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Methods: Embedding Different Approaches into the Study of Urban Morphology

A Cultural Perspective on the Typo-Morphological Approach

A Planning Proposal for Hehua Tang, China

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Keywords: Urban heritage, Typo-morphology, Chinese context, Street, Fringe belt

Abstract: Hehua Tang once was a lively historical dwelling settlement in the inner fringe belt area of Nanjing. For decades, it was 'forgotten' during the rapid urbanization of the city. Nowadays, streets in Hehua Tang, which act as the main collective space for residents, are facing the enormous threat of losing their precious vitality due to controversial conservation and restoration schemes driven by local government.

This paper uses typo-morphology analysis to extract the characteristics of Hehua Tang. It also categorically defines the streets in this area in terms of a setting of street culture, with traditional customs, historical inheritance. The study also covers the multifaceted reactions of urban planning policies, and awareness and requests of residents. The analysis details the current situation of street system and form at two urban scales: the neighborhood and block scale; building scale, including building types, facade continuity, height-width proportion, plan rhythm, distribution of living units, and density.

This study not only provides a detailed graphical analysis, but also demonstrates a cultural perspective for reading and understanding the Chinese street. In particular, it is of use in seeking possible strategies to balance the preservation of Hehua Tang's street vitality and improvements of living-environment quality.

1. Introduction

Many historical cities are currently suffering from a morphological and typological crisis, due to mass production and the internationalization of design. Beyond the conflicts between old urban patterns and new ones, universal architectural solutions have strengthened the debate against the idea of the 'modern tradition' architectural style since the 1960s (Dellapiana, 2018). This study focuses on Hehua Tang, located in the old southern town of Nanjing, which has been neglected during its explosive urbanization; it is an ideal candidate for understanding the inner-city traditional settlement as a physical and cultural object.

Following a series of UNESCO, ICOMOS, ICCROM conferences, the definition of the heritage issue has been progressively broadened (Blake, 2000). The Historic Urban Landscape approach has been adopted as a holistic urban heritage with more inclusive consideration about socio-cultural context, economic and financial development, environmental impact, as well as

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urban transformation (Bandarin and Oers, 2012). Meanwhile, the concept 'Living Heritage' has been recurring over the last 20 years with increasing attention to the continuity of community connections and cultural expressions in the heritage sites (Poulios, 2014). Some scholars believe that the re-use of abandoned historical buildings is crucial for revitalizing communities and improving habitability conditions (Coscia et al., 2018). The typo-morphological approach, introduced as a reaction to Modernism, provides a prescriptive strategy of identity restoration in historical districts, which are progressively de-contextualized by market-driven urban development (Oliveira, 2016). It can nowadays be reinterpreted in the Chinese context, to provide a technical and operational guidance/methodology.

In this paper, we apply the typo-morphological approach, which originated in the Italian School in the 1950s, as a main method in the context of HehuaTang historical neighborhood. Despite being one of the last neighborhoods to have thrived for a thousand years, the Hehua Tang area has depreciated into a place of physical and moral decay for decades. However, despite the overcrowding and haphazard (chaotic) setting resulting from incoherent additions, Hehua Tang could be an emblematic example to study the identity of the traditional urban dwelling area owing to its abundant scope to reveal "a slow and organic piece-by-piece development process" (Kupka, 2012).

Following the introduction, the work is organized in three sections. The following section discusses culture integrated urban conservation approaches which emerged from Modernism and describes the possibility of reading the typo- morphology approach with a cultural perspective. In the third section, the paper illustrates a brief overview of the socio-economic evolution in Hehua Tang and analyzes the current built environment with corresponding cultural explanations. Besides, there is an analysis on the street system, that in the context is carried forth in two scales: neighbourhood/block scale, building scale. The last section is an overall discussion of urban transformation in Hehua Tang and concludes with design suggestions for future urban planning.

2. Methodology

This study adopts a multi-disciplinary methodology combining the typo-morphological analysis with the cultural demonstration, to investigate the impact of the changes of residential environments on the identity of the city and on the resident's perception. The spatial analysis identifies the characteristics of physical environment in terms of building types, spatial sequence, density and configuration. In addition, the spatial and cultural continuity in the transformation process of urban form can help sustain the local identity, thus benefiting resident's living quality. This study adopts a dual methodology by combining the typo-morphological analysis and the illustrations from a cultural perspective: sense of place. In addition to exploring the impact of typo-morphological changes of the built environment, the paper also defines a framework of guidelines for the future urban design.

