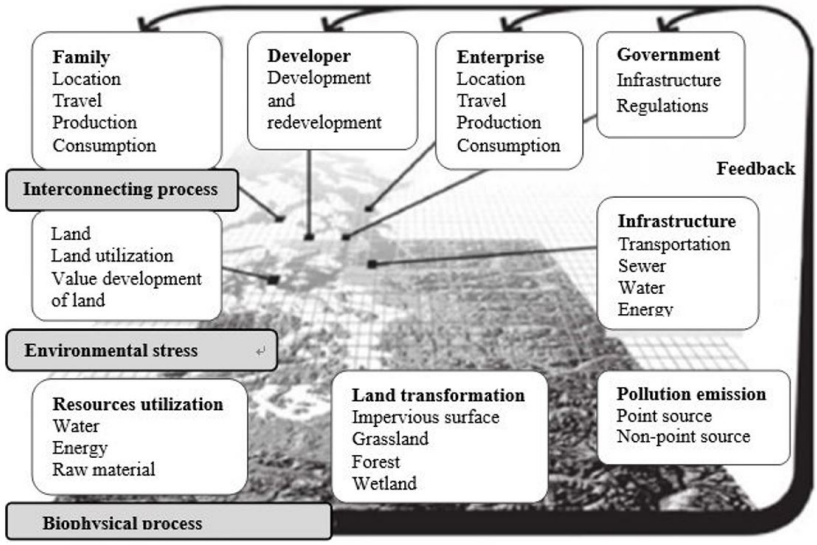

FIG. 3.19 Scientific model: land exploration-ecological coupling model (Marina Alberti)

Summary

The chapter applies the HUL method to construct the value system of urban heritage, including the basic value category and the holistic value category (FIG. 3.20). Apart from the value of scientific restoration, contents of basic value category originate

208 Alberti, M. (2008) *Advances in Urban Ecology: Integrating Humans and Ecological Processes in Urban Ecosystems*. New York: Springer Science+ Business Media, pp. 47-49.

from the document of Historic England. In particular, historical value and aesthetic value are derived based on the evidential value and communal value and have been widely agreed upon by most researchers as the intrinsic value, which become the important reference of UNESCO outstanding universal value. Since the value of scientific restoration proposed by Prutsin exists in the urban heritage, this study incorporates it into the basic category of urban heritage value.

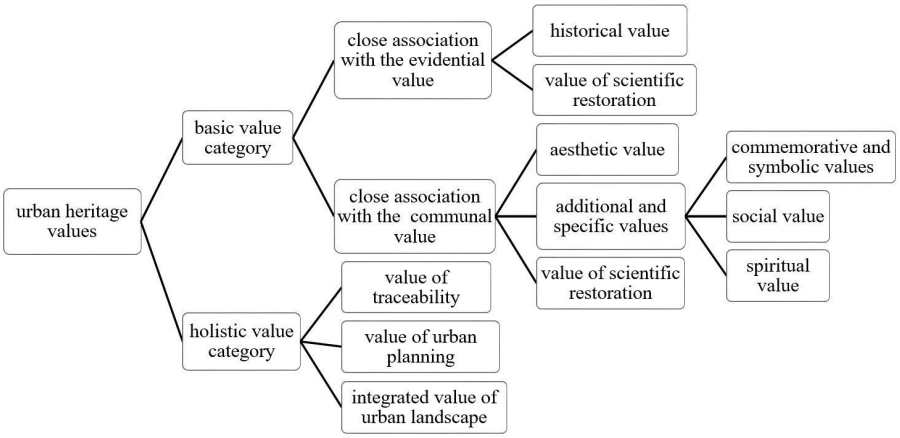

FIG. 3.20 Diagram of urban heritage values (Huang Huang)

The innovation point of this chapter is to adopt the HUL method to construct the holistic value category of urban heritage. The holistic value belongs to a specific type of urban heritage. If the holistic value is neglected, there is no difference between the value of urban heritage and the heritage value. In this study, the basic value category and holistic value category share a high degree of commonality. The traditional Chinese aesthetic theory and theory of urban construction are added into the value system of urban heritage, which is quite appropriate to the value identification in the Chinese context. Therefore, the value system of urban heritage constructed by the HUL method includes both communality and individuality. The value identification of urban heritage indicates the practical significance can be discovered as long as the value analysis of vernacular characteristics is complemented into the system.

The ancient city of Suzhou has a history of more than 2,500 years. It experiences periodic process of destruction and restoration on its original urban site. In this process, monument heritage, large-scale fabric composed of non-exceptional elements, and new urban elements together constitute a complex system in terms

TOC

of their interdependence relationships. Just American urban theorist L. Mumford pointed out "through the material fact of preservation, time challenges time, time clashes with time: habits and values carry over beyond the living group, steaking with different strata of time the character of any single generation, layer upon layer, past times preserve themselves in the city."[209] The existing ancient city of Suzhou not only manifests the continuity of Chinese cultural context in a specific area, but also reflects the interdependent relationship between heritage types divided by structure. Hence, Suzhou is a historic city with extremely high value characteristics. It can be used as a carrier to evaluate the rationality of the urban heritage value in the practical sense.

209 Mumford, L. (1970) *The Culture of Cities*. Harvest Books: p. 4.

4 Analysis of Suzhou's Urban Heritage Values

Urban heritage can be understood as a complex system based on the coexistence of multiple historical forms. Considering the relation between system and holism, South African stateman J. Smuts deemed that wholes are not mere artificial construction of human thought but the signs of a real great evolutionary process, every organism is a whole with specific internal organization and self-direction. It is an organic whole of a certain structural and specific function in terms of a series of interdependent and interacting parts. Structurally, the wholeness of urban heritage is composed of monumental heritage, large-scale fabric, and new urban elements. They are the first level sub-wholes of urban heritage, which can be further divided into sub-wholes at two and three levels. Its system function is an expression of utilization, and the function leads to the progressive change of system structure. Therefore, the synchronic and diachronic studies apply to the analysis between interactions of sub-wholes of urban heritage on account of structure and function.

The value of urban heritage reflects the relationship between subjectivity and objectivity. The synchronic study on the value object includes two aspects: first, the relationship between heritage unit and town plan, as represented in the location and layout of each unit on the urban planning. Second, the structural relationship within the heritage itself, it reflects the material use, technical level and aesthetic standards of a certain historical period. These two relationships interact mutually and evolve in terms of different historical periods. Accordingly, the HUL system method is introduced in this dissertation to study the value object. Since the HUL system method is to establish a systematic thinking in the field of human cognition, it can discover valuable clues and casual relationship in the study, playing a role in conveying the information between value object and standards. Correspondingly, researchers can make value judgement according to the systems thinking given by the HUL method, namely, how does study case reflect the various standards of the value system of urban heritage. Therefore, the value analysis of urban heritage is a normative analysis introduced by the HUL system method.

4.1 Basic value of the urban heritage of Suzhou

From the composition of urban heritage, it can be seen that the first level of Suzhou's urban heritage is composed of historic monuments, large-scale fabric and new urban elements. At this point, the five heritage categories under the historic monuments (timber structure building, brick-timber mixed structure building, pagoda, classic garden) constitute the second level, which can be regarded as having five sub-systems. Based on the HUL system method, we regard the heritage in each category as a node or segment in the process of category evolution, and conduct a structural analysis to discover the value category according to its importance.

From the study of basic value in chapter three, we can see that there exist several levels of historical value and aesthetic value, which are closely related to the evidential value and communal value of high-level. Therefore, historical value and aesthetic value play an outstanding role in forming the basic value category of urban heritage.

4.1.1 Historical value

Riegl's historical value refers to the fact that human activities reflected in historical buildings are in a special historical stage, which are specific and recordable. It is consistent with Prutsin's view of defining historical value from the historical building itself, since they all use historical evidence to illustrate historical value. According to the document of Historic England, "places with illustrative value will normally also have evidential value."
Therefore, illustrative value fits historical value judgement of urban heritage very well. But interpreting history with the visible evidence of place involves methodology. The theoretical source of the HUL method is system theory, which treats the visible evidence of place as a system element, the meaning of element is derived from the system structure and function. That is to say, the HUL method can place visible evidence in the structure and evolution of heritage, and objectively explain the historical value of heritage.

4.1.1.1 Historical value of Suzhou wooden architecture

The historic wooden architecture of Suzhou is an extremely important type in the urban heritage of Suzhou. The wooden architecture is regarded as a segment in the Chinese architectural history; by adopting the HUL method, the structural analysis is deduced in the following: apart from base, column, and roof, the bracket (Dougong) is a critical structural component that connects the column and roof (FIG. 4.1).

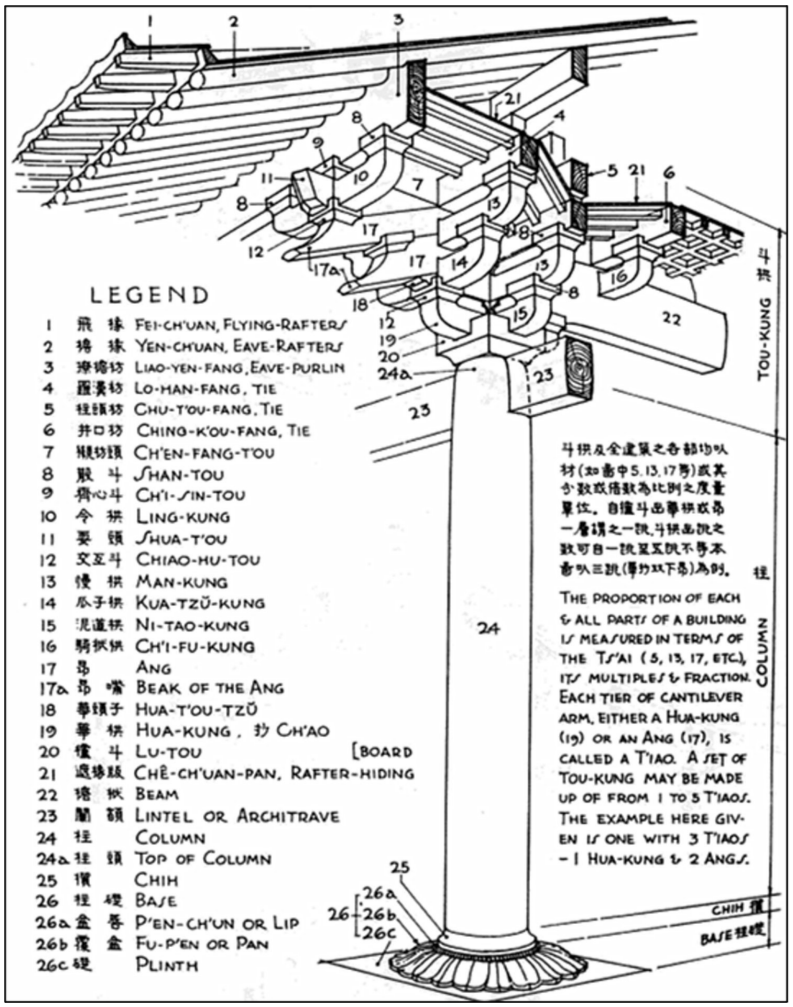

FIG. 4.1 The structure of Chinese wooden architectural framework: base, column, and bracket (Sicheng Liang)

TOC

The bracket is mainly composed of four parts: dou (斗), gong (拱), ang (昂), fang (枋). The function of dou is to support, it means various square woods are connected by means of mortise and tenon structure. Gong is placed on the dou and has the function of stretching out. The main function of ang is to adjust the height of the eaves. Fang is a long wood with a rectangular cross-section, which is arranged along the cornice line parallelly. As well as serving as cantilever, the function of fang is to connect each bracket into a whole. It can be seen that the bracket is an overhanging structure that is supported by various components, which acts as a balance in the whole wooden architecture.

According to the diachronic study, the evolution of bracket serves as a vital clue in the development of Chinese wooden architecture. When ang appeared in the bracket structure in the 9th century, it marked the completion of the basic approach of Chinese wooden architecture. At that time, the scale and structure of bracket reached its historical peak, its height was between 2/5-1/2 of the column height. From the 10th to the 11th century, since the brick walls improved the anti- rainwater erosion ability, it objectively created conditions for the shortening of eaves of wooden buildings. Hence, the height ratio of the bracket in the whole wooden structure began to shrink, and the height of the bracket was about 30% of the column height. Since the 12th century, Chinese wooden architecture emphasized the delicate lightness and changes in form, and developed towards standardized direction in technology. The Sanqing Hall of Suzhou is such a wooden structural heritage of this period (FIG. 4.2).

FIG. 4.2 The Sanqing Hall of Suzhou: the representative work reflecting Chinese architectural technique of the 12th century (Gisling)

In terms of synchronic perspective, the past evidence provided by the Sanqing Hall of Suzhou not only manifests the standardized layout of *Yingzao Fashi* in the inner column network, but also retains the traditional architectural craft of the 12th century and the Cai-Fen modular system. As the restoration work changed the upper eaves structure after the fire disaster in 1817, its beam of upper eaves adopted the column and tie construction to make the whole structure more stable (FIG. 4.3). The structure of its lower eaves is similar in shape to the description in the *Yingzao Fashi*. The lower eaves are about the six-grade cai (FIG. 4.4), and the height-width ratio is nearly 2:1; the upper eaves are about the third-grade cai, the height-width ratio is nearly 3:2.

If the Sanqing Hall of Suzhou is regarded as a sub-system in the wooden architecture, the past evidence serves as the element of this sub-system. A series of these elements constitute a holistic structure, and the meaning of the structure is to reflect the historical value based on the system function. As a unique case in the Chinese architectural history, the architectural technique of the 12th century is sufficiently applied into the Sanqing Hall of Suzhou, which is a succession of the Cai-Fen modular system from the ancient Chinese architectural treatise *Yingzao Fashi*.

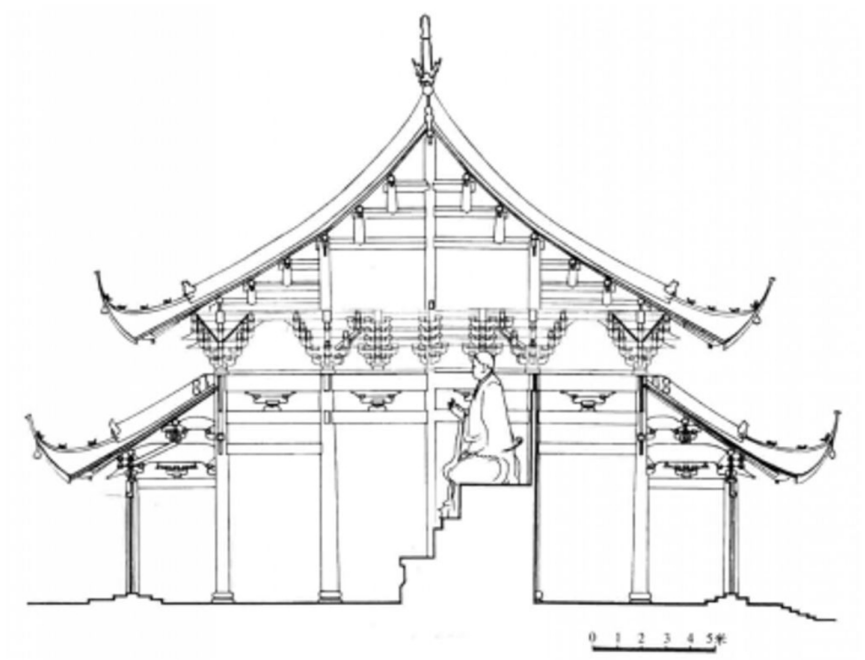

FIG. 4.3 The section of the Sanqing Hall of Suzhou (Daiheng Guo)

The Dacheng Hall of Suzhou Confucian Temple (FIG. 4.5), rebuilt in the 15th century, was in the reform period in which the wall materials change from rammed earth to brick. The Dacheng Hall adopts the structure of the combination of the palace-type and column-tie type, and abandons the traditional stack-up approach, which weakens the structural function of the wooden bracket. Meanwhile, the brick wall replaces the load of part of the wooden frame. In front of the bright room on the south side, there is a non-floor column standing on the back of the lower eaves beam (FIG. 4.6). This structure makes the brick walls replace the column of the outer eaves.

Thereby, the change of frame weakens the function of the wooden bracket in the sense of structure, which proves the progress of ancient Chinese architectural technique.

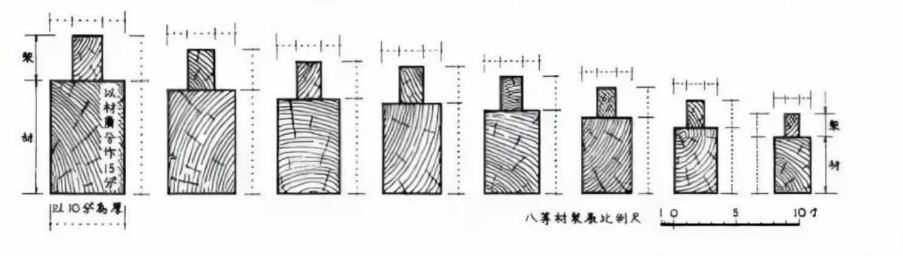

FIG. 4.4 Cai-Fen modular system defined in the Yingzao Fashi: 8 grades, the six-grade Cai and the third-grade Cai are applied into the construction of the Sanqing Hall (from left to right) (Yingzao Fashi)

In terms of the advancement of building technology, the Qing Ministry of Works issued the *Gongcheng Zuofa* (Technical instructions for building crafts) in 1734. The Kou-Fen system was adopted to determine the width of doukou (mortise of cap block), which is divided into eleven grades (FIG. 4.7), the other various components are calculated according to several multiples of the width of doukou.
Compared with the Cai-Fen system, the height of gong is used as the standard in the *Yingzao Fashi*, whereas the width of gong is used as the modular standard in the *Gongcheng Zuofa*.
Both are aimed at controlling the building grade and material consumption, and technically strive to achieve the result of confirming the building standards.

The existing traditional wooden buildings of Suzhou such as the Zhongwang Mansion and the Quanjin Guild Hall (FIG. 4.8) witnessed that the ratio of bracket-column was reduced to 1/5 or 1/6, and they also witnessed how the *Gongcheng Zuofa* regulated the craft methods, material names, function, and connection with a certain part of the position.

FIG. 4.5 The Dacheng Hall of Suzhou Confucian Temple (Jakub Hałun)

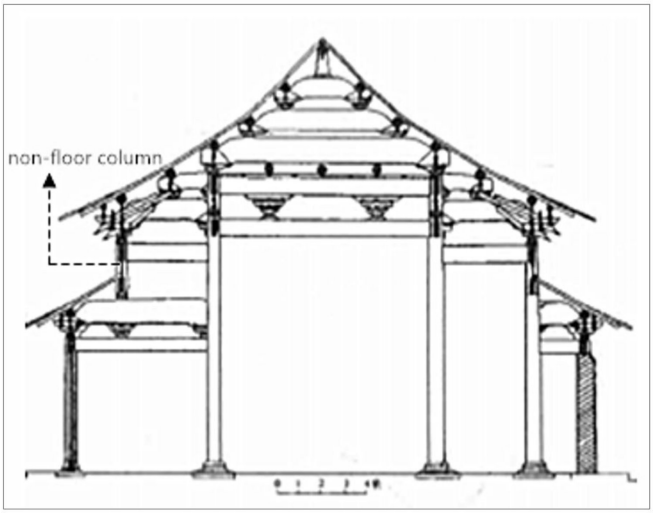

FIG. 4.6 The section of the Dacheng Hall (Shichao Lin)

In general, the wooden bracket (dougong) not only is an important architectural component, but acts as a clue of Chinese wooden architecture. The evidential value

of the wooden building heritage represented by the Sanqing Hall, the Dacheng Hall and the Quanjin Guild Hall of Suzhou reflects the evolutionary process from pure structural components to decorative components. Meanwhile, together with the other components, the wooden bracket reveals the historical value of Chinese wooden architecture: since the 12th century, a strict construct logic towards standardization has been confirmed with advances in building materials and technology.

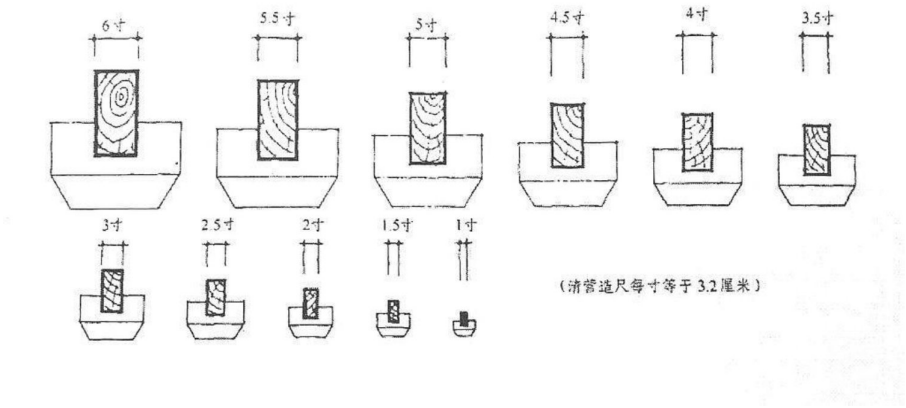

FIG. 4.7 The Kou-Fen system defined in the Gongcheng Zuofa (Gongcheng Zuofa)

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FIG. 4.8 The Quanjin Guild Hall of Suzhou: the wooden brackets and the decorative ceiling (Siyuwj)

4.1.1.2 Historical value of the Beamless Hall of Suzhou

To evaluate the historical value of urban heritage by means of the evidential value, it is necessary to conduct a structural analysis of urban heritage within the context of historical evolution. The Beamless Hall of Suzhou was built in 1618 (FIG. 4.9), this time period is in the mature stage of Chinese brick-arch technology. The double-centred arch and the triple-centred arch with a ratio of 1.1: 1 between the vector height and the span, based on the practical experience, gradually substituted the semi-circular arch, which became the main form of the brick arch.

The Beamless Hall of Suzhou, which applied this craft technique, provides the past evidence of the double-centred arch line. Chinese architectural historian Pan Guxi found that the double-centred arch approximates the optimal arching curve proved by mechanics, that is, the inverted catenary.

