Analysis on the Dynamic Mechanism of the Evolution of Chengdu Urban Planning

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Abstract. Since 1949, the overall urban planning of Chengdu has been compiled and revised for six times in total. Through the analysis on these six versions of overall urban planning, this article concludes that the overall planning of Chengdu has experienced the transformation from a traditional one to an innovative one. On the other hand, the factors, such as national policies, economic development, reform and innovation, as well as the protection and construction of urban culture, finally constituted the dynamic mechanism of urban planning of Chengdu.

Introduction

City planning is the specific arrangement which determine the city property, scale and direction of future development, reasonably use urban land, coordinate urban space layout and various constructions based on the existing structures of urban economic, social, ecological and infrastructure, essentially, which is regarded as the comprehensive deployment which study the future development and space reasonable layout of the city, manage all the resources, and arrange all kinds of the engineering constructions\textsuperscript{[1-3]}. Under the historical conditions of full implementation of scientific outlook on development, it is essential to study and review the theory of urban planning, summarize the historical experience and lessons learned from the development of urban planning, and analyze the dynamic mechanism of urban planning in order to promote the healthy development of cities in China.

Chengdu is the fastest growing city in the west of China, and it is the major pioneer of practice which is the first time of changing from the urban planning to the town and country planning in history as well. In the analysis and research of the dynamic mechanism of the evolution of modern urban planning, it is believed that Chengdu is a good representative in China. The analysis conducted on the dynamic mechanism of the evolution of urban planning in Chengdu can help to accurately determine the new driving force of urban development and planning, and it will be beneficial to better serve the urban planning and development of other cities.

Development Course of Urban Planning in Chengdu

Since 1949, Chengdu has compiled a total of six versions of overall planning of the city. It has played an important role in guiding urban construction, improving the urban functions, and promoting the overall development of economy and society in different social and economic backgrounds of Six planning stages. The first overall urban planning of Chengdu was compiled in 1953. It is believed that this overall planning basically followed the soviet model, which emphasized on the formality and pursued for momentum, and it determined the basic pattern of the core radiation\textsuperscript{[4,5]}. The second overall urban planning began in the sixties. Due to the three years of natural disasters, some changes were made on the planning. Overall planning was downsized and reduced in scale, the width of the road was compressed. It was more pragmatic and less in formality.
The third overall planning of Chengdu city began in 1984. This planning took urban modernization as its theme, which emphasized the improvement of urban function, established the circular and radiation pattern of urban road network, and it formed a city structure of single center. What’s more, the main guiding idea was to control the scale of the city, improve urban infrastructure, and properly protect the historic sites and valuable buildings. The period of the fourth overall planning of Chengdu city is during 1995 to 2020, and the plan was completed in 1996. The development goals of this urban planning are building modern metropolis, which has a good ecological environment and reflect the history and local characteristics, and where people live and work in peace and content, and ultimately achieving the sustainable development of economy and society.

The fifth phase of the overall planning of Chengdu city is from 2003 to 2020 year. The development goal of this urban planning in this phase is that Chengdu will be built into a city with many faces, a new industrial city, a central hub city, a city with livable gardens and attractive charm cultural, a city with beautiful landscape and eco-city tourist center. The sixth phase of the overall planning of Chengdu city is from 2011 to 2020 year. The development goal of this urban planning in this phase is to build Chengdu into a modern super central city with an optimal entrepreneurial environment, the best living environment, and the most comprehensive competitiveness in the central and western regions of China. Long-term vision (2050) is to eventually build Chengdu as the world's ecological garden city.
Analysis on the Evolution of Urban Planning in Chengdu

Urban planning is a comprehensive deployment which study on future development of the city space, reasonable layout of the city space, as well as the management of all the resources and comprehensive arrangement of all kinds of the engineering constructions. It is a blueprint for urban development in a certain period of time, and a fundamental part of urban management. Besides, it is not only the important basis of urban construction and management, but also the leading management of the three stages—urban planning, urban construction, and urban operation [3]. The six overall planning of Chengdu had been made tremendous changes. The overall development process had showed distinct characteristics, specifically reflected in some aspects including urban nature definition, the scale of the city, urban pattern and layout, and urban transportation etc [1].

The Evolution of City Properties

The dominant function of a city determines the nature of the city, and the nature of the city is a historical concept rather than a fixed pattern, which keeps evolving as the city's leading function changes [6].

