Suitable renewal and space organization methods of historic town in the transition period: a case study in China

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Abstract: China's urban planning and construction have stepped into a transition period, with three major characters, which are transitions "from efficiency demand to humanity demand", "from perceptual planning to rational planning", and "from incremental expansion to inventory planning", this bring new demands to urban space planning, especially historic towns in China. The previous planning approaches caused some problems to historic towns, some of them were turned into tourist attractions, some of them were abandoned by natives. Most of them are facing the problems: how to develop sustainably with the consideration of the natives? How to demonstrate cultural heritage in a proper way? With the demands of transition period, this paper studied a typical historic town in Jiangsu province, China. First, this paper summarized the three characters of the transition period of China. Then through the study on the typical case, the paper summarized the problems caused by the previous planning approaches, which were missing of the original life pattern, narrow use of resources and inefficient use of public space. In order to solve these problems systematically, studies were made on three key parts "resource understanding", "function activation", and "space organization". Firstly, on resource comprehensive understanding aspect, multi-dimensional resource understanding and excavation system were construct, which expanded resource understanding ideas, and offered resource discovery system, to adjust the old perspective of economic optimality. Secondly, on function activation and implantation aspect, a function activation system taking people and value as the double core was construct, which expanded function organization ideas, and offered a function activation system. Thirdly, on coupled spatial renewal aspect, an embedded planning model facing urban renewal was construct, which condensed spatial renewal main points, and improved renewal planning ideas.

Keywords: historic town; resource understanding; function activation; space organization

1. Research background

Suitable renewal of historic town is a worldwide hot research topic in urban and rural planning research fields, and is getting a continually increasing attention in China. China's urban and rural planning and construction have stepped into a transition period, that bring new demands to the related works on historic town. With the demands of transition period, how to develop sustainably with the consideration of the natives? How to demonstrate cultural heritage in a proper way?

2. Characteristics of transition period

There were three major characters of transition period, which are transitions “from efficiency demand to humanity demand”, “from perceptual planning to rational planning”, and “from incremental expansion to inventory planning”.

2.1 From efficiency demand to humanity demand

In 2017, General Secretary Xi Jinping emphasized in his report to the Nineteenth National Congress that China has entered a new stage, and the main contradictions in our society have been transformed into the contradiction between the people's growing need for a better life and the unbalanced and inadequate development. In his important speech on July 26, General Secretary Xi Jinping pointed out that people's lives have improved significantly, their yearnings for a better life have become stronger, the needs of the people have diversified, have multi-level and multi-faceted characteristics, and they hope to have better education, more stable work, more satisfactory income, more reliable social security, higher level of medical and health services, and more comfortable living conditions. Beautiful environment and richer spiritual and cultural life. "Good life" and "human needs" have become the key words to be considered in social development at this stage (Leung *et al.* 2019). How to plan reasonably based on human needs is an important direction to be studied in the transitional period.

2.2 From perceptual planning to rational planning

With the rapid economic development of China, problems such as the spread of urban diseases, the similarity of urban styles and features, and the decline of the quality of human settlements have become increasingly prominent. Academician Wang Jianguo believes that how to achieve future-oriented "sustainable development" through "rational planning" in China's urban development is an important issue that needs to be considered and solved at this stage of urban development (Wang, 2018). The traditional perceptual planning method has some problems in our long-term planning practice, such as implementation failure and subjective decision, which cannot meet people's requirements and expectations for the quality of life at this stage.

Academician Wang Jianguo, on the basis of analyzing the development frontiers of urban design at home and abroad, put forward that there is a new trend of urban design development characterized by digitalization. "Human-computer interaction" is an important development direction of urban and rural planning and construction in the new stage, which requires efforts and exploration in the direction of "scientific analysis and guidance of spatial planning". Academician Wang believes that the design process of "human-computer interaction" can emphasize the combination of value-based creative design and multi-source data management and control. Rational planning can solve the problems of insufficient systematic grasp and subjective judgment in traditional planning and design, and integrate database and quantitative planning into urban planning and control.

2.3 From incremental expansion to inventory planning

With the improvement of the understanding of land resource shortage and the reflection on the development mode of growth doctrine, the transformation of urban development from "incremental

expansion" to "stock optimization" has attracted extensive attention from the government and all sectors of society. The state has put forward the requirement of delimiting the boundary of urban growth. The 13th Five-Year Plan (2016-2020) pointed out that the efficiency of resource utilization should be greatly improved, the total amount of construction land should be effectively controlled, the increment of construction land should be reduced year by year, and the management of restrictive indicators should be strengthened, and the double-control action of total amount and intensity of construction land should be implemented. Incremental and stock planning have become the inevitable choice of urban planning (Yang, 2017).