Consequently, the stress state of the double-centred arch is better than that of the semi-circular arch with zero side thrust on the side of the arch.

FIG. 4.9 The Beamless Hall of Suzhou Kaiyuan Temple (Suzhou Municipal People's Government)

Based on the structural analysis of the HUL method, the Beamless Hall of Suzhou is characterized by the treatment of the horizontal thrust generated by the barrel arch. In terms of the layout of the barrel arch, the axes of the barrel arches on the same floor are perpendicular to each other, the bottom barrel arch and the upper barrel arch are arranged at a 90-degree angle to reduce the horizontal thrust of each wall (FIG. 4.10, FIG. 4.11). Therefore, the exclusive buttresses set on the upper and lower floors replace the heavy wall of the early beamless hall, which plays an important role in stabilizing the wall.

The vertical intersection of the barrel arches and buttresses serve as the evidence for dealing with the horizontal thrust generated by the barrel arch.

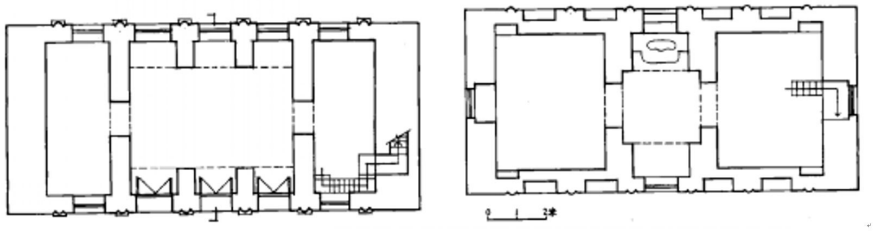

FIG. 4.10 The Beamless Hall of Suzhou: the plan of the ground floor (left) and the plan of the second floor (right) (Guxi Pan)

FIG. 4.11 The section of the Beamless Hall of Suzhou (Guxi Pan)

The key technique of the vault of the Beamless Hall of Suzhou is manifested in the connection between the circle plane of the vault and the square plane of the wall (FIG. 4.12). On the surface, the forms of the barrel arch and vault are different, but there is no essential distinction on the technical level. The barrel arch is a two-way force structure for generating the arch, while the vault can be regarded as the result of the 360-degree rotation of the arch in space. Technically, the vault provides evidential value for the arch technology.

The past evidences provided by the Beamless Hall of Suzhou include: the double centred arch line, the buttress, and the technique of barrel vault. On the one side, these evidential values illustrate the characteristics of Chinese brick arch structure, as well as possibility of engineering craft skill in a specific architectural period; on the other side, the historical value of the Beamless Hall of Suzhou is mainly reflected in the technical value.

FIG. 4.12 The inner structure of the Beamless Hall of Suzhou: the connection between the circle plane of the vault and the square plane of the wall (Sicheng Liang)

4.1.2 Aesthetic value

Aesthetic value means the value derives from the ways in which people draw sensory and intellectual stimulation from a place.
It is the sensory and perceptual experience that the experiencer obtains through a certain place under the guidance of aesthetics. It means that aesthetics is related to human thoughts, emotion, and judgements, and proves that the aesthetic value has the function to help people in developing aesthetic ability. As the British philosopher R. Scruton pointed out, the first task of aesthetic must lie in the correct understanding of certain mental capacities, the capacities for experience and judgement.

According to the systems thinking of the HUL method, the aesthetic value not only has a specific function, but also manifests a structural relationship. Based on the artistic design, the structural relation is divided into three categories: design value, product of informal design, and the influence resulting from the action of nature on human works, which constitute the aesthetic category. Since the composition of the aesthetic value is to judge what kind of aesthetic value a place contains. It can be regarded as a classification standard for the aesthetic value of urban heritage. People perceive the aesthetic quality of places by means of this standard, and further experience the aesthetic of urban heritage through the aesthetic quality of

places. Various types of aesthetic values motivate people's sensory and perpetual experiences evoked by the aesthetics of urban heritage, and take the feedback as people's identification of the meaning and aesthetic quality of the place. This identification reflects the communal value; therefore, the communal value is the basic standard of aesthetic value.

The classification and standard of aesthetic value serve as the basis to judge the aesthetic value of urban heritage. However, the value analysis process is implemented by the HUL method. The place is first regarded as the result of art work in the historical evolution, and the communal value represented by the aesthetic quality of place is explored in accordance with the classification standard of aesthetic value.

4.1.2.1 Design value: traditional roof

The Chinese traditional wooden architecture is characterized by the roof. The traditional building roof acts as the critical foundation for the recognition of the aesthetic value of Chinese traditional wooden architecture.

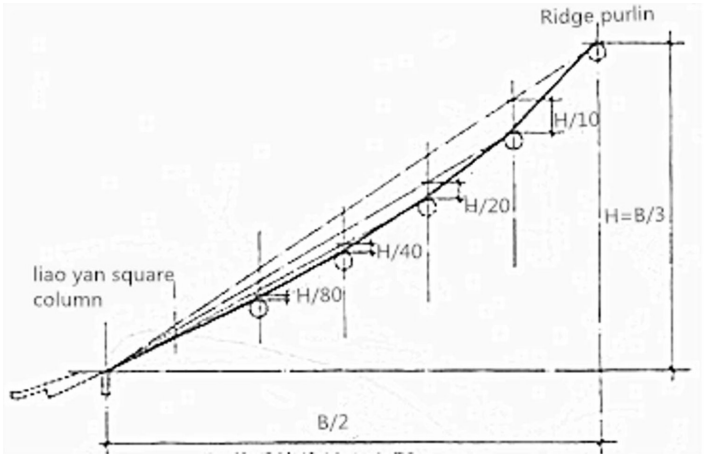

FIG. 4.13 Diagram of Juzhe: B means the distance between eave-purlins, H means the ratio relation between the height of ridge purlin and the distance (Illustration of Chinese classical architecture 中国古典建筑图释)

Based on the perspective of diachrony, it can be found that the there is a vivid metaphor of ancient Chinese buildings in the *Classic of Poetry* (诗经): *like a bird*

which has changed its feather; like a pleasant on flying wings (如鸟斯革,如翚斯飞), which proves that the eaves curve of Chinese traditional buildings was formed ahead of the 6th century BCE. Besides, the roof curve is derived from the inverse warping structure of building roof, which initially generated in the 3rd century, and popularized in the Tang dynasty of the 7th century.

FIG. 4.14 Nen Qiang Fa Qiang (left) and Shui Qiang Fa Qiang (right) (Construction technology of Suzhou Xiangshan faction 苏州香山帮营造技术)

According to the perspective of synchrony, this kind of the inverse warping structure *Ju Zhe* (举折) represents the practical craft of confirming the roof slope and curved line.

Here the total height of *Ju* is first determined, namely the ratio between the height of *Ju* and eave-purlin in the *Yingzao Fashi* keeps in the range of 1/3-1/3.8. Then the *zhe* generated from top to bottom, the position of each purlin on the hypotenuse of the triangle formed by the eave-purlin is moved down by 1/10H, 1/20H, 1/40H, and 1/80H successively, thereby forming a specific roof curve (FIG. 4.13). *Nen Qiang Fa Qiang* (FIG. 4.14 left) means the application of corner beams, the support of the corner beams and the rafters, and the arrangement of rafters are parallel to the tiles, all of these components constitute the upturned roof-ridge (FIG. 4.15). *Shui Qiang Fa Qiang* (FIG. 4.14 right), which does not rely on the upturned corner beams, is completely shaped by the extension of warping tiles (FIG. 4.15). The combination of the repeating eaves curve and the corresponding curved surface produces a specific sense of rhythm, which reflects the attribute of repetition in visual art.

The design value of this traditional roof aims to find an appropriate way to adapt and connect lines and angles, so that the curved beauty of the roof is represented through the combination of the eave corner and the curve shaped by purlins. This kind of roof characterized by upturned eave corners and curved surfaces not only

reflects the structural characteristics of ancient buildings, but also has a deep symbolic connotation: the roof gives the image of a huge bird spreading its wings, which is reminiscent of the ancient Chinese people's worship for the phoenix totem, this totem symbolizes the sun bird in the ancient myth. In the ancient times, the Yinshang and Dongyi people in the middle and lower reaches of the Yellow River regarded the phoenix bird as the totem of the sun, this ancient worship connects with measuring shadow by setting up a pole when ancient Chinese people confirmed time and season by observing celestial phenomenon.

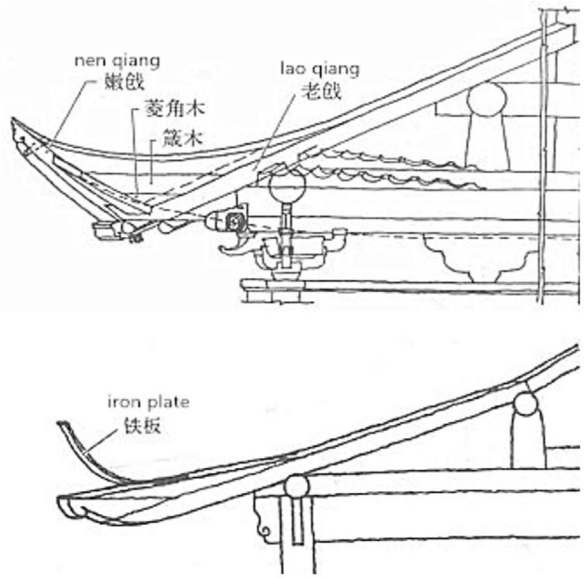

FIG. 4.15 Structural diagrams of Nen Qiang Fa Qiang and Shui Qiang Fa Qiang (Illustration of Chinese classical architecture 中国古典建筑图释)

FIG. 4.16 is made by Chinee scholar Lu Sixian based on the data of the sun's appearance at the Dawenkou archaeological site on the summer and winter solstice. If the meridian and prime vertical lines are removed, then the sundial shadow lines are connected respectively, it can be found the result is surprisingly similar to the traditional Chinese hip roof- *Wudian* (FIG. 4.17). The connected four sundial shadow lines are equivalent to the four ridges of the roof, furthermore, when the pole dot is extended, it symbolizes the main ridge of the early hip roof (FIG. 4.18). Importantly, the four corners on FIG. 4.17 are not only the location of the sun on the summer and winter solstice, but also the shadow of the phoenix bird decoration on the top of the pole.

It manifests a fact that the traditional Chinese hip roof *Wudian* was designed by the ancient Chinese ancestors inspired by the astronomical phenomena. Another traditional roof form-*xuanshan* (FIG. 4.19), which has four slightly upturned corners of eaves, still retains the Chinese ancestors' worship of the sun bird in the myth. The hip-and-gable roof, which evolves from the above two roof forms, symbolizes a bird who is about to fly. The *cuanjian* roof (FIG. 4.19), which is normally applied in the garden design, is almost identical with the location of the sun on the summer and winter solstice. The specific characteristics of these roofs are embodied in the architectural heritage of Suzhou. Hence, the traditional roof of Suzhou reflects the communal value of the Chinese ancestors influenced by ancient astronomy and worship of the sun. This communal value becomes the fundamental driving force and inspiration for the design and construction of traditional building roofs.

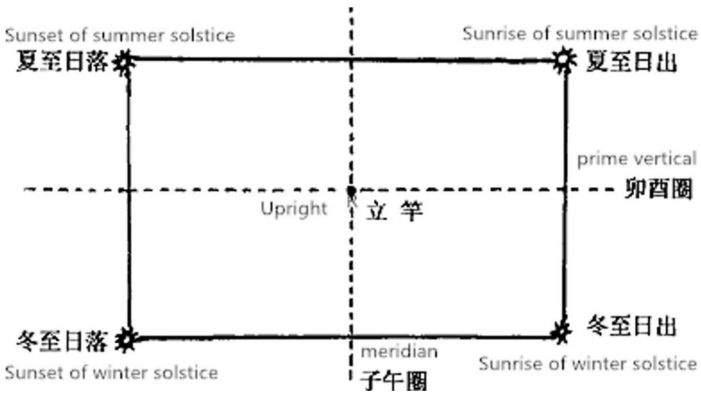

FIG. 4.16 The sun's appearance at the Dawenkou archaeological site on the summer and winter solstice (General introduction of Chinese astronomy and archeology 天文考古通论)

From the perspective of thinking, the design value of Chinese traditional roof is regarded as the result of imagery thinking, which is prominently reflected in the decoration of the palace roof. The decoration of the palace roof is a kind of indispensable component in the Chinese wooden architecture, especially the *Chiwen* (螭吻) serves as waterproof and decorative components in the ancient times.

Chiwen is a kind of traditional roof decoration which is characterized by different animals in Chinese myth. In ancient times, rulers of all Chinese dynasties used this specific decoration as the reference of the construction hierarchy. *Chiwen* can be often found in some famous monuments of Suzhou such as Dacheng Hall, Sanqing Hall, Beamless Hall (FIG. 4.20). These decorative animals are distributed on the main

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roof ridges, vertical ridges, and eaves corners, which manifest the characteristics of architectural art elements.

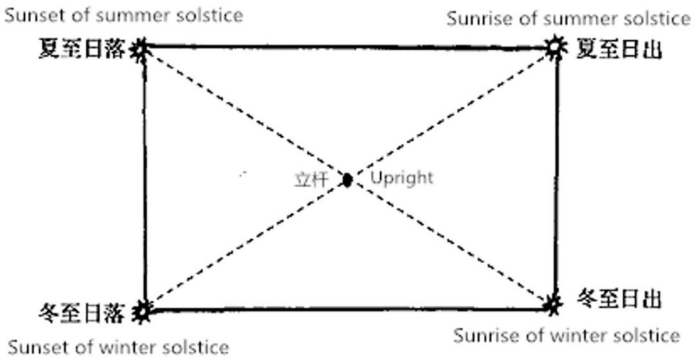

FIG. 4.17 The identity between the sundial shadow lines and the ridges of Wudian roof (General introduction of Chinese astronomy and archeology 天文考古通论)

The roof ridge represents the hierarchy, thus indicating the identity and status of the building owner. This ritual hierarchy expressed through the animal decorations reflect the influence of decoration and the interconnection between decorations on humans' mentality.

The roof decoration typified by *Chiwen* is more than a kind of architectural component, more importantly, it reflects a high symbolic imagery in the sense of spirit.

FIG. 4.18 The roof ridge changes from short to long (Sicheng Liang)

Specifically, with regard to the relationship between the known symbol and symbol connotation, the symbol is a kind of imagery metaphor, while the symbol connotation indicates the ritual hierarchy and relevant cultural concept with a metaphorical

TOC

meaning. When a symbol is applied in a specific place, the deep national culture is implicitly revealed through the perceptual form of the symbol. Hierarchy, ethics, and moralization are inadvertently conveyed to people's consciousness by the implication of a symbol, the interaction between mind and object occurs when people can perceive this imagery symbol, thereby achieving an aesthetic situation of exhausting the meaning through images. As a result, the decoration of the traditional building roof of Suzhou reflects the Chinese social hierarchy in ancient times and collective memory, which can be understood as the communal value with a certain tendency.

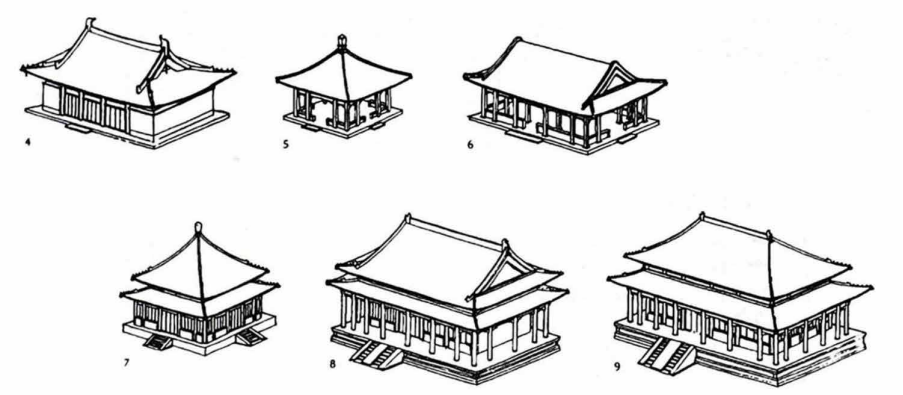

FIG. 4.19 Another roof forms: Cuan Jian and Xie Shan (Sicheng Liang)

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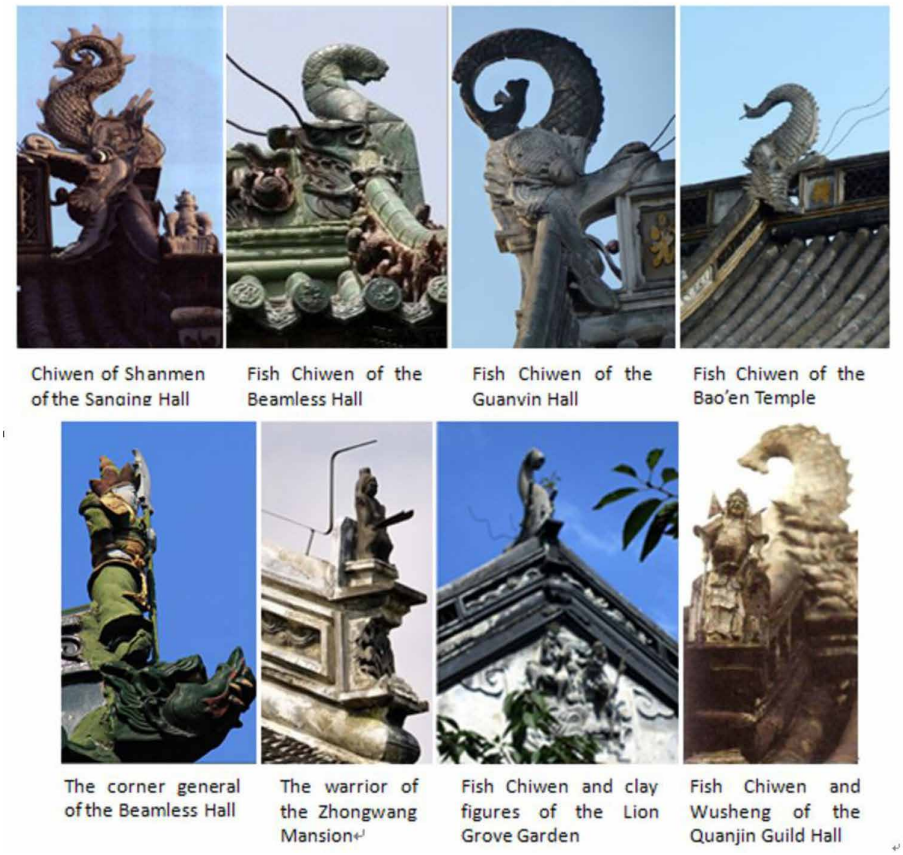

FIG. 4.20 Different Chiwen forms in traditional buildings of Suzhou (Construction technology of Suzhou Xiangshan faction 苏州香山帮营造技术, Xia Liu)

4.1.2.2 Design value: Classical gardens

The classical garden of Suzhou is composed of rockery, pool, architecture, and vegetation. Structurally, various elements are grouped together and form a network layout through paths. Consequently, the traditional Chinese private garden represented by Suzhou classical garden is not simply a pure stimulation of nature, but is constructed based on the garden designer's elaborate conception, and this conception is actually derived from the composition of ancient Chinese landscape painting.

As early as the 5th-6th century in ancient China, the landscape was not content to depict the reality, but acted as a carrier of romantic associations in spirit. The painter viewed from on high, his/her emotions are deeply affected by the sight he/she sees: trees, rivers, mountains, animals, and figures, thereby creating a rich association which plays a guiding role in the appreciator's perceptual experience. In addition, the overall layout is unified with the perspective of local object, the detailed description of figures, horses, and boats in the landscape only change in volume, all relevant elements are minimized to a certain degree in terms of different observation perspective.
The composition of perceiving small by the big view is a dynamic aerial view approach, which transcends the limitation of time and space, representing the scenery with a flowing perspective, so that the beauty of landscape is revealed through the infinite vast space.

The approaches of perceiving small by the big view and seeing bigger from small adopted in the traditional Chinese landscape painting are all reflected in the garden design. Since the landscape painting serves as the indispensable preparation for the garden landscaping, garden designers apply the skill of landscape painting to arrange the garden spatial layout, and turn every conception into reality in the process. The whole process is a creative transition from natural landscape to garden by means of the perspective of landscape painting. Here the landscape imagery conceived by painters does not only serve as design inspiration, but also garden designers pile up rockeries and construct pools according to the diverse characteristics of cliffs, ravines, rivers, and waterfalls; thereby a romantic garden that embodies more cultural connotation is created on the basis of imitation of nature. The specific composition approach can be regarded as the design value of Suzhou classical garden.

According to the systems thinking derived from HUL, structure and function reflect interdependent relationships in a system, the structure is to satisfy the functional requirement. The classical garden known as *the world in pot* (壶中天地) is a concretized reflection of the network of garden structurally, the function and purpose of classical gardens of Suzhou aim to interpret Chinese traditional Confucian idea through the implication of *the world in pot*. Essentially, the classical gardens of Suzhou are the spiritual residences of the Confucian scholar-official class who follow the seclusive creed.

Based on the consideration of diachronic analysis of the HUL method, the Chinese classical garden experiences a long evolutionary process. The Chinese classical garden initially originated from the primitive nature worship in ancient times, *Tai* (platform) and *You* (hunting-ground) are embryonic forms of the early gardens.

As early as the pre-Qin period, ancient Chinese people's recognition of basic characteristics of the universe is directly represented: both platform and hunting-ground, various early garden forms embody the contents that cover all elements in the world. This is the first time the spatial feature of the cosmic pattern of *harmony between human and nature* (天人合一) was successfully expressed in the form of garden art.
Therefore, the early garden forms have a pioneering significance in the history of Chinese garden landscaping.