At first in 1956 Chengdu was defined as “the capital, a city with precision instruments as well as machinery manufacturing and light industry” in Sichuan Province. Then in 1984 Chengdu was positioned as “the capital of Sichuan province, one of the famous historic and cultural cities, an important scientific and cultural center in China”. After that in 1995 Chengdu city was positioned as “the capital of Sichuan province, the center of political, economic and cultural for the whole province, the central heart for science and technology, finance, business trade center, transportation, and communication in the southwest China, an important tourist center city, a national historic and cultural city”[7,5,8]. In 2003 Chengdu city was positioned as “the provincial capital of Sichuan Province, one of the important central cities in the Western China, the central heart for Science and technology, finance, business trade center, transportation and communication in Southwest China, a national historical and cultural city, a tourist center city”[8,9,10]. In 2011 the city was positioned as “the capital of Sichuan province, the major center city in the western region, and the national historic and cultural city” [11].

Evolution of Urban Spatial Pattern in Central Urban Area

In 1949, Chengdu had only 18 square kilometers, and in 1978 the built-up area of Chengdu was only 57.2 square kilometers. However by 1995 the city center area had reached 598 square kilometers, in 2003 it reached 597 square kilometers, and even in 2011 it reached 630 square kilometers. The overall scale of the central urban in Chengdu didn't change much significantly from the beginning of 1995. However, the spatial pattern has changed dramatically. For more than 60 years, the urban spatial structure of the center city in Chengdu changed from the pattern that was
built since the early stages of the founding of new China, which was surrounded by two rivers and overlapped by three cities, to the pattern of single center and circle development style namely "ring plus radiation" in the 1980s. From 1995 to 2003, the space layout of center city developed from the "circle" to "fan" type of layout, and it developed from the east to the south. The space pattern of the downtown in Chengdu in 2011 was a multi-center, axial concentrated, and the circle shape is extended to a fan blade shaped extension.

Evolution of Urban Transport in Central Urban Area

In 1956, the overall planning of Chengdu basically followed the soviet model, which emphasized on the formality and pursued for momentum. The urban layout was on the basis of old city, then tightly developed towards surrounding area in a compact format. The road network adopted the type of layout of “the ring and the radiation”, it retained the traditional pattern of eccentric shaft which was surrounded by two rivers. In 1984, the overall plan established the road network pattern which is circular and radial, forming a single center city structure. The overall plan basically achieved the “the ring and radiation” type of road network pattern, along with the "well" shape expressway system in the central area in 1996. In 2003 overall planning stipulated that the central city transport development pattern was the "well" shaped road, circular road, and radial shape road. In 2011 the overall planning required the center of the city to build a high efficient transport system covering from the road to the air, as well as combining humanization, intensification, information, ecologization, coordination and civilization into one efficient transport system. In 2011 the overall planning target was to establish a 2D to 3D efficient public transportation system for a more people friendly, environment friendly and information friendly city center. At present, Chengdu had built second ring express way on the former basis of transportation, opened 4 subway lines, realized the comprehensive transportation system of three layers of over-ground, aerial and underground joint development, all of these made it convenient for residents getting around.

Evolution of Historic and Cultural Protection and Construction

As one of the first national-level historic and cultural cities, historic and cultural protection has experienced three stages in Chengdu. At first, the initial stage of the reform and opening up, it was the formation of a single system with the focus on the protection of cultural relics as the core content in this stage. The second stage occurred in the middle of the 1980s, and the double layer protection system was developed in this stage, where protection on historic and cultural city is an essential component for this double layer system. The last stage was the mature stage of the multi-level protection system where the center of the focus turned to the historic and cultural blocks in the middle of the 1990s. The overall planning stipulated there would be established integrated frame of conservation of historic cultural cities and built a frame system of preservation of cultural relics, famous historic cultural cities, historical and cultural blocks to make them get comprehensive protection when it came to 2003. In 2011, the overall planning brought historical and cultural resources into the protection system, including famous historic cultural cities, (town, village), historical and cultural blocks, cultural relic protection site, historical building, old tree and famous wood species, intangible cultural heritage and so on, the scope of protection was wider and more comprehensive.

