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TOD Policies and Their Influencing Factors in Chengdu City, China

中国四川省成都市における TOD 施策及びその影響要素に関する研究

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Content

*Some illustration and materials have been modified for copy right reasons.

Chapter 1: Introduction

1-1 Research Background

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1-1 Research Background

With the increase of urban population and spread of motorization, many of Chinese cities have taken the trunk roads as the skeleton to expanded the city since the 1980s. Many of them developed multiple ring-roads outside the old part of the city, made land readjustment along the road system and developed homogeneous large residential blocks for urban expansion. After the 2000s, urban problems brought by such way of urban expansion mode such as urban sprawl, car traffic jam and air pollution became gradually remarkable.

To ease these problems, many local governments of Chinese cities have promoted construction of urban metro systems. According to *TOD Annual Report of China's Urban Rail Transit in 2022* by Yijuyanjiuyuan, by 31st December of 2022, 55 cities in China operating 10292 km of metro lines. Among them, Chengdu city began its metro construction since 2006 and in 2022 it is running 558 km operating milestone of 10 metro lines.

Figure1- 1 China Map of Metro Development

On the other hand, many of Chinese cities suffered the urban problems cause by urban sprawl (Li Lu, 2022). Scattered-disordered development happened in urban suburban areas, caused the environmental destruction and disordered urban form. The local government of Chinese cities begun to consider the city development policy, which can make compact development and efficiently arrange public resources. (Hao Shouyi, 2022)

Moreover, Liu Dingjie (2021) critized that the cooperation between metro construction and development of metro station areas was weak in the Chinese first-tier cities. For example, Wanxiang Cheng shopping mall, a commercial complex that holds the largest floor area in Chenghua District, Chengdu City, was opened in 2012 while the metro station in front of it opened in 2016. The local government of Chinese cites called for the way to combine metro station and development of its surrounding areas. (Liu Dingjie, 2021)

Furthermore, large-scaled metro construction projects took enormous construction costs resulted in high debt of Rail Transit Groups (state-owned railways company) of cities in China. (Yijuyanjiuyuan, 2022) Besides, as a state-owned public transport institution, the metro ticket price is stipulated should not be high, resulting in low the ticket revenue which can only cover the operation cost. As a result, Rail Transit Groups not only has a high debt but also continues deficit management. The local governments were seeking for fund to support sustainable metro construction and operation.

With the development problems and demand of above, in the 2010s many local governments of Chinese cities focused on the Transit-Oriented Development (TOD) advocated by Peter Calthorpe, the urban development strategy which formed residence and commerce accumulation areas around train stations in Japan and TOD model of

Hong Kong. (Mi Xue, 2021)

Figure1- 2 Conceptual diagram of the TOD model
The next American metropolis: Ecology, community, and the American dream

Figure1- 3 Urban Planning of Denenchofu
東急グループ 洗足・大岡山・田園調布まちづくり 100 年 (https://tokyugroup.jp/action/gardencity/)

Among them, Chengdu city government became the 'first Chinese city to carry out a series of TOD development policies for the entire city' (Page 17 of *TOD Development Survey of Urban Rail Transit of China (2010-2020)*) and appointed Chengdu Rail Transit Group as the executant to implement them.

1-2 Research Questions

Many Chinese cities have already built an automobile-oriented road infrastructure. The impact of metro system and TOD urban development strategies on the development of metro station areas has not been clarified in such urban infrastructure and urban areas.

The intention and measures of TOD policies promoted by Chengdu city's local government and their impact to urban development of metro station areas has not been clarified.

1-3 Research Objectives

This research aims to clarify the current situation of metro station areas and clarify the impact from the intervene of metro system and TOD to development of metro station

areas in Chengdu city, China.

This research aims to clarify the measures and purpose of TOD policies by Chengdu government, compare them to current development of metro station areas and clarify the realization degree and problems of them.

1-4 Previous Research and the Position of this Research

1-4-1 Previous Research on Chengdu's TOD Development

Previous research on Chengdu's TOD development can mainly divided into two parts: research on TOD policies by Chengdu government and research on TOD development current situation.

On one hand, there are two research on TOD policies by Chengdu government. Yuan Hong (2020) collected and interpreted the measures for TOD urban design guidelines and design standards of Chengdu government from 2016 to 2018. And she claimed that TOD is useful for construction of Park City (公園都市) of Chengdu city. Liu Cheng (2021) collected the measures for land management, funds distribution of Chengdu city's TOD policies. He claimed the problem of the development of TOD in Chengdu city is lack of incentive policy and policy related to the integrated development above ground and underground.

On the other hand, there are four research on TOD development current situation. Li Weike (2014) and Gong Qing (2016) introduced the current situation of TOD redevelopment projects in old downtown areas in Chengdu city. Yu yang (2022) took three metro stations in Chengdu city's old city center to analyzes the change of commercial distribution around the station since 2010 and gave some suggestions on commerce planning nearby the metro station of old downtown areas. Rong Xing (2021) took Line 6 Luxiao Station as research object to show how Chengdu Urban Planning Bureau made the change of land use and plot ratio for TOD project.

1-4-2 Previous Research on TOD Development of other Chinese cities

There are four research on TOD policies of other Chinese cities, Shao Yuan (2011), Shao Juan (2017), Zhang Dezhi (2018), Pan Bin (2019) took Shenzhen city, Beijing city, Shanghai city and Foshan city as research object to collect their TOD policies and analyze the intention of them.

There are two research on the impact of TOD to metro station areas of other Chinese cities. Zhao Pengjun (2016) studied the impact of metro on the changes in travel habits of residents around 10 stations in Beijing. Zhou Jun (2020) compared the distribution of urban complexes before and after the construction of Hangzhou Metro.

However, these cities built their metro system in around 1990s-2000s, which was 30 years before. Because their urban built-up areas are different from cities which promoting metro construction now, research on TOD of cities which promoting metro systems in this decade is needed.

1-4-3 Position of this Research

To summarize, it is still a lack of research on the achievements and problems of Chengdu city's TOD policies from verification by the development situation of metro station areas. Besides, previous research focus on few metro station areas in the central areas of Chengdu city while it is insufficient research on the development of metro station areas around suburban areas across the entire city.

However, with the growth of population, Chengdu city continues urban expansion and many of TOD projects carried out in metro stations in suburban areas. The development situation and effectiveness of TOD policies on those metro station areas are also significant to be studied.

The position of this research is that, this research will clarify the current situation of metro station areas in suburb of Chengdu city. Then contrast between current situation and intention of TOD policies to verify the effectiveness and problems of TOD policies.

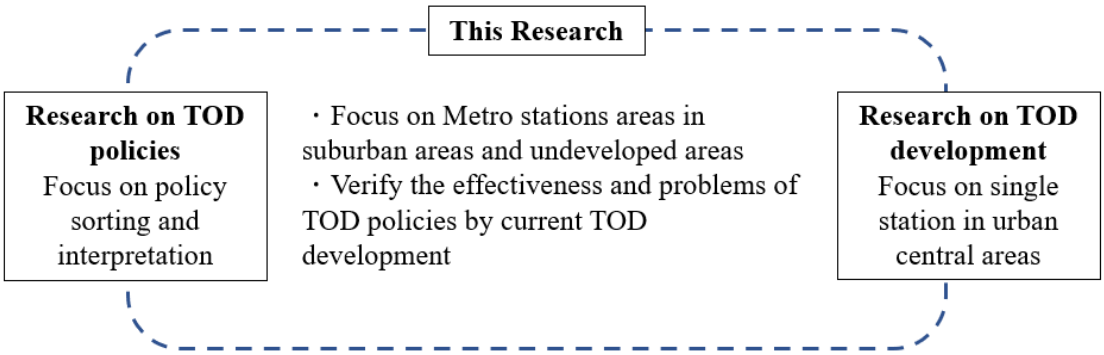

Figure1- 4 Position of this Research

By author

Because from now on, many of local government of Chinese cities formulate their TOD policies based on overseas previous TOD development experience and lack of reference of practice on Chinese urban built-up environment, this research will benefit for Chengdu government or other Chinese cities which promoting TOD to make wiser TOD policies.

1-5 Research Framework

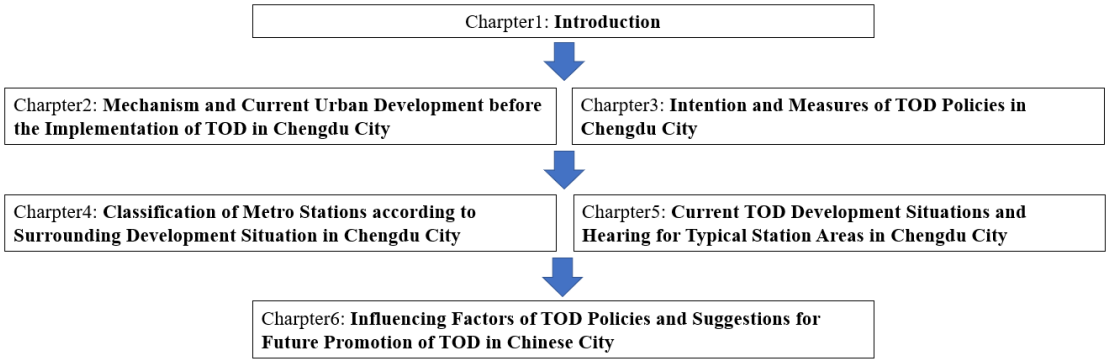

Figure1- 5 Research Framework

By author

Chapter 2: Mechanism and Current Urban Development before the Implementation of TOD in Chengdu City

2-1 Objective and Methodology of This Chapter

2-2 Mechanism of Urban Development in Chengdu City before Implementation of TOD

2-3 Urban Development Situation and Problems before TOD Development

2-1 Objective and Methodology of This Chapter

Firstly, in order to lay the foundation for understanding the new measures for TOD development (which will be sorted out in Chapter 3) in Chengdu city, this chapter will sort out the original urban land development mechanism of Chengdu city, by consulting to papers on land circulation, consulting to Chinese land management regulations and laws and referring to the author's observation during urban planning internship experience for half a year in Chengdu city.

Secondly, in order to lay the foundation for understanding the intention of TOD development (which will be sorted out in Chapter 3) in Chengdu city, this chapter will clarify the current urban development situation and problems before the promotion of TOD by sorting out the previous research on the development of Chengdu city and open materials of Chengdu city government.

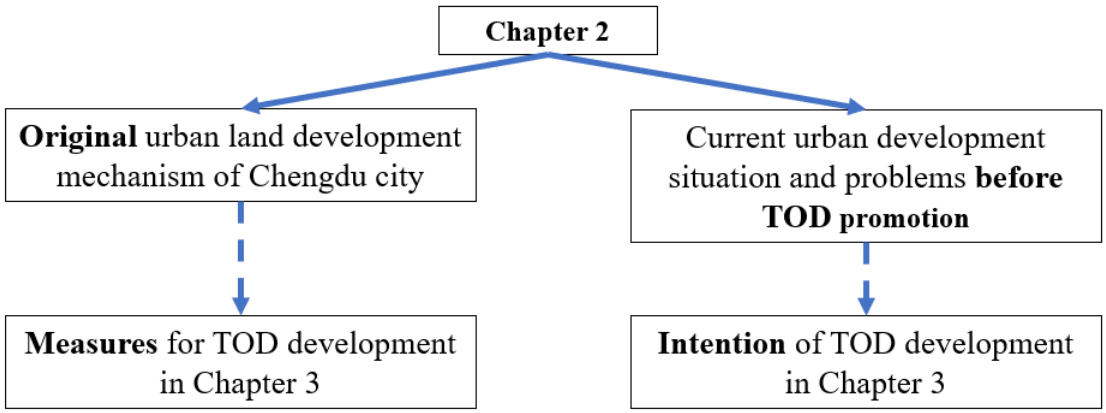

Figure2- 1 Research Framework and Position of Chapter 2

By author

2-2 Mechanism of Urban Development in Chengdu City before Implementation of TOD

According to Chinese land management regulations and laws and the author's observation during urban planning internship experience, typical process of urban development in Chengdu City can be divided into 5 stages: Urban Planning, Road Infrastructure Construction, Land Expropriation and Consolidation, Land Use Right

Transfer and Land Development.

2-2-1 Mechanism of Urban Planning and Position of Metro Planning in Chengdu City

According to *Urban and Rural Planning Law of the People's Republic of China 2007*, The urban planning of Chinese cities can be divided into three levels: City Master Plan, Detailed Land Use Plan, Specialized Plan and Construction Detailed Plan.

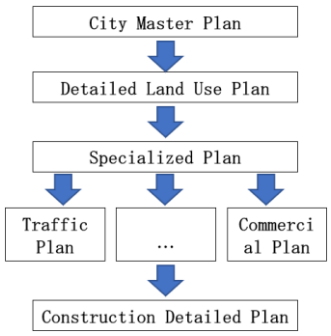

Figure2- 2 Typical Urban Planning System in Chinese Cities

By author

Made by city government and City Planning Bureau, the City Master Plan is the comprehensive deployment for urban nature, development objectives, development scale and spatial layout, general land use distribute in a certain period. In case of Chengdu city, the interval of City Master Plan is 20 years. Based on City Master Plan, each district government and district planning bureau will make the Detailed Land Use Plan, which is the planning of land use type, land use intensity such as plot ratio and altitude restrictions. Under the Detailed Land Use Plan, the Specialized Plan, which includes Traffic Plan, Disaster Prevention Plan, Water Supply and Wasted Water Plan and so on, will be made by related government agencies. Finally, the Construction Detailed Plan is the guideline and rules of architecture design and construction.

As one of the Specialized Plan, Metro Plan is usually made by city Rail Transit Groups based on the City Master Plan. However, as Gong Qing (2016) claimed, because City Master Plan and Detailed Land Use Plan of many of Chinese cities were made in 2000s

without taking metro system into consider, many of Chinese cities didn't reserve place for metro stations. Besides, in Chinese urban planning system, subordinate law must obey the superior law, which means that Specialized Plan (Metro Plan) must obey the Detailed Land Use Plan and the city rail transit groups has no right to request to district government and district planning bureau for Detailed Land Use Plan readjustment. These resulted in the weak cooperation between metro stations and development of their surrounding areas.

2-2-2 Mechanism of Road Infrastructure Construction and Its Problems in TOD Development in Chengdu City

Road network constitutes the unit in urban construction--Blocks. Many of cities in China implement the urban development strategy of Road Infrastructure Lead Development, which means to develop the trunk road infrastructure to form basic road network, then carry out land expropriation and subsequent development.

Main road infrastructure construction is carried out by city government. Zhao Yanjing (2014) claimed that fund from Land Use Right Transfer has become the largest revenue of most of Chinese local governments. He also claimed that the role of road infrastructure is to make land appreciation so that government can earn disparity between Land Expropriation and Consolidation and Land Use Right Transfer. This operation mode to earn disparity by land is also called 'Land Finance'(土地财政), which was claimed as one of power source for China's large-scale urbanization in the past decades. In order to improve such revenue, many of Chinese local government vigorously promote road construction.

Road infrastructure is also the skeleton of resource allocation in urban planning in Chinese city. Take Chengdu city as an example, Han Xiao (2013) found that in the new urbanized area of Chengdu city from 1980s to 2010s, large commercial facilities, schools, hospitals and other public service facilities are mainly planned along the trunk

roads. In other areas, the higher level of road, the more commerce and public service distributed.

