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Study on the Heterogeneous Space Pattern in the Urban Development Process

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Abstract: Faced with the changing economic pattern in our country, there have been qualitative changes in its original nature and form. Taking sustainable development as the main principle, under the guidance of second spatial creation theory, this study combines the original industrial plants, historic districts and old business buildings with the requirements of the function and form space development in the new period, proposes the second design concept for heterogeneous space and describes several characteristic spatial patterns from the changes of space function, the elements of landscape structure and other aspects, thus realizing the development and regeneration of unused or abandoned space forms in the new period.

Key words: Heterogeneous space, second creation, characteristic spatial pattern

INTRODUCTION

In the traditional classification of space combination, implementing orderly arrangement and organization according to certain spatial properties, functional requirements, size, transport routes and other factors can solve the issues of the relation between multiple single space. The traditional space combinations include centralization combination, linear combination, group combination and other spatial patterns. Due to the transition of economic structure from industrial-based economy to service-oriented economy in the 21st century, there have been some dislocations in the function and form of old spatial patterns. To develop the unused space or the space should be reconstructed, a kind of spatial pattern with the characteristics of the times silently comes into view which is called heterogeneous space.

HETEROGENEOUS SPACE

As the name implies, heterogeneous refers to a state of randomly mixing multiple substances that retain their original properties. Conceptually, diversified space is also called "heterogeneous space". There are different things existing in a field, in which the coexistence of heterogeneous materials forms the aesthetics and diversity of spatial formation. In heterogeneous space it needs to make second designs for the whole space which is to achieve a cold-dish-like creative improvement for the space with different backgrounds, styles and functions in different ages. While making improvements, retain the valuable parts of the building or site in the original space

and enhance the developments of formal language and function in new space to meet the new demands for the continuous use of space under the transition of present socio-economic pattern.

Semantic conversion of heterogeneous space (from original meaning to present meaning): Semantically, heterogeneous space can be defined as a kind of special space combination with multiple forms of space. Then how to explain the transformation from old industrial sites to creative park and the reconstruction of old cities to historic districts? From the instances of city symbol analysis through sociosemiotics it's easy to see that large shopping centers have successfully transformed their images from commercial interests maker into new landmark in the city. This conversion not only shows the transformation process of the symbolism for symbols, original meaning and present meaning but also tells us how to make use of it to influence the goals and behaviour in built environment at the moment. Because of the new economic patterns and the transformation of space usage, the industrial heritage was transformed into creative parks represented urban creative economy and old cities were transformed into historic districts with historical features and modern district function. (Madanipour, 2009) Because of the fundamental reformation of times and economic patterns, these two irrelevant concepts have convergences after making fundamental changes in semantics, thereby forming characteristic spatial patterns based on the theory of second creation.

CHARACTERISTIC SPATIAL PATTERNS IN HETEROGENEOUS SPACE

Because the particularity of the form and function of heterogeneous space type, several spatial patterns with distinct features of the time were created which has solved a lot of common issues during the process of urban development and urban spatial transformation. The heterogeneous space is a special type of space that emerged in the process of urban spatial development. It mainly has three types: The creative park that transformed from former industrial plants, the historic district of different periods that reconstructed, restored and preserved from old cities and the commercial district with different themes.

Heterogeneous space function

Transformation of space function: From the perspective of space functions, industrial space with functions of production, logistics and warehousing has changed into a gathering place of creative teams and companies; production space has transformed into a base of cultural enterprises. Large and open plants meet the functional needs of production but the creative enterprises need relatively independent space function. From the perspective of landscape, space with simple and unadorned image has been developed with diversified functions which can fully show communal space and public space. Similarly while the ordinary streets which just simply meet the needs of residents' daily life are transforming into the blocks with age characteristics and styles, on space function, simple living space is transforming into modern blocks with folk styles of a certain period or some typical folk features which can not only meet the needs of daily communication between neighbours but also satisfy the requirements of all kinds of stops, such as visiting, shopping, recreation, rest, stay, etc. There is the block space with both the use function of modern society as well as the function of recalling and restoring the style of a certain period; The former and simple product sales platforms which had certain reputation and features and took business for its purpose, has developed into the district space which mainly embodies the commercial atmosphere and block characteristics, preserves the product features of old business and has been endowed new forms of space and new commercial value. On space function, space with simple sales behaviour has changed into comprehensive space with sightseeing, shopping and recreation (Fig. 1-2) (Ashihara, 1985).