Analysis on the Dynamic Mechanism of Urban Planning of Chengdu

In foreign countries, the dynamic mechanism of the evolution of urban planning generally consists of many factors including government policies, economy and society, as well other various factors on the whole. The dynamic mechanism of the evolution of modern urban planning comprises multi-level and very complex factors in China. There is a close relationship among the various factors, and these factors interact with each other. All factors play different roles in the process of urban planning.
Adapting to National Macro Strategic Layout—National Center City Construction Needs

On May, 2016, the planning for the development of Chengdu and Chongqing city cluster were officially announced in the National Development and Reform Commission website, building national center city is the goal of Chengdu city were put forward in this planning. This was the National level defined Chengdu as national center for the first time, and changing Chengdu and Chongqing urban group into the national city group were put forward. On September 11, 2016, The Seventh Plenary Session of the 12th Chengdu Municipal Committee was held, the development goals of current and future periods of Chengdu is to construct the National Center City that is the western economic center, technology center, creative center, foreign exchange center and transportation hub. The National Center City is compared to the tower spire of the national urban system "pyramid ", which has lead, radiation and distribution function in the whole country. This requires that Chengdu city should make a new plan to meet the needs of the country's strategic layout in future.

Planning Ideas or Development Goals of City Government

One of the driving forces of urban planning in Chengdu is the idea of urban planning and development goals from city government. In the six overall planning, Chengdu Municipal Government had proposed its development goals, which is to construct "the world's ecological garden city" and build Chengdu as the super center city in the west of China that has the best business environment, best living environment and the most comprehensive strength. At the meantime, urbanizations are regarded as the main way to coordinate the urban and rural economic development in Chengdu Municipal Government [16]. In addition, "four in one", "three concentration", "four basic projects" and other development strategies were put forward by Chengdu municipal government successively [16], which made another significant leap in urban planning development of Chengdu.

ATTENTION: Four in one: economic construction, political construction, cultural construction, social construction. Three concentration: Industry to focus on the development of the District, farmers to towns and new communities, land to moderate scale business concentration. Four basic projects: Rural grassroots democratic politics construction, rural property rights system reform, rural land comprehensive improvement, village level public service and social management reform.

Reform and Innovation, and the First Breakthrough

Reform and innovation and the first breakthrough are also one of the driving forces to promote the evolution of urban planning in Chengdu. In order to reverse the consecutive expanding trend of the gap between urban and rural areas, central authorities have put the “three rural issues” as the top priority among many priorities to be addressed. Coordinated development between urban and rural area has become one of the fundamental ways to solve the problems of agriculture, rural areas and farmers. Back in 2003, Chengdu has already taken measures to balance urban and rural areas, and has planned to take the road of coordinated development between urban and rural areas as the development program of the government [17]. By the end of 2004, the first new rural community construction planning was completed, and a series of important special planning to guide the development of urban and rural areas had also been completed one after another, This was the first time in history that changes had taken place in planning from urban areas to urban and rural areas, therefore Chengdu has become a pioneer in this field [18]. In 2007, China government approved and designated Chengdu as “a national pilot area for urban and rural comprehensive reform” [17]. This first breakthrough and a series of reforms and innovations have significantly promoted the development of urban planning in Chengdu.

Economic Impetus

Urban economic development is the basic power of urban planning evolution, which promotes the development of urban planning and provides the financial support at the same time. Urban economic development can also produce enormous agglomeration effect, which will attract many
surrounding people and businesses to gather together. Meanwhile, population increase and the lack of land will definitely promote the further development of urban planning. As a result, it needs the editing of previous general planning.

**Urban Culture Protection**

Urban culture protection is also one of the driving force for urban planning evolution and development. Culture has historically been a driving force and now recognized as a key resource and assets for sustainable urban development. Stemming from social and cultural processes, urban heritages reflects societies’ identities, expectations and visions over time. In 2011, the overall plan stipulated to construct the conservation systems of historical and cultural resources that includes constructing historical and cultural cities (towns, villages), historical and cultural districts, heritage conservation units, historical buildings, the ancient and famous trees, intangible cultural heritage, other intangible cultural contents included. For instance, the overall plan required that the ancient trees should be protected under the laws and regulations of “Rules of Protection and Regulation of Ancient and Famous Trees in Chengdu” with respective level and type, as well surrounding environment should be planned and controlled by other relevant laws and regulations. All of these require the relevant units to follow and strictly perform the regulations of historical and cultural heritage protection, so that the development of urban planning can be promoted. As a return, urban planning greatly helps create the sustainable development of urban culture.