In recent years, there have been some practices and explorations of stock planning, including a new round of general planning for Shenzhen, Shanghai, Beijing and other major cities, as well as detailed planning such as regulatory detailed planning, urban design and renewal planning.

Inventory planning conforms to the overall idea of the transformation of urban development from "incremental expansion" to "tapping the potential of stock" (Ge *et al.* 2017a). It is a kind of planning that takes the stock space of built-up areas as the object and optimizes the adjustment as the main content without adding new construction land. Firstly, the concept of inventory planning is based on the realistic background of strict control of new urban construction land at the national level. Secondly, the inventory planning takes the stock space as the object, including all the land and buildings in the built area, such as the land and buildings with good or bad use status. Thirdly, stock planning should fully respect and make use of the current situation, take optimization and adjustment as the main content, encourage "acupuncture-type" planning, and avoid large demolition and construction.

3. Typical case study and main problems

There were problems caused by the previous planning approaches, which were missing of the original life pattern, narrow use of resources and inefficient use of public space.

3.1 Location

As seen in figure 1, Hushu town is situated at the east of Nanjing, which is one of the economic prosperous cities in China. The research area is about 27.13 hectare. Hushu Town was founded in the Western Han Dynasty 2000 years ago. It began to prosper in Ming Dynasty, which played an important part in the development of economy of the city. Because of the spread of cities, it is facing the stress of land-use transformation and missing of the original life pattern. There are seven intangible cultural heritages. Nanjing salted duck and manufacturing method are the provincial intangible cultural heritages. Zhou Gang mahogany carvings are the municipal intangible cultural heritages.

Hushu town embodied the culture of Nanjing and is also one of the Hui communities in Nanjing. Due to the lack of guidance in construction for many years, the original texture of villages has changed, the decline and reconstruction of old buildings have increased, and the cultural ecology of old town has been damaged.

Figure 1 Location of Huahu town in Nanjing

3.2 Material space

There are lots of historic factors in Hushu town, whose history is connected with the main city. As seen in figure 2, historic factors include historic buildings, historic streets and alleys, historic trees and so on. According to the investigation, there are 1400 buildings in this town, which include one provincial, seven municipal and seven district-level protection units and other outstanding historic buildings. All the historic buildings were built before 1980. Because of lack of correct renewal methods, some of them are at the edge of damage, which were made of local material. And they scattered among the normal buildings (Ge *et al.* 2017b).

Figure 2 The overall style and features of Hushu town

3.3 Population structure and cultural tradition

According to the official data, there are about 3347 people in Hushu town, nearly half of which are external population. Most of the natives moved to the new town in the north. Only old and some poor people are still live in this old town. Some of the traditional festivals are kept here. But the traditional life-style changed a lot.

3.4 Missing of the original life pattern

The existing historical value-oriented method of functional activation lacks consideration of human needs, which tends to use museum and exhibition hall to show historical value. According to the survey, the existing functions of Hushu town were composed of protection function, tourist oriented commercial functions, low-quality residential function, and some even mixed with industrial production functions. On one hand, the existing functions can no longer meet the needs of residents for a better life, and there was a phenomenon of residents looking forward to move out. On the other hand, the existing function lacked the combination of various resources of the towns, and can't display the unique value of the town well.

3.5 Narrow use of resources

The focus of resources understanding is mainly on the historical value of built-up areas, while the value of a wider variety of resources is indeed neglected. On one hand, because lack of systematic understanding of the resources of the town, historic residential area in the center of the town suffered serious protective damage. The local government renovated some historic buildings on both sides of the main streets, which totally did not conform to the local architectural characteristics and destroyed the traditional style of the streets in the area. On the other hand, other available resources have been neglected because of insufficient historical value, many of them can be used to enhancing the vitality of the town.

3.6 Inefficient use of public space

Spatial organization of public space lacks systematic combing. Due to the lack of systematic sorting out of space, the blind expansion of space development has destroyed the traditional space texture, the traditional landscape along the river has been destroyed, and private construction has been serious. At the same time, the old town's internal traffic chaos, the original traditional bluestone pavement was replaced by cement pavement. Because inefficient use of public space, the living environment is difficult to meet the requirements of comfortable living standards.