Figure2- 3 Detailed Land Use Plan in Xi Pu Area, Pi Du District, Chengdu City

From *Land Use Layout Plan of Central Urban Land of Chengdu City (2011-2020)* by Chengdu Planning Bureau

2-2-3 Mechanism of Land Expropriation and Consolidation in Chengdu City

Under planned economy, *Chinese Constitution (1954)* stipulated that land in China was divided into Urban Land and Rural Land. Urban Land is used for urban construction to meet the functional operation of the city while Rural Land is used for agricultural production. *Chinese Constitution (1954)* also stipulated that China implements Public Ownership of Land, which included State (Local government) Ownership of Urban Land and (Rural) Collective Ownership of Rural Land. From the perspective of land nature, urban expansion in China essentially means turning land from Rural Land to Urban Land. The district government expropriates land from rural collectives, paying compensation fund or resettlement housing for compensation.

After Land Expropriation, district government will carry out Land Consolidation, which often includes sorting out fragmented, uneven and irregular land or damaged

land, which made land ready for development.

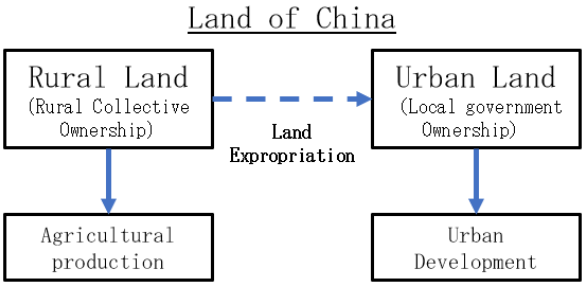

Figure2- 4 Relation between Rural Land and Urban Land in China

By author

2-2-4 Transition of Land Use Right Transfer in Chinese City

Under planned economy, *Chinese Constitution (1954)* stipulated that China implement Public Ownership of Land, which included State Ownership of Land and Collective Ownership of Land. *Chinese Constitution (1954)* also stipulated that land cannot be trade and government gives urban land use right by 'Free Allocation'.

While in 1988, under the Economic Reform and Opening-up, *Decision on Amendments to Land Management Act of the People's Republic of China (1988)* established the State-owned Land Compensation Usage System, which stipulated urban land owned by state and government paid lease and transfer the right of land use.

In 1995, the State Council of China legislated the *Provisional Regulations of the People's Republic of China on the Lease and Transfer of Urban State-owned Land (Order 55)*, which stipulated the system of parallel of 'Free Allocation of Land Use Right' and 'Paid Lease and Transfer Land Use Right'. The local governments of cities were stipulated as the executant of 'Free Allocation Land Use Right' while the local government of districts were stipulated as the executant of 'Paid Lease and Transfer Land Use Right'. During 'Paid Lease and Transfer Land Use Right', land use right will be transfer from district government to developer while developer pay Land Transfer Fee to district government.

In 2002, the Ministry of Land and Resources of China legislated the *Land Use Catalogue (2002)*, which stipulated catalogues of Military, Transportation (railway) and so on of land for 'Free Allocation Land Use Right'. As for land of metro station, *Land Use Catalogue (2002)* also stipulated that land expropriation and consolidation and 'Free Allocation Land Use Right' of metro station land to be made by city government.

So far, the system of parallel of 'Free Allocation Land Use Right' and 'Paid Lease and Transfer Land Use Right' has been established and it was used until now. Under the influence of this system, Chen (2020) argued that the policy of 'Paid Lease and Transfer Land Use Right' implemented by Districts resulted in the loose control of city governments over urban construction land developed. This also indirectly led to the phenomenon of unplanned and disorderly development in some Chinese cities.

In the case of TOD development, the land of metro stations, metro lines and trains base are provided to Rail Transit Group for construction by government of City by 'Free Allocation of Land Use Right' while the land around metro stations is provided to developers for construction by government of District by 'Paid Lease and Transfer Land Use Right'. As Liu (2021) claimed, by reasons of different process of land use right approval and number of years of construction, weak cooperation between Rail Transit Group and developers, the development of metro station and surrounding areas usually out of sync, even if they are planned together.

2-2-6 Patterns of Paid Lease and Transfer Land Use Right in Chinese Cities

After the establishment of 'Paid Lease and Transfer Land Use Right' in the 1990s, China explored and established four patterns of 'Paid Lease and Transfer Land Use Right': Land Using Right Transfer in Competitive Tender, Land Using Right Transfer in Auction, Land Using Right Transfer in Listing and Land Using Right Transfer in Agreement

Firstly, Land Using Right Transfer in Competitive Tender is established by the Chinese Ministry of Land and Resources in *Provisions on the Transfer of State-owned Land Use Right by Tendering, Auction and Listing (Order No.11, 2002)*. The tender inviter sets the conditions for participation and the land price and the developers who meet the conditions can take the urban design planning to tender, which will be selected by the transferor of the land use right. This pattern is mainly used for the transfer of land use right of key development areas (such as the business areas in the center of the city or key residential areas). The advantage of Land Using Right Transfer in Competitive Tender is that the government can collect excellent urban design planning to improve the original urban planning. However, the disadvantage is that the original plan needs to be modified according to the successful bidder's urban design planning before formal land use right transfer, so it will take a long time for successful bidder to get the land use right.

Secondly, Land Using Right Transfer in Auction is established by the Chinese Ministry of Land and Resources in *Provisions on the Transfer of State-owned Land Use Right by Tendering, Auction and Listing (Order No.11, 2002)*. The tender inviter sets the conditions for participation (developer's scale, number of years of operation and so on) and the floor price. Then highest bidder obtains land use rights through auction. The advantage of this pattern is that the transfer price is usually higher than the other three patterns and the government can obtain more land transfer fees. However, the disadvantage of this model is that sometimes the government will set preferential participation conditions for some developers, resulting in unfairness.

Thirdly, Land Using Right Transfer in Listing is established by the Chinese Ministry of Land and Resources in *Provisions on the Transfer of State-owned Land Use Right by Tendering, Auction and Listing (Order No.11, 2002)*. Land Using Right Transfer in Listing is that district government lists using right of land and set a time limit, within which developers who want to obtain the land use right will publicly offer a price. They

can adjust the prices several times. After the end of time limit, the land use right belongs to the developer with the highest bid. The advantage of this pattern is that bidding developers can adjust their bids according to their business conditions while the disadvantage is that listing usually takes a long time

Fourthly, Land Using Right Transfer in Agreement is established by the Chinese Ministry of Land and Resources in *Provisions on Transfer of State-owned Land Use Right by Agreement (Order No.21, 2003)*. It means that land users directly negotiate with the district governments and reach an agreement. The district government transfers the state-owned land use right to the land user within a certain period (usually 40-70 years), and the land user pays the transfer fee to the district government. Meanwhile, agreement includes the land user obligations such as acquirer of land use right should build up 1000 square meters open space along the road and so on. This further strengthens the implementation of government's planning. The advantage of Land Using Right Transfer in Agreement is that the land user and the government directly negotiate on the price and land user obligations so that they can adjust flexibly case by case. However, the disadvantage is that it is not transparent and not fair. Therefore, Land Using Right Transfer in Agreement is used in low priority and it was usually use in case of industrial land use right transfer.

2-2-7 Features of Land Development

After obtaining the land use right, the development of land by developers is still strictly supervised by the government. Developers need to comply with the provisions of the construction law on building height, building density and even building color when carrying out architectural design. Before construction, the design drawings need to be submitted to the Housing and Construction Bureau for examine. After building construction, the acceptance of the Housing and Construction Bureau is required.

2-2-8 Summary of Urban Development Mechanism in Chengdu City

In conclusion, the urban development mechanism in Chengdu City can be summarized as following:

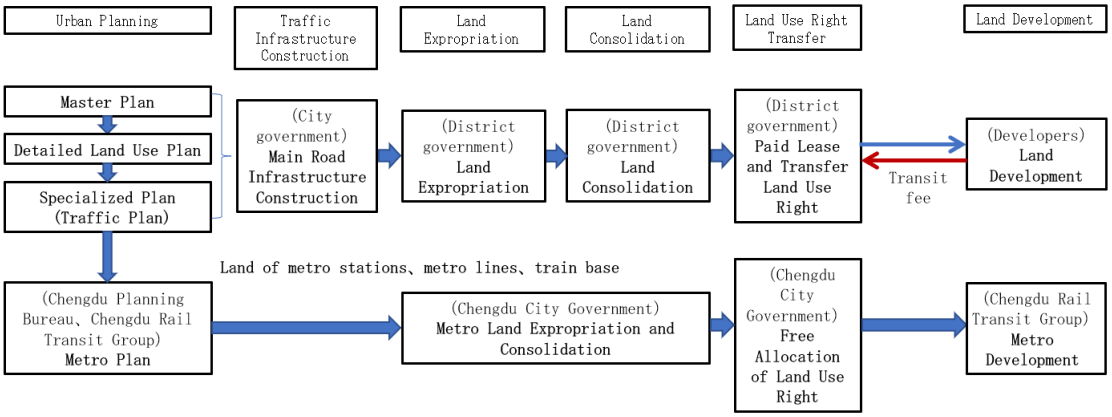

Figure2- 5 Typical Urban Development Mechanism of Chengdu City

By author

Features and problems:

Firstly, Chinese government administrates and controls all the steps from the location and time of development to the detailed urban design style of urban development.

Secondly, it is a separation of planning and development between metro construction and metro areas development.

Thirdly, it is a loose control to Land Use Right Transfer of Chengdu city government, which may allow discorded and unplanned development happened.

2-3 Urban Development Situation and Problems before TOD Development

2-3-1 Urban Development History in Chengdu City from 1950s to 2010s

Since 1950s, Chengdu city has implemented the Urban Master Plan four times in year 1954, 1982, 1996, 2005.

Urban Master Plan of Chengdu City (1954) was made under period of development with the assistance from Soviet experts. It basically follows the Soviet urban planning model and planned a circular and radial road network, which made the foundation of Chengdu city's road infrastructure.

Figure2- 6 Urban Master Plan of Chengdu City (1954)

From Chengdu Planning Bureau

Urban Master Plan of Chengdu City (1982) was made under period of industry development. In the period of it, Chengdu city focused on industry development in the east side along the Second Ring Road.

Figure2- 7 Urban Master Plan of Chengdu City (1982)

From Chengdu Planning Bureau

In 1990s, the population of Chengdu city rapidly rise and problems of dense population, traffic congestion and heavy infrastructure happened in old city center. Against such urban development background, *Urban Master Plan of Chengdu City (1996)* planned six satellite areas outside the old city center and connected them with old city center by trunk roads.

Figure2- 8 Urban Master Plan of Chengdu City (1996)

From Chengdu Planning Bureau

Urban Master Plan of Chengdu City (2011-2020) was made in 2007 and the objectives of it followed:

· Develop six satellite areas on the outer edge of the old city center to transfer residence and industry.

· Develop new CBD areas on the south of the old city center to transfer business.

· Strengthen road network to connect old city center and satellite areas and new CBD areas.

Figure2- 9 Urban Master Plan of Chengdu City (2011)

From Chengdu Planning Bureau

2-3-2 Urban Development Situation and Problems since 2005

According to Xu Xin (2013), under the policies of industry relocation, large industrial

areas development around satellite urban areas. For example, the Galaxy Industrial Park started construction in 2007 and it developed with the area of 1043ha, 21 manufacturing workshops and factories with more than 80,000 workers. With large-scale industrial relocation, large-scale residence developed followed. For example, the Southeast New Area was constructed since 2009 and it developed 13 housing estates with the area of 1043ha, population more than 130,000.

Figure2- 10 Galaxy Industrial Park

Figure2- 11 Southeast New Area

By 2021 Satellite Map of Chengdu City of Shuijingzhu Co., Ltd and processed By author

According to Mao Yin(2014), disordered development happened in marginal areas of the city. The reason was that, *Urban Master Plan of Chengdu City (2007)* predicted that the population of Chengdu will be about 14 million by 2020 and planned construction use land based on it. However, in fact, the population of Chengdu city reached 21 million by 2020. The serious shortage of population led to the shortage of urban construction land plan. On the other hand, the population of Chengdu city kept rapidly increased. Each district government had to break through the *Urban Master Plan of Chengdu City (2007)* to carry out unplanned land development and resulted in disordered development. Mao Yin (2014) found that disordered development were mainly residence and they were planned along trunk roads. Mao Yin (2014) also criticized that disordered development made damage to natural environment and urban landscape and made it difficult for government to supply infrastructure.

Figure2- 12 Large residential blocks along the trunk road in the suburbs of Chengdu city

By 2021 Satellite Map of Chengdu City of Shuijingzhu Co., Ltd

Scattered-disordered development in urban suburban areas caused the environmental destruction and made it difficult to arrange commerce and public service. This further led to cause a low-convenience and lack of diversity of life circle. The local government of Chengdu city begun to consider the city development policy, which can make compact development and efficiently arrange public resources. (Xu Xin, 2013; Mao Yin, 2014)

According to Han (2013), Chengdu city's main commercial areas is concentrated in the old city center and main business areas concentrated in the old city center and new CBD areas in the south. On the other hand, as I observed, although Chengdu City Master Plan has allocated commercial plots in the satellite urban areas, in fact, the satellite urban area has carried out a single land development of industry and residence. The concentration of commerce and business in old city center and relocation of residence to the satellite urban areas resulted in the separation of commerce, workplace and residence and further burdened the traffic pressure.

Under the urban development background above, Chengdu government begun to consider the city development policy which can guide compact urban growth and efficiently arrange commerce, business and public resources.

2-3-3 Metro Extension Situation and Problems since 2005

In order to ease car traffic jam and air pollution, Chengdu city promote two phases of metro construction since 2005. Phase 1 included Line 1, Line 2, Line 3, Line 4 and Line 7 and they were constructed from 2006 to 2018. Lines of Phase 1 were defined by Chengdu Rail Transit Group as Central Lines. They radially connect the satellite new town areas and old city center.

Figure2- 13 Chengdu Metro Construction Plan Phase 1

By Chengdu Rail Transit Group

Phase 2 included Line 5, Line 6, Line 8, Line 9, Line 10, Line 17 and Line 18 and they were constructed from 2016 to 2021. Lines of Phase 2 were defined by Chengdu Rail Transit Group as Supporting Lines. They connect the fringe of satellite new town areas and old city center.

Figure2-14 Chengdu Metro Construction Plan Phase 2

By Chengdu Rail Transit Group

Until 2022, Chengdu city is running 558 km operating milestone of 10 metro lines and it becomes the fastest metro extension Chinese cities in the past decade.