The attention to existing cultural contexts has been at the core of emerging urban conservation approaches in the twentieth century. Among architects, planners, and social thinkers, the Italian architect Gustavo Giovannoni stood out as the first person who coined and defined the term 'urban heritage' (Choay, 2001; Zucconi, 2014) as an amalgamation of the cultural function and the built environment (Bandarin and Oers, 2012). Inspired by Giovannoni, Italian scholars Muratori and Caniggia developed a new method since the 1950s, the typo-morphology approach, to understand the transition process of urban structure; it is inclusive of both the phys-

ical and socio-cultural elements (Caniggia and Maffei, 2001) and is deemed as one of the most significant milestone in the field of urban heritage conservation (Bandarin and Oers, 2012).

Despite the long history of theoretical and practical studies in western countries, academic interest in the Chinese urban fabric is a recent issue. Since the beginning of the twenty-first century, the Conzenian methodology, known as urban morphology (Conzen, 2004), has been more prevalent with the extensive contribution of scholars, such as the British geographer J.W.R Whitehand and the New Zealander planner Kai Gu (Whitehand et al., 2011, 2014). On the other hand, the recent works of the young Chinese researchers like Fei Chen and Shuyi Xie introduces typo-morphology approach into Chinese context. They believe that this approach can help to "interpret the built landscape in relation to location, time and scale in order to understand the production and transformation process of urban form and guide quality design practice" (Chen and Thwaites, 2018). However, there is still a lack of practical exploration of the Italian school approach to the Chinese context (Xie, 2019).

The transformation of city must be understood as an integration of various urban components. In urban design, the street has constituted a planning element of value equal to the building or the building block. Despite numerous transformations, the streets, being the strongest urban morphological sign, influence the shape of the city for a prolonged period of time (Conzen, 2004; Xie, 2019). Following this, the examination of the case study is carried out through an in-depth analysis from the morphological to the typological scale. To this end, Hehua Tang area is defined into two different scales: Urban neighbourhoods scale and building scale. The neighbourhoods, which are defined by Conzen as the area which is "bounded wholly or partly by street-lines" (Chen and Thwaites, 2018; Whitehand et al., 2014), has a slow but strong influence on the urban form, as well as the urban landscape (Oliveira, 2016); Building, especially the ordinary houses, is the real cultural carrier (Caniggia and Maffei, 2001), since they play an intimate role in the daily life. The typological processes of houses, on the other hand, are more ductile and flexible to the cultural and social evolutions. The street in this case is considered as the extension of the house, providing not only the access to houses, but also the social and multifaceted public space.

It is important to highlight that the Chinese historical cities have an ontological different cultural context from those faced by Muratori and Caniggia. Initially, the definition of the city has been cosmological in nature rather than morphological, which translates into a practical scarcity of graphic data. In fact, "ground floor plans of cities in historical periods have been largely absent," which makes the analysis of Chinese urban form transformation extremely difficult (Chen and Thwaites, 2018). Moreover, the shape of the urban city is designed to heed the affinities of state power, such as the city central axis of Nanjing. Thus, typo-morphology as a research approach based on western city study needs to be addressed into the specific cultural contexts in Chinese historic urban landscape.

"The continuity of a culture is closely associated with the continuity of housing" (Gokce and Chen, 2018).Among the wide variety of identified cultural landscape elements, the sense of place has particular relevance for urban form. Sense of place is the contemporary equivalent of the 'genius loci' of ancient times, which was the guardian divinity of a place, its 'genius' or protective spirit (Bandarin and Oers, 2012).The argument about continuity, as a way to mitigate the trend of place-lessness in the transformation process of the historic urban settlement, is particularly relevant to the embedding of residents' collective memory (Bideau and Yan, 2018; Gokce and Chen, 2018).