Convergence of space function: Along with the second transformation of heterogeneous space, the convergence of design method and space function is usually the most important issue for designers to think. How to melt the



Fig. 1: Comparison diagram of the function of heterogeneous space before transformations

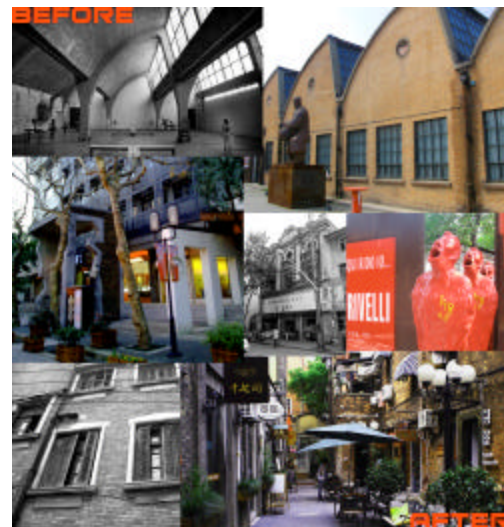


Fig. 2: The comparison diagram of the functions of heterogeneous space after transformations

original space function into transformed space, how to connect the characteristics and elements of a new era with historical features, how to integrate special tourism and city quality embodiment into the space with purely commercial function and other key issues are the design difficulties and points of second creation. The methods like the transformation of the facades and internal space of the building, the overall adjustment of landscape design and the detail design of nodes would be used frequently for convergence. Take the creative park transformed from an industrial plant for example, first make reasonable segmentation and arrangement of the



Fig. 3: Southern song imperial street site museum in Hangzhou

layout for the large blocks in the factory space. Beijing “798 Creative Park” divides a typical Bauhaus industrial buildings into several creative units with different sizes and also designs some small-scale shared space in each creative gathering group. Thus each block can have its relatively independent area for activities and exchanges which enlarges the small-scale space for stay and communication and also increases the spontaneous activities for the people in the park. Hangzhou Southern Song Imperial Street is a typical renovation project of historic district. On the convergence of space function, besides the reservation of architectural form and historical culture sites with historic features in each block, the public site museum that was reconstructed from cultural relics as well as the natural transition of space function makes the treasures awake from their long sleeping and shine new splendour in the new era (Fig. 3). Museums of Chinese knives, scissors, swords, umbrellas and fans are successful examples of the transformation of space function which protect and develop traditional Chinese folk culture.

Theory of spatial second creation: After analysing the function transformation and convergence method of heterogeneous space, the essence of second spatial creation theory can be roughly summed up as follows: when the buildings with different backgrounds are in an environment, using a combination of use function and



Fig. 4: Second creation theory

aesthetic taste as well as collage arts can form a kind of diverse, chaotic and repellent beauty of difference. In the present idea ocean of new space design, the field of architecture and landscape adopts lots of soft transition design methods, natural integration of architecture and urban context, the methods of creating natural landscape and so on. For this reason it makes the charm of the characteristic space pattern-heterogeneous space more apparent and summarizes the core theory of second design in a state of difference and chaos. The second spatial creation theory can be expressed with this mathematical formula (Fig. 4).

The formula intuitively embodies the essence of second creation theory: On the basis of the building or site of the original space, the space created by second creation (Space C) neither fully belongs to the original space (Space A) nor entirely vests in the new space (Space B). It makes maximum use of the valuable parts of the original space that can be preserved and developed and also collects spatial form elements that adapted to the recent requirements of function. It reshapes the space and gives a chance of life to the space. The transformed space (Space C) has the properties of both the original space (Space A) and the new space (Space B), thereby achieving the goal of sustainable development after mixing the space.

LANDSCAPE STRUCTURE OF HETEROGENEOUS SPACE

Due to the heterogeneous space-the three distinct characteristic spatial patterns created by second creation theory, the authors have to respectively expound several elements of landscape structure, including various landscape elements of landscape mechanism, landscape corridors that highlights visual guiding, the landscape nodes that shows the core of space, the penetration relation between all the parts of the spatial landscapes.