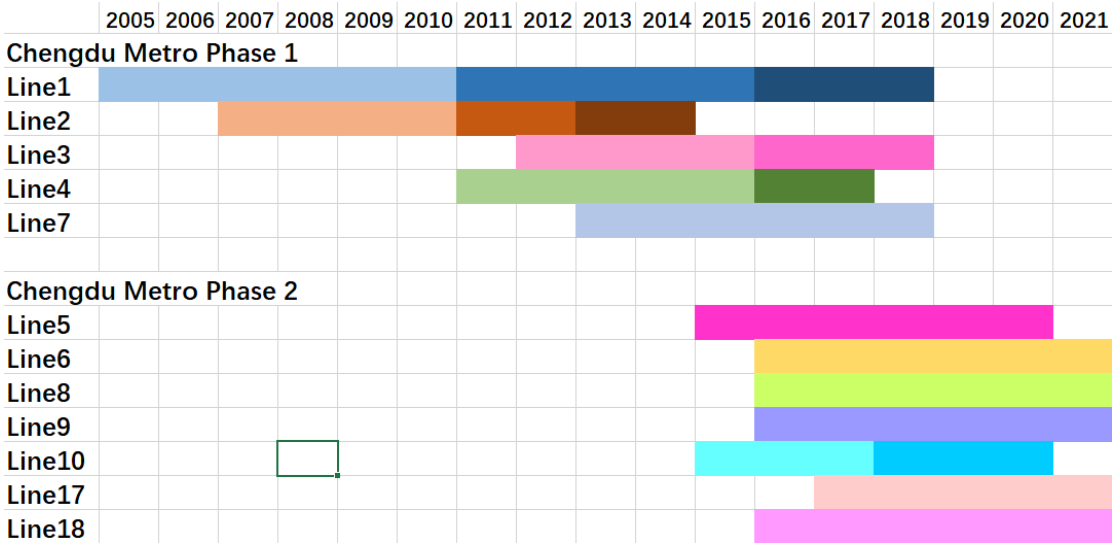

Figure2- 15 Construction Year of Chengdu Metro Phase 1 and Phase 2

By author

Under rapid and large-scaled metro extension, Chengdu city troubled from weak

cooperation between metro station and development of metro station areas. (Liu Dingjie, 2021) For example, Wanxiang Cheng shopping mall, a commercial complex that holds the largest floor area in Chenghua District, Chengdu City, was opened in 2012 while the metro station in front of it opened in 2016. The local government of Chengdu city called for the way to combine metro station and development of its surrounding areas.

Furthermore, large-scaled metro construction projects took enormous construction costs resulted in high debt of Chengdu Rail Transit Groups. For example, according to the *Management Report of Chengdu Rail Transit Group in 2019*, Chengdu Rail Transit Group was in an 824-billion-yuan (around 16 trillion yen) debt from the construction cost in 2018. Moreover, metro operating income in 2018 is 16.6 billion yuan while metro-operating costs was 20.2 billion yuan. As a result, Chengdu Rail Transit Group not only has a high debt and it continues deficit management.

2-3-4 Summary of Urban Development Situation and Problems before TOD Development

Scattered-disordered development happened in urban suburban areas, caused the environmental destruction and made it difficult to arrange commerce and public service. The cooperation between metro construction and development of metro station areas was weak in Chengdu city. Large-scaled metro construction projects took enormous construction costs resulted in high debt of Rail Transit Groups. These problems made Chengdu Government explore urban development mode which can combine the construction and operation of the metro with the development of the metro station areas.

Chapter 3: Intention and Measures of TOD Policies in Chengdu City

3-1 Objective and Methodology of This Chapter

3-2 Time Series of TOD Policies in Chengdu City

3-3 Features of TOD Policies Comparing to Original Development Mechanism in Chengdu City

3-4 Summary of Measures and Intention of TOD Policies in Chengdu City

3-1 Objective and Methodology of This Chapter

Firstly, in order to clarify the intention and measures of TOD policies in Chengdu city, this chapter will sort out the time series of TOD Policies in Chengdu city and then classify them.

Secondly, in order to clarify the measures of TOD policies in Chengdu city, this chapter will compare them to the urban development problems and the original urban development mechanism summarized in Chapter 2.

3-2 Time Series of TOD Policies in Chengdu City

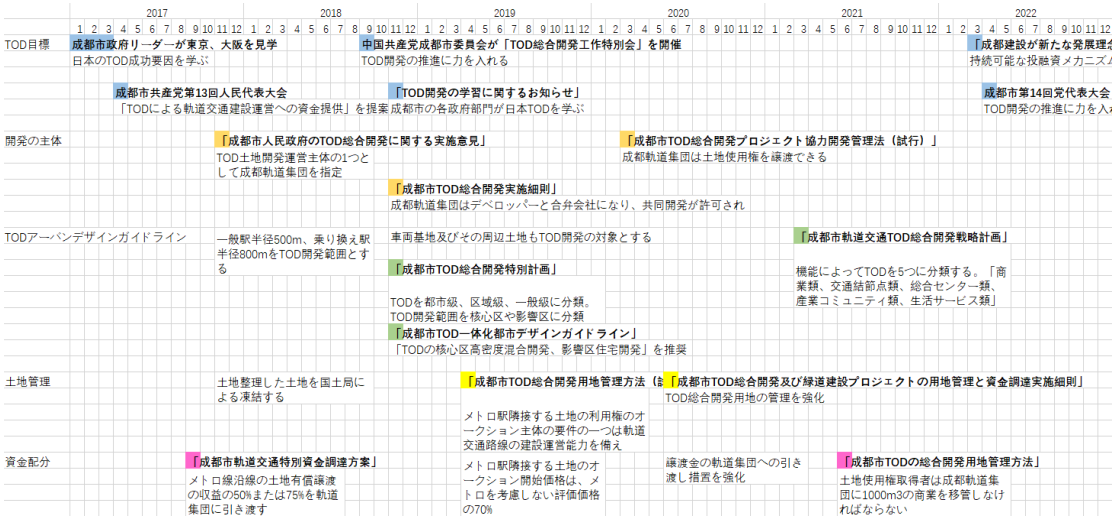

Figure3- 1 Time Series of TOD Policies in Chengdu City

By author

Since 2017, Chengdu city's leaders visit Tokyo, Osaka for many times to study the success factors of TOD in Japan.

In April of 2017, *the 13th Congress of the CPC in Chengdu City* proposed to vigorously promote rail transit (metro) construction. It also proposed that 'Through TOD development and sustainable financing channels, provide sustainable financial support for rail transit construction and operation'.

In September of 2017, Chengdu City Government issued the *Chengdu Rail Transit Special Fund-Raising Plan (Order [2017] No. 153)*. Firstly, it proposed that when Chengdu Rail Transit Group plan the metro lines, it was necessary to consider the land resources along the line so as to obtain the income from the transfer of land use rights along the line in the future. Secondly, it stipulated that part of the transfer fee of metro station land use right should be given to Chengdu Rail Group for metro construction and operation. 'For the land within the scope of metro station TOD, if the Land Expropriation and Consolidation is completed with the contribution of the district government, 50% net income from Paid Lease and Transfer Land Use Right should be given to Chengdu Rail Group'. Thirdly, it granted Chengdu Rail Transit Group the right of Land Consolidation of TOD areas. During land consolidation, Chengdu Rail Transit Group can reserve the municipal facilities connecting TOD land and metro station for future TOD integrated development. As for fund allocation, Chengdu Rail Transit Special Fund-Raising Plan stipulated that 'If the Land Consolidation is completed by the contribution of Chengdu Rail Transit Group, the net income from Paid Lease and Transfer Land Use Right will be shared by the district government and Chengdu Rail Transit Group at a ratio of 25%:75%'.

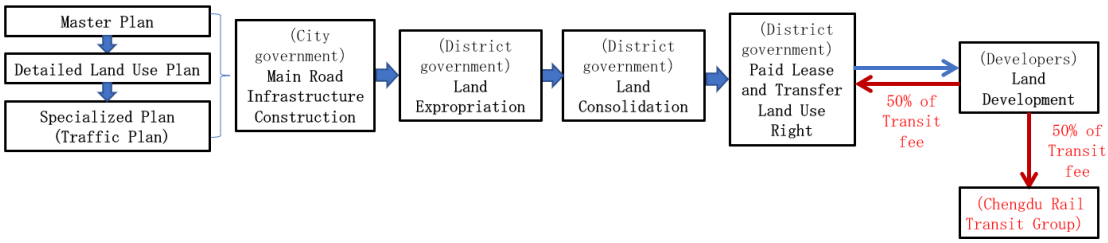

Figure3- 2 Typical TOD Urban Development Mechanism of Cheng City under the *Chengdu Rail Transit Special Fund-Raising Plan* while District Government Carries out Land Consolidation

By author

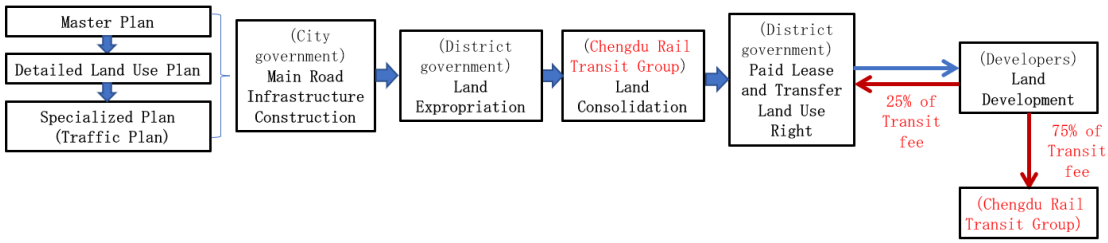

Figure3- 3 Typical TOD Urban Development Mechanism of Cheng City under the *Chengdu Rail*

Transit Special Fund-Raising Plan while Chengdu Rail Transit Group Carries out Land Consolidation

By author

In November of 2017, Chengdu City Government issued the *Implementation Opinions of Chengdu City Government on the Metro Station TOD Development (Order [2017] No. 183)*. Firstly, it proposed to guide urban development with TOD concept and it was the first time for Chengdu city to mention TOD in urban development. Secondly, it stipulated that the TOD development scope, which TOD policies take effect, of general station of radius 500 meters while transfer station of radius 800 meters. Thirdly, it stipulated that Chengdu Rail Transit Group to act as the land development agency related to TOD land development. Fourthly, it assigned that Chengdu Rail Transit Group to explore ways to obtain TOD development funds and explore the attraction investment to participate in TOD development. Fifthly, it stipulated the deputy mayor to set up a TOD Development Leading Group in conjunction with all departments to deal with matters related to TOD development to improve the approval efficiency of TOD land especially the land adjacent to the metro station. Sixth, it stipulated that the transfer of land use right of TOD-related land by district governments should be approved by Bureau of Land and Resources in Chengdu City and Chengdu Rail Transit Group.

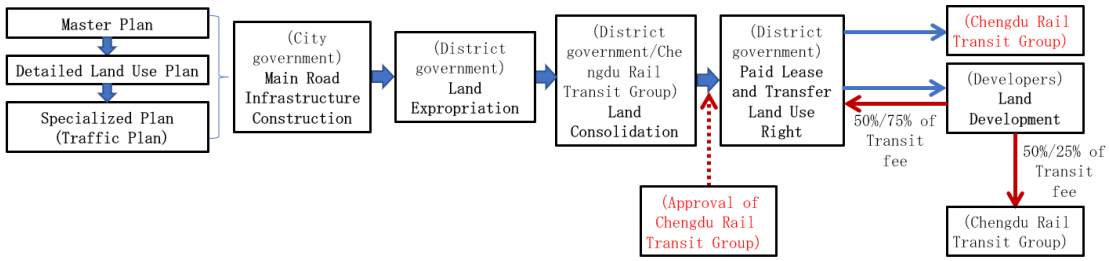

Figure3- 4 Typical TOD Urban Development Mechanism of Cheng City under the *Implementation Opinions of Chengdu City Government on the Metro Station TOD Development*

By author

In September of 2018, Chengdu Municipal Committee of the CPC held the strategic

deployment meeting of *'TOD Development Work Symposium'* and emphasize to vigorously promote TOD development.

In November of 2018, Chengdu City Government issued the *Notice on In-depth Studying on TOD Development*, which organized all government departments in Chengdu city to watch the *Apocalypse of the TOD Model in Japan* and the *Report on the investigation of TOD development in Tokyo and Osaka* by the Chengdu TOD Development Mission in order to deepen the understanding of all government departments on TOD development to facilitate the implementation of TOD policies.

In November of 2018, Chengdu City Government issued the *Detailed Rules for Implementation of Metro Station TOD Development in Chengdu City (Order [2018] No. 192).* Firstly, it stipulated that the land which using right obtained by Chengdu Rail Transit Group can be developed independently or form a joint venture with developers for cooperative development. Secondly, it stipulated that TOD urban design should be carried out for TOD land in accordance with *Chengdu Metro TOD Integrated Urban Design Guidelines* (will be introduced following) before development. The Chengdu Rail Transit Group should review TOD urban design scheme and apply to Chengdu City Government for Detailed Land Use Plan adjustment. This is equal to give right to Chengdu Rail Transit Group participate in urban planning of TOD areas. As for TOD urban design, *Implementation of Metro Station TOD Development in Chengdu City (Order [2018] No. 192)* proposed to introduce foreign teams to make TOD business planning and urban design. Thirdly, it proposed to TOD development income to be used for metro construction, operation and subsequent TOD development. Fourthly, it required all district governments in Chengdu city to promote the development of at least one TOD development project.

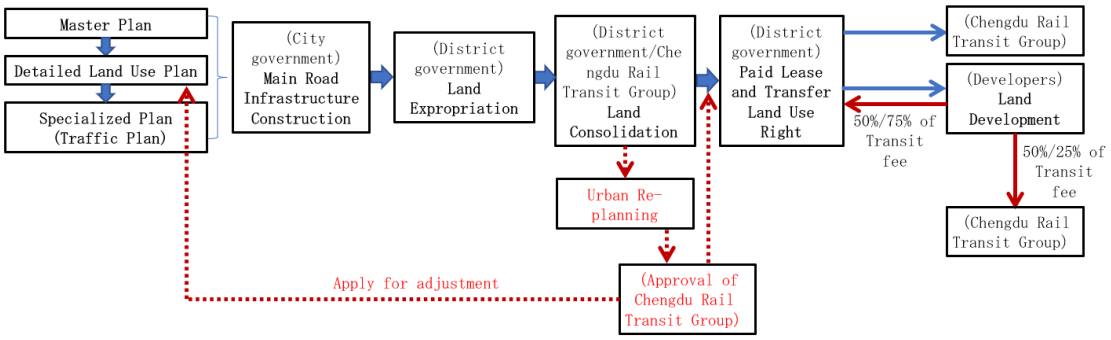

Figure3- 5 Typical TOD Urban Development Mechanism of Cheng City under the *Detailed Rules for Implementation of Metro Station TOD Development in Chengdu City*

By author

In November of 2018, Chengdu Planning Bureau issued the *Special Plan for TOD Development of Chengdu City's Metro Stations*. It divided Chengdu city's TOD as four levels: City Level TOD, Region Level TOD, City Group Level TOD and General Level TOD.

According to *Special Plan for TOD Development of Chengdu City's Metro Stations*, steps of evaluation for TOD classification were mainly the following four: Firstly, to find out the metro stations located in important development areas by overlaying the metro station layout map and the spatial structure map in the city master plan.

Figure3- 6 Metro Station Layout Map and Spatial Structure Map of Chengdu Master Plan

From *Special Plan for TOD Development of Chengdu City's Metro Stations* by Chengdu Planning Bureau

Secondly, to find out the metro stations near the 66 industrial parks and 97 specialty towns determined in City Master Plan of Chengdu City by overlaying the metro station layout map and the industrial parks and specialty towns layout map.