However, the early garden forms, including platform and hunting-ground, are not conductive to the elaborate design and creation of garden art, because their vast scale often extends for hundreds of kilometres, which is not appropriate for appreciation during walking. From the 3rd to the 6th century, small-scale private gardens around Suzhou were popular in the scholar-officials' way of life. The landscape paintings and landscape poems perceived by their emotions provide a potential inspiration for the space design of garden landscaping. Garden designer not only imitated the features of the natural landscape by means of rich associations and subtle craft skills, but also integrate the limited *world in pot* into the infinite universe by dealing with the relationship between various elements and scenes. Hence, this inspiration of garden design represented by *the world in pot* originated from the areas around Suzhou from the 3rd to the 6th century. With the development of seclusive thought after the 9th century, the ideal of *the world in pot* became the common pursuit of the Chinese scholar-officials class, and further widely popularized.

The seclusive culture characterized by the pursuit of *the world in pot* is deeply affected by Confucianism and Taoism. Not only do Taoists tend to live in seclusion, Confucius also believed *when the way prevails in the world, show yourself; when it does not, then hide*.
(天下有道则见，无道则隐) Seclusion prevailed in ancient times due to sharp contradiction between scholar-officials and the ruling hierarchy. In addition to the pursuit of official career in the court, the garden serves as the ideal place that keeps the relative independence of personality; ancient Chinese scholar-officials tended to use gardens to achieve the goal of retreating and enjoying. This kind of seclusive culture between advance and retreat is the driving force for the development of Chinese garden art.

For the scholar-officials who pursued the seclusive ideal, they were not only the aesthetic subject of garden, but also the creative subject of garden art. By adopting the Confucian and Taoist aesthetics, the ancient scholar-officials were able to mobilize all forces to create their ideal spiritual residence. If the concept of *the world*

in pot is regarded as a specific art form of Chinese natural garden, the Confucian scholar-officials adopted this art form to express the ancient view of universe that cover all things, so that the relationship between seclusive culture and garden art can be interpreted as interior-exterior interdependence.
Therefore, the ancient Chinese private garden represented by Suzhou is rooted in the seclusive culture, its core lies in the traditional culture led by Confucianism and Taoism.

From the systemic thinking of HUL, the Chinese seclusive culture characterized by the form of *the world in pot* is embodied through the perfect combination of structure and function in the garden design. Structure reflects the interaction relation between different elements of garden; while function indicates that the garden served as the living and spiritual residence for the ancient Chinese scholar-officials based on the concept of *the world in pot*. The design value of classical gardens of Suzhou means the result of a series of reactions facilitated by seclusive culture within the traditional Chinese cultural framework. All private gardens in Suzhou are products of seclusive culture.

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Taking the central part of the Humble Administrator's Garden of Suzhou as an example, nearly all landscape elements are artificially created by the garden designer's conception (FIG. 4.21). The water accounts for 3/5 of the total area in the middle of the garden, and it is divided by two islands in the pond, buildings, curved bridges, bamboos, and trees, main buildings are built near the water. The islands, stones, and vegetations are the result of imitating the natural landscape based on the designer's conception. Culturally, when the original site of garden is regarded as a pot, all things imitating natural landscape, trees, flowers, and gorgeous buildings for recreation are elements selected from reality to express a kind of joyful world that is compatible with the pot. Therefore, the classical gardens of Suzhou represented by the Humble Administrator's Garden can be understood as the result of combination between the living environment and the spiritual satisfaction under a specific cultural framework.

The art form characterized by *the world in pot* is acknowledged by ancient Chinese scholar-officials (FIG. 4.22), since its artistic value contains the beauty that coincides with ancient philosopher Laozi's thought of *Tao follows nature* (道法自然), then appreciator obtains the emotional feedback that the garden is almost shaped by natural forces. Natural elements and buildings are not only transformed into garden landscape in the cultural sense, but also the vast cosmic prototype which covers all things is reflected through the landscape composition inspired by the idea of *the world in pot*, so that the view of universe named by the *harmony between human and nature* is revealed. Therefore, this natural garden determines the interactive relationship between the appreciator's perceptual experience and garden. It means the view of universe named by the *harmony between human and nature* is realised by appreciator's aesthetic conception. Because the aesthetic conception comes from the stimulation and feedback between aesthetic object and spirit.
Hence, the artistic conception derived from the idea of *the world in pot* is the aesthetic value of the classical gardens of Suzhou. The aesthetic conception can be summarized as the sublimation of the aesthetic principle of *exhausting meaning through images* proposed by Confucius. It can be seen that the Chinese traditional culture and the Confucian and Taoist aesthetics reflected in *the world in pot* are the communal values of classical gardens of Suzhou.

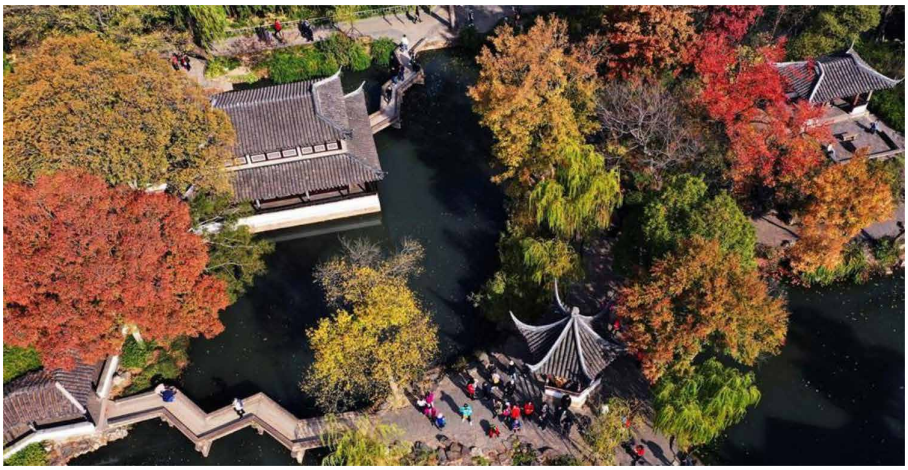

FIG. 4.21 The aerial view of the Humble Administrator's Garden of Suzhou, garden aesthetics is represented through the layout of different garden elements (Guangyi Liu)

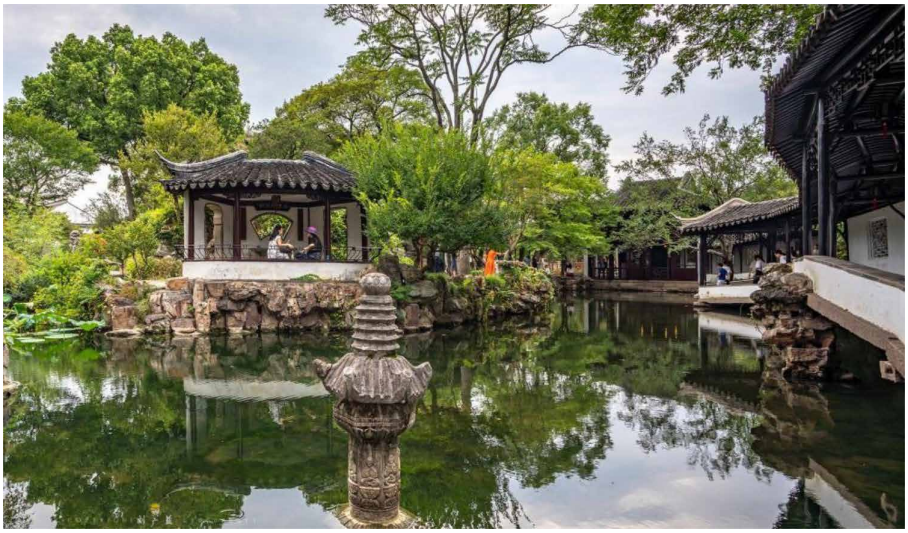

FIG. 4.22 The Humble Administrator's Garden of Suzhou: romantic art form characterized by the world in pot (Guangyi Liu)

4.2 Holistic value of the urban heritage of Suzhou

In this study, the holistic value category of urban heritage contains the value of traceability, the value of urban planning, as well as the integrated value of urban landscape.

TOC

4.2.1 Value of traceability

4.2.1.1 System structure of urban heritage

When the concept of urban heritage is treated as a comprehensive system, system structure and system function can be used to understand the holistic value of urban heritage. The urban organization that describes the urban spatial structure is an organic whole. According to organicism, an organic whole consists of a whole and related parts, the interdependent state is usually manifested as the fact that it directly or indirectly includes the causal relationship of part to part effects, the causal relationship of part to whole effects, as well as the relationship of whole to part effect.

Here the effect of whole to part is greater than the effect of part to whole, since the concept of part is often generated by the influence of the whole. Thereby, the effect of city plan on urban organization reflects the casual relationship between the whole and part in an organism, based on the casual relationship, city plan hierarchically gives the urban heritage a kind of macroscopic connotation: holistic value.

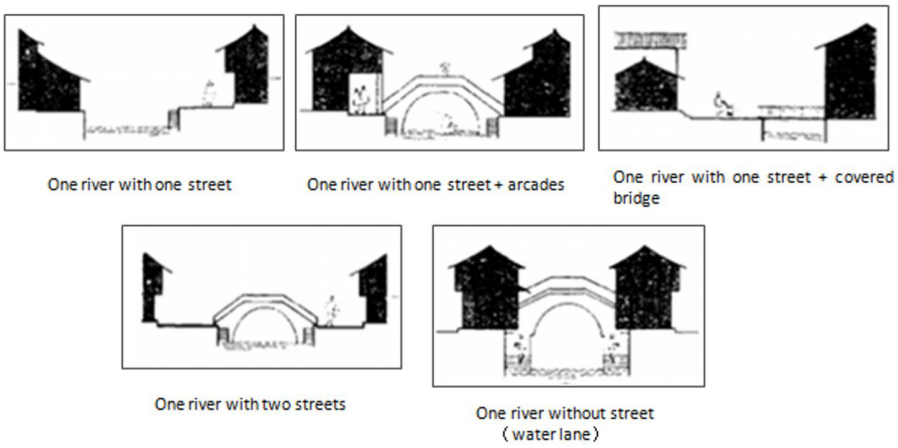

FIG. 4.23 Different types of neighbourhood layouts, it reflects the diverse spatial relationships between rivers, bridges, and buildings (Yisan Ruan)

The double chessboard pattern integrating land transportation into water transportation in the history of Suzhou is regarded as the city plan, then the network

TOC

characterized by parallel land-water transportation is regarded as the street system on the city plan. The criss-crossed network of canals and streets constitutes the boundary of neighbourhoods. Neighbourhoods are affected and restricted by the boundary, therefore, according to the neighbourhood layout, the double chessboard pattern integrating water into land transportation forms an organic whole, the interactive interdependence between the double chessboard pattern and neighbourhood layout reflects the casual relationship of whole on the part.

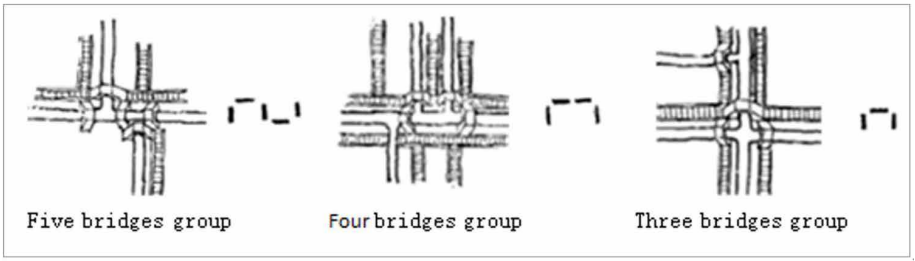

FIG. 4.24 Different combination rules between rivers, streets, and bridges (Ancient city protection of Suzhou and its historical and cultural value 苏州古城保护及其历史文化价值)

There are three types of neighbourhood layouts (FIG. 4.23): the type of *one river with one street* is to arrange roads along the side of the river, then build houses along the road, this type is distributed in the areas of Pingjiang Road and Daoqian Street; type of *one river with two streets* is to arrange roads along both sides of the river, which forms a spatial form of two streets and one river, this type is mainly distributed in the areas of Lindun River and Pingjiang River. The above two types are recognized as the water alley in the broad sense; type of *one river without street* means one or two floors buildings are lined up on both sides of the narrow canal, forming a water alley sandwiched by buildings, this type is distributed in the area of Shiquan Street, Xueshi Street, and Nanhao Street. Generally speaking, type of *one river with one street* and type of *one river without street* belong to the neighbourhood layout that relies on the horizontal rivers on the map, whereas the type of *one river with two streets* is mostly distributed in the main line of vertical rivers on the map, the vertical rivers determine the neighbourhood layout. Consequently, the three types of neighbourhood layout which depends on the river axis appear quite regular on the plane. Additionally, those small alleys more manifest relatively randomness, indicating that they are less affected by rivers.

Bridges are chess pieces in the double chessboard pattern. As a kind of node element, its functional meaning is greater than the visual meaning. Since in the water

network system, not only do bridges play roles in drainage and transportation, but also are used to divided the space of water alleys. As a result, the location, numbers, and form completely rely on the river system (FIG. 4.24). In addition, this specific double chessboard pattern contains a rich content, which is reflected by means of layout of buildings and pagodas of different periods. As a landmark element, pagodas form the main skyline of the ancient city, whereas other buildings and accessories increase the richness of urban spatial pattern.

It can be seen that the double chessboard pattern composed of water and land traffic routes is the unique spatial framework of Suzhou's urban form. On one hand, it uses the river and relevant axis to confirm the three neighbourhood layouts and the arrangement of bridges, thereby shaping a regular urban whole. Moreover, various physical elements are incorporated into a unified space through the double chessboard pattern. As a result, both the influence of the river axis and the specific pattern characterized by double chessboard reflect the value of traceability of the whole to the parts.

4.2.1.2 System function of urban heritage

The system function of Suzhou's urban heritage contains a causal relationship between the whole and parts. Since the double chessboard pattern in the urban ecosystem is a generative whole, the spatial structure of urban heritage represents a series of system functions during operation, when the urban heritage is regarded as a dynamic organic whole throughout history. These system functions indicate the indispensable human needs that are offered by the specific double chessboard pattern. On this occasion, the water pattern interacts closely with the land pattern despite the passage of time, which is represented by canals flowing across and leaving the water gates. Here canals are distributed throughout the whole city along complex streets and alleys, which have a series of functions including coordination, support, coupling, and nourishment. These fundamental system functions serve different human needs to reflect the meaning of the whole to parts: (1) Domestic water supplies and transportation: In ancient periods, canals provided fresh water for human living and production, meanwhile, the urban sewage was released through the complex watercourses. Compared with land transportation, low-cost water transportation facilitated the freightage and commercial exchange in the Yangtze River Delta. As a result, areas with a dense river network tend to have a large number of traditional dwellings. (2) Waterlogging prevention and fire prevention: The water gates in the four directions of the city are composed of sluice gates. These sluice gates can control the water level and occupy an important position

for water supply, drainage, and regulation of the flow of water. Hundreds of canals play roles in retaining the water, they serve the waterlogging prevention and flood discharge together with the sluice gates in four directions. Therefore, the ancient city of Suzhou is able to drain water through the water gates after heavy rain or prolonged rain. Furthermore, the water chessboard pattern plays a blocking role in fire prevention of wooden buildings. (3) Influence on the cultivation of gardens: As early as the 12th and the 13th centuries, most of the private gardens in Suzhou were built close to canals, which leaves 16 garden marks on the ancient *Map of Pingjiang*. From the 14th to the 17th century, the development of the canal business activities led to the increase in the house density in the city, as an extension of residences, a large increase in numbers of gardens also started. There are more than ten gardens gathered in the northeast of the city, located in the area between 1-2 horizontal canals and 3-4 vertical canals.
As a result, the change of canals in the city directly affects the garden distribution, those areas with dense canals are often places for residences and gardens. For example, the Couple's Retreat Garden of Suzhou is located at the junction of the east river ring and the second horizontal river, the method directly diverts water into the garden from the sluice under the east garden wall, then final converging into a pond (FIG. 4.25).

It follows then that a dynamic and developing generative whole affects relevant parts, then form a causal relationship. In the case study of urban heritage of Suzhou, this relationship is manifested as the fact that people live by water, gardens are built by water, the city is born and prospers by water, the beauty of the city is influenced by the water network. All neighbourhood layouts, bridges, and garden constructions are the effect of the whole on the parts. All relevant elements such as pagodas, buildings and accessories, vegetations are absorbed in this double chessboard pattern based on respective locations and the interactive relationship with other elements. This generative result reflects the casual relationship between the whole and parts, which can be understood as the value of traceability of urban heritage.

FIG. 4.25 The Couple's Retreat Garden of Suzhou is located at the junction of the east river ring and the second horizontal river (Guangyi Liu)

4.2.2 Value of urban planning

Urban planning indicates the planning of urban layout on the plane surface. The holistic value of urban heritage is manifested by means of the value of urban planning: first, the planning system associated with buildings, streets, and canals reflects the historical significance; second, the value composition of urban planning. The former explains the continuity and influence of the value of urban planning in the sense of time, while the latter reflects the integrity of the value of urban planning in spatial structure. Correspondingly, the planning system of a city is regarded as a dynamic evolutionary process when the continuity and influence of the value of urban planning is analysed through the HUL method. The continuity and influence derived from history is represented in the value composition of urban planning in different periods, which serves as the basic standard of the value of urban planning.

According to diachronic development, the ancient city of Suzhou, in the timeline of urban development, experiences three major events in the interaction between people and nature: the construction of city and rivers in the initial period, the completion of the Grand Canal in the 7th century, and the rise of modern transportation in the late 20th century. Due to the close connection with urban

planning, the urban planning of Suzhou is divided into three different stages: the pre-canal period, the Grand Canal period, and the post-canal period.

4.2.2.1 Value of urban planning in the pre-canal period

The urban planning value of Suzhou in the pre-canal period lies in the historical value of the planning system, which means the relics of the early period became the fundamental elements of the urban layout. It includes the layout of residential buildings, various major and minor business squares, farms, handicraft villages; the urban planning created by the layout principle becomes the system of historical urban planning.

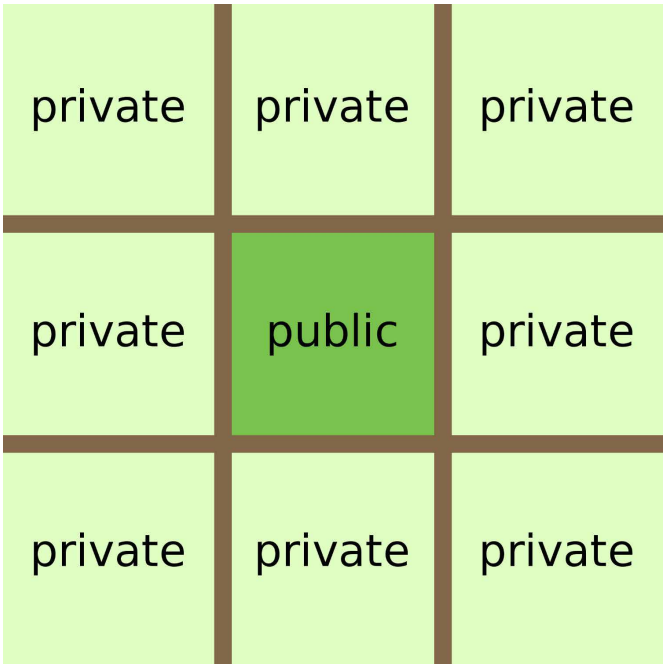

FIG. 4.26 The Chinese well-field system in the Spring and Autumn period (en.wikipedia.org/wiki/Well-field system)

In terms of diachronic perspective, China not only has the early historical relics as the basis for the urban layout, but also has a preliminary regulation characterized by *Jiang Ren Ying Guo* (匠人营国) (literally means architectural artisans build the city).

TOC

Chinese urban planning historian He Yeju deemed that ancient Zhou people adopted the concept of well-field to plan the city (FIG. 4.26). The historical practice of China's urban construction is a testimony that inherits this regulation.

The *Ying Guo* regulation (**营国**) was an urban construct system in the Western Zhou dynasty.
The legacy left by this regulation is the concept of well-field and derived well-field planning. The well-field planning reflects a simple systems mindset, which regards the city as a well-field, and conducts urban planning in the way of a well-field. The well-field planning method refers to the grid pattern adopted in the urban planning. Therefore, there exists a causal relationship between the well-field system and traditional urban planning.

FIG. 4.27 The contemporary map of Suzhou overlaps the capital of State Wu, it can be seen that the urban site has not changed, the urban growth and evolution are all based on the early layout. (The magic square-cities in ancient China)

The well-field system was a form of land holding system implemented by Zhou people in the 11th century BCE. A farmer is granted 100 mu of land, its unit area is called *fu*, nine or ten *fu* are called well. Ditches and roads used to divide fields include five levels. Consequently, the well-field in the Zhou dynasty consisted of fields, ditches, and roads is a complete system. Moreover, the management of agricultural slaves in the Zhou dynasty was devised at the same time as the well-field system, then the *yili* (native unit), closely associated with the well-field, emerged. The Zhou people set a boundary for the divided fields, and the earth was dug up on the boundary to build a low wall. In this way, large square fields surrounded by low walls and square *yili* are integrated together. Zhou people were inspired by the well-field system and used this concept and relevant practical methods to plan the urban construction in the early years of the Zhou dynasty.