4. Multi-dimensional resource understanding method

On resource comprehensive understanding aspect, multi-dimensional resource understanding and excavation system were construct, which expanded resource understanding ideas, and offered resource discovery system, to adjust the old perspective of economic optimality. multi-dimensional resource understanding and excavation system include comprehensive screening, classified evaluation and value extraction.

4.1 Comprehensive screening

The available resources can be divided into material resources and intangible cultural resources. According to the different classification criteria of "scale, time and form", the material resources have many kinds of classification methods, as seen in table 1. The resources of the town can be divided into 18 sub-categories by interpreting them from the three dimensions. According to the dimension of time, intangible cultural resources can be divided into three categories: intangible cultural heritage, characteristic intangible cultural resources and innovative intangible cultural resources. Overall, the resources of the town can be divided into 21 sub-categories, and arranged in a certain order one by one, forming a list of available resources screening. The investigation and screening of resources according to the list can effectively excavate the resources of the town in an all-round way.

Table 1 Classification of available resources of historic town

Classification basis	Classification Contents
Scale division	Macro-resources, meso-resources and micro-resources
Time division	Historical resources and characteristic resources
Morphological division	Linear resources, planar resources, point resources
Carrier division	Material and non-material resources

After resource screening, it was found that the resources of Hushu Town covered 12 of the 21 sub-categories. Among them, there are many resources in many subcategories. For example, the medium-sized linear historical resources include two items: water network system and spatial pattern, and the micro-point historical resources include two items: ancient wells and ancient trees. Each item may contain several specific resource points.

4.2 Classified evaluation

In the process of resource classification and evaluation, it is necessary to carry out specific evaluation according to different resources. Firstly, classify the primary screening resources, merge the resources to be evaluated properly, and merge all the primary screening resources into several special evaluations according to the needs. Then, establish a targeted evaluation system according to the different evaluation contents. Each special evaluation method and evaluation system should be different according to the different objects and importance of evaluation.

Through proper classification and merger, all resources of Hushu Town are summarized into 6 evaluation aspects, including "historical context analysis, spatial pattern analysis, historical relics combing, street spatial evaluation, water network evaluation, and building evaluation". In the process of delimitation of special evaluation, emphasis should be laid on different levels of importance.

4.3 Value extraction

Value extraction refers to the further refinement and generalization of available resources on the basis of resource evaluation, and the extract available resources and values into concise and clear items of resource value. Resource value abstraction is based on the results of resource evaluation. After evaluation, more than two resource values can be extracted from the larger value of resources. The smaller value of resources can also be combined with one resource value from several resource evaluation results. The significance of value extraction is to further sort out and summarize the

evaluation of resources, and to further clarify the value of available resources. By extracting the evaluation results of six resources in Hushu Town, the total value of resources is summarized as follows: typical example of Nanjing culture, ideal landscape form, and unique architecture.

5. function activation

On function activation and implantation aspect, a function activation system taking people and value as the double core was construct, which expanded function organization ideas.

5.1 Combining with resources to enrich functional contents

Integrating human activities into functional organizations can enrich the functions of historic town, such as natural value recognition based on sightseeing activities, natural value exploration based on learning activities, intangible cultural experience based on leisure activities.

5.2 Increasing human participation

The inheritance of town value can't be separated from people's cognition, feeling and memory. It enriches people's understanding and experience of town value and is conducive to the display and inheritance of local value.

6. Space organization methods

On coupled spatial renewal aspect, an embedded planning method facing urban renewal was construct, which condensed spatial renewal main points, and improved renewal planning ideas, as seen in figure 3.