Figure3- 7 Metro Station Layout Map and Industrial Parks and Specialty Towns Planning of Chengdu Master Plan

From *Special Plan for TOD Development of Chengdu City's Metro Stations* by Chengdu Planning Bureau

Thirdly, to find out the metro stations with high accessibility by calculating the accessibility and network centrality of each subway station. Among them, Chengdu Planning Bureau define that accessibility refers to the number of stations that can be reached through metro system within 40 minutes from a station. The more stations can be reached, the higher the accessibility of the stations. Besides, Chengdu Planning Bureau defined that to calculate network centrality was to connect every two stations in the metro system and count the times of each metro station to be passed. The higher the network centrality of a metro, the higher the accessibility of the metro station in the metro system. Fourthly, to find out the metro stations with developable land surrounding. Chengdu Planning Bureau determined classification of metro station TOD based on the above four conditions.

As the result of TOD classification, there were 16 City Level TOD and they mainly located in the city central areas and urban comprehensive transportation hub in Chengdu City Master Plan. There were 45 Region Level TOD and they mainly located

in central areas of districts and main business and industrial areas. There were 125 City Group Level TOD and they were located in the central area of the residential area, specialty towns and agricultural industrial park. The general site is other than the above. The rest were defined as General Level TOD.

Figure3- 8 Schematic Diagram of Distribution of Levels TOD Metro Stations

From Page 3 of *Special Plan for TOD Development of Chengdu City's Metro Stations*

In November of 2018, Chengdu Planning Bureau issued the *Chengdu Metro TOD Integrated Urban Design Guidelines*, which was the guideline of TOD urban planning adjustment and the criteria for Chengdu Rail Transit Group to review urban design scheme. *Chengdu Metro TOD Integrated Urban Design Guidelines* proposed the land use distribution and land development intensity distribution of TOD areas.

In order to specify the land use distribution of TOD development areas, *Chengdu Metro*

TOD Integrated Urban Design Guidelines divided TOD development areas into Core Sphere and Radiation Sphere.

Table3- 1 Table of Scopes of Core Sphere and Radiation Sphere of Levels of TOD

Levels of TOD / Scopes	City Level TOD & Region Level TOD	City Group Level TOD	General Level TOD
Core Sphere Radius （m）	500	300	300
Radiation Sphere Radius （m）	800	800	500

Figure3- 9 Example of Delimitation of TOD Overall Research Scope and Urban Design Scope

From Page 4 of *Chengdu Metro TOD Integrated Urban Design Guidelines*

Chengdu Metro TOD Integrated Urban Design Guidelines specifies the land use types of each sphere of TOD at each level. For City Level TOD and Region Level TOD, the blocks next to the metro station were recommended to plan three-dimensional public transport facilities. The core sphere was recommended to plan urban complex and it should be planned with commerce, business, culture and entertainment mixed facilities. The radiation sphere should be planned with residence.

For City Group Level TOD, the core sphere was recommended to plan urban complex and should be planned with commerce, business, culture and entertainment mixed facilities. The radiation sphere should be planned with residence.

For General Level TOD, the core sphere should be planned with commerce and public services for the local community while the radiation sphere should be planned with residence.

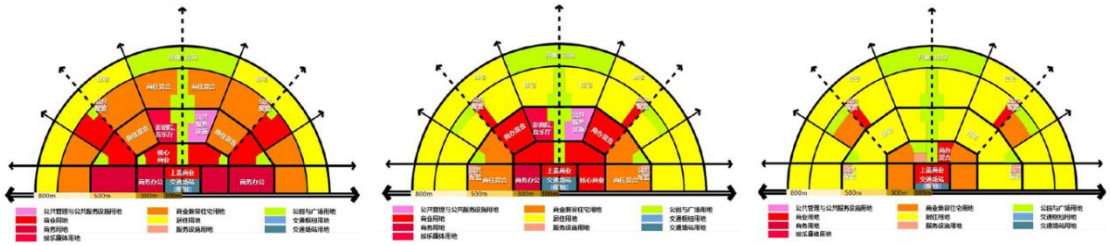

Figure3- 10 Recommended Land Use Distribute Layout of

'City Level TOD and Region Level TOD', 'City Group Level TOD' and 'General Level TOD'

From Page 7,8 of *Chengdu Metro TOD Integrated Urban Design Guidelines*

On the other hand, *Chengdu Metro TOD Integrated Urban Design Guidelines* also proposed the land development intensity distribution of TOD areas. Chengdu Planning Bureau named it '137 theory': '1' refers to the core area within 100 meters around the metro station should be planned for high-density development to create a prominent urban landmark. '3' refers to the sub-core area between 100 and 300 meters around the metro station should be planned for high-density mixed function development. '7' refers to the non-core area 300-700m away from the metro station should be planned for low-density development to create a livable urban environment.

In April of 2019, Chengdu City Government issued the *Administrative Measures for TOD Development of Land for Chengdu City's Metro Stations (for Trial Implementation) (Order [2019] No. 54).* Firstly, it stipulated the district government should not transfer the land within the scope of TOD development without authorization by Chengdu TOD Development Leading Group. Secondly, it stipulated the land use right transfer pattern of TOD. As for land for metro construction, city government provides land use right to Chengdu Rail Transit Group by Free Allocation. As for blocks adjacent to metro stations, *Administrative Measures for TOD Development of Land for Chengdu City's Metro Stations (for Trial Implementation)* stipulated that land acquirer must have experience

in metro development and operation. In fact, the only company that meets this requirement in Chengdu city is Chengdu Rail Transit Group. Therefore, the land use right of land adjacent to the metro station can only be obtained by Chengdu Rail Transit Group. As for other TOD development land, the pattern of Paid Lease and Transfer Land Use Right will be selected by the district government case by case. Thirdly, it stipulated that when Chengdu Rail Transit Group obtained the land use right of TOD land, 30% of land transfer fee can be exempted.

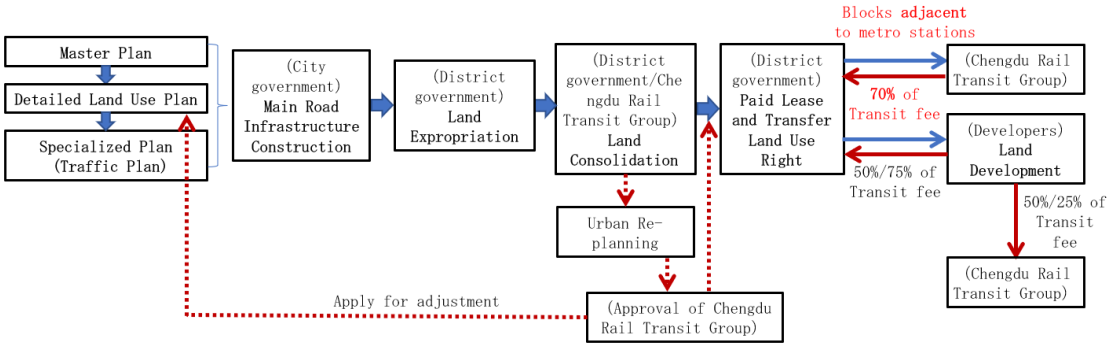

Figure3- 11 Typical TOD Urban Development Mechanism of Cheng City under the *Administrative Measures for TOD Development of Land for Chengdu City's Metro Stations (for Trial Implementation)*

By author

In March of 2020, Chengdu Rail Transit Group issued *Administrative Measures for Cooperative Development of Chengdu TOD Development Projects (Trial)*. It proposed that Chengdu Rail Transit Group can transfer the acquired TOD land use right to developers.

In February of 2020, Chengdu City Government issued the *Opinions on Further Encouraging the Development and Utilization of Urban Underground Space (Trial) (Order [2020] No. 11)* to simplify the process and reduce the construction difficulty of projects underground. It encouraged various funds to invest in the construction of underground space and made it convenient for the construction underground by clarifying the ownership rights and management responsibilities.

In April of 2020, Chengdu City Government issued the *Administrative Measures for the Development and Utilization of Urban Underground Space in Chengdu City (Order [2020] No. 11)* to encourage the interconnection between metro and underground space such as commercial and public facilities and reward the development of underground space.

In June of 2020, Chengdu City Government, Chengdu Planning Bureau and so on issued *Implementation Rules for Land Use Control and Fund Raising of TOD Development and Greenway Construction Projects in Chengdu City*, *Policy Suggestions on Commercial Proportion and Holding Proportion of TOD Development Projects of Chengdu Rail Transit Group*, *TOD Development and Municipal Supporting Facilities Specification*, *Technical Regulation for Development and Design of Upper Cover of Metro Stations in Chengdu City* and *Standard for Fire Protection Design of Chengdu Metro* to support TOD development.

In March of 2021, Chengdu City Government issued *Chengdu Metro TOD Development Strategic Plan*. Firstly, it put forward the Chengdu TOD concept of 'integration of station and city, industry priority, functional integration and comprehensive operation' and objective to build Chengdu city into a 'Global TOD Model City'. Secondly, it proposed that TOD planning should not only consider a single metro station, but also consider regional development and cooperation between metro stations. It also proposed that government and Chengdu Rail Transit Group should not only emphasize on TOD construction, but also should pay attention to the operation of TOD and continuously transform the value of metro into the revenue of Chengdu Rail Transit Group. Thirdly, in order to avoid the homogenization development of TOD projects, it divided TODs in Chengdu city into five categories: 'business district core category, transportation hub category, comprehensive center category, industrial community category and life service category' and made recommended land use

development of each category.

In June of 2021, Chengdu City Government issued the *Administrative Measures for TOD Development of Land for Chengdu City's Metro Stations (Order [2019] No. 54).* It stipulated that when the developer obtains the land use right from the district government, it must hand over some commercial property to Chengdu Rail Transit Group as the rail transit supporting facilities. The handover building area of City Level TOD shall not be less than 1500 square meters, the handover building area of Regional Level TOD shall not be less than 1000 square meters and the handover building area of City Group Level TOD and General Level TOD shall not be less than 500 square meters. The commercial property to be transferred must be close to the metro station or the channel directly connected with the metro station.

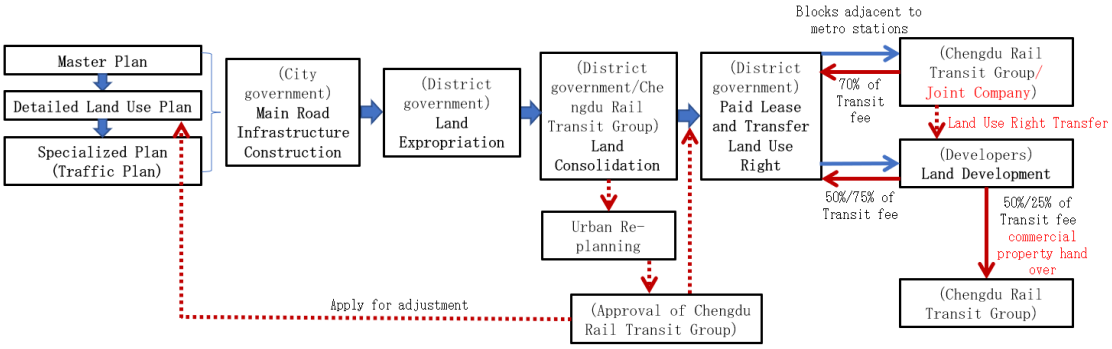

Figure3- 12 Typical TOD Urban Development Mechanism of Cheng City under the Policies of 2020, 2021

By author

In March of 2022, National Development and Reform Commission issued the *Overall Plan for Chengdu City to Build a Park City Demonstration Area with New Development Concepts*. It mentioned the establishment of sustainable investment and financing mechanisms. And it instructed Chengdu city to innovate the urban investment and operation mode, implement the public transit-oriented development (TOD), strengthen the comprehensive development of the district, balance the income and expenditure of Chengdu Rail Transit Group and promote the land appreciation income to be more used

for the people's welfare.

In April of 2022, *the 14th CPC Congress of Chengdu City* emphasized TOD development. ‘Strive to optimize the traffic structure, adhere to metro guidance and public transport priority, to build 'metro + public transport + slow traffic' green transport system and promote the public transit-oriented development (TOD)’.

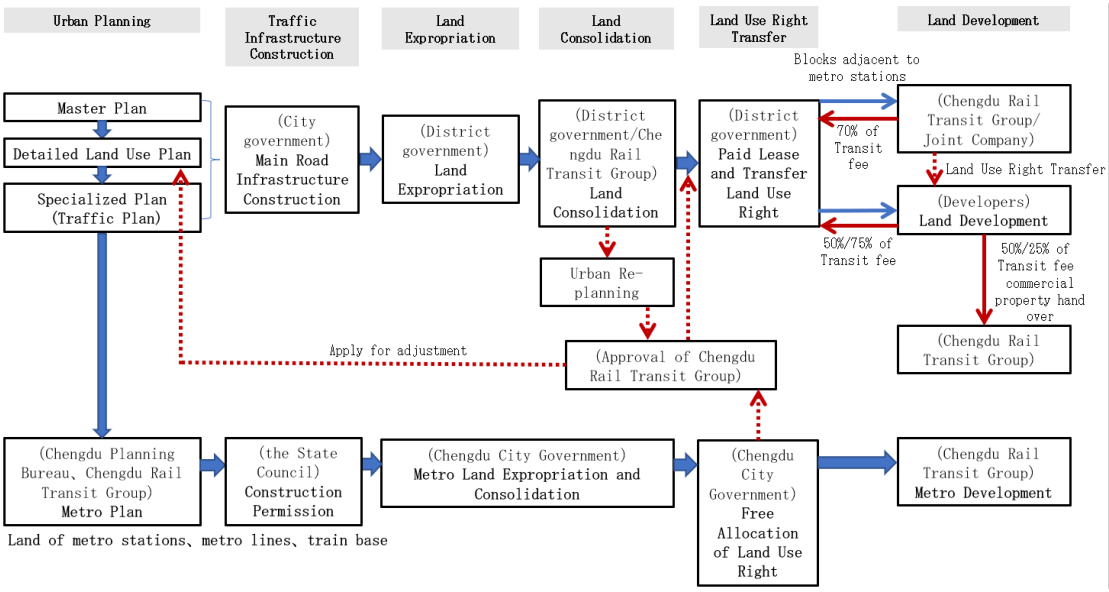

Figure3- 13 Typical TOD Urban Development Mechanism of Cheng City until 2022

By author

3-3 Features of TOD Policies Comparing to Original Development Mechanism in Chengdu City

Chengdu city’s TOD policies can be divided into the following five aspects:

TOD development intention, TOD urban design guidelines, measures for TOD land management, measures for land development rights and measures for land development revenue allocation.

3-3-1 TOD Development Intention

TOD development intentions were proposed by *the 13th Congress of the CPC in Chengdu City, TOD Development Work Symposium, Overall Plan for Chengdu City to*

Build a Park City Demonstration Area with New Development Concepts, the 14th CPC Congress of Chengdu City. They can be summarized as:

- Obtaining land appreciation bring by metro construction for future metro construction and operation
- Promoting the formation of intensive and mix-used development around the metro station
- Improving the synchronization and integration between metro stations and their surrounding areas

3-3-2 TOD Urban Design Guidelines

Policies of TOD urban design guidelines of Chengdu city were stipulated by *Special Plan for TOD Development of Chengdu City's Metro Stations, Chengdu Metro TOD Integrated Urban Design Guidelines, and Chengdu Metro TOD Development Strategic Plan.* Their stipulations following:

- TOD development scope to a radius of 800 meters centered on the metro station.
- Divide Chengdu city's TOD into City Level TOD, Region Level TOD, City Group Level TOD, General Level TOD.
- Divide each scope of Level TOD into core sphere and radiation sphere by radius of 300, 500, 800 meters centered on the metro station.
- Stipulate land use planning guideline as recommending for commerce, business, public service and industry mixed planning in core sphere while recommending for residence planning in radiation sphere.
- Stipulate land development intensity distribution guideline as high-density development should be planned closed to metro station while low-density development should be planned in the outskirt of metro station areas.