**To Avoid the Breeding of Many Environmental and Social Problems**

As a big central city, Chengdu produces huge concentration and scale benefits. In other words, Chengdu has more advantages on economic, political, cultural, transportation and medical treatment than its surrounding cities. Be compared with the surrounding areas, it inevitably can attract lots of workers in burst. The government have to make a new planning of the city to avoid many environmental and social problems such as the unreasonable urban functional layout, the disorder of urban sprawl, the aging infrastructure, and the deterioration of ecological environment and a series of social problems in the process of the rapid urbanization.

**The Expiration of the Original Plan, a Significant Breakthrough in the Size of the City**

Taking the master plan in 1995 year as an example, the plan was started in 1994, and was approved by the State Council in 1999. Although the overall plan is due till 2020, but the statutory time limit by State Council approved is 2010. On the other hand, the actual resident population of the central city in Chengdu had reached 550 ten thousand, and the actual built-up area had already reached 375 square kilometers in 2009, which far exceeded the population and land scale set in overall plan in 1995. About 270 ten thousand city resident population and 226 square kilometers of the city land scale in 2010 were predicted by the overall plan (covering from 1995 to 2020) established in 1995 on Chengdu. So overall the actual population scale exceeded 280 ten thousand, and the actual land scale exceeded 149 square kilometers. Under such a circumstance, this significant breakthrough in city population and land scale made it imperative to have a new plan.

**Adjustment in Industrial Layout and Major Infrastructure Construction**

Prior to 2011, the relocation of the eastern suburbs of Industrial Zone in Chengdu had made great progress, projects in new district in the east and the south of the city (Chengdu municipal government moves towards the south of the city) had started to construct as well, a series of projects had already begun such as building of the core area of the city, transformation of the dilapidated houses, governance of the water environment, comprehensive improvement of Sha rivers, smooth flow engineering of traffic, cleanup and disposal for shutdown project. Selection and feasibility study of regional significant traffic infrastructure had also begun to be implemented (Chengdu-Chongqing passenger dedicated line, Chengdu north railway marshalling station, expansion of the second runway of Shuangliu airport in Chengdu, selection of the new airport location, etc.) All these changes in industrial layout and major infrastructure construction posed a new challenge to urban planning, therefore the overall plan started to be revised in 2011.
Requirement of Integration and Coordination with Other Programs

Taking the overall plan revision in 2011 as an example, Chengdu was one of 14 pilot cities in the next round of land use planning from the Ministry of Land and Resource in the whole country. “The Overall Planning of Urban Land Use of Chengdu” from 2006 to 2020” had already fundamentally been completed. “Reconstruction Master Plan after Disaster of Chengdu” had just been completed. “The Overall Functional Area Planning of Chengdu” and other macro-planning had already been completed. Integration and coordination between the overall urban planning of Chengdu and all these other plans were urgently needed in theory and operation. For all of this, it must have a critical impact on the overall economic development for Chengdu.

Natural Disasters and Adjustment of Administrative Divisions

After the 2008 Wenchuan earthquake, as the disaster zone and the provincial capital of Chengdu, it is pressing for Chengdu to reconsider and coordinate the overall layout for post-disaster reconstruction, and put forward new requirements for the long-term development. Therefore the 2011 overall planning of Chengdu started. In 2002 the administrative division of Chengdu began to be adjusted. For example, Xindu and Wenjiang set districts after the revocation of county. The population and land status in central city both exceeded the scale of the 2010 overall planning. This brought up the need to revise the overall planning in 2003.

Summary

As one of the initial famous historic and cultural cities, the dynamic mechanism of city planning evolution in Chengdu is not sole, it is the interaction and interplay of multi-factor, including: economy, politics, culture, society, environment, population increase, state macro strategic layout, the goal of city development made by government, administrative division, natural disaster, industrial distribution and major infrastructure adjustment etc. meanwhile, Chengdu is “the test site of comprehensive coordinated reforms of balancing urban and rural on whole country”, “the key city of the state”, its dynamic mechanism of city planning has representativeness and topicality. I hope that the study in this paper could provide reference for planning and development in other cities.

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