Post-industrial creative parks: The post-industrial creative park is the most typical type of heterogeneous space. It takes the building and field environment of the former factory as the background of its landscape and



Fig. 5: Environmental signage system for the creative parks

makes various post-industrial elements, such as the industrial heritage with symbol of industrial civilization (machinery equipment, industrial buildings, etc.), as landscape elements. In addition, the establishment of the overall environmental signage system for the park is vital for the improvement of space identifiability and the recognition of second creation space (Hara, 2010). Repeatedly expressing the identity and spatial distribution of the park through a variety of art forms has significantly improved the ambiguity and uncertainty of its self-positioning (Fig. 5). Highlighting the post-industrial color hue and the public nature of building outer space, increasing the functions of shared space and public space and adding organized positive space to lax and unorganized negative space can make the outer space realize the function of landscape corridors and highlight its practical function, thus forming a platform for people to exchange, communicate and rest. It's just like the urban square in Italy which has inadvertently become a communication and recreation space for most Italians and an essential outdoor style life (Lynch, 1990). Furthermore, the landscape structure should focus on the penetration of the industrial atmosphere of the original space and highlight the suitable psychological needs of artists and designers for the space while creating (Donald, 2010). In the system of whole landscape structure, always put emphasis on the aesthetic value and functional value of modern landscape design art and make up the aesthetic deficiency of the original space basement to show a unique landscape style created by secondary design.

Historic districts: With the development of cities, major cities have gradually started the transformation project of historic districts. However, there are still some stacked landscapes existing in many district transformation examples. They show the opposite of performance engineering. When men first come into contact with this type of heterogeneous space, historical nature, regional characteristics, folk humanities and historical background should be highlighted in the overall conception of landscape structure because the transformation of historic district has special period and regional nature. Solidify the spatial impression in that particular era and repetitively use the regionalism as landscape elements in the space. Penetrate the cultural context into the landscape details of the district through transformations and use local materials as much as possible to retain the structure of the old district. During the transformation process of Hangzhou Southern Song Imperial Street, we can see the construction of small space systems in street and the connection of small space systems were used to create historic space so as to raise the “core” space in the district as the nodes of landscape. Create a shaped spatial structure with a romantic city, elegant streets and quiet lanes and develop modern creative fashion ideas, unify the urban furniture and signage systems and form the diversity of historical development for the building facade on the basis of the memory of imperial street. In addition, the streetscape which performs the function of landscape corridor is also a very important element during the landscape construction of historic districts. Build landscape penetration relations between building and its outer space through the environmental embellishment and scene sculpture with historical features in the space, show urban historical context in the new era and give a new interpretation of regionalism by remodeling and reconstructing the space (Lu, 2008).

CHARACTERISTIC COMMERCIAL DISTRICTS

The reason why the commercial district is classified as heterogeneous space is because the design concept of commercial district in recent years has changed into zone combinations that consist of multi-zone small space diversification from the uniform pattern and been ready to be diversified, characteristic and topical. The sweeping generalization of the design ideas of street storefront pattern that was simply transformed from old cities has developed to the awareness of the importance of maintaining life and natural growth state, or this is a trend transition from deliberately organized space to negative space (i.e., less planned features) which is undoubtedly a qualitative progress of design industry reflecting on design spirit. The commercial industry which belongs



Fig. 6: Scenes of life with full of Shanghai lane atmosphere in Tianzifang on the Taikang street in Shanghai

to modern characteristic commercial district, contains various commercial street with different themes: Cuisine variety street, shopping street, antique street etc. In the area of landscape structure, put emphasis on different commercial atmosphere (or fashion, or old, or full of delight of life). The diversification of the original architectural form, the diversity of space format, the individualization of the overall outlook, the exclusiveness of showcase and storefront style and so on are regarded as the landscape elements of district spatial design. Furthermore, the design of night view for the commercial district is the primary focus of landscape atmosphere design. Tianzifang on Taikang Street in Shanghai is an leisure commercial format with rich overlap of vulgar life and lane scenes (such as living groceries, restaurants, bars, cafes, etc.). The ubiquitous noise, bustling and the remains of foreign culture in old Shanghai neighbourhood as well as the life scenes are interspersed in this commercial district. The mutual landscape penetration of life and business mode shows its spatial feeling with strong local characteristics (Fig. 6). The Sohu creative district in America is also full of classical architecture symbols and old shops and the internal functions of the building and the functions of district are fully in line with the needs of life and psychology.

CONCLUSION

All in all, the optimum spatial transformation under the guidance of second creation concept surely embodies the unique charm of heterogeneous space during the design process, what's more it makes people in the city experience unprecedented surprise and pleasure. Whether it is a creative park transformed from an industrial plant, or a historic district reconstructed from old cities, or the commercial districts with different themes, when they are in a chaotic space with complex and diverse base, the former space can be given unprecedented vitality through the transformation and convergence of space function as well as the reconstruction and recreation. It not only opens a new chapter in the sustainable development of building outdoor space in the city but also provides a new lifestyle for the main body of the city.

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