To summarize, TOD urban design guidelines of Chengdu city tried to guide the mixed-use and high-density development closed to the metro station while low-density residential areas distributed in the outskirt of metro station area. By doing so, commerce,

business and public resources such as hospital, school and housing can be gathered around the station to make them close, which benefited to increase the efficiency of public resource allocation, preserve land by intensive and compact urban growth, increase metro travel frequency and reduce car travel volume.

3-3-3 Policies of Measures for TOD Land Management

Policies of measures for TOD land management of TOD were stipulated by *Chengdu Rail Transit Special Fund-Raising Plan, Implementation Opinions of Chengdu City Government on the Metro Station TOD Development, Detailed Rules for Implementation of Metro Station TOD Development in Chengdu City.* Their stipulations following:

- Grant Chengdu Rail Transit Group the right to participate in Land Consolidation.
- Set up TOD Development Leading Group to push TOD development.
- Give management right of TOD land to Chengdu Rail Transit Group by stipulating that district government should make urban design scheme and submit to Chengdu Rail Transit Group for review before TOD land use right transfer.

To summarize, policies of measures for TOD land management of Chengdu city tried to make Chengdu Rail Transit Group to participate in TOD Land Consolidation and give it right to license land use right transfer. By doing so, Chengdu Rail Transit Group can design the metro exit and the municipal facilities of TOD land together. Chengdu Rail Transit Group can adjust urban design schemes according to metro station exit plan. At the same time, the time of land transfer license is managed by Chengdu Rail Transit Group according to the time of the completion of the metro station, so that the completion of the metro station can close to the completion of the development of TOD land. The intention of these measures is to improve the spatial and temporal synchronization of the development of metro stations and TOD land development.

3-3-4 Policies of Measures for Land Development Rights of TOD

Policies of measures for land development rights of TOD were stipulated by *Implementation Opinions of Chengdu City Government on the Metro Station TOD Development, Detailed Rules for Implementation of Metro Station TOD Development in Chengdu City, Administrative Measures for TOD Development of Land for Chengdu City's Metro Stations (for Trial Implementation), Administrative Measures for Cooperative Development of Chengdu TOD Development Projects (Trial), Administrative Measures for TOD Development of Land for Chengdu City's Metro Stations*. Their stipulations following:

- Permit Chengdu Rail Transit Group to be developer of TOD land
- Stipulate that one of the necessary conditions for developer to obtain land use right of land adjacent to the metro station is that the developer must have the metro operation capability.
- Stipulate that Chengdu Rail Transit Group can form a joint venture with other developers to jointly develop the TOD land.
- Stipulate that Chengdu Rail Transit Group can transfer the land use right to the developers.

To summarize, policies of measures for land development rights of TOD tried to make Chengdu Rail Transit Group participate in the development of TOD land, especially let Chengdu Rail Transit Group develop the land adjacent to metro stations and improve the integration of TOD development. Since Chengdu Rail Transit Group has no urban development experience before, the jointly development with developers can improve the quality of TOD development. In case of problems in land development, Chengdu Rail Transit Group can transfer the land use right to developers to complete development.

3-3-5 Policies of Measures for Land Development Revenue Allocation

Policies of measures for land development revenue allocation were stipulated by *Chengdu Rail Transit Special Fund-Raising Plan, Implementation Opinions of*

Chengdu City Government on the Metro Station TOD Development, Administrative Measures for TOD Development of Land for Chengdu City's Metro Stations (for Trial Implementation), Administrative Measures for TOD Development of Land for Chengdu City's Metro Stations. Their stipulations following:

- When the developer obtains the land within the scope of TOD development, 50% or 75% (Chengdu Rail Transit Group completes Land Consolidation) of the land transfer fee shall be paid to Chengdu Rail Transit Group.
- When the developer obtains the commercial land within the scope of TOD development, developer should transfer 500 (City Group Level TOD and General Level TOD), 1000 (Region Level TOD), 1500 (City Level TOD) square meter shops to Chengdu Rail Transit Group.
- When Chengdu Rail Transit Group obtain the TOD land use right, the land transfer fee can be 30% exemption.

To summarize, policies of measures for land development revenue allocation tried to pass part of the land value improvement profit brought from the operation of metro to the Chengdu Rail Transit Group and used for metro construction and operation.

3-4 Summary of Measures and Intention of TOD Policies in Chengdu City

Intentions and measures of TOD policies in Chengdu City can be divided into three aspects: firstly, Chengdu City aims to obtain sustainable funding for metro construction and operation by permitting Chengdu Rail Transit Group to participate in land development, giving priority to Chengdu Rail Transit Group to obtain land with high value near metro station and so on.

Secondly, Chengdu City aims to promote the intensive and mix-used development around the metro station by formulating TOD urban design guidelines and requiring TOD land needs to be replanned according to it and reviewed by Chengdu Rail Transit Group before Land Use Right Transfer.

Thirdly, Chengdu City aims to improve the synchronization and integration between metro stations and their surrounding areas by permitting Chengdu Rail Transit Group to participate in land consolidation and land development of TOD areas so that Chengdu Rail Transit Group can plan and develop the metro stations and metro station areas together.

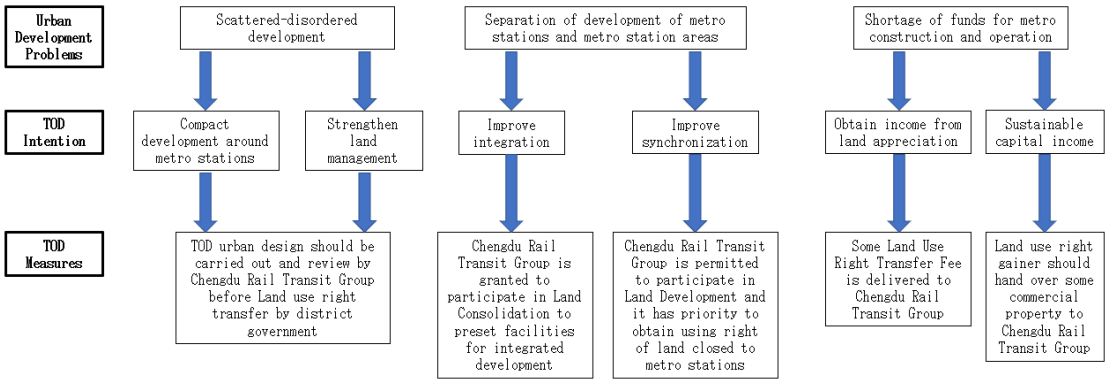

Figure3- 14 Main Intention and Measures of TOD Policies in Chengdu City

By author

The author found Chengdu city's TOD policies aimed at newly development while no policy for urban redevelopment. Therefore, this article will screen the metro stations remained undeveloped land to analyze the effectiveness and influencing factors of TOD policies in Chengdu city.

Charpter4: Classification of Metro Stations according to Surrounding Development Situation in Chengdu City

4-1 Objective and Methodology of This Chapter

4-2 Classification of Metro Stations in Chengdu City

4-1 Objective and Methodology of This Chapter

In order to analyze the impact of TOD on the development of metro stations areas in different urban development processes, this chapter classifies the metro stations in Chengdu city according to the land consolidation and land development situation of the metro station construction permission year by observing satellite maps of years.

In terms of reason why this chapter selects the Construction Permission Year to classify metro stations, two reasons following: firstly, in view of the weak cooperation between the construction of metro stations and metro station areas in Chengdu city, one of the intentions of Chengdu TOD policies is to improve the synchronization of the development of the metro station and metro station areas, so that when the metro station is completed, the metro station areas will be built into multi-functional mixed communities. In order to achieve this intention, Chengdu TOD policies take measures such as permitting Chengdu Rail Transit Group to carry out TOD land development or giving Chengdu Rail Transit Group permitting right for land use right transfer of TOD land so that TOD land can be developed since metro station construction permit. Therefore, to analyze the realization degree of TOD policies and their impact on the metro station areas in the follow-up research, it is necessary to select the metro construction permit year rather than the year of metro operation to make classification.

Secondly, once the metro station construction permission, the constructing metro lines will have an impact on the development of surrounding urban areas. The metro station construction permission is approved and publicized by the State Council of China, which will attract developers to invest in the land along the metro lines under construction.

In terms of reason why this chapter selects the 800 meters from metro station center as scope to classify metro stations. The scope of TOD has been defined in many ways in previous research. For example, Peter Calthorpe (1993) defined TOD as 2000 feet

(around 600 meters) while Bernick Cervero defined TOD as a 500-meter scope. This research aims to examine the TOD policies and their influencing factors and Chengdu city defined TOD development scope of 800 meters, so this research selects 800 meters of the station center for analysis.

The reason why this chapter selects the land consolidation as one of classification criteria goes following: land consolidation is the first step carried out by district government, it makes land ready to be land use right transfer and develop. Therefore, if areas being carried out land consolidation, it shows that the government promote their develop by original urban planning while TOD urban re-planning couldn't be carried out.

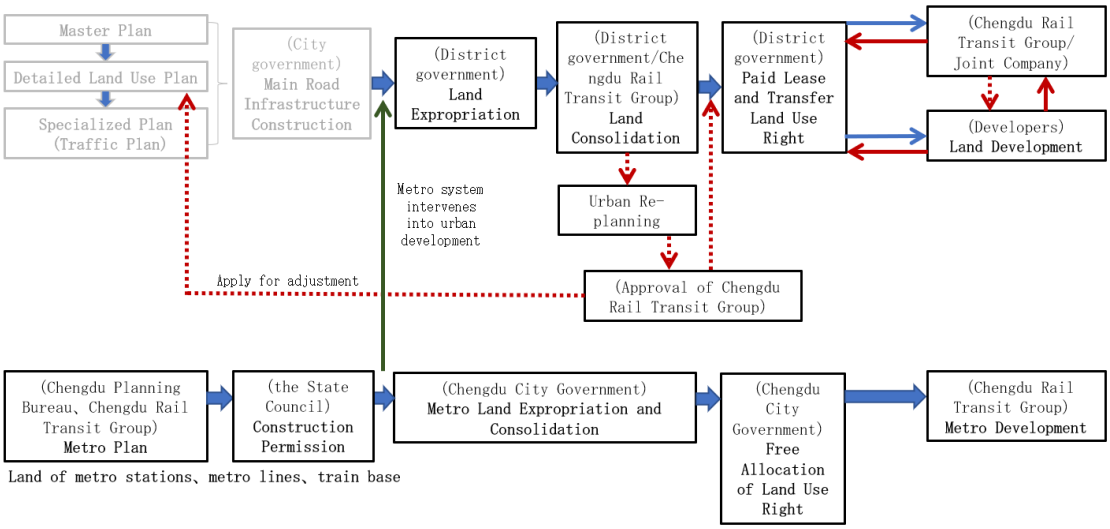

Figure4- 1 Typical TOD Urban Development Mechanism of Areas before Land Expropriation in Cheng City

By author

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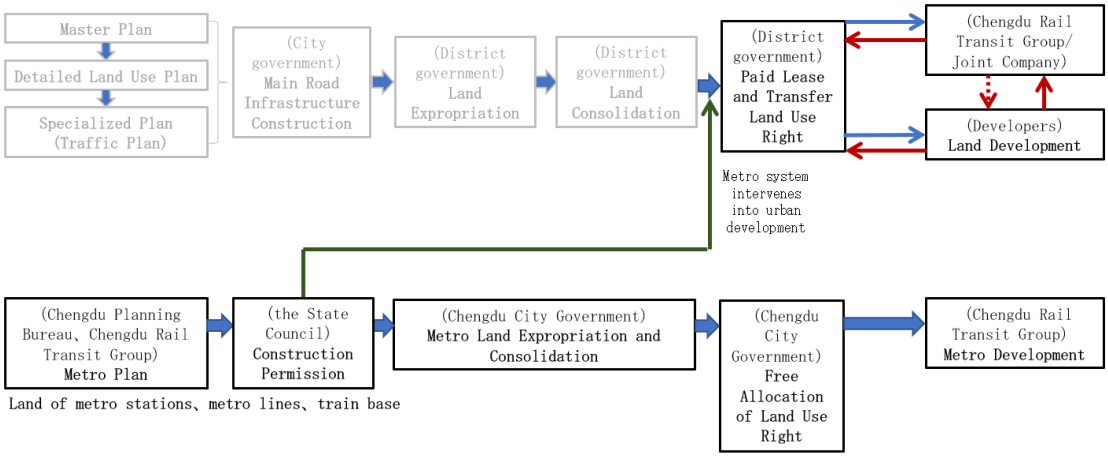

Figure4- 2 Typical TOD Urban Development Mechanism of Areas before Land Development in Cheng City

By author

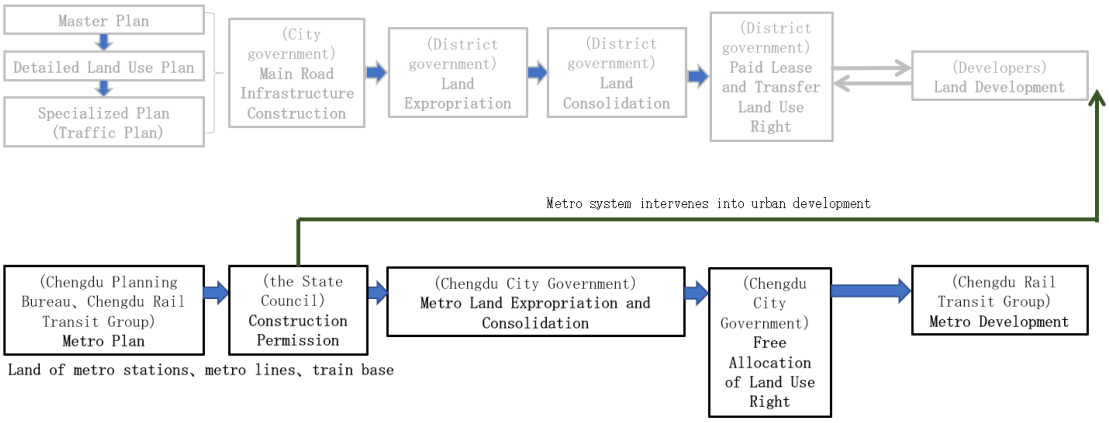

Figure4- 3 Typical TOD Urban Development Mechanism of Areas after Land Development in Cheng City

By author

4-2 Classification of Metro Stations in Chengdu City

Based on the age of metro station construction permission of each metro stations, this chapter investigates the land development situation within 800 meters around the metro stations and divides them into the following four types:

Type A: No Land Consolidation Happened within 800 meters

Type A includes the metro stations of undeveloped areas within 800 meters and

government has no plan to develop for the time being.

