

Research on the Mode and Strategy of Urban Renewal in the Old Urban Area of China: A Case Study of Chongqing City

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Abstract—In the process of rapid urbanization, old urban renewal is an important task in China's urban construction. This study, using status survey and Analytic Hierarchy Process (AHP) method, taking Chongqing of China as an example, puts forward the problems faced by the old urban area from the aspects of function, facilities and environment. Further, this study summarizes the types of the old urban area and proposes space renewal strategies for three typical old urban areas, such as old residential area, old factory and old market. These old urban areas are confronted with the problems of functional layout confounding, lack of infrastructure and poor living environment. At last, this paper proposes spatial strategies for urban renewal, which are hoped to be useful for urban renewal management in China.

Keywords—Old urban renewal, renewal mode, renewal strategy, Chongqing, China.

I. INTRODUCTION

WITH the rapid development of technology and economy, China's urbanization has gone through a period of rapid growth. There are some problems showing in urban area, such as long term of use, poor quality, small per capita living area, inadequate infrastructure, inconvenient transportation, public security and fire hazard and poor environmental sanitation. In these areas, the roads are crowded, garbage is discarded at random and lack of garbage collection seriously affects the city image. The old urban areas in many cities in China need urban renewal [1]. The purpose of urban renewal is to enhance and improve urban functions, optimize the allocation of land resources, improve the happiness index of residents, and promote the harmonious development of society.

II. THE SPATIAL CLASSIFICATION OF THE OLD URBAN AREA IN CHONGQING

The old urban area of Chongqing can be divided into 4 types: old market, old factories, old residential areas and historical blocks [2].

- 1) The old market: They have good location. The buildings are mostly built in 1970s and 1980s, and the greening situation is good. However, the problems faced in this area include the low plot ratio, the large impact of urban traffic, and the overall transformation faced with financial pressure.

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- 2) The old factory areas: The factory buildings are so large and the quality of them is poor. It is located in the surrounding areas of the trunk line, such as railway and waterway, and the building has a certain value of use. But the problem is that factory buildings are large and the transformation is facing financial pressure. Some factories are facing pollution and waste problems.
- 3) The old residential areas: The buildings are mostly built in 1970s and 1980s, and the plot ratio is low, but the neighborhood atmosphere is good. The problems faced in these areas include the financial pressure of the overall demolition, the poor matching of public facilities, and the poor quality of residential environment.
- 4) The historical blocks: They have a certain historical value. But the problem is that the protection of historical buildings is poor and needs further renovation. There are some problems in the coordination relationship between historical buildings and surrounding environment.

III. THE PROBLEMS IN OLD URBAN AREA OF CHONGQING

A. Functional Layout Confounding

The old urban area is the administrative office, business, economic, information and cultural center of Chongqing. It concentrates on the most important business, finance, entertainment, administration, medical services and basic education facilities in the city. Since 1950s, the blind distribution in these regions become more and more serious, which leads to mixed residential, commercial and industrial functions, traffic confusion and low environmental quality. With the continuous increase of population, the contradiction between different functions and land in these area is increasingly revealed, which has become increasingly unsuited to the requirements of urban modernization.

B. Lack of Infrastructure Construction

Lack of infrastructure construction in old urban areas is one of the features, and construction problems such as roads, water supply and drainage are particularly prominent, which has affected the development of cities. Due to the limitation of early urban planning standards, parking facilities in these areas are insufficient, parking demand exceeds supply, and parking conflicts in old urban centers are particularly prominent. Due to the influence of terrain, the connectivity of urban road network is poor, and the density of road network is insufficient. The layout of public facilities in old urban areas is unreasonable, and all kinds of public facilities are not perfect.

C. Poor Living Environment

There are a large number of people living in the old city. But the housing quality is low, the layout of the building is chaotic, the infrastructure is not perfect, the population density is too high, and the resident environmental quality is poor. The old urban area was developed with high density, and the housing was crowded. At the same time, there is not enough space for public activities in these areas, and there is not enough room for public daily life.