Sense of place can be mainly projected into three dimensions: visual, psychology and spiritual aspects. Carmona and their fellow researchers declare that the visual experience of localities, such as the height of building, the scale of the street, etc. has strong connection to

human activities, as well as their behavior (Cullen, 1995). Meanwhile, the psychological aspect can be demonstrated predominately as "hierarchy of identity and place-lessness" (Tuan, 2001). Regarding the spiritual aspect, the sense of place mainly refers physical elements which can represent beliefs and memories of local community (Tuan, 2001). Literature review and online survey are the main tools of this research to gather information from Chinese literatures, local newspapers, digital archives, as well as reports about residents' interviews. Further research may involve other research approaches, such as ethnography, to achieve a better understanding by "thick descriptions" on local societies and cultures (Geertz, 1973).

3. Analysis/Results

Nanjing has a rich history dating back to thousands of years, however, in the recent past, it has experienced several dramatic changes, from the demolition of the inner-city walls to geometrical restructuring through 'Great Capital Plan' and the contemporary boom of new commercial skyscrapers. Hehua Tang is located in the inner-fringe belt area of Nanjing, as part of the "Nanjing's Precious Historical City Conservation Zone". It is an outstanding historical district which still retains the features of Chinese traditional residential settlements mainly formed in Ming and Qing Dynasty.

3.1. *The Streets (figure 1)*

The streets in Chinese historical urban district are usually as narrow as 2 to 3m, while the ones in the modern settlements could reach over 40m in width. Despite the size difference, the main transformation concerns the relation between blocks, buildings, and streets. The boundary between public and private areas are not clearly defined in the traditional street system, while in later cases, it is distinguished and accentuated by large semi-private or semi-public spaces.

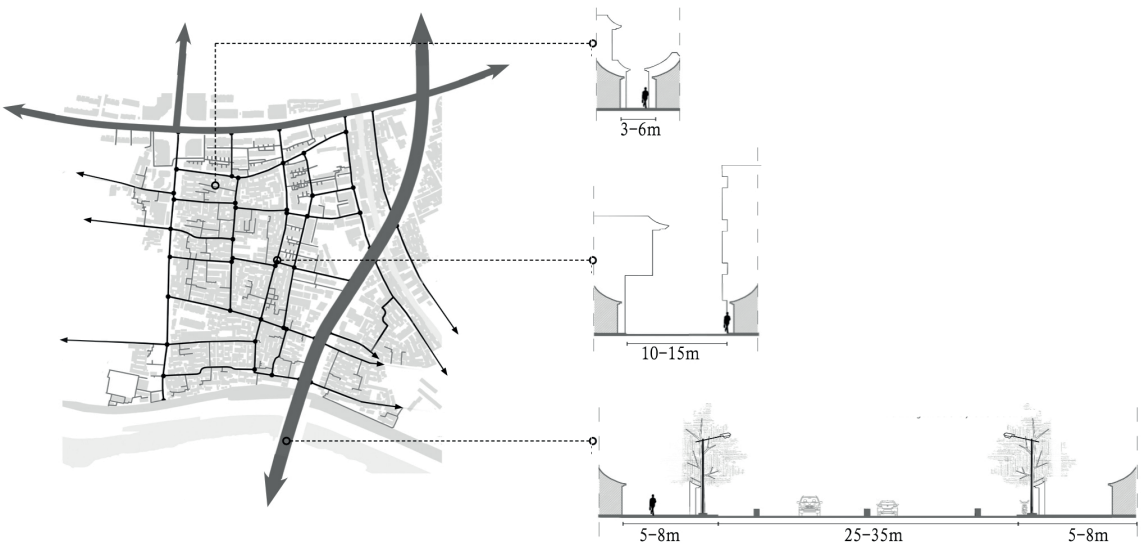

Figure 1. *Street system structure. Source: made by the author.*

Essentially, three types of streets can be identified according to the urban structure in Hehua Tang: the modern boulevard, the traditional lane, and the capillary alleys. The first type originates from the contemporary top-down planning, which literally overlaps the traditional street pattern. For Hehua Tang, the Zhongshan road is undoubtedly the strongest mark, that divides the old south town of Nanjing into two administrative districts. It creates a contrast with the traditional pre-existing urban fabric and street system. On the other side, the traditional lane, which is shaped by courtyard houses as surroundings, has been designed to provide a social space to merge the communities instead of dividing different blocks. Besides playing the role of social catalyst, it traditionally and presently provides access to the houses. Moreover, we can identify a recently emerged network of capillary alleys which are developed inside the private buildings. They represent a spontaneous reaction to the informal transformation and fragmentation of the traditional courtyard houses.