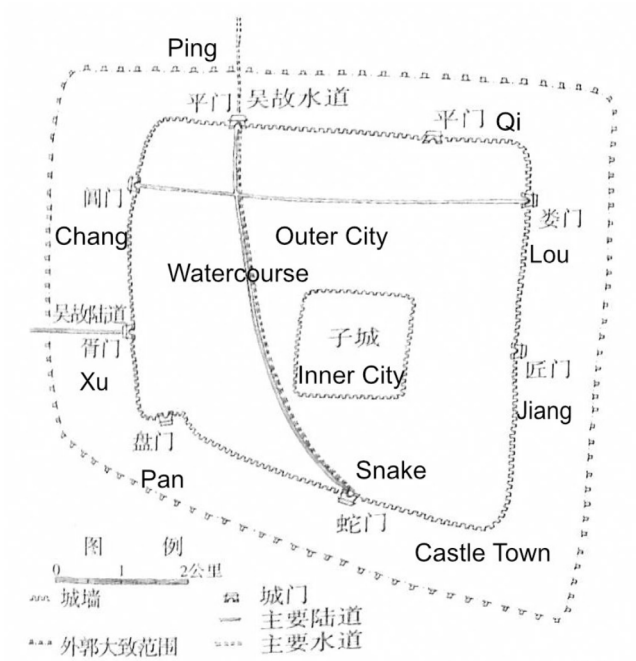

FIG. 4.28 The urban layout of Suzhou in the early period (Zifang Cao, Naifu Wu)

The ancient Chinese document *Kao Gongji* (考工记) summarizes the three levels of urban construction system, the three levels of ritual construction system, as well as the three levels of urban planning system. Thereby the ancient city of Suzhou with a history of more than 2,500 years is inevitably created by the *Ying Guo* regulation. Both the ritual construction system and the urban planning system are deeply

TOC

affected by this regulation, which can be found in the traditional architecture in Suzhou. For example, the building scale, dougong (wooden bracket), roof decoration of the Dacheng Hall and the Sanqing Hall in Suzhou reflect the ritual construction system; the stone inscription *Map of Pingjiang* engraved in 1229 shows that the grid system consisted of the magic square, latitude, and longitude reflects the planning system of Suzhou in the 13th century. The ancient city of Suzhou can provide past evidence to demonstrate the historical value and of urban planning. In this regard, the value composition of urban planning in the pre-canal period originates from the ancient Chinese urban planning system.

Suzhou is initially derived from the capital of the State Wu in the 6th BCE. In spite of several invasions and destructions over thousand years, the urban site of Suzhou has not changed significantly (FIG. 4.27). According to the historical records from Chinese ancient documents *Spring and Autumn Annals of Wu and Yue* and *Yue Jue Shu*, the capital of State Wu Suzhou adopted the form which consisted of the inner city, outer city, and castle town (FIG. 4.28). The ratio of the circumference is calculated to be 1:3:5.65. This is basically consistent with the urban construction system of the vassal states. There were eight pairs of water and land gates around the city, as well as wide streets and river courses in the city. The value composition of urban planning in the pre-canal period is represented as two aspects when the HUL method is used to conduct a diachronic analysis:

Urban layout based on the concept of well-field

The square shape of the city serves as the starting point of the well-field planning. The grid network based on the well-field concept promotes the emergence of the square city. In this regard, the great city of Wu (Suzhou) is seen as a well-field, which is divided according to the principle of *hundred mu form fu and nine fu form well* (百亩为夫，九夫为井). Since the *Ying Guo* regulation confirms the royal palace as the centre of the city, the north-south axis of palace also becomes the main axis of the whole city. As a result, the layout characterized by the palace in the urban centre facilitates the planning system that the cross axes dominate the whole city. Here the specific overlapping layout form that the outer city embodies the inner city exactly satisfies the basic requirement of the well-field concept.

Another point that needs to be clarified is the great city of Wu is not the standard north-south direction, but south by east 7°54' from official survey data in 1978. As archaeological evidence proves that the city did not move significantly over history, it can be inferred that the urban site was selected by politician Wu Zixu in accordance with the wind from southeast. The city wall of south by east made the building

parallel to the wall, which achieves the effect of moderate temperature by using the wind direction. The location of the royal palace in the inner city slightly closes to the southeast direction, which is also associated with the local terrain condition. The terrain of inner city is higher than other areas, so that the royal palace is kept safe from the threat of flooding.

City walls and water courses based on the concept of well-field

The grid network integrated land into water transportations relies on the local hydrologic condition and geographical environment. Thereby the setting of eight pairs of land and water gates and the corresponding layout serve as the basic conditions for the grid network of the well-field. The inner city is located in the centre, then a magic square characterized by the land and water traffic routes is generated based on the well-field concept. Here the inner city serves as the centre in the nine-magic square so as to realise the planning of well-field under the instruction of the idea of *nine fu are well*. However, the river system is neither a simple network built on the earth surface, nor ditches attached to a well-field. River courses are the products that reflect the interaction between humans and nature, it requires people to consider their mutual relationships. Thus, the water course running through from north to south and the water course from east to west constitute the cross-shaped form, which indicates the earliest river system of Suzhou consists of the combination of main cross-shaped rivers and the two moats inside and outside the city. This kind of cross-shaped form can be found in the first horizontal river. According to historical records from *Yue Jue Shu*, the ancient water and land routes in the records were still under construction. Although the mature grid system characterized by water and land traffic routes had not yet formed at that time, the urban layout, the setting of eight pairs of gates, and the initial river system constitute the general framework of the grid network based on the well-field concept.

In the 3rd century BCE, the Lord Chunshen Huang Xie excavated many cross watercourses in the north of the city, which is an inheritance of the urban planning framework found by Wu Zixu. In order to prevent the flooding from the Lake Tai, he took measures to close the water gate of Xu, then opened up the land and water gates of Feng. Generally speaking, this grid system of land and water traffic routes was completed after the efforts of several generations. Thereby the urban planning of Suzhou in the pre-canal period reflects the pioneering significance, keeping sufficient and inheritable development potentials for the later periods.

4.2.2.2 Value of urban planning in the Grand Canal period

From the 7th to the early 18th century, the commercial prosperity and busy traffic caused by the canal trade became an important historical background for the urban planning of Suzhou (FIG. 4.29). The Grand Canal period is known as the golden age in the history of Suzhou, which is acknowledged as the peak of ancient urban development (FIG. 4.30).

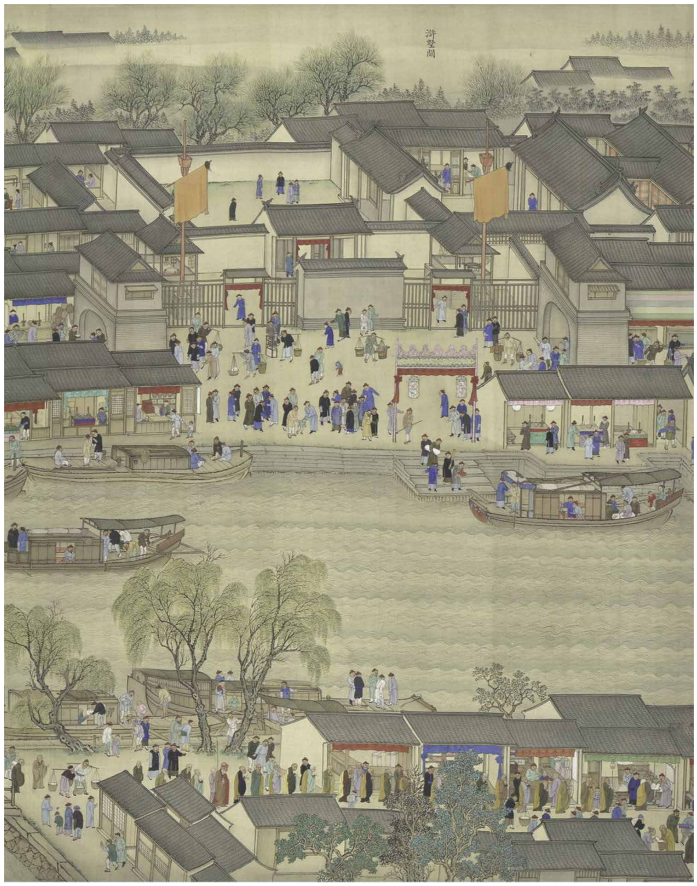

FIG. 4.29 The Chinese painting "Kangxi Emperor's Southern Inspection Tour" (1691), it shows the canal trade of Suzhou in the late 17th century (Hui Wang)

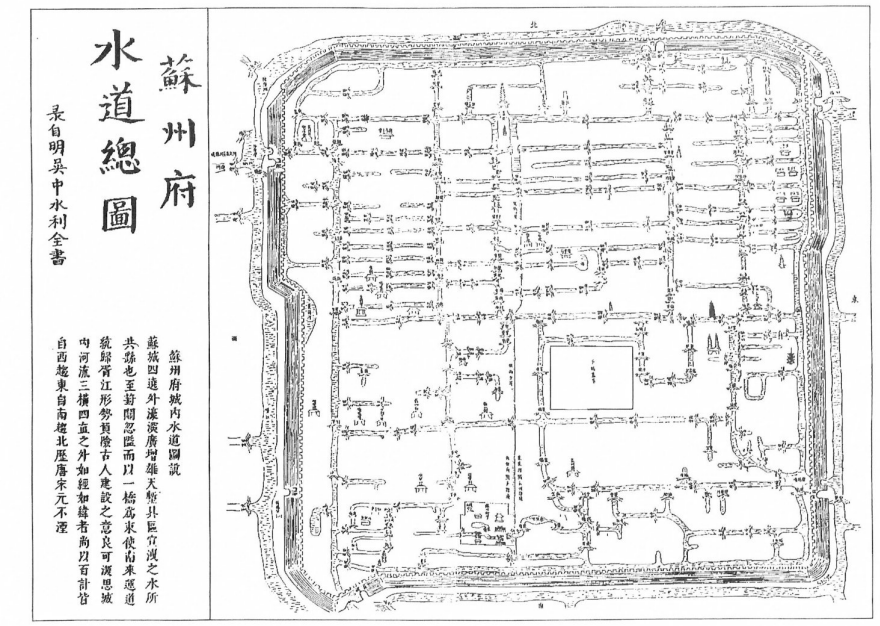

FIG. 4.30 Map of Waterways of Suzhou in the 17th century (1639), the length of waterways shown on this ancient map is the longest in history (Catalogue of General History of Suzhou **苏州通史图录**)

On the basis of the initial eight pairs of water and land gates, two new gates, Feng and Chi, were opened in the southeast of the city before the 7th century. The city gates of Suzhou experienced a series of changes in the Grand Canal period: The Snake Gate and the Ping Gate in the pre-canal period, which were connected by water and land routes from south to north, had already silted up. The Jiang Gate in the early period was abandoned, only the waterway to the sea was retained, meanwhile, the land route of Chi Gate did not exist in the Tang dynasty. Since the Shangtang River connected the Grand Canal in the 7th century, the water intake from the Chang Gate and the Pan Gate increased, through the complex river network system, water was mainly discharged from the three water gates in the urban east. The change of water flow caused the drainage of the Ping Gate and the Snake Gate to decrease, then both were caught in siltation and closed; correspondingly, the land gates of Jiang and Chi disappeared due to the large drainage in the urban east. Therefore, the Grand Canal that connects with the Shangtang River serves as a critical condition for the analysis of the evolution of water courses in the city. This can be understood as the start point to recognize the value of urban planning in the Grand Canal period. The five pairs of water and land gates inscribed in the Map of

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Pingjiang are convincing evidences of the water diversion and drainage of Suzhou in the Grand Canal period.

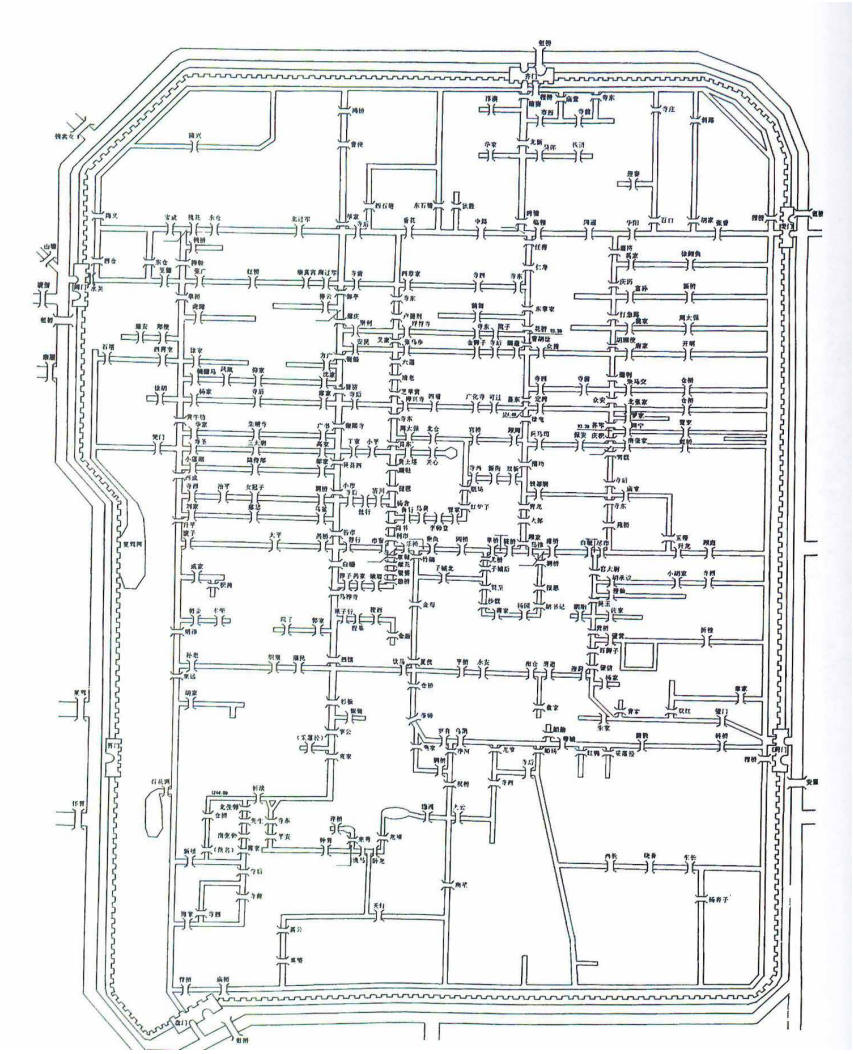

FIG. 4.31 The diagram of waterways of Suzhou in the early 17th century (Urban Space: Form, Type, and Significance- A Study on the Morphological Evolution of Urban Structure of Suzhou 城市空间：形态、类型与意义-苏州古城结构形态演化研究)

According to the earliest local gazetteer of Suzhou *Record of the Lands of Wu* (吴地记), from the 7th to the early 10th century, “great canals run through the middle

TOC

of the city, three horizontal and four verticals. It has seven counties (under its auspices) and eight gates, all of which are connected by roads and waterways. In the commandery seat, there are more than three hundred lanes; the two counties of Wu and Chang (zhou) consist of sixty ancient wards and have more than three hundred bridges."

This historical record indicates that the grid network system characterized by the land and water routes had been basically completed (FIG. 4.31, FIG. 4.32). The land and water grid network reflected on the *Map of Pingjiang* in the 13th century was mature urban planning (FIG. 4.33). Its maturity lies in that people actively applied the water courses to improve the urban planning of grid network. In terms of diachronic analysis, the value of urban planning is manifested in three aspects:

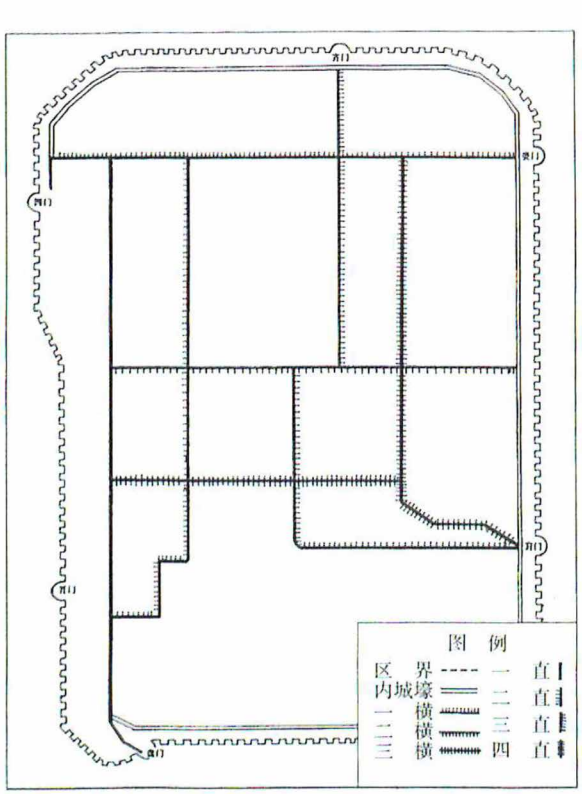

FIG. 4.32 The diagram of trunk waterways of Suzhou in the late 18th century. It can be seen that the waterways in the city significantly reduced. (Urban Space: Form, Type, and Significance- A Study on the Morphological Evolution of Urban Structure of Suzhou 城市空间：形态、类型与意义-苏州古城结构形态演化研究)

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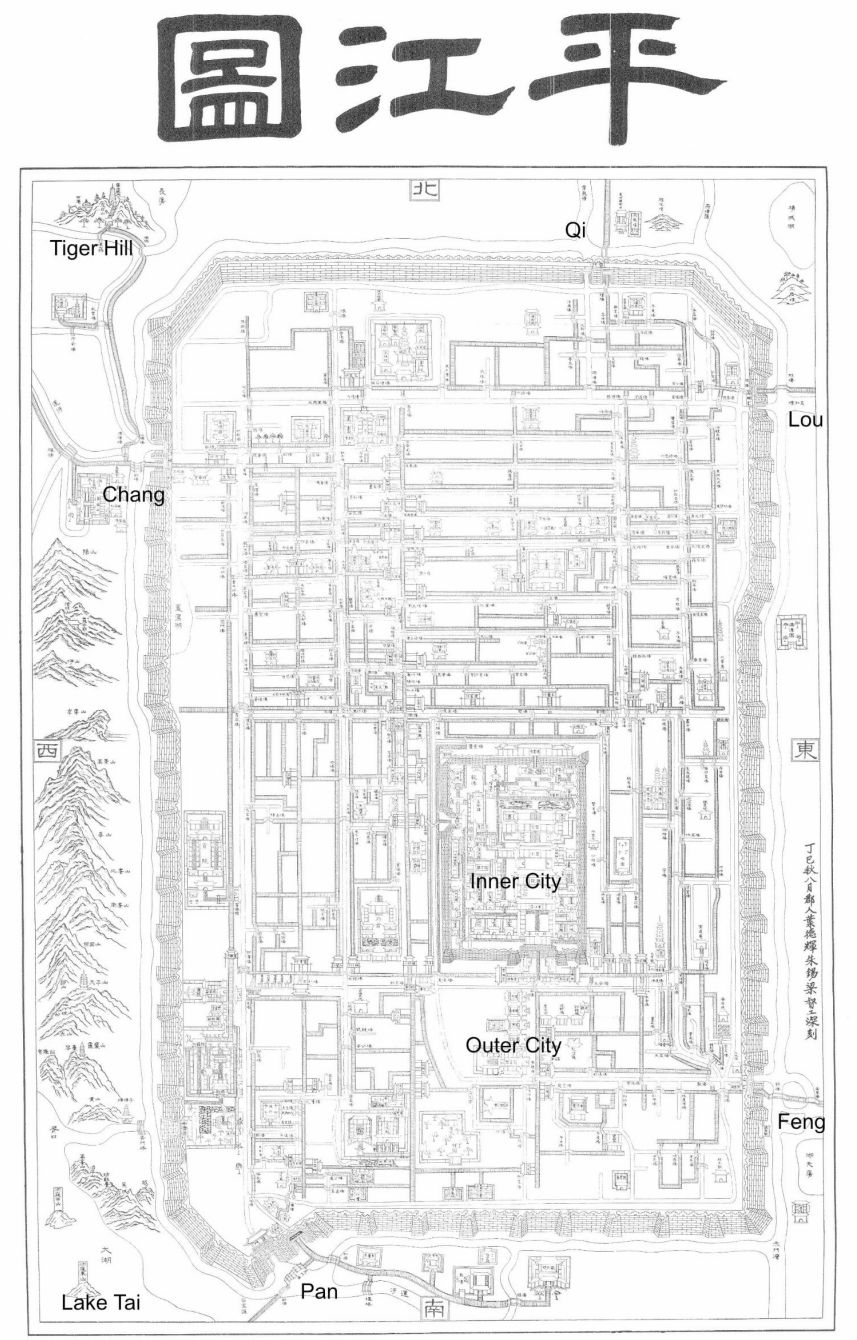

FIG. 4.33 Stone inscription "Map of Pingjiang" in the 13th century reflects a kind of mature urban planning which is characterized by the land and water grid network

TOC

The value of water diversion and drainage system characterized by the grid network

Considering that water diversion and drainage composed of the river courses in the city and the inner ring river formed under the complex terrain condition, there are two different connection approaches at the intersection of river courses: T-shape and cross-shape (FIG. 4.34). Trunk stream: a. water is introduced from the Chang Gate, then diverted at the T-shaped point of the first horizontal river, the river turns south, flows across the second and the third horizontal rivers, finally connects with the inner ring river. All intersections are connected in the T-shape. b. water is introduced from the Chang Gate, then diverted at the cross point of the first horizontal river, flows across the second and the third horizontal rivers, the water route connects to the first vertical river. All intersections are connected in the cross-shape. c. water is introduced from the Chang Gate, then diverted at the cross point of the first horizontal river, flows along the third vertical river and across the second horizontal river, the river turns west, then south, flows across the third horizontal river, finally the water is discharged through the water gate of Feng. All intersections that pass through are connected in cross-shape, T-shape, T-shape, and cross-shape respectively. d. water is introduced from the Chang Gate of the urban northwest, then diverted at the T-shaped point of the first horizontal river, one stream turns east, other stream turns south, flows across the second and the third horizontal rivers along the fourth vertical river, finally is discharged through the water gate of Feng. All intersections that pass through are connected in T-shape, cross-shape, and T-shape. The T-shape can satisfy the needs of water diversion and drainage from high to low; the cross-shape can effectively adjust the water flow of horizontal rivers by means of vertical rivers, thus ensuring the normal operation of water courses in the city. This kind of water diversion and drainage system based on the grid network pattern is the inheritance of the ancient well-field concept, which sufficiently is acknowledged as an important value composition of urban planning of Suzhou in the Grand Canal period.

Symmetry and unity: the value of urban central axis

According to the well-field planning, the north-south central axis of ancient Suzhou implies an orientational extension based on the major buildings of the inner city. Although the north-south central axis of ancient Suzhou is not purely the axis in the geographical sense, the principle of selecting the royal palace as the centre emphasizes proportional planning mode and relevant urban division scale, which is closely associated with the well-field concept.