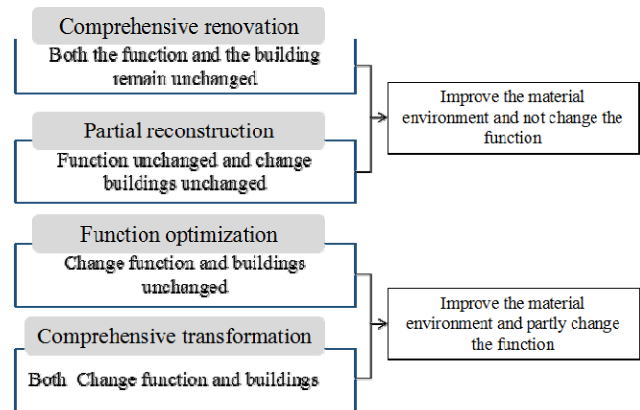


Fig. 1 Model selection of urban renewal in Chongqing

TABLE I
 RENEWAL STRATEGIES IN OLD RESIDENTIAL AREA

Number	Space strategies	Specific methods
Var01	Improve the infrastructure	Improve the infrastructure network of water supply, drainage, power supply, gas and so on
Var02	Improve road network	Improve the urban and community road network
Var03	Convenient public transport	Provide convenient public transport sites, routes, and convenient transfer with the subway
Var04	Improve the supporting of public facilities in residential area	improve community support and provide community public service facilities such as community cultural stations, community clinics, elderly housekeeping centers, and health care centers
Var05	Provide public open space	Provide entertainment and rest places such as squares, parks, amusement parks, etc
Var06	Provide garbage collection facilities	Improve the collection of garbage collection points and transfer stations, and promote the classification of domestic refuse
Var07	Optimize the community environment	Plant plants, flowers and trees, optimize the community environment, ensure the quality of residential space
Var08	Improve the commercial facilities in the residential area	Provide a network of community retail business
Var09	Improve air quality	Reduce air pollution emissions and shut down air pollution sources
Var10	Lower noise level	Install sound insulation barriers to reduce noise sources
Var11	Ensure community safety	Improve fire and police facilities to improve community safety and response capabilities
Var12	Improve the community neighborhood atmosphere	Improve community facilities and the community atmosphere
Var13	Building facade regulation	Renovate the facade of the buildings
Var14	Strengthen the structure of the building	Maintain the structure of the building to ensure the safety of use
Var15	Protect of historical buildings	Protect of valuable historical buildings
Var16	Protect of block texture	Protect the original texture of historical blocks
Var17	Recycling materials	Use of recycled materials in buildings
Var18	Water saving design for building	Design or install water-saving facilities, such as water recycling
Var19	Building energy saving design	Using solar energy and design green roofs
Var20	Interior structure change of building	Change the interior structure and space layout of the building
Var21	Function change of building use	Build and upgrade kitchen and sanitary facilities, optimize the internal pipe network facilities
Var22	Formulate the compensation standard for residents' relocation	Formulate the compensation standards for the relocation of residents at different levels, and provide house for high, medium and low income families
Var23	Dismantling the old building	Dismantling the old buildings and structures
Var24	Build new buildings	Build new functional buildings and improving building standards
Var25	Formulate progressive update strategy	Develop incremental planning steps and formulate phased implementation plans
Var26	Reconstruct the infrastructure system	Reconstruct infrastructure system and improve fittings standard
Var27	Reconstruct the road network system	Reconstruct road network system and improve road system construction standard
Var28	Planning management policy	Issue planning management policies to support urban renewal

IV. URBAN RENEWAL MODE AND SPATIAL STRATEGY

A. Menu Mode Selection of Old Urban Renewal

1) Model Selection of Urban Renewal in Chongqing

According to the types and special situations of the old urban area in Chongqing, this paper puts forward 4 reform categories: comprehensive renovation, partial reconstruction, function

optimization and comprehensive transformation (see Fig. 1). Comprehensive renovation is to improve the living environment of the old city through the improvement of the physical environment, but it does not change the function and architecture of the old urban area. This methods adopted include improving the basic and public facilities, street renovation, and improving the environment, but without

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changing the main structure and function of the buildings. The other 3 transformation modes are to improve the material environment and partly change the function of the old urban so as to get the renewal of environment and function. The main way is to change part or all of the use function through environmental renovation and demolition and reconstruction of buildings.

2) Menu Mode Selection for Urban Renewal in Chongqing

This study proposes a menu mode urban renewal model, which is realized by the path of "comprehensive evaluation - mode selection - planning method selection". Through the comprehensive evaluation of a certain old urban unit, we select the corresponding mode from the four renewal modes [3]-[5], which can be either a single mode or a multimode. And the last step is to choose the renewal mode and the corresponding plan and transformation method to achieve the renovation of the old urban area.

B. The Renewal Strategy of Three Types old Urban Areas

1) Old Residential Renewal Strategies

The menu mode renewal strategy in old residential areas includes 4 categories and 28 subcategories (see Table I). The renewal of these areas is mainly based on comprehensive renovation. According to the evaluation, combined with different evaluation results, we choose the corresponding level of spatial strategy. Among them, the basic menu is the primary menu, which aims at improving the city image and living environment mainly through the renovation of the residential environment and the improvement of the residential landscape. Its leading force includes government or company, and the planning is mainly on the level of landscape and building facade design.

2) Old Market Renewal Strategies

The menu model strategy in the old market includes 4 categories and 26 subcategories (see Table II). The renovation of old market is mainly based on reconstruction and function optimization. According to [3] and evaluation, combined with different evaluation results, we choose the corresponding level of spatial strategy.