Since street is inserted in the urban context as a morphological structure, the street will be discussed again together in two scales of built environment: the neighbourhood and blocks scale as a space continuity, and the buildings scale as a social catalyst.

3.2. *Neighbourhood, Blocks and the streets (figure 2)*

Tracing back to Song dynasty (960-1279), an important urban system has heavily influenced the current urban fabric in Nanjing: the Lifang unit system. Lifang is an urban layout for Chinese capital cities regulated by central government from Tang dynasty (618-906). Some researchers believe that a unit of Lifang is theoretically identical to the concept of an urban block

Figure 2. *Neighbourhood, blocks and the streets. Source: made by the author.*

(Schinz, 1996). Despite the symbolic central axis of the city, the constitution and urban planning regulation of Song dynasty states that the urban area should be divided into a number of rectangular or square shaped districts. In addition, the city walls should be built with four main gates around those districts. This Chinese 'utopia block' still retains a significant impact on the historic urban neighbourhoods and districts. Nowadays, in Hehua Tang area, as well as most of the dwellings along Qinhuai River, some remnants from Lifang unit system can still be recognized from the organization of the residential blocks. Generally, most of the plots in Hehua tang follow the arrangement of a row with the short side facing the streets providing the access. Maintaining the system orthogonal, the warping of the urban fabric can vary from a north-south orientation to a less common east-west one according to the shape of the block. A typical plot is about 8 to 15 m wide and flexible in length in order to accommodate a traditional courtyard house.

The main current morphological characteristics of the Hehua Tang historical area are homogeneity and high density. On one hand, the carpet-like tissue that characterizes Hehua Tang is composed mostly of one or two stories of courtyard houses. On the other hand, the density of house units of the previous urban fabric is noticeably higher than the contemporary one resulting in lower land coverage. Despite its formal homogeneity, the Hehua Tang urban tissue is the result of several informal stratifications. The morphological evolution of Hehua Tang can be divided into three stages: the traditional city (1929), the industrial city (1977) and the speculative city (2019).

As shown in the graphic, in the 1920s, the West side of Chunhua gate was completely covered by traditional settlements composed by low-rise courtyard houses, which created the typical carpet like tissue. There were still some areas left as arable land or open land inside the city wall, mostly near to the south-west corner. In the second half of the twentieth century, the previous empty spaces as arable lands were progressively filled up by big industrial factories until saturation. Consequently, the street patterns resulted in an expansion without essentially changing. The third stage corresponds to the large-scale replacement of the 'decayed' traditional built-up area in the 90s. In this stage, the existing traditional fabric was progressively replaced by a punctual and serial arrival of high rises, and multi-story commercial districts.

The street patterns in 1920 shaped the urban blocks and still reflect the traces of the feudal period. Essentially, the streets followed a regular 'T' junction patterns that are organically developed according to the topography, mainly in the areas along the river. However, since 1977, the Zhongshan road defines the current Hehua Tang East border with west wing of the Chunhua gate. This street, as the main transportation path, is incoherent to the traditional patterns by changing the hierarchies. Meanwhile, other historical streets in this area have been renewed to accommodate an increasing number of cars (this is the case of the other two streets which define the North and the West border of Hehua Tang). Buildings alongside the two types of streets in the last three decades have been largely replaced by the aforementioned high-rises. The buildings height varies from two stories to ten so that the width-height ratios differ significantly, creating a chaotic visual effect. Although it was strongly lacerated, the traditional road system is still evident nowadays.

3.3. *Buildings and the Streets (figure 3)*

The Hehua Tang courtyard house represents the traditional vernacular typology in this region. It is widespread in Nanjing and other surroundings such as the Anhui province (another Chinese province along Yangtze River). As shown in the graphic, Hehua Tang courtyard is usually