The symmetrical layout of Suzhou can be directly represented through the *Map of*

Pingjiang of the Song dynasty: the five horizontal alleys on both sides of the central axis in the urban north extend to the two wings respectively; the four vertical rivers show the symmetrical pattern then further affect the related streets and alleys. The symmetry in the urban south is different from that in the urban north, the second and the third vertical rivers at the south end basically keep symmetry with curved lines. All these prove that the ancient city Suzhou adopted the architectural extensive axis composed of the north-south axis to dominate the whole urban development, so as to ensure the buildings construction and relevant urban growth kept in harmony with the geographical axis.

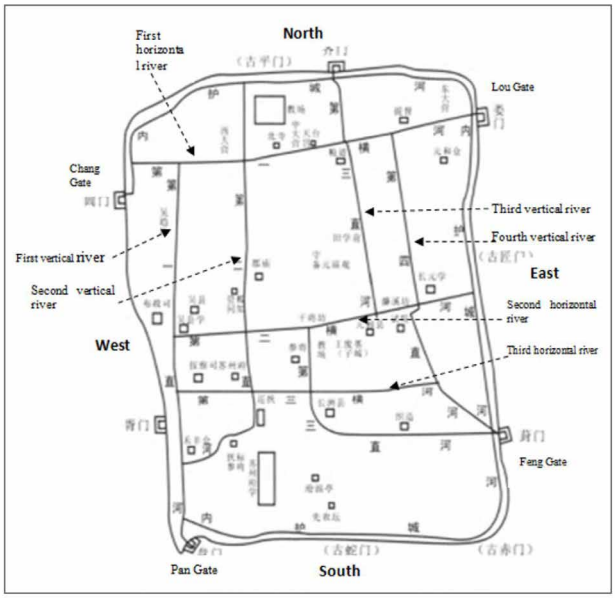

FIG. 4.34 Trunk streams of Suzhou: three horizontal rivers and four vertical rivers (Feng He)

The unity is manifested in the fact that streets are uniformly distributed along canals, which are normally perpendicular with each other. As a result, the layout of neighbourhoods is expressed in the form of vertical streets and horizontal alleys. The vertical streets rely on the north-south vertical rivers. On this occasion, the river course is situated in the west, whereas the street is in the east, most of shops are distributed on the vertical streets. The seven vertical streets represented in the *Map of Pingjiang* are planned and built within a space of only 3,100 meters width. Horizontal alleys mainly depend on the east-west horizontal rivers, most of them are built along the river, the number and trunk lines are similar to the horizontal rivers.

Due to the land saving, the layout of horizontal alleys not only enables inhabitants to obtain an ideal living condition, but also facilitate the local land and water traffic routes.

Hierarchical representation of the urban landscape

From the perspective of the urban skyline, the hierarchy composed of different building heights is an important feature of the ancient city. Pagodas represented by Yunyan Pagoda, Beisi Pagoda, and Ruiguang Pagoda constitute the first level (height from 32–76m), monuments represented by the Pan Gate, Sanqing Hall, and Confucian Temple serve as the second level (height from 19–23.5m), residential houses serve as the third level (height from 6–9m). Pagodas dominate other buildings in visual effect (FIG. 4.35): for example, the Beisi Pagoda located on the north bank of the first horizontal river forms an opposite scenery with the Xianghua Bridge; the Ruiguang Pagoda located in the urban southwest corner form a complete scenery with adjacent Pan Gate and Wumen Bridge. The Twin Pagodas on the west side of the bend of the fourth vertical river keeps a harmonious relationship with the Wenxing Pavilion on the east side. All ancient pagodas and monuments enrich the outline of urban space and give the whole urban landscape the hierarchical rhythm in the visual effect (FIG. 4.36). As the high outline architecture, pagodas pursue a kind of spiritual permanence and imply the religious significance and perpetual ideal. Its meaning passed from generation to generation and the magnetic field effect of space need to be passed in legislation to ensure that the height of building cornice in the sight cannot exceed 6–9 meters.

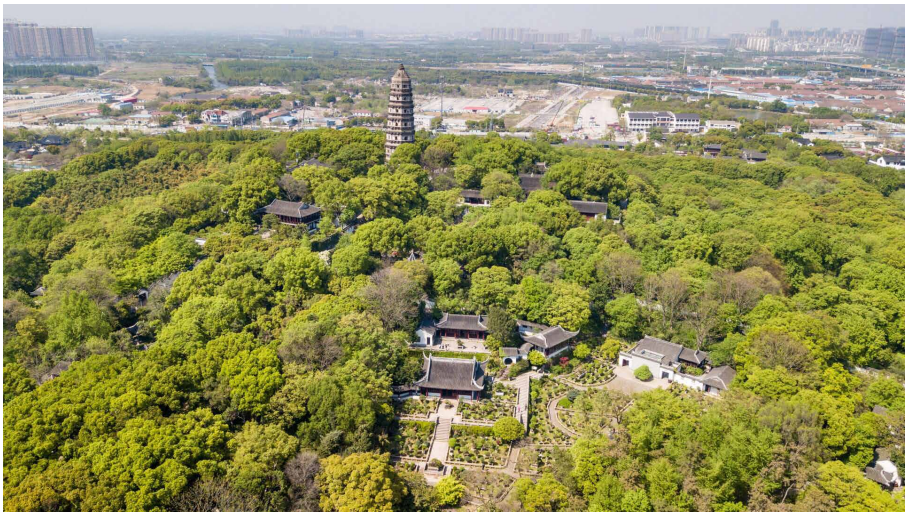

FIG. 4.35 The Yunyan Pagoda dominate other buildings in visual effect (au.trip.com)

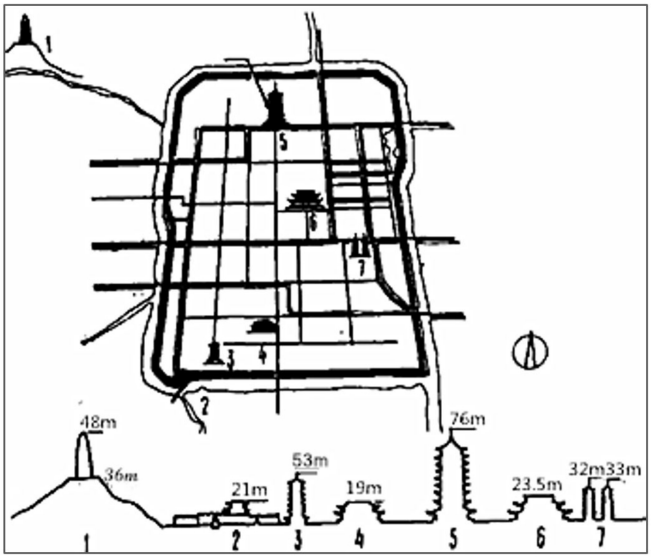

FIG. 4.36 The landmark ancient architecture of Suzhou and hierarchical skyline. 1. Yunyan Pagoda, 2. Pan Gate, 3. Ruiguang Pagoda, 4. Dacheng Hall, 5. Sanqing Hall, 6. Twin Pagodas (Ancient city protection of Suzhou and its historical and cultural value 苏州古城保护及其历史文化价值)

4.2.2.3 Value of urban planning in the post-canal period

The urban development of Suzhou is greatly affected by two factors in adopting the diachronic perspective of the HUL method: first, most of the branch rivers were filled from the late 18th century to the 19th century; second, the Grand Canal of Suzhou section has been diverted three times in history. The first diversion occurred in the mid 17th century, the channel of the Grand Canal kept away from the Chang Gate and flowed southward into the moat along the Xu River. Afterwards, according to the historical map of Suzhou in 1797, the amount of branch rivers then was remarkably reduced. Due to the prosperity of the canal trade and population explosion in the 18th century, the Qing government neglected the management of the water system, which caused the local canals to lose the ability of self-purification. Under the worsening situation of water pollution, the Qing government was forced to fill up canals to deal with the increasingly severe environmental crisis. Thus, the late 18th century is regarded as the beginning of the post-canal period, which marked the decline of the water system of Suzhou.

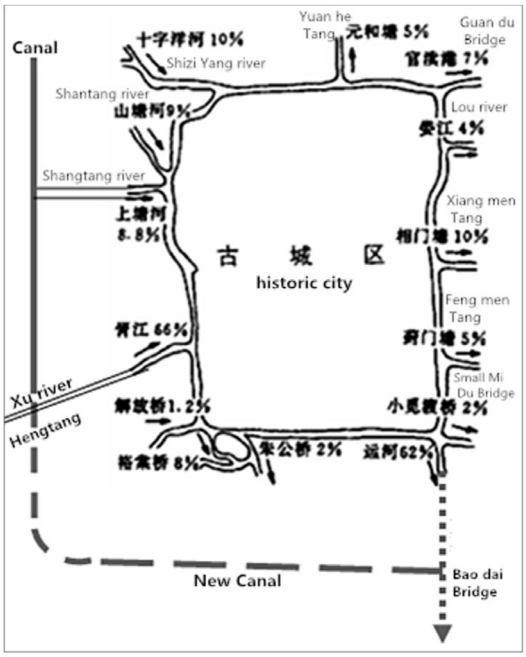

FIG. 4.37 Diagram of the third canal diversion project of Suzhou in 1992 (City Chronicle of Suzhou 1995)

TOC

In June 1992, the third canal diversion project of Suzhou section was completed and opened to navigation. A new nine kilometer canal from the south of Hengtang Town flows into the Dantai Lake, connects the old Grand Canal on the north side of the Precious Belt Bridge (FIG. 4.37). From 1993 to 1997, the Suzhou government continued conducting a large-scale renovation work of the Grand Canal. Since the new canal and renovated river are operated in accordance with the standards of navigable 500-ton ships and fourth-class waterways, they have a great diversion effect on the water source, so that the water source of the Grand Canal flowing into the city is greatly reduced. The lack of water deteriorates the problem of sewage discharge in the city every day.

Motivation of urban planning of Suzhou in the post-canal period

Since the deterioration of the urban waterway system in the late 18th century, the middle section of the second vertical river was filled (FIG. 4.38a), which resulted in the destruction of the original waterways network characterized by three horizontals rivers and four vertical rivers. In view of the lessons from the heavy rain in 1962, the Suzhou government stopped filling the rivers in the early 1980s, further conducted three dredging works, opened up the water courses, and finally represented a pattern in form of three horizontal rivers and three vertical rivers (FIG. 4.38b). The river courses in the city have been largely reduced, and the land use area has increased during the filling work of several generations. Consequently, the urban heritage of Suzhou in the post-canal period covers the ancient architecture, classical gardens, and modern architecture heritage, which mainly depends on the water system in the form of three horizontal rivers and three vertical rivers. At the same time, poverty and poor urban management led to neglect of renovation of a large number of traditional dwellings and increasingly deteriorating hydrological environment.

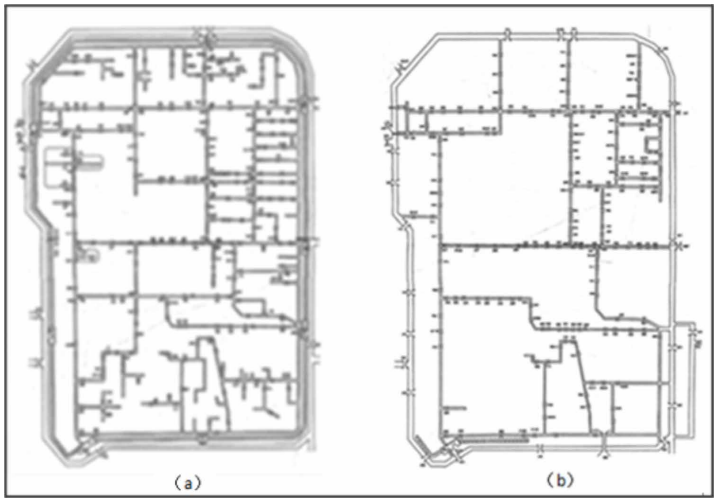

FIG. 4.38 a) the middle section of the second vertical river was filled (1940). b) the eastern area between the first horizontal river and the second horizontal river still retains the double chessboard pattern characterized by land and water routes in history (2000) (Traditional Cultural Studies: Vol. 23)

The practical problems caused by the environmental deterioration are first reflected in traffic, since the internal and external transportations of ancient Suzhou mainly relied on the waterways. Due to the reduction in transport capacity caused by filling activities of the courses, the evolution of the river system in the ancient city indicates that water transportation was gradually replaced by the land transportation. In the early 20th century, after the completion of the ring road from Suzhou Railway Station to the Customs, the two circular streets were renovated and widened by the national government, which were the earliest routes in the ancient city. In the middle of the 20th century, the construction of roads has developed, however, the municipal investment has been restricted to a very low level. Thus, the urban traffic lines in the ancient city and the traditional living style have always troubled the local inhabitants. Generally speaking, there existed many problems with respect to the ancient city of Suzhou in the 1980s such as poor infrastructure, poor living conditions, water pollution, and lack of vegetation. These practical problems caused by the environment in reality need to be solved through the approach of urban planning.

With regard to the spatial structure of the ancient city in the late 1980s, there is no extremely dense water network manifested on the stone inscription *Map of Pingjiang* in the 13th century, however, the Pingjiang historic zone still retains the original fourth vertical river (Pingjiang River) and horizontal river (Daxin River), which clearly represented the specific double-chessboard pattern inherited from the legacy of the ancient urban form. Although the second vertical river and many branch rivers

were filled, the main waterway system characterized by three horizontal rivers and three vertical rivers still exists. A small section of the original third vertical (now the second vertical river) river and the third horizontal river have been filled, but it does not affect the water flow direction of the trunk river, which is finally discharged from the Feng Gate. In a word, the water chessboard pattern has greatly changed, but the land chessboard pattern corresponding to the water chessboard does not change a lot.

It indicates that the grid street network in the urban layout does not change dramatically, the watercourses associated with the grid street network still generally keep the traditional features as seen in history. Additionally, the height hierarchy consisting of high, medium, and low scales, which is represented by streets and ancient buildings, has not changed. Thus, the grid street network and building height serve as important references for the urban fabric, which have an essential influence on the urban planning in the post-canal period. According to the over plan of Suzhou (1986-2000), the main content of the features of ancient city of Suzhou is summarized: the water system characterized by the three horizontal rivers and the three vertical rivers, water and land alleys are preserved; the double chessboard pattern and road landscape are preserved, classical gardens, traditional buildings, and other cultural relics are protected based on relevant regulations.

The sustainability of city lies in the overall analysis and step-by-step solution of the relationship between the function and the form of the city. Therefore, the reconstruction project of the Ganjiang Road becomes the breakthrough to solve this problem.

Planning value of the reconstruction work of Ganjiang Road

From 1992 to 1994, the reconstruction project of Ganjiang Road was implemented on the basis of demolishing old houses of about 300,000 square meters, which led to the resettlement of more than 8,000 households. The reconstructed Ganjiang Road has a total length of 7.03 kilometers, which connects the ancient city, west suburb area and east suburb area (FIG. 4.39). A modern transportation system that satisfies the urban needs had been created. Based on the perspective of urban heritage, the planning value of the reconstruction of Ganjiang Road is represented as the following aspects:

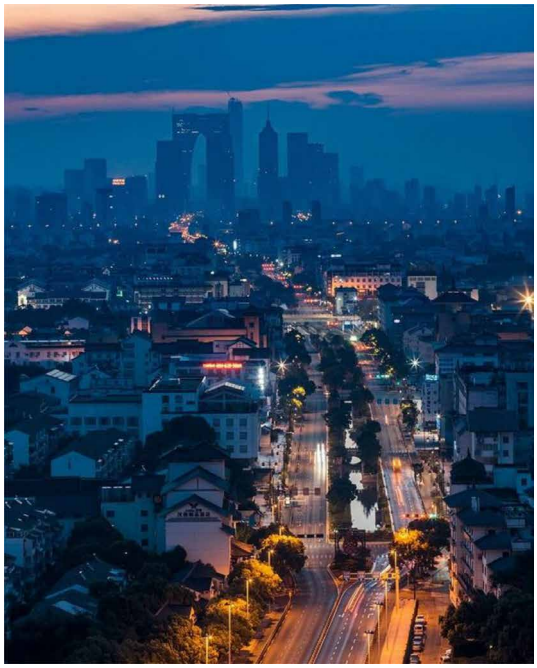

FIG. 4.39 The Ganjiang Road of Suzhou and related buildings and space (Instagram: visitsuzhou)

First, new urban elements are introduced in the interaction between history and reality. At the beginning of the reconstruction work, the cultural relics protection bureaucracy started to investigate and collect 22 cultural relics, and kept the original records by means of photography and video. Protection policy regulations were accordingly announced as in the following: ancient buildings with important values shall be protected as they were, for example, Ren House of Tieping Alley. Ancient buildings that must be demolished will be reconstructed or removed to another site. For example, the Xiangmen Bridge was rebuilt on the east side of the moat. In this regard, it is inevitable to eliminate or sacrifice some parts of urban fabric considering the interaction between history and reality.

The introduction of new urban elements refers to the road traffic, municipal pipelines and bridges in the category of infrastructure. Road traffic includes metro system, roads, parking area, public transportation system, traffic management, and navigation of central waterways. Municipal pipelines mean as many as 17 pipelines, including water supply, electricity, sewage, gas, communication, and radio, all buried below the ground of the Ganjiang Road. Bridges include one flyover, two bridges across the moat, and another 27 small bridges. The introduction of modern infrastructure in the ancient city not only provides the local inhabitants with modern

living and working conditions, but also creates an ideal hardware environment for the efficiency of land use. Its value lies in bringing new blood into the old so as to promote the sustainability of urban heritage.

Second, the reconstruction project of Ganjiang Road enabled the second horizontal river to maintain its influence and play a dominate role in controlling the traditional cross-shaped axis. From the perspective of section, the Ganjiang Road in the ancient city represents a new spatial structure characterized by two streets and one river (FIG. 4.39). The Ganjiang Road, which is separated from the left and right across the river, is widened and extended while keeping parallel with river: the width of the one-way road on both sides is 20m, the width of the inner water course is 8-10m, and the east and west sides respectively extend outside the city. The Ganjiang River in the middle of the road is the second horizontal river in the historical pattern of three horizontals and four verticals. The streets parallel to the second horizontal river are Ganjiang Lane, Tieping Alley, and Tonghe Lane. Since the position of the second vertical river has not changed, the reconstructed Ganjiang Road becomes the central axis that runs through the east-west direction of the city.

The inner city followed the principle of selecting the royal palace as the core had been always the political centre of ancient Suzhou before its destruction of the 14th century. The disappearance of the inner city in the middle of the 14th century greatly changed the distribution of the business area of Suzhou, the old business centre soon declined because of the destruction of the inner city. However, the northwest suburb near the Chang Gate gradually started to thrive and the business developed quite quickly from the late 15th century because its geographical location was near the Grand Canal. The disaster of Taiping Rebellion, which occurred in the mid-19th century, completely destroyed the commercial centre in the northwest suburb. Until 1928-1930, two bus circulation lines passed through the Renmin Road, which made the new commercial centre in the Guanqian Street prosper again. Therefore, after the Renmin Road became the main traffic line of north-south direction, the old north-south axis had been replaced. The width of this road, which evolved from ancient times, was originally only 3 meters. After several reconstruction works, the width of road had reached 32 meters in 1958. After the intersection between the Renmin Road and the Ganjiang Road was completed, these two roads constituted the main traffic framework of the city in contemporary period (FIG. 4.40).

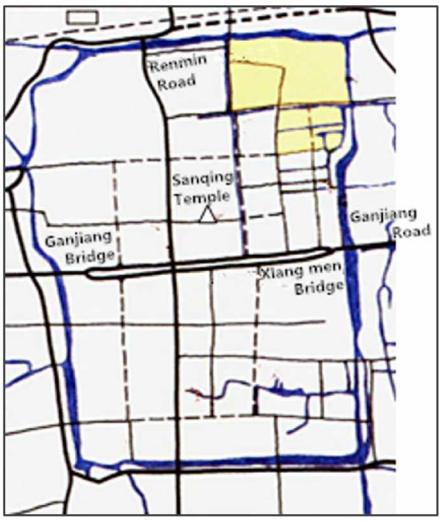

FIG. 4.40 Ganjiang Road and Renmin Road constitute the main traffic framework of the city; the dark blue indicates the moat around the city (Yisan Ruan)

In the urban planning of Suzhou (1986), 54 neighbourhoods were planned within the 14.2 square kilometers; this means 54 blocks of various sizes were divided according to the urban fabric. The Renmin Road crosses three horizontal rivers and five alleys in the form of six cross-shapes and two T-shapes, connecting 18 neighbourhoods in total; the Ganjiang Road, on the other side, crosses three vertical rivers and five alleys in the form of three cross-shapes and five T-shapes, connecting 16 neighbourhoods in total. In the central axis where Renmin Road and Ganjiang Road intersects, the secondary cross and T-shape are driven to form an intersection or connection, which further constitutes the grid network into different sizes, which reflects the feature of the system of longitude and latitude originated from the ancient well-field concept. The difference is that the scale of grid varies for the reason of the driving force associated with social development and the specific conditions of practical use, but the principles of the planning method remain consistent.

As a result, the land and water grid network constitute the boundary of neighbourhoods, whereas the 54 neighbourhoods divided by the grid network constitute the whole urban heritage together with the monumental heritage in the neighbourhoods. It can be seen that the land and water grid network characterized by the intersection between Ganjiang Road and Renmin Road plays a dominating role in affecting the urban fabric.

Value of urban fabric conservation

In the value composition of urban planning, Prutsin put forward three points: first, the rule and proportion of buildings and spaces in historic cities; second, the significance of ancient buildings in the historic environment (architectural composition, colour); third, the urban panoramic outline formed by the combination of architectural styles of different historic periods. When the urban panoramic outline associates with the urban fabric, the first point is the most important reason for the formation of urban fabric, since the ratio reflected by the proportion of building and space indicates the scale relationship between the various components formed under a certain composition rule. In this regard, Chinese architectural historian Ruan Yisan deems that the spatial scale of the ancient city serves as the spirit of urban conservation.