Type B: Land Consolidation not Completed within 800 meters

(Part of the areas developed or government has decided to develop within 800 meters while the others remained undeveloped or Land Consolidation wasn't carried out for the time being)

Type C: Land Consolidation Completed while Urban development not Completed within 800 meters

(Government decided to development the whole scope within 800 meters while some of areas remained undeveloped)

Type D: Urban Development Completed within 800 meters

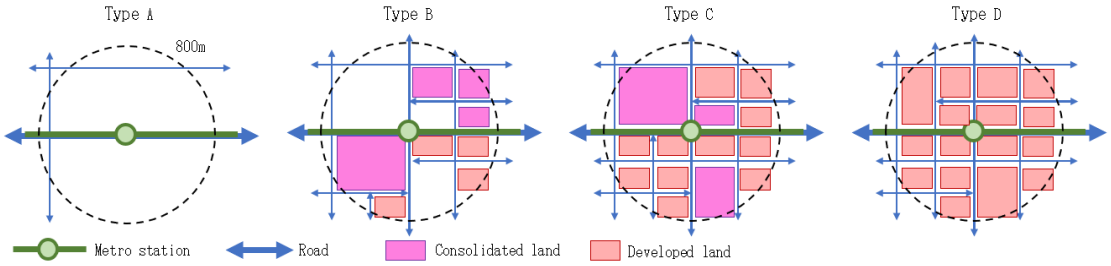

Figure4- 4 Schematic Diagram of Various Types of Metro Stations

By author

4-2-1 Classification of Metro Stations Type A: No Land Consolidation Happened within 800 meters

Metro station list follows:

Lines of Chengdu Metro Phase 1:

Line 1: Luhu Lake Station, Wuhan Road Station, Tianfu Park Station, Xinglong Lake Station, Kexuecheng Station

Line 2: Jiepai Station, Lianshanpo Station, Damianpu Station, Chengdu Administrative College Station, Honghe Station, Chengyu Overpass Station, Chengdu East Railway Station, Tazishan Park Station

Line 3: Shuangliu West Station

Line 4: Caiqiao Station, Intangible Cultural Heritage Expo Park Station, Machangba Station

Line 7: Shuangdian Road Station

Lines of Chengdu Metro Phase 2:

Line 5: Huagui Road Station, Xingfuqiao Station, Jiudaoyan Station, Yixin Lake Station, Longma

Road Station, Huilong Station
Line 6: Longdengshan Station, Pucaotang Station, Qingdao Road Station, Qinhuangsi Station, Songlin Station, Yuyuzui Station, Lanjiagou Station
Line 10: Yingtiansi Station, Huangshui Station, Liujianian Station, Xinping Station
Line 17: Jinxing Station, Huangshi Station, Mingguang Station, Baifoqiao Station
Line 18: Sancha Station

Type A station areas with no Land Consolidation Happened within 800 meters are stations that located in undeveloped areas, where government has no plans to develop this area during metro station construction permission year. During metro station construction permission, the metro station areas are often rural areas or suburban trunk road crossing. For example, Line 2 Lianshanpo Station got Construction Permission in 2012, in which the station was surrounded by wasteland and Taodu Avenue (across the station) was under construction. Line 1 Luhu Station got Construction Permission in 2012, in which the station was surrounded by farmland and sandy land.

Figure4- 5 Line 2 Lianshanpo Station Construction Permission in 2012

Figure4- 6 Line 1 Luhu Station Construction Permission in 2015

Satellite Map of Chengdu City from Shuijingzhu Co.Ltd modified By author

4-2-1 Classification of Metro Stations Type B: Land Consolidation not Completed within 800 meters

Metro station list follows:

Lines of Chengdu Metro Phase 1:

Line 1: Weijianian Station, Shengxian Lake Station, Jinrongcheng Station, Incubation Park Station, Jincheng Square Station, Century City Station, Sihe Station, Guangfu Station, Hongshi Park Station, Xibo City Station, Guangdu Station, Wugensong Station

Line 2: Shufang Station, Huiwangling Station, Yangxi Interchange Station, Yingbin Avenue Station, Jinke North Road Station, Jinzhou Road Station, Baicao Road Station, Tianhe Road Station

Line 3: Sanhe Station, Jinhuasi East Road Station, Botanical Garden Station, Military General Hospital Station, Panda Avenue Station, Chengdu Zoo Station, Taiping Garden Station, Wuqing South Road Station, Shuangfengqiao Station, Longqiao Road Station, Hangdu Street Station, Yingchunqiao Station, Sanliba Station

Line 4: Xihe Station, Mingshu Wangling Station, Chengdu University Station, Shiling Station, Lailong Station, Huaishudian Station, Chengdu West Station

Line 7: Sichuan Shifan University Station, Daguan Station, Yinghui Road Station, Cuijiadian Station, Erxianqiao Station, Balizhuang Station, Fuqing Road Station

Lines of Chengdu Metro Phase 2

Line 5: Baishui Station, Liaojiawan Station, North Trade City Station, Dujianian Station, Funing Road Station, Minle Station, Qilong Station, Erjiangsi Station, Nanhu Interchange Station

Line 6: Wangcongci Station, Shangjin Road Station, Zitong Palace Station, Houjiaqiao Station, Xingsheng Station, Qinggang Station, Liusan Road Station, Financial City East Station, Zhangjiasi Station, Luxiao Station, Guandong Station, Xintong Avenue Station, Xinchuan Road Station, Wan'an Station, Shenyang Road Station, Changgongyan Station, Hangzhou Road Station, Tianfu Business District Station

Line 8: Shunfeng Station, Jiang'an Campus Station of Sichuan University, Lianhua Station

Line 9: Xindao Station, Taiping Temple Station, Jituqiao Station, Huangtianba Station

Line 10: Huaxing Station, Jinhua Station, Shuangliu Airport Terminal 1 Station, Huayuan Station, Xinjin Station, Huaqiao Station, Yulin Road Station

Line 17: Wenquan Avenue Station, Jiujiang North Station

Line 18: Xinglong Station

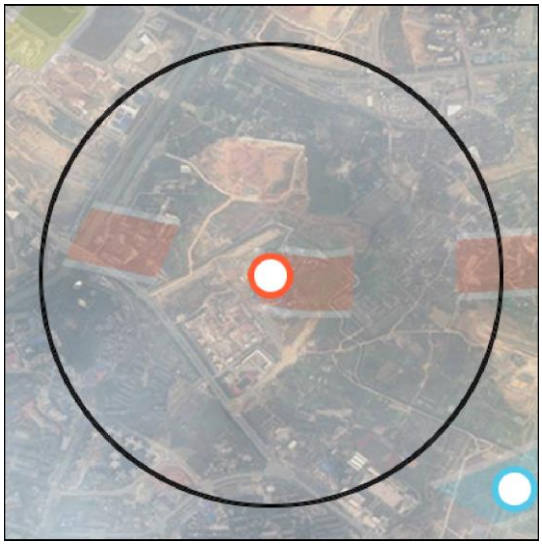

Figure4- 7 Line 2 Tazishan Station Construction Permission in 2008

Figure4- 8 Line 5 Yixinhu Station Construction Permission in 2015

Satellite Map of Chengdu City from Shuijingzhu Co.Ltd modified By author

Type B station areas with no Land Consolidation Happened within 800 meters are stations that located in undeveloped areas, where government has no plans to develop this area during metro station construction permission year. During metro station construction permission, the metro station areas

Type C: Land Consolidation Completed while Urban development not Completed within 800 meters

Lines of Chengdu Metro Phase 1:

Line 1: Tongzilin Station, South Railway Station, Gaoxin Station, Tianfu Third Street Station, Tianfu Fifth Street Station, Haichang Road Station, Guangzhou Road Station

Line 2: Longping Road Station, Dongda Road Station, Niushikou Station, Yipintianxia Station, Chadianzi Passenger Station, Xipu Station

Line 3: Chengdu Medical College Station, Bell Tower Station, Tuanjie New Area Station, Zhaojuesi South Road Station, Simaqiao Station, Lijiatuo Station

Line 4: Wannian Station, Shuangqiao Road Station, Zhongba Station, Fenghuang Street Station, Yongquan Station, Guanghua Park, Nanxun Avenue Station, Fengxi River Station, Yangliuhe Station, Wansheng Station

Line 7: Chadianzi Station, University of Technology Station

Lines of Chengdu Metro Phase 2

Line 5: Dafeng Station, Shixi Park Station, Huanghuayuan Station, Dongzikou Station, Wuzhueshi Station, Shiyang Interchange Station, Shiyi Hospital Station, Jiaozi Avenue Station, Jincheng Lake Station, Dayuan Station, Police Academy Station

Line 6: Heping Street Station, Pitong Station, Shuxin Avenue Station, Mengzi Station, Honggao Road Station, Xingye North Street Station, Dongguang Station, Jinshi Road Station, Zhonghe Station, Lushan Avenue Station

Line 8: Shilidian Station, Eastern Suburb Memory Station, Wannian Road Station, East Lake Park Station, Sanyuan Station, Zhujiang Road Station, Wenxing Station

Line 9: Peifeng Station

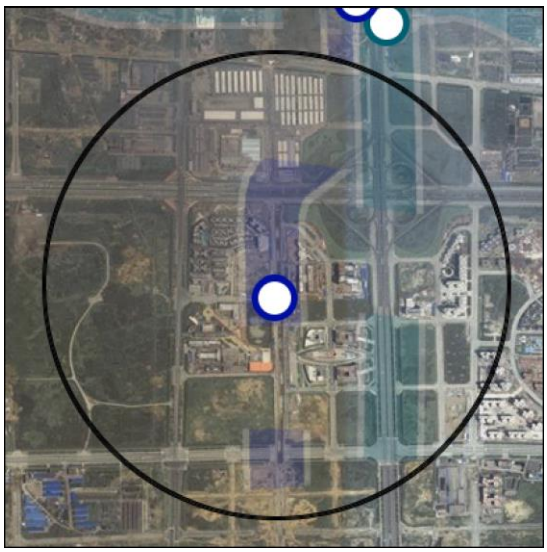

Figure4- 9 Line 1 Gaoxin Station Construction Permission in 2006

Figure4- 10 Line 4 Yongquan Station Construction Permission in 2014

Satellite Map of Chengdu City from Shuijingzhu Co.Ltd modified By author

Type D: Urban Development Completed within 800 meters

Lines of Chengdu Metro Phase 1

Line 1: North Railway Station, Renmin North Road Station, Wenshuyuan Station, Luoma City Station, Tianfu Square Station, Jinjiang Hotel Station, Huaxiba Station, Provincial Stadium Station, Nijiaqiao Station, Huafu Avenue Station, Huayang Station

Line 2: Longquan Post Station, Niuwangmiao Station, Dongmen Bridge Station, Chunxi Road Station, People's Park Station, Tonghui Gate Station, Provincial Hospital of Traditional Chinese Medicine Station, Baiguolin Station, Shuhan Road East Station

Line 3: Shiyou University Station, Machao West Road Station, Jinshuihe Station, Qianfeng Road Station, Hongxingqiao Station, No. 2 Municipal Hospital Station, Xinnanmen Station, Moziqiao Station, Yiguanmiao Station, Gaoshengqiao Station, Hongpailou Station, Sichuan-Tibet Interchange Station, Wuhou Interchange Station, Dongsheng Station, Shuangliu Square Station

Line 4: Yushuang Road Station, Taisheng South Road Station, Kuanzhai Alley Station, Caotang North Road Station, Southwest University of Finance and Economics Station, Cultural Palace Station, Qingjiang West Road Station

Line 7: North Station West 2nd Road Station, Jiulidi Station, Southwest Jiaotong University Station, Huazhaobi Station, Jinsha Museum Station, Dongpo Road Station, Longzhaoyan Station, Wuhou Avenue Station, Gaopeng Avenue Station, Shenxianshu Station, Sanwayao Station, Liulichang Station, Shizishan Station

Lines of Chengdu Metro Phase 2

Line 5: Lujiaqiao Station, Quanshui Road Station, Saiyuntai Station, Northwest Bridge Station,

Huapaifang Station, Fuqin Station, Qingyanggong Station, Provincial Orthopedic Hospital Station, Keyuan Station, Jiuxing Avenue Station, Jincheng Avenue Station

Line 6: Tianyu Road Station, Xihua Avenue Station, Jinfu Station, Xinghe Station, Shawan Station, Liangjiaxiang Station, Jianshe North Road Station, Xinhong Road Station, Shunjiang Road Station, Sanguantang Station

Line 8: Shanbanqiao Station, Jingjusi Station, Yinjialin Station, Qing'an Station, Shiyang Station

Line 9: Cuqiao station

Line 10: Cujin Station, Shuangliu Airport Terminal 2, Wujin Station

Line 17: Shiwu Hospital Station

Figure4- 11 Line 2 Shuhanludong Station Construction Permission in 2008

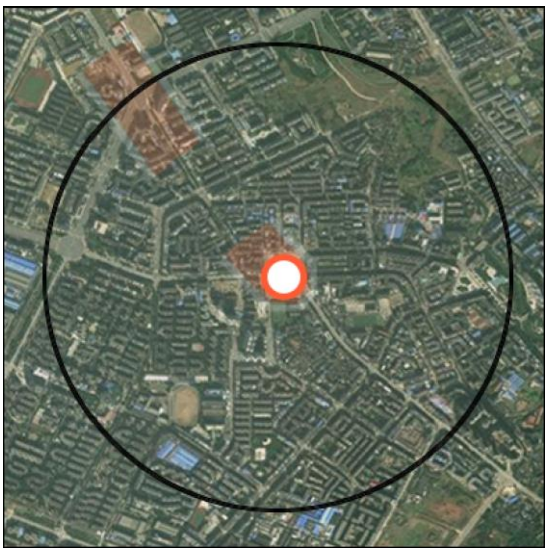

Figure4- 12 Line 2 Longquan Station Construction Permission in 2010

From Satellite Map of Chengdu City from Shuijingzhu Co.Ltd modified By author

Chapter 5: Current TOD Development Situations and Hearing for Typical Station Areas in Chengdu City

5.1 Objective and Methodology of This Chapter

5-2 Cluster Analysis and Hearing for Development Problems of Typical TOD in Type A

5-3 Cluster Analysis and Hearing for Development Problems of Typical TOD in Type B

5-4 Cluster Analysis and Hearing for Development Problems of Typical TOD in Type C

5.1 Objective and Methodology of This Chapter

To clarify the effectiveness of TOD policies and influencing factors of TOD development in Chengdu city, this chapter will collect the development area within 800 meters around the metro stations from the year of metro station construction permission to three years after the operation of metro stations. Then this chapter will conduct cluster analysis and select typical cases and conduct hearing to analyze the problem of development of TOD in Chengdu city.