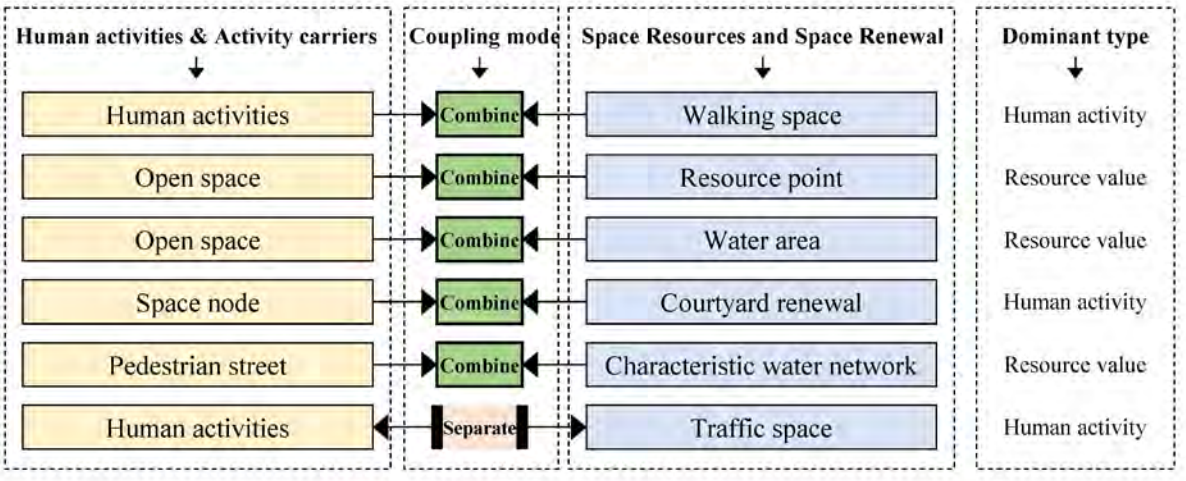

Figure 3 Embedded planning method facing urban renewal

6.1 Combine human activities and walking space

The combination of human activities and walking is a combination of linear elements and other elements, as well as a combination of functions and linear elements.

The planning emphasizes the combination of human activities and walking, and takes the walking system as the carrier of the spatial framework. On one hand, the walking system is the best carrier of public functions. On the other hand, the space and texture of historic town and streets are more suitable for walking. The main space nodes and active streets are processed on foot. Planning links all kinds of point and area elements in the town through walking system, including cultural protection units, characteristic buildings, historic wells, historic courtyards, water, open space and so on. The main public functions of the planning are also combined with the walking system.

6.2 Combine open space and resource points

The combination of open space and resource points is a combination of area elements and point elements. Planning emphasizes the combination of open space and resource points, including cultural protection units, historic courtyards, historic wells, excellent buildings and so on. Firstly, the combination of open space and cultural protection units will expand the open space. Secondly, combine open space with historic courtyards and historic wells. Through investigation and evaluation, it is found that there are two excellent historic courtyards and two historic wells in the town, and the location of historic wells and courtyards is relatively close. In combination of them, two new open spaces are added. Thirdly, combine open space and excellent architecture. Through the evaluation, it is found that there are nearly 100 excellent buildings in the town, and new open space is added in the dense areas of excellent buildings.

6.3 Combine open space and water resource

The combination of open space and water resource is a combination of area elements and area elements. Planning emphasizes the combination of open space and water resource. The water network system is one of the characteristics of the town. There are two large water pools around where a lot of human activities carried out. The planning combines the current water resource and expands the open space.

6.4 Combine courtyard renewal and space nodes

The combination of courtyard renewal and spatial nodes is a combination of area elements and area elements. Planning emphasizes the combination of courtyard renewal and spatial nodes. There are four areas in the planning core space: two cultural protection units and two water pools. Planning select the courtyards around the core space with better status to renewal, and improve the quality of the core space.

6.5 Combine characteristic water network with pedestrian Streets

The combination of characteristic water network and pedestrian streets is a combination of linear elements and linear elements. The planning emphasizes the combination of characteristic water network and pedestrian streets. Water network system is one of the important characteristics, which has the characteristics of distribution along streets and lanes. Planning protect the characteristics of the water network, following the spatial characteristics of its distribution along the street, expands the existing water network, and pays attention to its combination with pedestrian streets.

6.6 Separate human activity space from vehicle space

System coupling is not only the combination of systems, but also the separation of systems in space. The separation of human activity space and vehicle space is a kind of separation coupling relationship. The planning emphasizes the separation of the vehicle space from human activity space. Through investigation, it is found that the streets in town is not suitable for driving, and vehicle space will interfere with other space and functions, so the vehicle space will be limited outside the main space, and the driving and walking will be separated. There is a main street in town, which has a great impact on the quality of cultural protection and the surrounding areas through the core space; moreover, there are often various types of agricultural motor vehicles entering the town, which have an impact on the quality of the living space and cause damage to the bluestone pavement. Specific treatment methods include the pedestrian treatment of motor lanes and the construction of three parking around the town.

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