FIG. 4.41 Two different layouts: one river with one street (left); one river without a street (right) (Xia Liu)

The scale represented by the proportion is formed under a certain composition rule. As far as the spatial scale of the ancient city of Suzhou is concerned, the spatial scale of streets is deeply affected and formed under the double chessboard pattern, which includes two styles: street facing river and street behind river. The former style includes two different layouts: one river with one street or one river with two streets (FIG. 4.41). The latter is characterized by the layout of one river without a street (FIG. 4.41). Therefore, the spatial structure between the streets and waterways reflects the rule and proportion of spatial composition. As a result, two solutions have been adopted in practice according to the local natural conditions: the layout of one river with one street, in some cases, is replaced by the layout of one river with two streets. It indicates that the road has to be widened or green space will be added by demolishing the unvalued buildings on one side of the road, while traditional residential houses are still retained on the other side of the river. On the other side, some covered bridges and corridors will be reconstructed, it can not only solve

the problem of insufficient area caused by terrain restriction, but also the spatial interaction between streets and waterways become a reality.

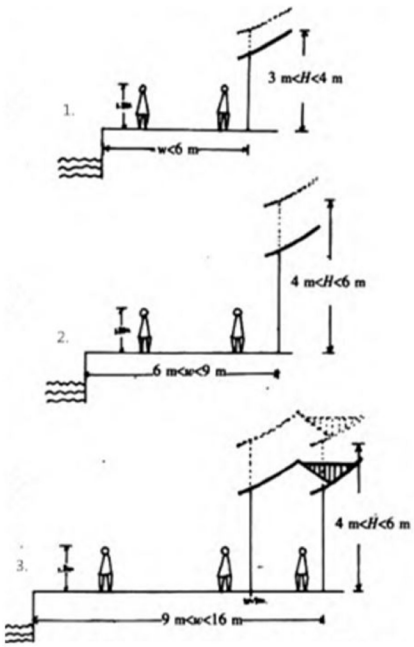

FIG. 4.42 Sectional view of the spatial relationships of streets and alleys on the Pingjiang Road (Chenxu Lu)

The streets and water alleys serve as the fundamental elements that constitute the local neighbourhoods. In spite of some historical changes of waterways in the city, the land chessboard pattern basically remains complete, the scale and direction still affect streets and alleys at the positions where the rivers are filled. The resulting phenomenon and trend are regarded as the influence of the grid network system, which is the legacy of well-field planning from ancient times. The spatial scale of ancient city of Suzhou is formed under the rule of combination of geographical environment and ancient planning idea.

FIG. 4.43 Diverse features of street landscape of Suzhou: continuity, hierarchy, and rhythm (Tourist authority of Suzhou and Sina Weibo)

The specific scale is described by the ratio (W/H) of the street width (W) to the surrounding building height (H) (FIG. 4.42). The experiencer's spatial perception varies according to the change of ratio. The ratio (W/H) of the width of streets or water alleys to the building height on both sides of the river is mostly around 1, and the ratio (W/H) of river facing street is over 2.5.

Therefore, it is necessary to maintain a good ratio of street width to building height (W/H) so as to protect the urban fabric of the ancient city of Suzhou. The architectural composition and colour that reflect the significance of traditional buildings are kept in a good condition on the basis of ensuring harmonious scale and proportion. Obviously, the value composition of the urban planning of Suzhou in the post-canal period indicates that the regional neighbourhood landscape is composed of a linear street landscape; the neighbourhood landscape is connected and divided through the boundary line in the form of city walls, bridges, and waterways, thus the wholeness of urban heritage is demonstrated from the micro perspective to macro perspective.

FIG. 4.44 The aerial view of the Pingjiang historic area of Suzhou (Suzhou broadcast)

There is a dramatic continuity associated with the characteristics of the street landscape of Suzhou, which is rooted in the scale and grid network system. Since the scale and height of buildings in the traditional neighbourhoods are basically consistent, the building facade, size and other details show a high degree of similarity. These similar residential buildings are closely arranged to form the continuity of the street landscape (FIG. 4.43). As a larger regional concept, the neighbourhood is composed of many streets and alleys (FIG. 4.44). In this regard, the continuity of the street landscape serves as the pre-condition of the larger urban landscape in the sense of wholeness.

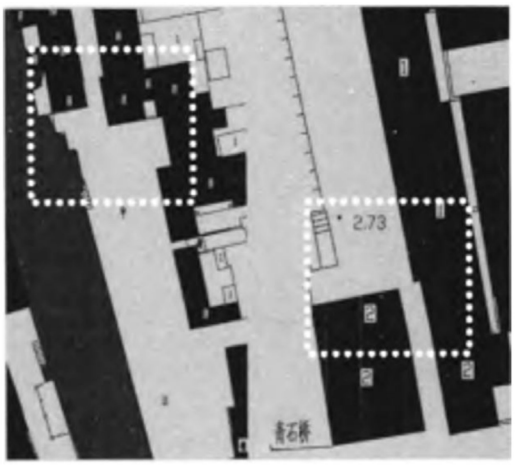

FIG. 4.45 The width of the streets and alleys of the Pingjiang neighbourhood changes based on the expansion and contraction (Chenxu Lu)

Architectural similarities reflect the unity beyond differences. Unity is the main aspect, while differences vary according to building size, scale, colour, and details. Architectural similarities make it possible for each building to become centre in different perspectives, thus there exists no absolute dominating part in terms of scale and height in the streets and alleys (FIG. 4.43).

Furthermore, the difference comes from the change in the proportion of streets and alleys, as well as the organic expansion and contraction related to the boundary space (FIG. 4.45). For example, arcades and corridors are added to reduce the space, by contrast, the boundary of neighbourhoods is expanded at the intersections or entrances. The spatial resilience formed by expansion and contraction enable people to obtain the unity, dynamic completeness, and harmonious experience.

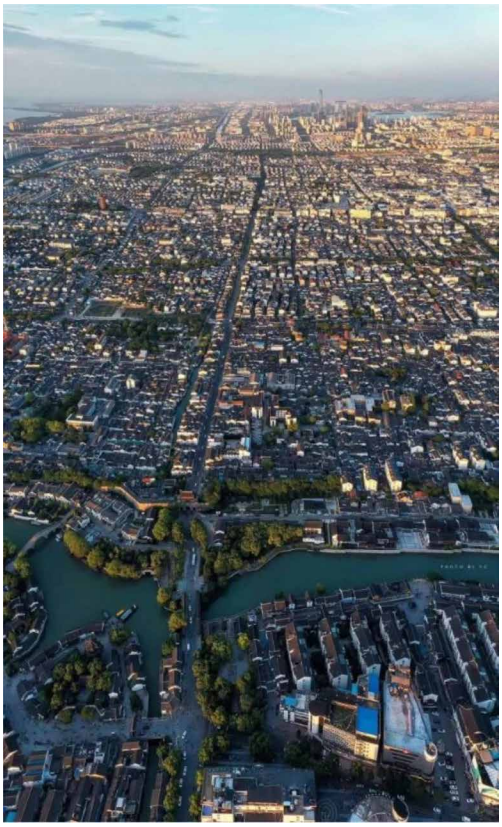

FIG. 4.46 The aerial view of Suzhou in contemporary, the image shows all urban heritage elements including monuments, large-scale historic blocks, neighbourhoods, streets, canals and new elements (Suzhou broadcast)

In general, the urban planning value of Suzhou in the post-canal period closely associates with the urban spatial scale and corresponding gird network system so that the large-scale urban fabric composed of non-prominent heritage is well protected from potential external threats or negative changes (FIG. 4.46). The urban landscape of Suzhou is well known for the combinations of rich elements including bridges, canals, streets, alleys, and historic neighbourhoods based on the grid network system which were inherited from the ancient well-field concept. The mutual interaction and penetration between large-scale urban fabric and monumental heritage not only highlight the cultural value of monumental heritage, but also produce the holistic value in the form of historic urban landscape.

4.2.2.4 Holistic value formed by the continuity of urban planning in the post-canal period

The continuity and influence of the historical significance of urban planning is reflected by the value composition in different periods, which serves as an important reference for urban planning value. Thus, the holistic value formed by the continuity of urban planning in the post-canal period is considered in this part.

The policy of comprehensively protecting the features of the ancient city confirmed in the overall planning of Suzhou (1986-2000) is essentially to protect the exceptional cultural value of urban heritage and relevant large-scale urban fabric composed of non-exceptional elements, thus the supporting infrastructures and architectural types which keep in harmony with the features of the ancient city, such as Suzhou Museum and other new urban elements, are introduced in the urban planning. Therefore, the overall planning of Suzhou (1986-2000) emphasizes its important strategic significance (FIG. 4.47), which acts as the basis for urban planning in the future. According to the planning, the widening project of Ganjiang Road is a major regulation to the spatial structure of the ancient city, which facilitates the connection and development between the Suzhou Industrial Park on the east side of the city and the Suzhou National Hi-Tech District on the west side of the city. The project has solved the traffic problem that troubled local inhabitants, and becomes the basis for the economic boom of Suzhou over the following thirty years. On the other side, seventeen different types of pipelines have been installed including water supply, electricity, sewage discharge, gas, and communication so as to solve the poor condition of infrastructure, which creates the advantageous prerequisite for the comprehensive protection work of the ancient city of Suzhou.

The overall planning of Suzhou (1996-2010) adopts a grouped style layout (FIG. 4.48), it builds up the specific structure named by the east park and west district, one whole with two wings, the landscape outside the ancient city is considered to be transformed into a large green space. It is an inherited continuation based on the protection area of one city, two lines, and three areas that were described in the 1986 edition planning. It clearly puts forward the planning concept of protecting four historic blocks and three traditional style areas, thus a detailed controlled plan was compiled in 1998. The implementation of the detailed plan for seven neighbourhoods in this stage is the realization of transforming the conceptual idea in 1986 into a physical spatial form; meanwhile, it also aims to protect the large-scale urban fabric composed of non-exceptional heritage elements.

FIG. 4.47 The overall planning of Suzhou (1986-2000) (Planning bureau of Suzhou)

As early as 1987, the municipal government of Suzhou renovated the courtyard at Nr. 50 Shizi Street and Tongfang Lane respectively. The building space of the courtyard of Shizi Street has been redivided on the basis of retaining the original structure so that the residents possess separate kitchens and bathrooms. In the case of Tongfang Lane, 95% of dilapidated buildings were demolished instead of renovated.

The traditional neighbourhoods have been renovated in batches from 1995 on the basis of the installments of public pipelines. Specifically, the residents have benefited from the renovation work of Nr. 37 neighbourhood (FIG. 4.49), the original pattern and relevant building structure have been retained so as to highlight the urban landscape characterized by canals, bridges, traditional buildings and decorations. In 2001, the municipal housing management started to renovate the dilapidated houses of East Qilin Lane (FIG. 4.50); the sewage collection pipes were introduced into residential houses and the residents' poor living conditions related to the bath had been effectively solved. It is widely promoted by enhancing the inner infrastructure to improve the living conditions.

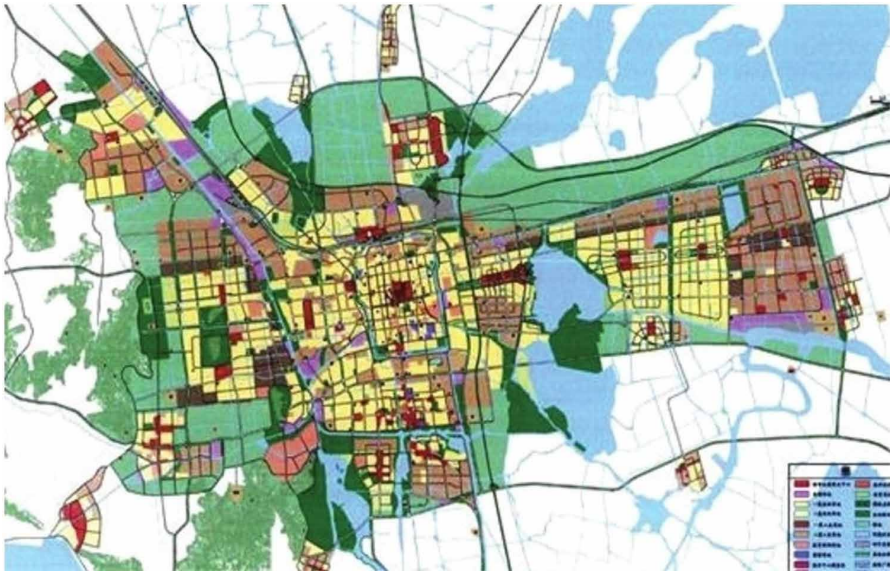

FIG. 4.48 The overall planning of Suzhou (1996-2010) (Planning bureau of Suzhou)

With the implementation of the detailed planning for historic blocks and areas, the 45 historic sites that defined the ancient city are further expansions of the large-scale urban fabric on the basis of the 1996 edition planning. In 1998, the Suzhou municipal government carried out a comprehensive renovation project of the Guanqian Street in the urban centre. In 2002, the Suzhou municipal government launched the protection project of the Shantang historic area (FIG. 4.51), meanwhile, the moat renovation has been also included in the future planning. The protection project of Pingjiang historic area was confirmed in 2003 (FIG. 4.52). In 2006, in terms of renovated and reconstructed old neighbourhoods, the urban fabric is divided into three different levels: strict protection, general protection, and coordinated protection (FIG. 4.53). Here strict protection refers to the protection of commemorative heritage with prominent cultural value, general protection refers to the large-scale fabric surrounding commemorative heritage, coordinated protection means the protection of buildings and structures that need to be coordinated with the stylistic features of the ancient city. The above heritage protection projects show that the holistic value of a historic city is represented through the organic whole with a certain structure and specific functions, normally the structure and function are composed of the interdependent and interacting elements. The function of urban planning often bound up with utility rooted in human needs, which is the trend reflected by the structure of urban planning formed by different element interactions. The function is dynamic in history, it always varies by terms of diverse human needs.

FIG. 4.49 Nr. 37 neighbourhood: Twin Pagodas and surrounding buildings (tuchong)

The overall planning of Suzhou (2007–2020) adopts a cooperative approach to protect resources within the territory of Suzhou (FIG. 4.54). The green space system shown in the figure indicates a kind of hierarchical reflection composed of two belts, three rings, and five wedges, which acts as the buffer zone for the urban heritage protection of Suzhou. The urban heritage that is integrated into the natural environment can produce the holistic value associated with human needs.

FIG. 4.50 East Qilin Lane (2003) (news.sina.com.cn)

The upgraded version of overall planning of Suzhou (2013-2030) conducts the urban heritage protection according to the professional multidisciplinary collaboration, refined design approaches, the idea characterized by comprehensive protection; the professional protection is seen as the primary principle. In this planning, the ancient city of Suzhou is still the protection focus, protection contents and strategies are representatively reflected in the overall planning map and structure map (FIG. 4.55, FIG. 4.56). The concept of two wings, three lines, nine areas, and multiple points in the protection structure are all closely bound up with the waterway system of the ancient city. Therefore, the overall planning (2013-2030) will concentrate on the waterway system to solve the problem of incommunicability in canals of different scales.

FIG. 4.51 The Shantang historic area (www.chinatravel.com)

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FIG. 4.52 The Pingjiang historic area and canals (2010) (AlexHe34)

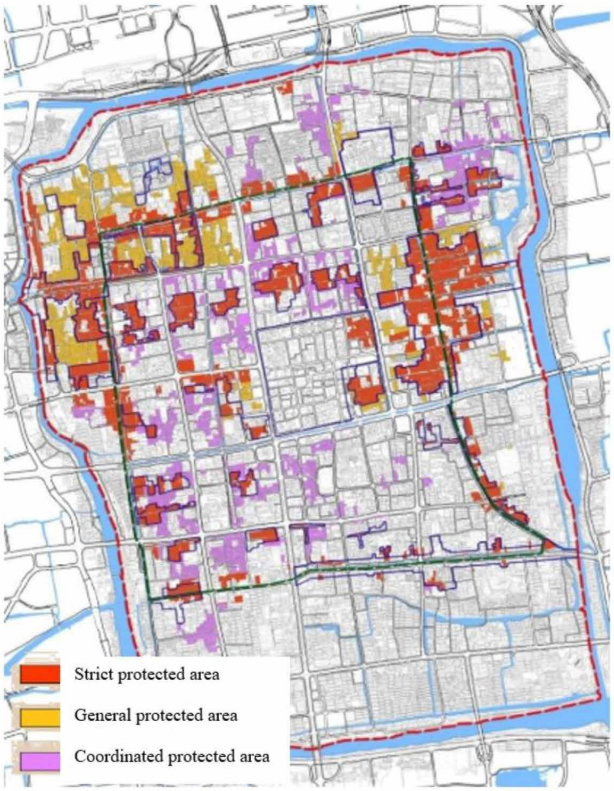

FIG. 4.53 Three protection levels of urban fabric of Suzhou (Planning and Design Research Institute of Suzhou)

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FIG. 4.54 The overall planning of Suzhou (2007-2020) (Garden administration office of Suzhou)

As far as the Ganjiang Road project planned in 1986 is concerned, it has a profound impact on local traffic system and future urban planning. However, the gap between the 10-meter-wide Ganjing River and the 50-meter-wide Ganjiang Road on both sides is too large, which results in the separation of the water gates between the Ganjiang River and other canals. It cuts off the communication between the Ganjiang River and the main water system, leading to the three independent water systems in the ancient city. Therefore, the continuity of urban planning determines that the 2013 version strives to restore the second vertical river which was filled in history; thus the whole water system will be unified in the future.

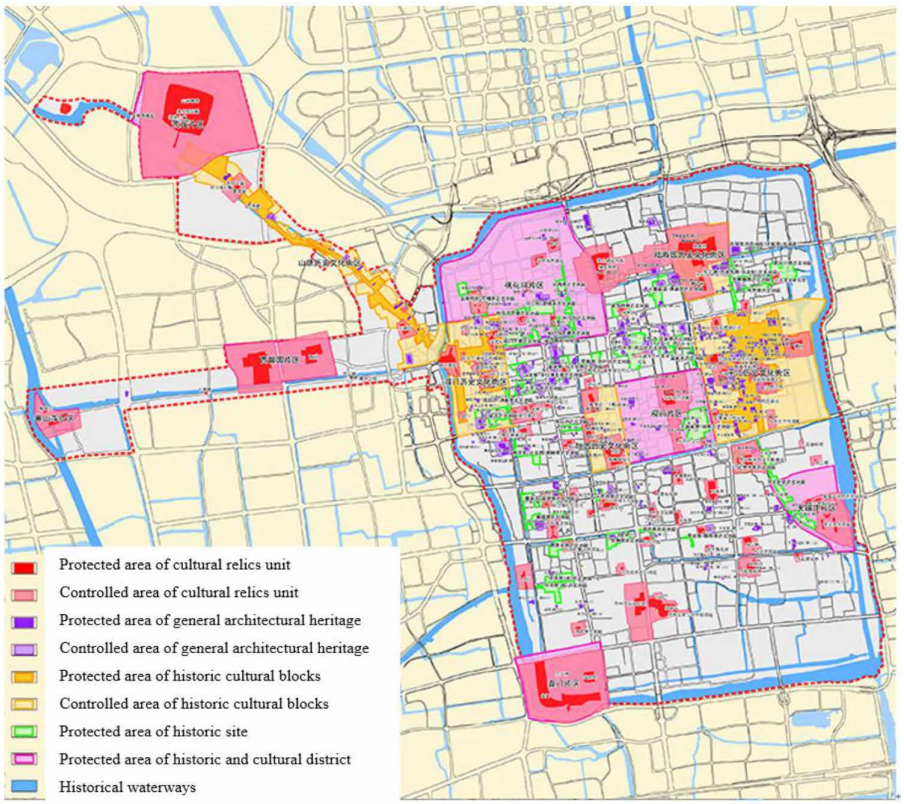

FIG. 4.55 The overall planning of Suzhou (2013-2030) (Planning and Design Research Institute of Suzhou)

In the 2013-2030 version, it is decided to restore the Zhang Jiaxiang River in the east of the city, as well as the Wang Tianjing River and some branch rivers in the urban northwest (FIG. 4.57). The restoration of these three rivers will lay the foundation for the realization of the water system characterized by three horizontal rivers and four vertical rivers. The connection and communication between trunk rivers are conducive to improving the purification capacity of the rivers. The restoration work will not only create ideal living conditions for the local inhabitants by means of purified water, but also expands the protection area from the concept of one city, two lines, three areas to two rings, three lines, nine areas, and multiple points (FIG. 4.58).

According to the implementation process of urban planning from 1986 to 2013, the holistic value of urban planning is realised by continuous operative practice. The influence of early planning plays a fundamental role in this process, subsequent

projects and plans are used to adjusted and further expanded the original idea so that the goal can be achieved in the future. In former chapters, the HUL method is demonstrated as a method of spatial-temporal scale. Considering the connection and dialogue between history and present, the idea reflecting spatial and time scale is adopted to compile the overall planning of the city in practices, which refers to the synchronic and diachronic study. At the same time, the implementation of relevant projects is also affected and completed based on the spatial and time scale. Therefore, the holistic value of urban planning is realised by means of application of the HUL method.