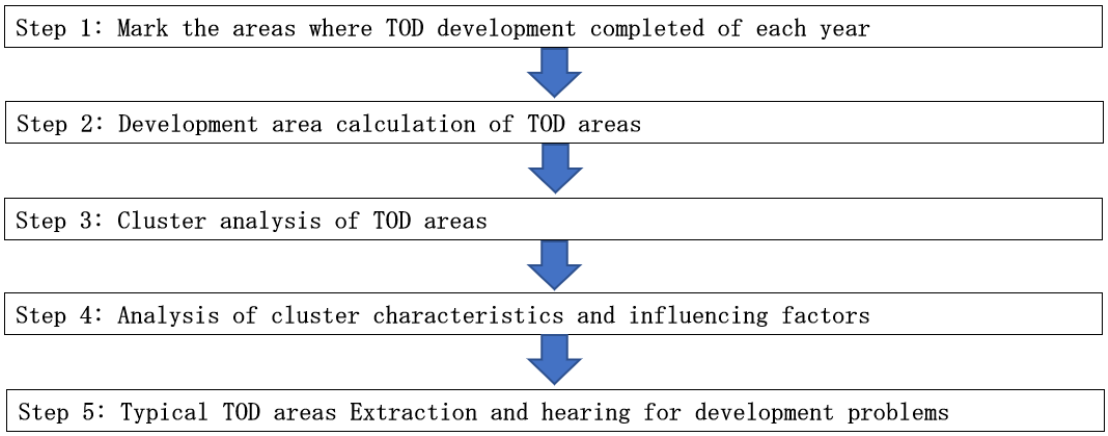

Figure5- 1 Methodology of this Chapter

By author

Step 1: Mark the areas where TOD development completed of each year

Since there is no public data about the current map of urban development in Chengdu city, the step 1 of this chapter is to mark the urban development areas within 800 meters around the metro station each year after the construction permission of each metro station by observing the annual satellite map of Chengdu city. The completion year of developed blocks are defined the based on the unchanged construction situation on the satellite map. For a sample, the block shows in following is defined to be developed in 2013.

Figure5- 2 Sample of Step 1

From Satellite Map of Chengdu City from Shuijingzhu Co.Ltd, modified by author

As the achievement, the newly developed land of each year of 800 meters around the metro stations in Chengdu city has been marked.

Figure5- 3 Newly Development Blocks of Metro Station Areas

By author

Step 2: Development area calculation of TOD areas

By objective to study the impact from the construction permission and operation of the metro station to the development of Chengdu city's metro station areas, and objective to study the distribution of the development areas in Chengdu city's TOD development scope, this step imports the land development data of Step 1 to ArcGIS Pro and calculate the following items of each metro station.

(For Lines of Chengdu Metro Phase 1) (Line 1,2,3,4,7)

Annually average newly developed area of metro construction period of 0–300-meter sphere, 300–500-meter sphere and 500–800-meter sphere.

Annually Average Newly Developed Area of Metro Operation for 3 years of 0–300-meter sphere, 300–500-meter sphere and 500–800-meter sphere.

Annually Average Total Newly Developed Area from Metro Construction Permission to Metro Operation for 3 years of TOD areas (0-800 meters).

Table5- 1 Sample of Data Collected of Newly Developed Area of Metro Stations

Newly Developed Area Data of XX Station						
Annually Average Newly Developed Area of Metro Construction Period			Annually Average Newly Developed Area of Metro Operation for 3 years			Annually Average Total Newly Developed Area from Metro Construction Permission to Metro Operation for 3 years
0-300m Sphere	300-500m Sphere	500-800m Sphere	0-300m Sphere	300-500m Sphere	500-800m Sphere	

Then calculate the proportion of annually average newly developed area of metro construction period of 0–300-meter sphere, 300–500-meter sphere and 500–800-meter sphere. The proportion of average Newly Developed Area of Metro Operation for 3 years of 0–300-meter sphere, 300–500-meter sphere and 500–800-meter sphere. Together with the data of annually average total newly developed area from metro construction permission to metro operation for 3 years of TOD areas (0-800 meters) calculated before, the data for cluster analysis of Chengdu Metro Phase 1 in the next step are as follows:

Table5- 2 Sample of Total and Proportion of Newly Developed Area of Metro Stations Phase 1

Total and Proportion of Developed Area Data of XX Station								
Proportion of Annually Average Newly Developed Area of Metro Construction Period in Total Developed Area			Proportion of Annually Average Newly Developed Area of Metro Operation for 3 years in Total Developed Area			Annually Average Total Newly Developed Area from Metro Construction Permission to Metro Operation for 3 years		
0-300m Sphere	300-500m Sphere	500-800m Sphere	0-300m Sphere	300-500m Sphere	500-800m Sphere			

(For Lines of Chengdu Metro Phase 2) (Line 5,6,8,9,10,17,18)

Table5- 3 Sample of Total and Proportion of Newly Developed Area of Metro Stations Phase 2

Total and Proportion of Developed Area Data of XX Station					
Proportion of Annually Average Newly Developed Area of Metro Construction Period in Total Developed Area			Annually Average Total Newly Developed Area from Metro Construction Permission to Metro Operation		
0-300m Sphere	300-500m Sphere	500-800m Sphere			

As reference elements, the distance from each metro station to the center of Chengdu city and the distance from each metro station to the nearest trunk road are also calculated.

Step 3: Cluster analysis of TOD areas

This step carries out the cluster analysis for metro stations of types A, B and C divided in Chapter 4 of Phase 1, Phase 2.

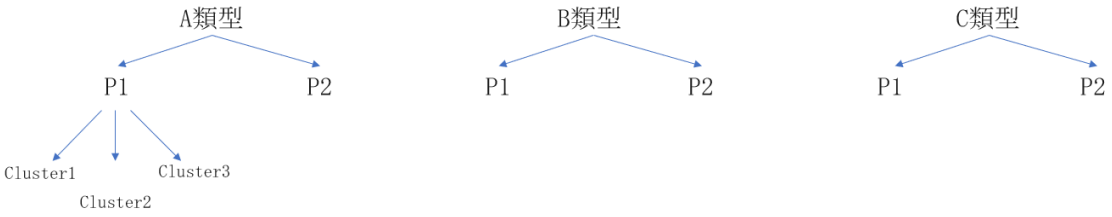

Figure5- 4 Schematic diagram of cluster analysis of various types of metro stations

By author

5-2 Cluster Analysis and Hearing for Development Problems of Typical TOD in Type A

Results of Cluster Analysis of Type A Phase 1

Type A (No development or only trunk road development)

Phase 1 (Line 1,2,3,4,7)

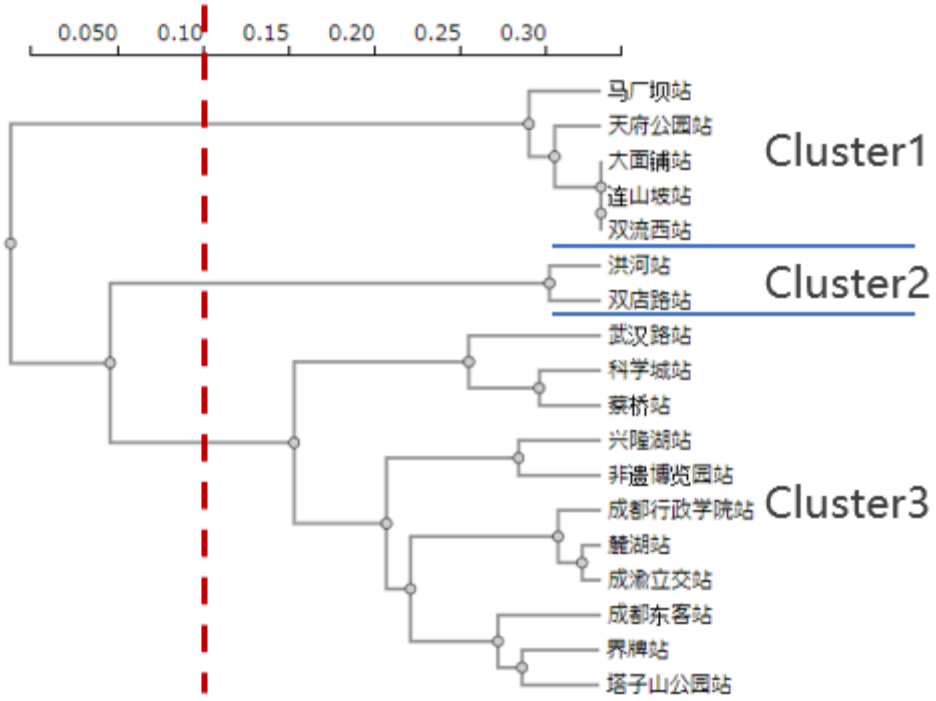

Figure5- 5 Result of Cluster Analysis of Type A Phase 1

By author

Results of Cluster Analysis of Type A Phase 1-Cluster 1:

Tianfu Park Station, Lianpo Station, Damianpu Station, Shuangliu West Station, Machangba Station

Table5- 4 Development areas and its distribution

Annually Average Total Newly Developed Area from Metro Construction Permission to Metro Operation for 3 years (ha)	Proportion of Annually Average Newly Developed Area of Metro Construction Period in Total Developed Area			Proportion of Annually Average Newly Developed Area of Metro Operation for 3 years in Total Developed Area			Average distance to the nearest trunk road(m)	Average distance to the center of Chengdu city(km)
	500－800m Sphere	300－500m Sphere	0－300m Sphere	500－800m Sphere	300－500m Sphere	0－300m Sphere		
16ha	7%	3%	2%	76%	8%	5%	968	18
	12%			89%				

Typical TOD areas Extraction and hearing for development problems of Type A Phase 1-Cluster 1:

Line 2 Lianshanpo Station, Damianpu Station

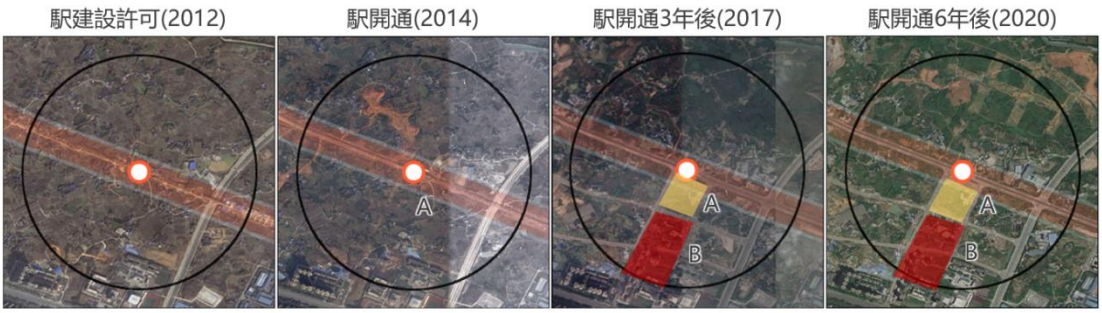

Figure5- 6 Transition of metro station areas

From Satellite map of Chengdu City from Shuijingzhu Co.Ltd, modified by author

Table5- 5 Time series of transition of metro station areas

2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
駅建設許可	幹線道路完成	駅開通	駅南部道路整備						
		A街区入札募集（入札不調）			A街区入札募集（入札不調）				
			B街区入札募集		B街区建設完了				

Hearing

Project manager of a developer company, Mr. Fu

Question: ‘How do you think about the land use right of block A near the metro station has not been auctioned out while block B far from the metro station has been developed in Line2 Lianshanpo Station?’

Answer: ‘I think the government intends to attract the development of residence by planning the metro station slightly away from the developed area. However, commercial facilities and schools built at Longquan Satellite Areas are distributed along the trunk roads (showed as the picture below). Our company believes that it is very risky to develop residence far away from existing commercial and school facilities. Therefore, our company did not participate in competitive bidding of block A of Lianshanpo Station.’

Figure5- 7 Longquan Satellite Areas and its commercial distribute

From Satellite map of Chengdu City from Shuijingzhu Co.Ltd, modified by author

From *Chengdu City Master Plan (2011-2020)*

Results of Cluster Analysis of Type A Phase 1-Cluster 2:

Honghe Station, Shuangdian Road Station

Table5- 6 Development areas and its distribution

Annually Average Total Newly Developed Area from Metro Construction Permission to Metro Operation for 3 years (ha)	Proportion of Annually Average Newly Developed Area of Metro Construction Period in Total Developed Area			Proportion of Annually Average Newly Developed Area of Metro Operation for 3 years in Total Developed Area			Average distance to the nearest trunk road(m)	Average distance to the center of Chengdu city(km)
	500－800m Sphere	300－500m Sphere	0－300m Sphere	500－800m Sphere	300－500m Sphere	0－300m Sphere		
13ha	74%	3%	0%	9%	14%	0%	304	10
	77%			23%				

Typical TOD areas Extraction and hearing for development problems of Type A Phase 1-Cluster 2:

Line 2 Honghe Station

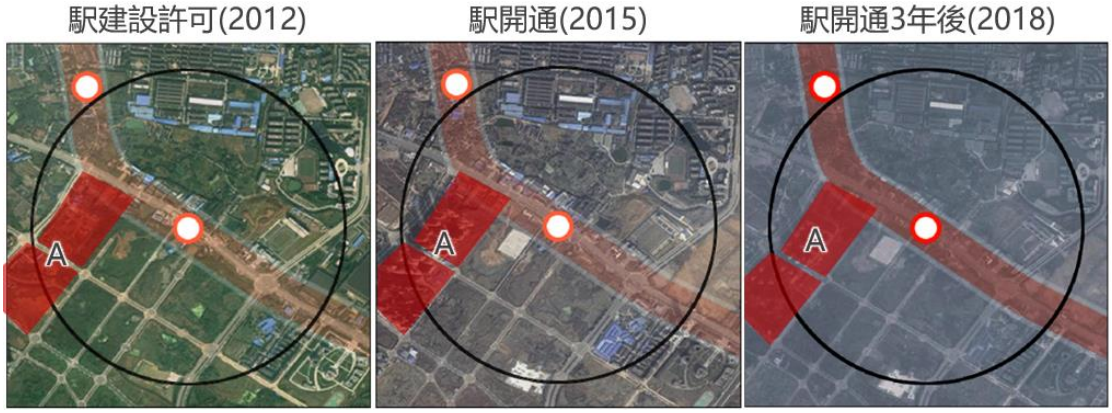

Figure5- 8 Transition of metro station areas

From Satellite map of Chengdu City from Shuijingzhu Co.Ltd, modified by author

Table5- 7 Time series of transition of metro station areas

2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
駅建設許可 幹線道路完成		駅南部道路整備	駅開通						
A街区入札募集（落札者：四川開成置業会社）	A街区開発	A街区完成							

Hearing to project manager of a developer company, Mr. Fu

Question: 'How do you think about the land use right of blocks near the metro station has not been developed while block A far from the metro station has been developed in Line 2 Honghe Station?'

Answer: 'According to the TOD policies of Chengdu city, the land use right of the blocks adjacent to metro station can only be obtained by Chengdu Rail Transit Group. The other developer can obtain the using right of land which is far away from the metro station. For us developers, it is not easy to make profits by developing residence which was not closed to the metro station. Therefore, our company's willingness to participate in TOD development project is not high'.

Question: 'What do you think about the reason why Sichuan Kaicheng Real Estate Company developed block A even if it will probably lose money?'

Answer: 'There will be more and more TOD related development project in Chengdu city. Some developers try to create brand through model projects and participate in future TOD projects'.