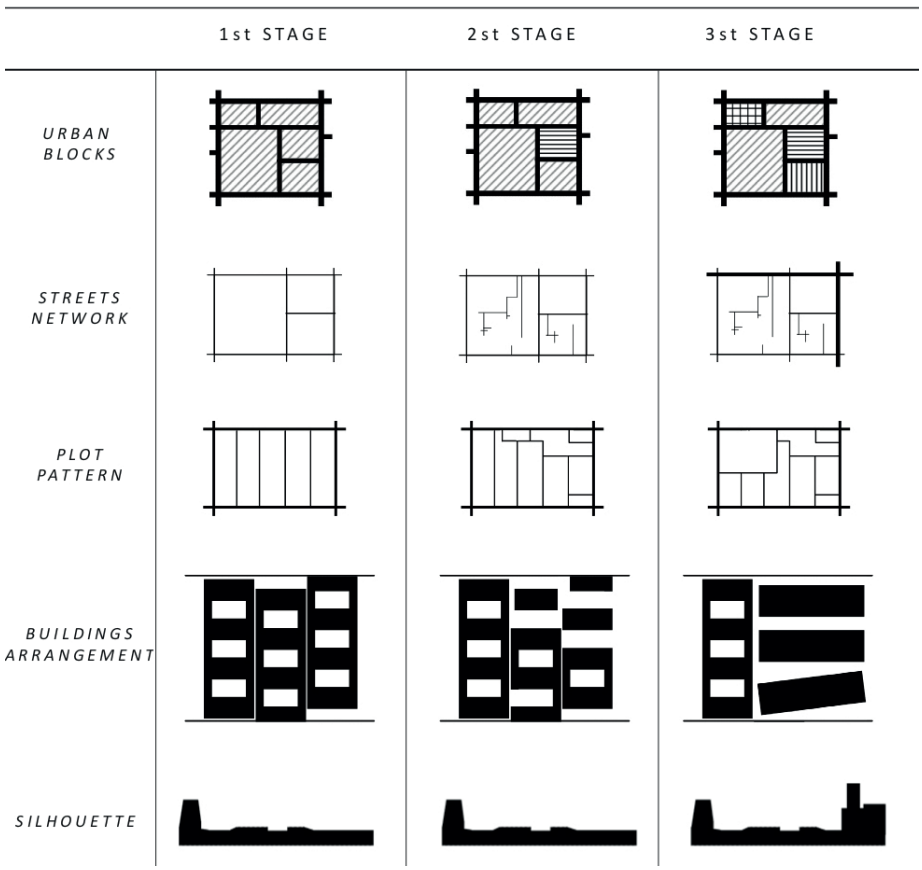

Figure 3. *Buildings and the streets. Source: made by the author.*

composed by a sequence of buildings and is developed inside a long and narrow plot. In order to assemble an urban block, the houses were placed beside each other. The buildings can be detached by a street: attached or partly attached to each other (fig.4). The number of courtyards could vary from one to five, according to the social status of the owner beyond the financial conditions. As the other typologies of the courtyard houses, the house has flexible plans ensured by simple and punctual structural elements. The individual buildings, as the components of the house, are usually narrow and developed in length. The courtyards were designed essentially to improve the ventilation inside the residential buildings. They are usually surrounded by two-story buildings or corridors, in order to reduce the onslaught of direct sun rays.

Originally, the orientation of these buildings follows an orthogonal orientation, prevalent along north-south axis. The distribution arrangement of this typology respected a specific functional and social order. Starting from the South, the first building was meant for the workshop; the following building was for the family activities or the accommodation of young generations; the biggest one was for the older generation of the family and, in the richest houses, the last building to the north was for the servants. However, it is hard to find an aboriginal typology in the current built environment of Hehua Tang owing to several significant socio-cultural revolutions: from the progressive vibrant state to the current ownership ambiguity. Thus, in order to host new social groups, the traditional houses have been transformed by the residents with minimal distributive interventions. After the Liberation, in a context of strong urbanization, the traditional house complex is too big to be affordable for a single family. For these reasons, this typology was progressively fragmented to adapt to new spatial and economical needs.

Thus, the need to reach the remote buildings of the complex necessitated a new different distributive street system. The series of surveys detected four main strategies of transformation

in Hehua tang: internal corridor, lateral corridor, access from the street and hybrid detached houses. In the first two cases, a new corridor is obtained inside the courtyards to access each building, as a living unit for single family. In the third case, the secondary street provides additional accesses to the courtyards. In the last case, new modern detached houses reshape the facade, the section proportion and the plan rhythm of the original street. These new additions create new hybrid solutions which witnesses the resilience of this historical residential area over years.