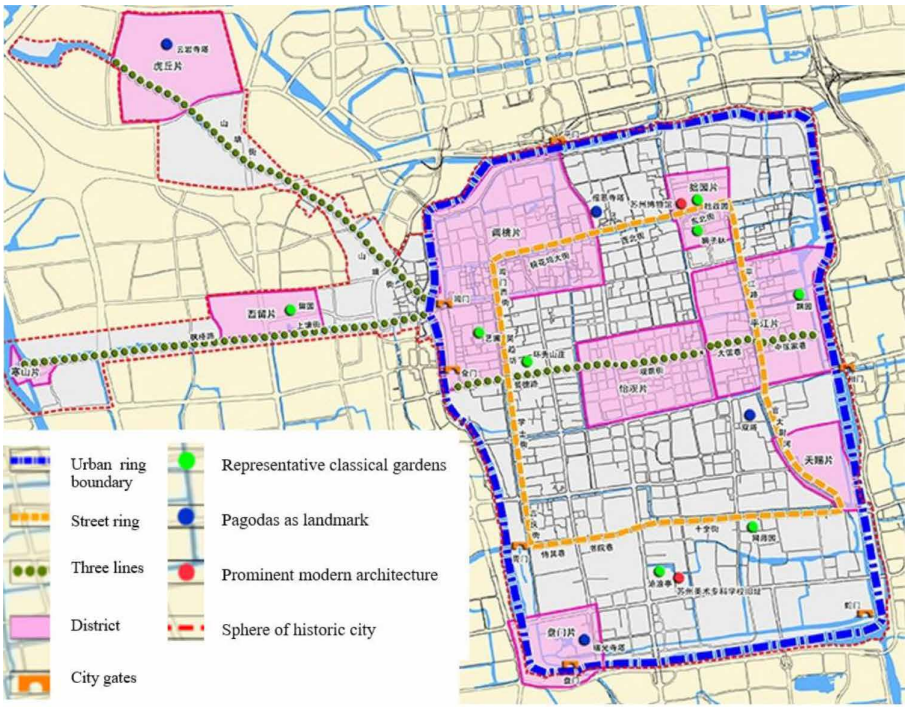

FIG. 4.56 Structure map of urban heritage conservation (2013-2030) (Planning and Design Research Institute of Suzhou)

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FIG. 4.57 Three rivers will be restored in the future: 1. Middle Zhang Jiaxiang River; 2. Wang Tianjing River; 3. River in the northwest (Planning and Design Research Institute of Suzhou)

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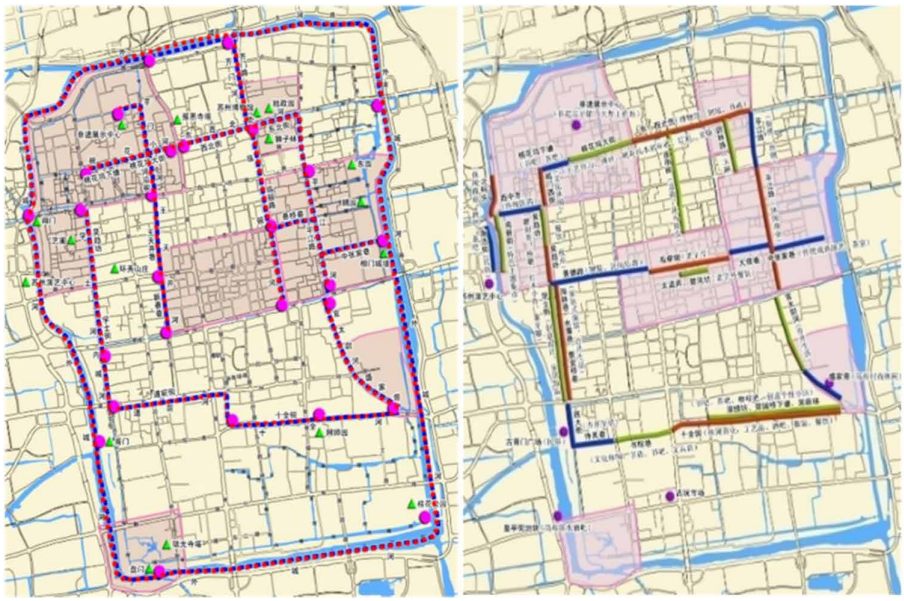

FIG. 4.58 Water tour routes and scenery spots (left); Guide map of historic streets and alleys (right) (Planning and Design Research Institute of Suzhou)

Summary

The value recognition of the case study of Suzhou is realised through the value categories classified in chapter three. First, the value evaluation criteria are derived from the value categories. Since the value of urban heritage is constructed based on the multiple levels, the basic value category and holistic value category of high-level are respectively composed of several sub-categories. As a result, the basic value category includes the historical value and aesthetic value, both of which reflect the universal significance. On the other side, the holistic value category is built upon the perception of the value of traceability and the urban planning value. Thus, the value criteria are clearly extracted: first, the criterion of historical value depends on the evidential value of a place; second, the criterion of aesthetic value lies in the design elements and the communal value; third, the criterion of value of traceability is reflected in the causal relationship between the whole and the part; fourth, the criterion of urban planning lies in the holistic value in the spatial sense, which is represented through the continuity and influence of planning.

After the value evaluation criteria are established, it is necessary to conduct the case study by adopting the HUL method. Since the inherent scientificity of the HUL method does not merely contribute to generating a rigorous logic associated with researchers' mindset. A series of valuable clues are discovered based on this logic, different concepts of the same research objects are connected through multidisciplinary collaboration and consideration, more importantly, this connection can help researchers to explore the casual relationship of urban heritage, so that the corresponding criteria will be accurately selected. As a result, the HUL method plays a role of verifying information transfer between the value object and the value criteria, which manifests that urban heritage value analysed by the HUL method is built on the basis on the truth.

5 Evaluation on the Value System of Urban Heritage and Research Method

The value system of urban heritage is the research result based on the HUL method, the HUL method essentially embodies the systems thinking. Systems thinking indicates an approach that treats things as a system. According to the definition from the general system theory, this study regards the physical HUL as a system, and connects the organic whole of the physical HUL with associated structure and function. The structure and function of the physical HUL correspond to the spatial scale and temporal scale respectively, therefore it can be concluded that the HUL method is an approach characterized by the spatial-temporal scale.

5.1 Significance of the HUL method to academic research

The precondition of constructing the value system of urban heritage lies in that researchers need to explore the relevant value theories developed by scholars in different historical periods over the past century. From the late 19th century to the early 21st century, scholars' research results in different disciplinary fields contribute to the contents of heritage value. All of them reflect that heritage value theories are produced in accordance with different subject fields and related topics.

Nevertheless, most of their studies on the value of cultural relics, historic buildings, architectural environment are essentially static structural analyses, which refers to the synchronic study. For example, Prutsin's value categories based on the historic buildings and environment do not take into account the potential role that time plays in the evaluation process (FIG. 5.1). On the other side, it is undoubted that there exists a clear time clue running through Riegl's value categories (TABLE 5.1), which manifests in that his research method integrates synchronic study with diachronic study. The selection and exploration of research method in this study is greatly inspired by Riegl's dynamic approach.

5.1.1 HUL method: A method of spatial-temporal scale

The historic urban landscape (HUL) was initially confirmed as a mindset in the UNESCO Paris conference in 2008. Based on this condition, this study aims to explore the connotation of the HUL method at the philosophical level by adopting the systems thinking. Cultural landscape and urban landscape serve as research mediums in the multidisciplinary studies, although there exist different operational approaches, their research methods share commonality, namely the spatial-temporal scale reflected in different fields is the representation of systems thinking. The HUL method is a way of thinking that treats the urban landscape as the medium. It not only takes the systematicity of urban heritage as the material basis, but also its theoretical source serves as the scientific basis of the HUL method. Therefore, the HUL method can be understood as the inheritance of the spatial-temporal scale method; more importantly, the HUL method confirms the spatial-temporal scale from the perspective of thinking. The temporal scale of urban heritage parallels to a city's development history chronologically, which takes hundreds or even thousands of years. Correspondingly, the spatial scale indicates the fact that the systematicity of urban heritage depends on the complex relations of various urban elements. On this occasion, the urban structure formed by the interdependence of monuments, large-scale fabric, and new urban elements is considered; the organic whole formed by the spatial scale and building scale represents a dynamic development trend of urban heritage on a timeline. Therefore, the spatial-temporal scale of mindset is generated based on the spatial-temporal scale of material entity, and this spatial-temporal scale of mindset can be applied into the study of the intangible aspects of urban heritage.

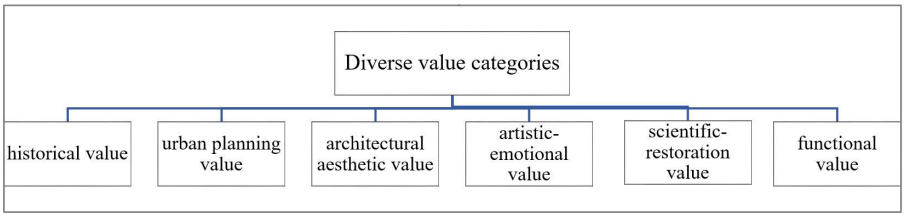

FIG. 5.1 Prutsin's value categories based on the architectural and historic environment (Huang Huang)

TABLE 5.1 Riegl's value categories of monuments

	Value categories	
Past values	Age value	
	Historical value	
	Intended commemorative value	
Present values	Use value	
	Artistic value	New value
		Relative artistic value

(Huang Huang)

5.1.2 Adaptability of the HUL method

The synchronic study regards various value types developed by value theories in different historical periods as elements in the synchronic system. The hierarchical characteristics represented through the interrelations of interdependent elements, does not only reflect the relationship between high-level value categories and low-level value categories, but also illustrates the interactivity between different high-level value categories. The diachronic study can reasonably explain the system function that adapts to the system structure. When the urban heritage is considered as a complex system, the system function reflects human needs in different periods and changes over time. On this occasion, the system function related to human needs is dynamic and diachronic, therefore the corresponding value theories and categories are also diachronic. It can be concluded that the value system of urban heritage constructed by adopting the HUL method is not merely a structural theoretical framework, meanwhile, its contents will change over time according to human needs in different periods. New value categories and related theories are constantly being added to this framework.

The adaptability of the HUL method indicates it acts as an instrumental medium, the instrumental meaning can be manifested as several aspects: first, researchers absorb and screen the relevant value theories based on the HUL method, the basic value category that is appropriate for urban heritage is generated; second, researchers can explore the holistic value category of urban heritage from the systematic perspective, filling the gap in the value structure; third, the HUL method serves the case study in a certain cultural background. The value system of urban heritage composed of the basic value category and the holistic value category reflects an intangible organic whole in the philosophical sense.

5.2 Contribution of the HUL method to Chinese traditional regulations and principles

When the HUL method is applied to the case study of Suzhou, the study process contains two aspects: the interactive relationship between different elements is analysed through synchrony and the development and evolutionary trend of research objects are grasped according to diachrony. For example, as far as the historical value of wooden architecture is concerned, the interrelation of components of dougong (wooden bracket), as well as the difference between the "Cai-Fen" modular and the "Kou-Fen" modular are selected to analyse the dougong structurally. On the other side, the evolution of dougong serves as the dynamic analysis on the timeline, which can be understood as the diachronic analysis chronologically. Here the scale of dougong maximized in the 9th century, then the scale gradually reduced from the 11th century, and the trend characterized by the reduction of the scale of dougong continued into the 19th century. The historical value of dougong is derived from the evidential value provided by the place. In terms of evidences reflected in the ancient buildings of Suzhou, dougong evolves from an extremely critical structural component to a decorative component: its original structural function is gradually substituted by the art. The evaluation of the urban planning value reflects the diachronic process in the following manner: the ancient city of Suzhou is divided into three different stages based on the HUL method, namely the pre-canal period, the grand canal period and the post-canal period. The urban spatial structure has a continuity on account of the temporal scale: first, the shape of city, the setting of city gates, and the layout of early traffic routes were deeply influenced by the local

geographic environment and ancient planning principles in the pre-canal period. Second, the double-chessboard pattern characterized by water and land routes was formed under the influence of canal exploitation and early planning in the grand canal period. Third, the pattern of grid network of Suzhou inherits the previous framework and has been basically retained in the post-canal period.

The above two cases show that the HUL method regards the internal structure and development process of things as an interrelated and interactive whole. Furthermore, the relationship between structure and development process reflects the unity between space and time. Therefore, the HUL method essentially represents a view of space and time. It can be found in two different forms when the view of space and time is introduced into the management of heritage resources: first, the exhibits in the museum only witness the past, which illustrates the historical record of a certain period. It reflects a static form; second, the sustainability of urban heritage reflects a dynamic form. Therefore, the systematicity of urban heritage serves as the material basis of HUL method, the HUL method reflect a dynamic view of space and time.

Adopting the HUL method to analyse the concept of cultural relics in the *Cultural Relics Protection Law of the PRC*, there exist two different views of space and time in the expansion and application of concept. The contents of historic cultural cities, blocks, towns, and villages are added into the chapter of immovable cultural relics of official legal documents, a conflict between static form and dynamic form emerges: cities, blocks, towns, and villages reflect the dynamic view of space and time, however, the *wenwu*, which literally means cultural relics represent the static view of space and time, witnesses the past. The concept of historical cultural cities, towns, and villages essentially equate to the urban heritage. Consequently, the category of immovable cultural relics regulated in the Chinese official legal documents cannot represent the connotation of urban heritage appropriately.

As far as the “3+2” paradigm is concerned, there exists an apparent defect in logical thinking by using the HUL method. Currently the framework of Chinese heritage values is built upon the “3+2” paradigm. Three major value categories include historical value, artistic value, and scientific value, which was initially proposed in the 1930s. These three major value categories were listed in the *Cultural Relics Protection Law of the PRC*. In fact, the three major value categories were influenced by the Athens Charter to some degree; their definitions aim to resolve issues in practices but lack the support of relevant heritage theories. Meanwhile, the cultural value and the social value concepts proposed in the China Principles mutually overlap and lack scientific argumentation. The essence of both added concepts is not clarified through the scientific method. When the HUL method is introduced to assess the current “3+2” paradigm, the paradigm is an aggregation of different

value concepts without interconnections. Three major value categories and two added value categories are separated from each other at the level of thinking, the cultural value is in conflict with other value categories. The definition of social value in the China Principles only emphasizes the educational benefit that comes from the dissemination of information of the site without reflecting the connotation of the communal value. The diversity of ethnic culture listed in the cultural value actually corresponds with the communal value.

Though there are defects in the "3+2" paradigm in the legal documents and China Principles, the contents of historical cultural cities, blocks, towns, and villages added in the Cultural Relics of Protection Law of PRC aim to protect the above objects as a whole, which are all reflected in the relevant assessment criteria.

5.3 Significance of the value system of urban heritage

The contribution of the HUL method to this study indicates that the value system of urban heritage is a theoretical framework based on the spatial-temporal scale. It is a value structure with hierarchical features composed of the vertical structure and the horizontal structure. The vertical structure represents the hierarchical relationship of value types between whole and part, the horizontal structure represents the connection between different sub-wholes or parts. Specifically, the interdependency between the basic value category (first class) and the evidential value (second class) reflects the vertical hierarchy, the interdependency between the holistic value category (first class) and the value of urban planning (second class) reflects the vertical hierarchy. The interdependency between the value of traceability (second class) and the value of urban planning (second class) in the holistic value category (first class) reflects the horizontal structure. On the other side, the value system of urban heritage is a dynamic and diachronic framework. With the continuous progress of human recognition of urban heritage, new value categories will be proposed to enrich and develop the contents of the value system. As a subsystem, the holistic value category is used to fill the gap of the value structure. One of the elements that constitute the subsystem, namely the integrated value of urban landscape, is a prospective concept. It indicates that the integrated value of urban landscape is reflected through comprehensive models of multiple spatial and temporal scales

explored by scientists. Hence, the value system of urban heritage by adopting the HUL method is a scientific value system.

5.3.1 Dynamic and structural value system of urban heritage

In the early 2000s, Chinese scholar Cai Dafeng suggested that the historical value of cultural relics is substituted by the social humanistic value, which exerted a great influence on the study of cultural relics at that time. It is a theoretical source of cultural value and social value in the traditional "3+2" paradigm. According to this study, the hierarchical relationship between high-level values and their associated low-level values reflects the vertical structure in the document of Historic England, which implies the value categories defined in the document of Historic England is based on the hierarchy. The high-level values frame the inherent attributes of the associated low-level values, thereby the evidential value of higher class serves as the basic criterion of evaluating the historical value of lower class. The communal value serves as the basic criterion of evaluating the aesthetic value, social value, and the spiritual value. Correspondingly, the scientific value judged on the basis of visible evidence is attributed to historical value. The horizontal structure between different high-level values is connected by means of places. Here the evidential value is provided by places, the communal value reflects the identity of ethnic groups in places. In this sense, due to the limitations of the study on the heritage theory at that time, Cai's understanding on the value categories confuses the internal relationship between evidence and identity, then separates them from each other. In his view, historical value is merely a pointless repetition because art history, history of science and technology already witness the development of human society. His fallacy lies in that the significance of evidence at the objective level is eliminated but illogically replaced by the identity at the subjective level. It proves that the value system of urban heritage characterized by hierarchical structure and dynamic evolution can correct the issues mentioned in the introduction.

Secondly, apart from following the traditional "3+2" value paradigm, some Chinese scholars list economic benefits as the economic value of heritage. This viewpoint not only confuses the distinction between economic benefits and heritage value, but also eventually leads to excessive exploitation and commercialization of heritage resources, which is especially reflected in the contemporary tourism industry. According to this study, the interdependency between economic benefits and heritage value actually implies a differentiated interaction. The complexity of urban heritage value structure makes it impossible to evaluate with economic benefits, though the exploitation of tourism industry largely depends on the sustainable

management of urban heritage and related diverse elements. Accordingly, this study opposes the inclusion of economic benefits in the value system of urban heritage.

Since the value system of urban heritage is established by adopting the HUL method, which represents both inheritance and innovation. Therefore, the significance of value system of urban heritage not only offers reasonable explanations for the issues in the introduction, but also expects more new value categories of urban heritage will be listed in the theoretical framework on account of continuously deepening multidisciplinary studies in the future.

5.3.2 Adaptability of the value system of urban heritage

The adaptability of the value system of urban heritage refers to the applicability of the established value system to the value carrier. The significance of urban heritage values can be fully reflected through value system, which depends on the corresponding functions produced by the hierarchical structure of the system. This hierarchical structure of the value system is formed by abstract thinking, namely it is abstracted from a series of complicated discourses. The function represented by the hierarchical structure not merely indicates that the established value system offers diverse value categories, but also implies that the criteria of value assessments are interrelated. Consequently, diverse value categories are beneficial for researchers to exploit potential new value categories of urban heritage. Moreover, the interrelationship between criteria of value assessments helps researchers to compare and identify the dominated value categories of urban heritage. Therefore, discussing the applicability of the value system of urban heritage from the perspective of system function actually reflects the universal significance.

The value system of urban heritage should be applied into all value carriers under the concept of urban heritage, which indicates that universality exists with individuality. Therefore, it is necessary to interpret its adaptability and significance by means of a concrete case. The adaptability means the value system of urban heritage is not limited to a certain case study, but should be applied in the diverse occasions including same, similar or different cultural context, geographical environments and climate conditions. The selected case should meet the criteria to verify the value system of urban heritage. The interrelationship between the value system and the case study indicates the value categories in the value system can be applied in different cases as broadly as possible. In fact, the case study of Suzhou runs through the specific characteristics of each historical stage based on the chronological timeline, which already shows the continuity of urban heritage and superior condition

of richness of heritage resources. Accordingly, as far as the selected case study is concerned, the city Suzhou is used as the value carrier to verify the adaptability of the established value system of urban heritage, which can represent two major categories of urban heritage in the form of individuality: basic value category and holistic value category.

The basic value category is particularly qualified for the value assessment of monumental heritage of prominent cultural significance. The value of monumental heritage is first represented by the historical value and the value of scientific restoration based on evidence; it is represented by the aesthetic value, the value of scientific restoration, commemorative value, social value, and spiritual value based on the communal cultural identity. Evidence and cultural identity correspond to the evidential value and the communal value of higher level respectively. There exists an inherent relation between the above two values of higher level and places. In this sense, the value assessment of the monument of urban heritage cannot be separated from the criteria of evidential value and communal value, regardless of which individual form is represented in a certain cultural background.

FIG. 5.2 Traditional building groups of Zhouzhuang (livepine)

When the adaptability of the value system of urban heritage is interpreted through the same, similar or different cultural contexts, the urban heritage in broader sense also includes historical towns and villages, which are smaller than cities from the scale point. Thus, the scope of urban heritage involved with cultural background basically matches the contents of Chinese legal documents of cultural relics, for the conservation object of urban heritage is equivalent to the concept of famous historical cities, towns, and villages in China.

Taking the Wu culture around the Lake Tai as an example, the Wu culture that covered southern Jiangsu, Shanghai, and northern Zhejiang is an important part of the Wuyue cultural circle in China. As the most representative city of Wu culture, Suzhou shares the same and similar cultural background with other cities, towns in the area of the Yangtze Delta. This same cultural background is most easily reflected through architectural form and related artistic features, since buildings serve as the most outstanding elements of urban heritage. At this point, the architectural features of Wu culture are specifically characterized by white walls, black roofs, and lattice windows (FIG. 5.2-FIG. 5.4). In spite of different expression forms, brick carvings, wood carvings, and stone carvings represent the local architectural art that appear in the urban heritage of the Wu culture.

FIG. 5.3 Longmen Town of northern Zhejiang (MasaneMiyaPA)

FIG. 5.4 The Grand Canal and traditional buildings in the ancient city of Wuxi (www.news.cn)

Compared with the Wu culture in the Yangtze Delta, the Hakka culture of Han Chinese subgroup is attributed to another different cultural background. The Hakka architectural culture is particularly prominent for local earthen buildings. Unlike the architectural composition and elements of the Wu culture, the architectural form of Hakka earthen buildings normally has 2–3 circles, either round or square, the space layout is designed from the inside to the outside, then an organic whole is shaped that is appropriate for human habitat and has multiple functions in consideration of quakeproof, defence, fireproof, ventilation, and lighting (FIG. 5.5). According to the value system of urban heritage in this study, the communal value lies in the large-scale rammed building groups that witnessed the Hakka blood ethic relationship and traditional inhabitation model through specific spatial layouts. On the other side, the historical value evidentially demonstrates that the Hakka people inherited the traditional technique of earth construction through building materials after they migrated from the Yellow River basin to western Fujian in ancient times. Surrounded by pleasant natural conditions, the Hakka earthen buildings leave a precious legacy to the world based on their extremely rare architectural forms.

As far as architectural form is concerned, all forms act as historical records of human activities, regardless of similarities under the same cultural background or distinctions under different cultural backgrounds. As the concrete manifestation of tangible heritage, diverse architectural forms are not just the evidences of human activities over history, importantly, people need to recognize and judge their significance in contemporary society so as to pass those valuable characteristics on from generation to generation. The importance of the basic value category lies in that it universally reflects the significance of urban heritage elements under different conditions and backgrounds.

As far as urban layout is concerned, even though historical cities, towns, or villages share the same or similar cultural background, the urban site, traffic routes, and layout of buildings groups vary largely from the local climate, natural conditions. The historical city of Suzhou is located in the area of the Yangtze Delta, the urban pattern, characterized by the double chessboard of water and land routes, is deeply influenced by the intensive river network. In the case of Hong village of southern Anhui, under the similar cultural background the whole village is surrounded by mountains and hills, the water system of village is designed as a specific bull-shaped curve which aims to adapt to the local complex geographical environments as much as possible. For historical cities, the urban development is not only derived from different geographical environments and natural conditions, but is also rooted in the influence of early planning and design over history.