TABLE II
 RENEWAL STRATEGIES IN OLD MARKET AREA

	Number	Space strategies	Specific methods
Basic space strategies (Menu A)	Var01	Improve the infrastructure	Improve the infrastructure network of water supply, drainage, power supply, gas and so on
	Var02	Improve road network	Improve the urban and community road network
	Var03	Convenient public transport	Provide convenient public transport sites, routes, and convenient transfer with the subway
	Var04	Improve the supporting of market public facilities	Improve market support facilities such as market service center, material management center, trading center and so on
	Var05	Provide public open space	Provide entertainment and rest places such as squares, parks, amusement parks, etc
	Var06	Provide garbage collection facilities	Improve the collection of garbage collection points and transfer stations, and promote the classification of domestic refuse
	Var07	Optimize the market environment	Plant plants, flowers and trees, optimize the market environment, ensure the quality of commercial space
	Var08	Improve air quality	Reduce air pollution emissions and shut down air pollution sources
	Var09	Lower noise level	Install sound insulation barriers to reduce noise sources
	Var10	Guarantee the security of the market	Improve fire protection, police and other facilities to improve market safety and response capabilities
The second level space strategies (Menu B)	Var11	Building facade regulation	Renovate the facade of the buildings
	Var12	Strengthen the structure of the building	Maintain the structure of the building to ensure the safety of use
	Var13	Protect of historical buildings	Protect of valuable historical buildings
	Var14	Protect of block texture	Protect the original texture of historical blocks
	Var15	Recycling materials	Use of recycled materials in buildings
	Var16	Water saving design for building	Design or install water-saving facilities, such as water recycling
	Var17	Building energy saving design	Using solar energy and design green roofs
The third level space strategies (Menu C)	Var18	Interior structure change of building	Change the interior structure and space layout of the building
	Var19	Function change of building use	Change the function of building use
	Var20	Formulate the standard of relocating compensation for market	Formulate the standard of relocating compensation for market
The fourth level space strategies (Menu D)	Var21	Dismantling the old building	Dismantling the old buildings and structures
	Var22	Build new buildings	Build new functional buildings and improving building standards
	Var23	Formulate progressive update strategy	Develop incremental planning steps and formulate phased implementation plans
	Var24	Reconstruct the infrastructure system	Reconstruct infrastructure system and improve fittings standard
	Var25	Reconstruct the road network system	Reconstruct road network system and improve road system construction standard
	Var26	Planning management policy	Issue planning management policies to support urban renewal

3) Old Factory Renewal Strategies

The menu model strategy in old factories includes 4 categories and 27 subcategories (see Table III). The renovation of old market is mainly based on local reconstruction and

function optimization. According to [3] and evaluation, we combined with different evaluation results and choose the corresponding level of spatial strategy.

TABLE III
RENEWAL STRATEGIES IN OLD MARKET AREA

	Number	Space strategies	Specific methods
Basic space strategies (Menu A)	Var01	Improve the infrastructure	Improve the infrastructure network of water supply, drainage, power supply, gas and so on.
	Var02	Improve road network	Improve the urban and factory road network
	Var03	Convenient public transport	Provide convenient public transport sites, routes, and convenient transfer with the subway.
	Var04	Provide public open space	Provide a place for entertainment, such as squares, parks and amusement parks in the factory area.
	Var05	Provide garbage collection facilities	Improve the collection of garbage collection points and transfer stations, and promote the classification of domestic refuse.
	Var06	Optimize the factory environment	Plant plants, flowers and trees, optimize the market environment, ensure the quality of industrial space.
	Var07	Improve air quality	Reduce air pollution emissions and shut down air pollution sources
	Var08	Lower noise level	Install sound insulation barriers to reduce noise sources
	Var09	Ensure factory safety	Improve fire protection, police and other facilities to improve factory safety and response capabilities
	Var10	Building facade regulation	Renovate the facade of the buildings
The second level space strategies (Menu B)	Var11	Strengthen the structure of the building	Maintain the structure of the building to ensure the safety of use
	Var12	Protect of historical buildings	Protect of valuable historical buildings
	Var13	Protect of block texture	Protect the original texture of historical blocks
	Var14	Recycling materials	Use of recycled materials in buildings
	Var15	Water saving design for building	Design or install water-saving facilities, such as water recycling
	Var16	Building energy saving design	Using solar energy and design green roofs
	Var17	Interior structure change of building	Change the interior structure and space layout of the building
	Var18	Function change of building use	Change the function of building use
The third level space strategies (Menu C)	Var19	Formulate the standard of relocating compensation for factory	Formulate the standard of relocating compensation for factory
	Var20	Disposal of waste in factory area	Treatment of industrial pollution waste in the factory area
	Var21	Disposal of dangerous goods in the factory area	Deal with hazardous chemicals in the factory area, and prevent pollution from subsequent construction
The fourth level space strategies (Menu D)	Var22	Dismantling the old building	Dismantling the old buildings and structures
	Var23	Build new buildings	Build new functional buildings and improving building standards
	Var24	Formulate progressive update strategy	Develop incremental planning steps and formulate phased implementation plans
	Var25	Reconstruct the infrastructure system	Reconstruct infrastructure system and improve fittings standard
	Var26	Reconstruct the road network system	Reconstruct road network system and improve road system construction standard
	Var27	Planning management policy	Issue planning management policies to support urban renewal

V. CONCLUSION

Taking Chongqing of China as a case study, this paper puts forward three types of old urban area in Chongqing, and initially puts forward three renewal strategies for old urban area. This article is only a preliminary study. The next step will be to study the old urban area evaluation method and further improve the old urban renewal strategies.

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