3.4. *Sense of place at Hehua Tang: Illustration from Cultural Perspective*

"Psychologically, traditional urban forms are imprinted into the collective memory and become symbols of a culture" (Chen and Romice, 2009). In Hehua Tang, the high density of low vernacular houses facilitates a high frequency of social interaction between dwellers.

The proportion of the height and width of streets creates a sense of belonging and safety for the community. Thus, the function of the streets in Hehua Tang is more similar to an open living space for residents, in which people can share news, eat together, play games, as well as dry their clothes. Some living rooms of the living unit are completely open to the streets, creating an ambiguous extension of the houses. In addition, the size of blocks and distance between street corners are friendly for open-air marketing. Hence, another impressive characteristic of the street is continuous appropriation with spontaneous and improvised commercial activities, such as selling vegetables in the early morning or street foods at the late night.

The courtyard, on the other hand, is another communal place for family dining, doing housework, and gathering. The plants and gardens are the most common elements for a courtyard, which helps people to distinguish the slight difference between the open-access place and family only space. Moreover, this intimate feeling is enhanced by the enclosing arrangement of the surrounded houses, as well as the almost blind facade towards the street.

4. Discussion/Conclusion

This study makes a typo-morphological analysis in the Chinese cultural context. It examines the applicability of western spatial study approaches in Chinese urban heritage conservation. In addition, it explores a practical way to maintain a continuity of community in the historical

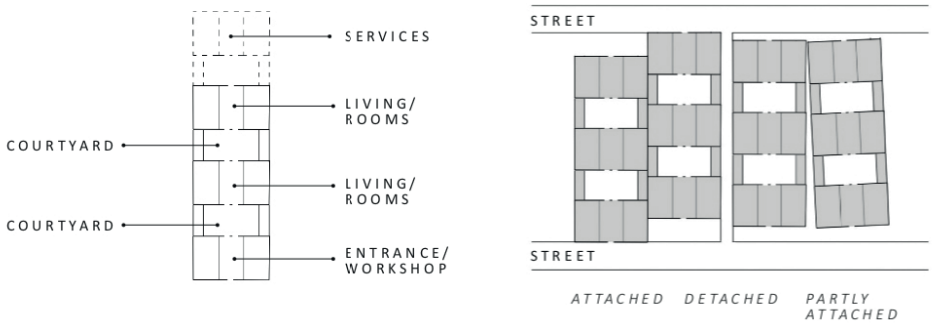

Figure 4. *The typology of traditional courtyards. Source: made by the author*

districts which are losing their livability and identity. The physical and social nature of heritage conservation in such areas are usually interrelated without definitive, or objective solutions.

The study offers design suggestions in response to the current built environment and vernacular culture. The urban morphology evolution of Hehua Tang area shows unique traces from the Chinese feudal period. Moreover, the sense of place, especially the spiritual aspect, has a strong connection with the local spatial characteristics. To sustain preservation of the local community, the courtyards should be maintained, as well as the traditional street structure. New design proposals should reproduce the high density of the current built environment, aiming to revive the local lifestyle. Meanwhile, the appearance of blocks must be compact, with the main accesses in the perimeter road. Porous solutions, such as ilot ouvert, should be avoided as much as possible regarding the arrangement of residential blocks. On the other hand, the plot should be respected, mainly in terms of proportions. It is not a fundamental element to be preserved in the original imprint, due to the vulnerability to rapid socio-economic changes. In addition, the open spaces should be redefined spatially and functionally with precise restriction. The social and cultural function of open spaces along the streets should be highlighted instead of the symbolic meaning of the state power. Furthermore, restored traditional courtyard houses should be adapted to the different needs which are required at present.

Since the population of the city has increased rapidly, it is hard to find a housing complex which is owned entirely by only one family. As the structure and space utilization are separated in the traditional house complex, every plot can be subdivided into different living units for different families. Even though this kind of typological process has already happened spontaneously and informally in Hehua Tang, a more planned intervention could produce fruitful effects in terms of living quality.

The research offers a multi-layered and multi-scale demonstration about the Chinese urban landscape which is facing heterogeneous and complicated circumstances, and seeks for a balance between urban heritage conservation and local community development. However, further study on typo-morphology is needed to fully examine its feasibility in the Chinese urban heritage context. Improvement could be achieved by introducing a more detailed consideration both of economical phenomena, such as market-driven tourism and ownership ambiguity, and socio-cultural impacts.

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