FIG. 5.5 The Hakka earthen building and its inner spatial layout (Lennartbj)

Taking the earthen building groups of a different cultural background as an example, they reflect an architectural form combining Hakka culture and the mountainous environment. The terraces in the mountains provide a superior residential condition of constructing earthen buildings, including the important building materials, raw soil (FIG. 5.6). Correspondingly, the historical cities, towns, and villages in Wu culture are deeply affected by rich water resources; the whole urban landscape or townscape is in sharp contrast to the Hakka earthen buildings. The holistic value of urban heritage is revealed through the continuous interactive process between humans and nature; the value of traceability reflects the natural influence exerted on cities, while the value of urban planning implies how people historically change nature and shape cities according to diverse conditions.

As a result, the adaptability of the value system of urban heritage lies in that it is appropriate for evaluating the urban heritage, as well as historical towns, blocks, and villages that are smaller than a city. Meanwhile, it can be used in analysis of the urban heritage of the same or similar cultural background, cases in different culture background can also benefit from the diverse value categories in value system of urban heritage.

FIG. 5.6 The Hakka earthen building groups and related geographical environment and natural conditions (Raffaele Nicolussi)

6 Conclusion

Contribution of this study to the HUL method and the urban heritage values

This study aims to build up an integrated value system to facilitate the identification of urban heritage values. The HUL method is essentially a method of spatial-temporal scale based on the systems thinking. By adopting the case study of Suzhou and the related argumentation, the value system of urban heritage constructed by the HUL method reflects the integrity of the dynamic spatial-temporal concept structurally.

6.1 Contribution of this study to the HUL method

6.1.1 Establishing the philosophical framework of the HUL method

Selecting urban heritage as the research carrier acts as the limited precondition in this study. This limited condition requires that the value system of urban heritage should be selected corresponding to the research method. A way to think about it is: the HUL method is rooted in urban heritage, it takes the urban landscape as the medium and is a crucial method for constructing the value system of urban heritage. Nevertheless, when the HUL method is implemented as the comprehensive and integrated approach within an overall sustainable development framework; the relevant measures that reflect diversity cannot directly construct the urban heritage values. It indicates that the lack of the HUL method at the philosophical level implies

TOC

a gap in the existing HUL studies. Therefore, based on the related conference reports and documents, it is necessary to build up a philosophical framework of the HUL method so as to reveal the link point between the value system of urban heritage and the HUL method.

The characteristic of urban heritage serves as the precondition of establishing the philosophical framework of HUL method. Italian urban theorist and planner Gustavo Giovannoni deemed that the connection between the elements of the urban fabric forms a whole that is the urban context, and this context is assumed to be urban heritage. French architectural historian Françoise Choay considers the urban historic heritage the result of a dialectic of history and of historicity which implies three successive figures of (or approaches to) the ancient city, … respectively as memorial, historical and historial. Accordingly, Giovannoni's definition of urban heritage reflects the spatial structure of a historic city at a certain period. Choay regards the structure and development process of urban heritage as an interrelated and interactive wholeness. It can be seen that integrity is an important characteristic of urban heritage on account of the interrelation between time and space.

System is the description of the whole. According to the general system theory, a system is an organic whole with a certain structure and specific functions, which is composed of a series of interdependent and interactive elements. Therefore, the philosophical framework of HUL method requires that the organic whole of urban heritage connects with its interrelated structure and functions. Here the structure of urban heritage refers to the complex interrelationships between various elements, while the functions of urban heritage reflects the human needs in the urban development. Human needs change over time, the functions of urban heritage are dynamic and evolutionary. At this point, the structure and functions of urban heritage corresponds to space and time respectively. Thus, the HUL method that reflects the systematicity of urban heritage is a method characterized by spatial-temporal scale. This argumentation process indicates that the systematicity of urban heritage is the material basis of HUL method. The structure composed of monuments, large-scale fabric and new urban elements reflects the spatial scale; whereas the functions associated with human needs reflect the temporal scale, which is represented in the form of historical and historial features of architecture and artificial elements.

The method of spatial-temporal scale was first represented in the interdisciplinary cultural landscape research, then it was widely applied in the studies and practices related to cities, which serves as the scientific basis of the HUL method. The innovation of the HUL method lies in that it confirms the spatial-temporal scale of thinking. In this way, though the HUL method is manifested as the various

operational measures in practices, its essence is a scientific method of spatial-temporal scale. Both the HUL method and the method of spatial-temporal scale are forms of expression of systems thinking.

6.1.2 Revealing the reasons for the diversity of HUL method

6.1.2.1 HUL method: relationship between commonality and individuality

The spatial-temporal scale is identified as the essence of the HUL method in the philosophical sense. It is represented both as physical entity and in the human mindset. Therefore, the attribute of the spatial-temporal scale can be interpreted as the commonality of the HUL method. The whole composed of structure and function of urban heritage varies in different contexts, the spatial-temporal scale eventually reflects the diversity. Correspondingly, the commonality of the HUL method can be revealed through the diversity of operational approaches. Therefore, those methods based on different contextual information can be interpreted as the individuality of the HUL method. For example, six critical steps are listed on the HUL recommendation, including comprehensive surveys and mapping to cover the spatial-temporal scale both in physical sense as well as mindset. The operational method requires the comparison between surveyed data and historical data, and mapping the graph; the instruments include surveying and mapping tools that reflect the spatial-temporal scale. The six steps indicate that the HUL method highlights the unity between structure and process. The HUL method is implemented according to the operational measures promoted by the urban conservation and sustainable development. Since the commonality of HUL is represented in the operational approaches, the operational approaches with the mindset of HUL commonly refers to the HUL method. It can be seen that the relationship between commonality and individuality of the HUL method account for the diversity of operational methods.

6.1.2.2 Relationship between method and instrument

There exists relevance between method and instrument, method needs to be carried out through instrument. Based on the HUL methods, in different contexts the corresponding instruments are also different. For example, the HUL method

of constructing the value system of urban heritage in this study: its associated instrument are synchronic and diachronic studies which reflects the spatial-temporal scale. As far as the HUL method used in urban conservation and urban development projects: its associated instruments reflect the diversity, resulting in diverse operational approaches.

When the HUL method is applied to the study of intangible aspects of historic cities, the spatial-temporal scale of mindset serves as the only way to identify the urban heritage values. The HUL method not only refers to the mindset, but it is also an instrument that is represented in transdisciplinary urban studies. The HUL method in the philosophical sense reflects the thinking activity, the related synchronic and diachronic studies reflect the operability of HUL. It indicates that the synchronic and diachronic studies are instruments to implement the spatial-temporal scale of mindset. As far as the HUL is concerned, it can be understood as a thinking method from the philosophical perspective; meanwhile, it also serves as an instrument in the application.

6.1.3 Significance and adaptability of the HUL method

As the thinking method, the HUL is widely acknowledged and applied to urban heritage management and urban sustainable development. Related literature indicates that the HUL is a scientific method based on the systems thinking. Therefore, establishing the philosophical framework of HUL can be understood as a derived theoretical construct.

Based on the systems thinking, this study draws the conclusion that the HUL method is identified as an approach of spatial-temporal scale by arguing the material basis and scientific basis. The importance of this conclusion lies in that the relationship between systems thinking and operational methods can be interpreted through the relationship between commonality and individuality, which reveals the origin of diversity of HUL. The research finding also indicates that the spatial-temporal scale is the essential attribute of the HUL method; synchronic and diachronic studies reflecting the spatial-temporal scale can be used to construct the value system of urban heritage.

On the other hand, the recognition of the HUL method reflects the unity between structure and process by means of diverse operational approaches. The unity between structure and process corresponds to the interrelation between the spatial scale and the temporal scale. Thus, the HUL method of mindset is closely

associated with the diverse operational approaches so that the HUL method has wide applicability.

As far as stakeholders of the HUL method, those people who are engaged in the urban conservation, urban planning and urban heritage management can effectively benefit from the HUL method. It is necessary to draw up plans and procedures at the operational level in accordance with the holistic principle of unifying structure and process. For the academic research related to city, the spatial-temporal scale of thinking is adopted to conduct synchronic and diachronic studies. Therefore, the mentioned above fields are direct beneficiaries of the HUL method.

This study also benefits from the HUL method. Not only is the HUL method applied to construct the value system of urban heritage, but it also addresses issues existing in the context of contemporary China. For example, famous historical cities, blocks, and villages are added to the chapter of immovable cultural relics in the Chinese Cultural Relics Protection Law, this classification treats urban heritage with the static view of immovable cultural relics, but ignores that cities are essentially dynamic complexes, which reflects the dynamic view of space and time. Besides, there exists a logical defect in the controversial "3+2" paradigm. The origin of these issues lies in that there is a lack of scientific method in the theoretical study of heritage value in contemporary China. It indicates that the HUL method can be used to analyse China's urban conservation and related issues. The application of the HUL method is not limited by the cultural context and has wide adaptability.

6.2 Contribution of this study to the urban heritage values

The *Conservation Principles, Policies and Guidance* of Historic England serves as an important theoretical source and reference in this study, the document has proposed rich value categories of heritage. Nevertheless, based on the HUL method, the value categories and their relations reflect a static value structure which is established on the evidential value and communal value of high level, and the values of high level dominate other value categories. This static value structure and value categories do not sufficiently account for the influence of the environment on cities from a holistic perspective including urban fabric, geographical environment, and natural condition.

TOC

It reveals the fact that the integrity of the value structure under the dynamic view of space and time has not been resolved yet.

6.2.1 Selection and absorption of the basic value category

There are diverse interpretations of heritage value theories. The diachronic study shows the development process of value theory. Different value categories and sorted out and compared with each other, a representative document of *Conservation Principles, Policies and Guidance* of Historic England is selected to conduct a synchronic study. At this point, the synchronic study indicates a structural analysis. Value categories in the document of Historic England reflect hierarchical characteristics of complex systems. Specifically, the hierarchical relationship between values of high-level and other associated values in the document reflects a vertical structure, whereas the relationship between values of high-level reflects an interdependent horizontal structure. The vertical structure and horizontal structure are selected as the basic framework in this study, which implies a theoretical inheritance. On the other hand, urban heritage is dynamic, and the value category that reflects this dynamic attribute is the value of scientific restoration proposed by Russian architectural scholar O.I. Prutsin. The value of scientific restoration is interconnected with historical value, artistic value, commemorative and symbolic value, as well as social value. As a result, value categories listed in the document of Historic England and the value of scientific restoration together constitute the basic value category in the value system of urban heritage.

6.2.2 Origin, construction and significance of the holistic value category

When the notion of place is associated with the historical environment, it should include a fabric of large-scale, geographical location, and natural condition. Due to the importance of place, the notion of sites is identified as an additional category of historic cities at the Olinda meeting in 2007. The document of Historic England proposed that the evidential value of high level is dependent on the inherited fabric of the place, whereas the communal value is derived from human's identification with the place. The evidential and communal values of high-level aims to facilitate people to concern the value category related to the environment. Therefore, as a new value category in this study, the holistic value category is to transform the notion of place to the urban integrity based on the diverse connections of different urban elements.

A place can be understood as a system based on the HUL method, the value of a place implies the holistic values. The origin of holistic values lies in that the urban ecosystem is derived from the natural system, then the urban ecosystem serves as the precondition of the urban layout. In this regard, urban layout depends on the urban ecosystem, meanwhile, it also becomes the carrier of urban fabric composed of different elements. It reflects a hierarchical structure which is formed by system and subsystem. In the sense of system function, it is a process of interdependence between whole and part. The holistic values of urban heritage originate from the association with nature, this association of holistic values is defined as the value of traceability in this study.

The holistic value category of urban heritage is also derived from the influence of human culture. Since human beings serve as the dominant elements in the urban ecosystem, the holistic value category of urban heritage is represented through urban planning. The holistic value produced by urban planning is called urban planning value. It contains two aspects from the perspective of HUL method: first, the urban planning value based synchronic study concerns the complex relationships between different urban planning elements including streets, buildings, canals, squares, and other elements in a certain historical period. Second, the urban planning value based diachronic study refers to the continuity and influence of urban planning.

Additionally, the holistic value category of urban heritage formed at the cultural level also includes the integrated value of urban landscape based on the “UrbanSim” model. The integrated value of the urban landscape regards households, enterprises, buildings, land, infrastructure, natural resources, and various biophysical elements as the main objects, and takes account of the relationship between these elements. The whole study process often covers multiple spatial-temporal scales from the perspective of a complex system. At this point, the integrated value of urban landscape based on transdisciplinary studies will eventually become a meaningful guide for urban planning.

In fact, the relationship between the basic value category and the holistic value category originates from a series of systematic functions of generation, coordination, coupling, and nourishment, which is represented through the interactive influence of the urban environment and associated parts. There exists the relationship between the whole and parts of the value structure, therefore, it is necessary to incorporate the holistic value category into the value system of urban heritage to deal with the integrity of value structure under dynamic conditions. In this sense, the significance of the holistic value category is to fill the gap in the value structure of urban heritage from the holistic perspective.

6.2.3 Significance of the value system of urban heritage

The construction of urban heritage values is put forward in response to the requirements of research background. The issues in the research background are attributed to the lack of theoretical studies of urban heritage values in the context of contemporary China. As a result, the research purpose of this thesis is to construct a value system that is appropriate to the Chinese urban heritage. At this point, the constructed value system of urban heritage and associated theories can resolve issues existing in the contemporary "3+2" paradigm of heritage conservation, so that the Chinese urban heritage conservation in both the theoretical and practical sense can directly benefit from the value system of urban heritage.

However, the significance of the value system of urban heritage is not limited to the Chinese context. Different scholars' heritage theories, documents and related value categories serve as the basic references, which play an important role in constructing the basic value category of value system of urban heritage. Moreover, this study proposes the holistic value category by introducing the systems thinking, which is associated with the holistic characteristics of urban heritage and the notion of place. This thesis focused on the urban heritage values is a branch study based on the document of *Conservation Principles, Policies and Guidance*. The value categories in this study are directly related to the management of urban heritage and sustainable development of the historic city in the future. Therefore, the value system of urban heritage in this study has critical significance in related fields.

The significance of the value system of urban heritage not only considers its theoretical origins and contribution, but the applicability is also concerned. The applicability of the value system of urban heritage has been verified in the case study of Suzhou, as well as in a wider context including similar or different cultural backgrounds. Though it is an evaluation of applicability in the context of contemporary China, the theoretical resources and contributions are beyond the cultural limitation. The significance of the value system of urban heritage cannot be underestimated.

It is acknowledged that the value identification of urban heritage varies according to different cultural contexts, which is often represented in the aesthetic value associated with the communal value of high-level. The value system of urban heritage reflects two aspects: the communal scientific principles based on the HUL method and the individual features based on different ethnic culture. It reflects the flexible practical significance as long as cultural characteristics and ethnic identity are interpreted in the value system.

6.3 Reflections and recommendations

6.3.1 Reflections on the value system of urban heritage

The value of scientific restoration is a sub-category of the basic values in the value system, which is reflected both in the evidential and communal value. The importance of the value of scientific restoration lies in that the monumental heritage and the fabric of large scale can be preserved, so that their precious qualities can be kept and inherited through scientific protection work in the future. Therefore, it is an indispensable value category in the whole value system. Nevertheless, this study neither demonstrates the value of scientific restoration based on Prutsin's theory, nor analyses it in the case study. Because the study on the value of scientific restoration requires careful investigation and confirmation to obtain the firsthand information. By reason of the lack of related conditions, the value of scientific restoration is not interpreted through the case of Suzhou, which is a limitation of this study. It is expected that researchers in related disciplines will be engaged in this topic in the future.

6.3.2 Recommendations

The HUL method is interpreted as a method of spatial-temporal scale in this study. The importance indicates that the relationship between systems thinking and concrete operational approaches can be understood in the relationship between communality and individuality. The diverse HUL approaches at the operational level also implies unity between structure and process, which corresponds to space and time respectively. Thus, the philosophical framework of the HUL method enables the connection and communication of diverse operational approaches in different contexts. The HUL method at the philosophical level, namely the method of spatial-temporal scale is applied to related documents, it will further promote the application of the HUL method in the future.

On the other hand, as a filtering criterion and mechanism, the outstanding universal value (OUV) proposed by UNESCO aims to maintain the authority and credibility of the world heritage list at the level of heritage management. The intrinsic value that the OUV adheres to and is associated with the evidential value and the

communal value of places. The historical value, aesthetic value, commemorative value, symbolic value, social value, and spiritual value represented by high-level value categories have been widely accepted. Nevertheless, connotation of the OUV does not sufficiently adapt to the urban environment from the holistic perspective. Therefore, the innovative point of this study: the holistic value category including value of traceability, urban planning value, and integrated value of urban landscape can be regarded as a useful supplement to the document of World Heritage Operational Guidelines. The holistic value category with a dynamic view of space and time truly reflects the connotation of urban heritage values in consideration of the interdependence between physical structure and development process of historic cities, which is significantly different from the basic value category.

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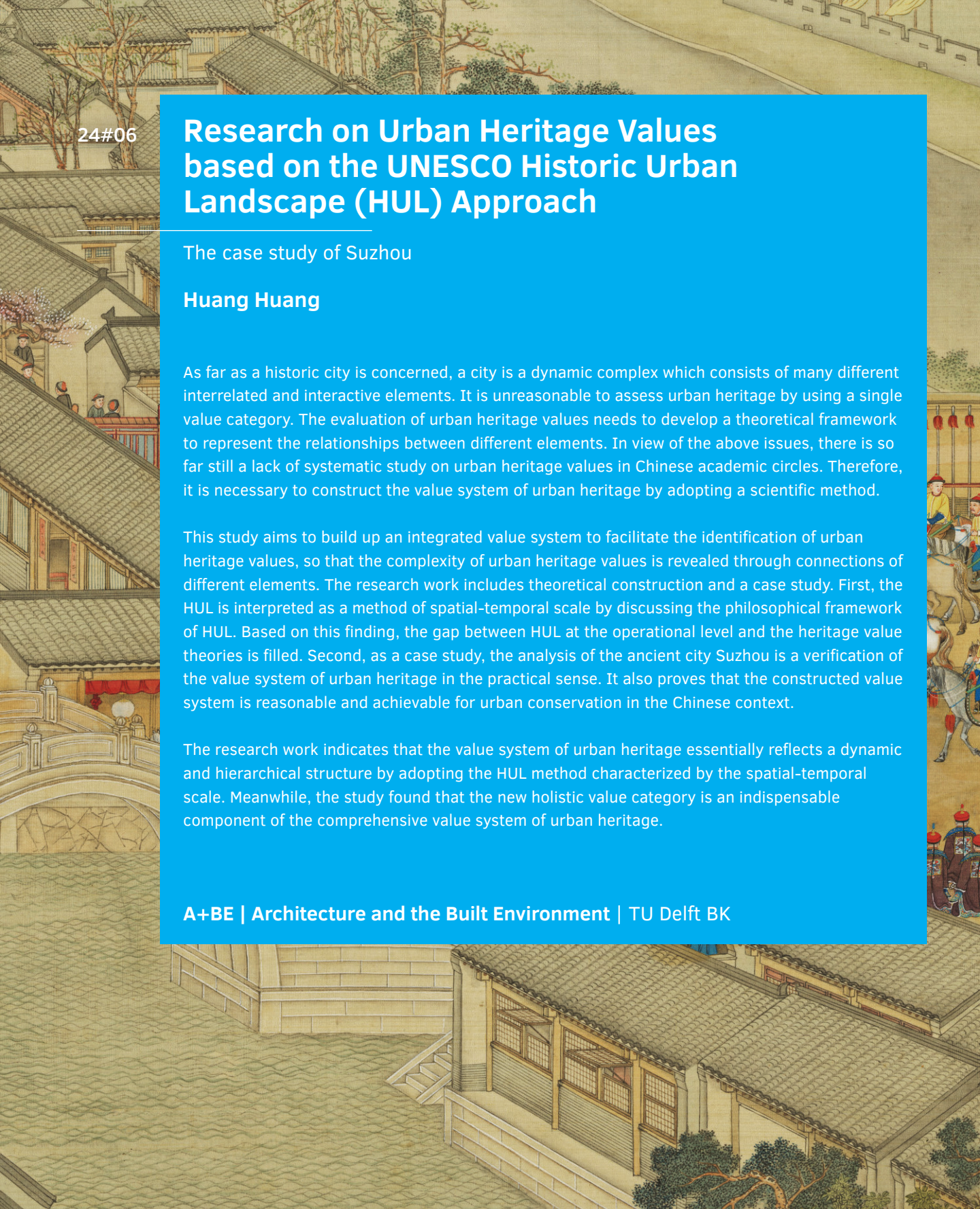

24#06

Research on Urban Heritage Values based on the UNESCO Historic Urban Landscape (HUL) Approach

The case study of Suzhou

Huang Huang

As far as a historic city is concerned, a city is a dynamic complex which consists of many different interrelated and interactive elements. It is unreasonable to assess urban heritage by using a single value category. The evaluation of urban heritage values needs to develop a theoretical framework to represent the relationships between different elements. In view of the above issues, there is so far still a lack of systematic study on urban heritage values in Chinese academic circles. Therefore, it is necessary to construct the value system of urban heritage by adopting a scientific method.

This study aims to build up an integrated value system to facilitate the identification of urban heritage values, so that the complexity of urban heritage values is revealed through connections of different elements. The research work includes theoretical construction and a case study. First, the HUL is interpreted as a method of spatial-temporal scale by discussing the philosophical framework of HUL. Based on this finding, the gap between HUL at the operational level and the heritage value theories is filled. Second, as a case study, the analysis of the ancient city Suzhou is a verification of the value system of urban heritage in the practical sense. It also proves that the constructed value system is reasonable and achievable for urban conservation in the Chinese context.

The research work indicates that the value system of urban heritage essentially reflects a dynamic and hierarchical structure by adopting the HUL method characterized by the spatial-temporal scale. Meanwhile, the study found that the new holistic value category is an indispensable component of the comprehensive value system of urban heritage.

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