Results of Cluster Analysis of Type A Phase 1-Cluster 3:

Wuhan Road Station, Science City Station, Luhu Station, Xinglong Lake Station, Jiepai Station, Chengdu Administrative College Station, Chengyu Interchange Station, Chengdu East Rail Station, Tazishan Park Station, Caiqiao Station, Intangible Cultural Heritage Expo Park Station

Table5- 8 Development areas and its distribution

Annually Average Total Newly Developed Area from Metro Construction Permission to Metro Operation for 3 years (ha)	Proportion of Annually Average Newly Developed Area of Metro Construction Period in Total Developed Area			Proportion of Annually Average Newly Developed Area of Metro Operation for 3 years in Total Developed Area			Average distance to the nearest trunk road(m)	Average distance to the center of Chengdu city(km)
	500－800m Sphere	300－500m Sphere	0－300m Sphere	500－800m Sphere	300－500m Sphere	0－300m Sphere		
38ha	23%	16%	6%	25%	20%	11%	686	16
	45%			55%				

Typical TOD areas Extraction and hearing for development problems of Type A Phase 1-Cluster 3:

Line 2 Chengdu East Rail Station

Figure5- 9 Urban planning of Chengdu East Railway Station Area

From *Chengdu City Master Plan (2011-2020)*

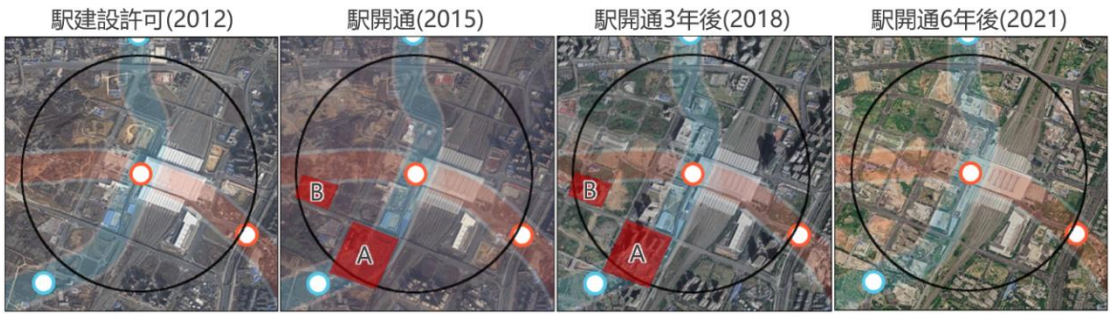

Figure5- 10 Transition of metro station areas

From Satellite map of Chengdu City from Shuijingzhu Co.Ltd, modified by author

Table5- 9 Time series of transition of metro station areas

2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
駅建設許可 成都東駅運営 駅前道路整備			駅開通		駅前道路整備				
	「成都東駅経済発展区建設計画」成都東駅駅前に30ha面積の商業、ビジネス区を開発予定	駅前商業用地**入札不調**	計画調整：A、B街区を商業用地から住宅用地に調整する	A、B街区入札募集		A、B街区住宅建設完成			

Hearing to project manager of a developer company, Mr. Fu

Question: 'What do you think about that Chengdu East Railway Station enjoys high daily passenger flow, but its station front development is stagnant?'

Answer: 'Referring to Kings Cross Station in London and Shinjuku Station in Tokyo, the government planned the commercial floor area of about 400ha in the assumption of developing the Chengdu East Railway Station and its station areas into the commercial subcenter of Chengdu city. However, in fact because the (Chinese) railway users are not preferred to stay at the railway station areas, the developer is not expected to invest in the commercial land in front of the railway station.

Hearing to urban planner of Chengdu Planning Bureau, Mr. Fu

Question: 'What do you think about that Chengdu East Railway Station enjoys high daily passenger flow, but its station front development is stagnant?'

Answer: 'The government instructed us (Chengdu Planning Bureau) to plan the business district in front of Chengdu East Railway Station into small blocks of 1 − 3ha according to the experience in developed countries. By doing so, the government intended that the business district will be walkable and small blocks can reduce the investment of developers so that attract developers to settle in quickly. However, developers thought that small blocks were not enough to make a shopping mall suited to commercial sub centers. Therefore, they are on the fence of investment'.

Results of Cluster Analysis of Type A Phase 2

Type A (No development or only trunk road development)

Phase 2 (Line 5,6,8,9,10,17,18)

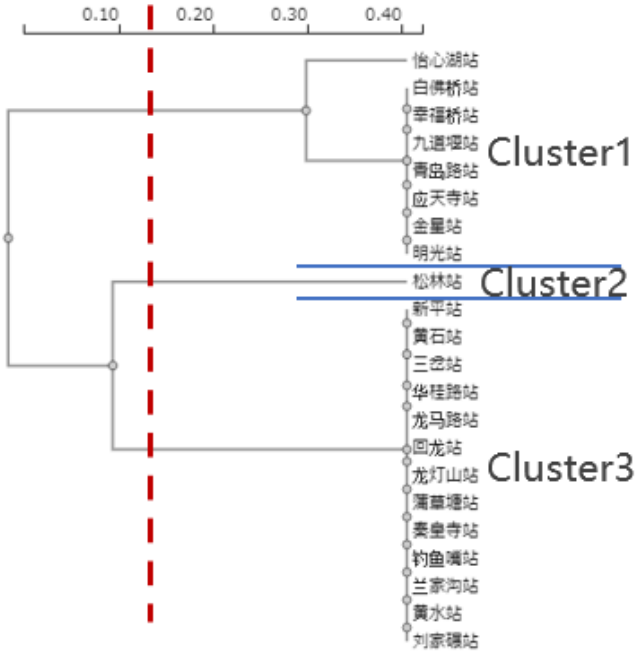

Figure5- 11 Result of Cluster Analysis of Type A Phase 2

By author

Results of Cluster Analysis of Type A Phase 2-Cluster 1:

Xingfu Bridge Station, Jiudaoyan Station, Yixin Lake Station, Qingdao Road Station, Yingtiansi Station, Jinxing Station, Mingguang Station, Baifo Bridge Station

Table5- 10 Development areas and its distribution

Annually Average Total Newly Developed Area from Metro Construction Permission to Metro Operation for 3 years (ha)	Proportion of Annually Average Newly Developed Area of Metro Construction Period in Total Developed Area			Average distance to the nearest trunk road(m)	Average distance to the center of Chengdu city(km)
	500－800m Sphere	300－500m Sphere	0－300m Sphere		
16ha	82%	9%	9%	968	18

Typical TOD areas Extraction and hearing for development problems of Type A Phase 2-Cluster 1:

Line 5 Xingfu Bridge Station

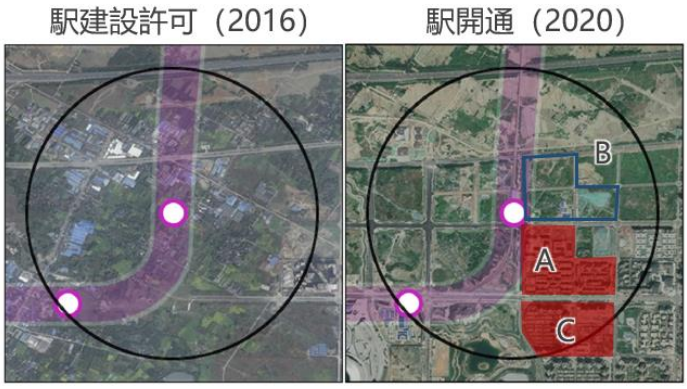

Figure5- 12 Transition of metro station areas

From Satellite map of Chengdu City from Shuijingzhu Co.Ltd, modified by author

Table5- 11 Time series of transition of metro station areas

2016	2017	2018	2019	2020	2021
駅建設許可	駅前道路整備			駅開通	
	A街区入札募集（落札者：成都市軌道集団）			A街区住宅建設完成	
	B街区入札募集（落札者：成都市軌道集団）	成都市軌道集団は66%の株式譲渡を求め、TOP50のデベロッパーとの合弁会社になり、共同開発を探求する			成都市軌道集団、招商蛇口公司、中国交通建設集団との共同開発を議定
		C街区入札募集（落札者：四川雲鼎雷不動産開発有限公司）	C街区住宅建設完成		

Hearing to Project Manager of Chengdu Rail Transit Group, Mr. Gou

‘Our company (Chengdu Rail Transit Group) was a company that only developed and operated metros and had no experience in housing development. Our company lacked of talents in housing development, design and operation, so our housing development project will be 2-3 years slower than other developers. In order to solve this problem, we are seeking joint development with developers, but the profit-sharing mechanism is not sound. Therefore, Chengdu Rail Transit Group acquired plenty of using right of land adjacent to metro station, but many of the lands are waiting for development.’

Results of Cluster Analysis of Type A Phase 2-Cluster 2:

Line 6 Songlin Station

Table5- 12 Development areas and its distribution

Annually Average Total Newly Developed Area from Metro Construction Permission to Metro Operation for 3 years (ha)	Proportion of Annually Average Newly Developed Area of Metro Construction Period in Total Developed Area			Average distance to the nearest trunk road(m)	Average distance to the center of Chengdu city(km)
	500－800m Sphere	300－500m Sphere	0－300m Sphere		
6ha	6%	**83%**	11%	**816**	23

Results of Cluster Analysis of Type A Phase 2-Cluster 3:

Huagui Road Station, Longmalu Station, Huilong Station, Longdengshan Station, Pucaotang Station, Qinhuangsi Station, Yuyuzui Station, Lanjiagou Station, Huangshui Station, Liujianian Station, Xinping Station, Huangshi Station, Sancha Station

Table5- 13 Development areas and its distribution

Annually Average Total Newly Developed Area from Metro Construction Permission to Metro Operation for 3 years (ha)	Proportion of Annually Average Newly Developed Area of Metro Construction Period in Total Developed Area			Average distance to the nearest trunk road(m)	Average distance to the center of Chengdu city(km)
	500－800m Sphere	300－500m Sphere	0－300m Sphere		
0ha	0%	0%	0%	506	**25**

Typical TOD areas Extraction and hearing for development problems of Type A Phase 2-Cluster 3:

Line 18 Sancha Station

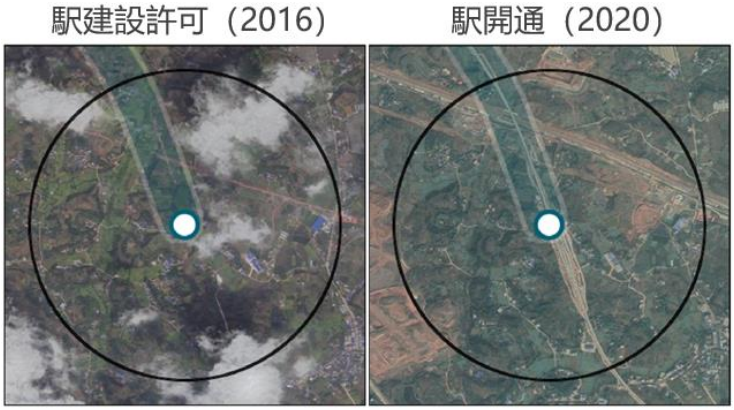

Figure5- 13 Transition of metro station areas

From Satellite map of Chengdu City from Shuijingzhu Co.Ltd, modified by author

Table5- 14 Time series of transition of metro station areas

2016	2017	2018	2019	2020	2021
駅建設許可				駅開通	
	「三岔駅TOD総合開発一体化都市設計案」打ち出し、小売商業、オフィスビル、ホテル、アパート、住宅、学校など機能複合の「公園新城」を目指す	企業誘致（進行不順）			

Hearing to Project Manager of Chengdu Rail Transit Group, Mr. Gou

Question: ‘The government has planned a "New Park City" around Sancha Station and tried to promote its development, but why Sancha Station areas were developed so far’.

Answer: ‘Because Sancha Station was closed to Chengdu Tianfu International Airport (The second airport of Chengdu city). The government intended to build a key development area integrating retail, hotel, office, apartment and school here to attract passengers from the airport. However, business developers believed that passengers coming out of the airport will have a higher priority to stay in the central area of Chengdu city for consumption, rather than staying in the suburb where 45 kilometers away from the center of the city. Therefore, commercial developers are cautious about the investment in Sancha Station’.

Hearing to project manager of a developer company, Mr. Fu

Question: ‘What do you think about the reason why the development of Sancha Station areas was unsuccessful while housing development in the Sancha Lake area (2-3 kilometers away from Sancha Station) was well-developed.’

Answer: ‘The Sancha Lakeside Area is adjacent to Sancha lake, so the scenery is good. High quality housing with good natural environment away from the city center is a sales point. Besides, Sancha Lakeside Area is adjacent to Sancha Lake Ring Road (trunk road). People who purchases the residence at 45km away from the city center is likely to be rich and travels by car. Therefore, it doesn’t matter even if luxury housing

is far away from metro station'.

5-3 Cluster Analysis and Hearing for Development Problems of Typical TOD in Type B

Results of Cluster Analysis of Type B Phase 1

Type B (Land Consolidation not Completed within 800 meters)

Phase 1 (Line 1,2,3,4,7)

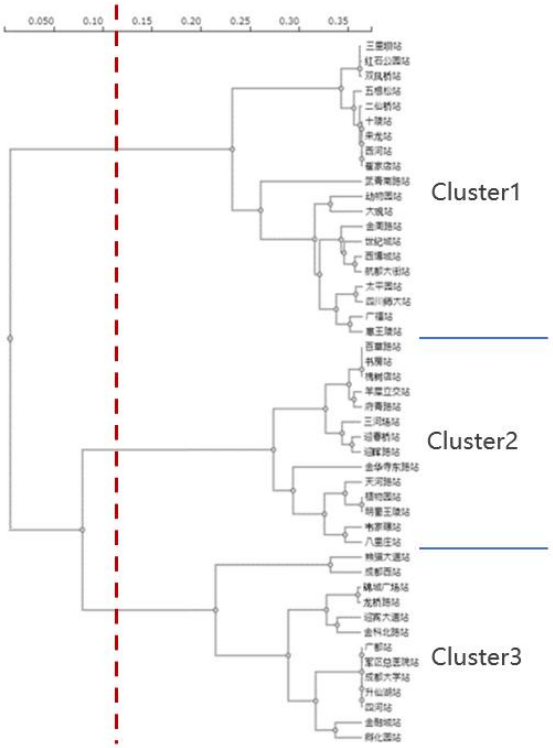

Figure5- 14 Result of Cluster Analysis of Type B Phase 1

By author

Results of Cluster Analysis of Type B Phase 1-Cluster 1:

Century City Station, Guangfu Station, Hongshi Park Station, Xibo City Station, Wugensong Station, Huiwangling Station, Jinzhou Road Station, Zoo Station, Taipingyuan Station, Wuqing South Road Station, Shuangfengqiao Station, Hangdu Street Station, Sanliba Station, Xihe Station, Shiling Station, Lailong Station, Sichuan Normal University Station, Daguan Station, Cuijiadian Station, Erxianqiao Station

Table5- 15 Development areas and its distribution

Annually Average Total Newly Developed Area from Metro Construction Permission to Metro Operation for 3 years (ha)	Proportion of Annually Average Newly Developed Area of Metro Construction Period in Total Developed Area			Proportion of Annually Average Newly Developed Area of Metro Operation for 3 years in Total Developed Area			Average distance to the nearest trunk road(m)	Average distance to the center of Chengdu city(km)
	500－800m Sphere	300－500m Sphere	0－300m Sphere	500－800m Sphere	300－500m Sphere	0－300m Sphere		
30ha	52%	21%	9%	8%	4%	5%	272	12
	82%			18%				

Typical TOD areas extraction and hearing for development problems of Type B Phase 1-Cluster 1:

Line 3 Shuangfengqiao Station

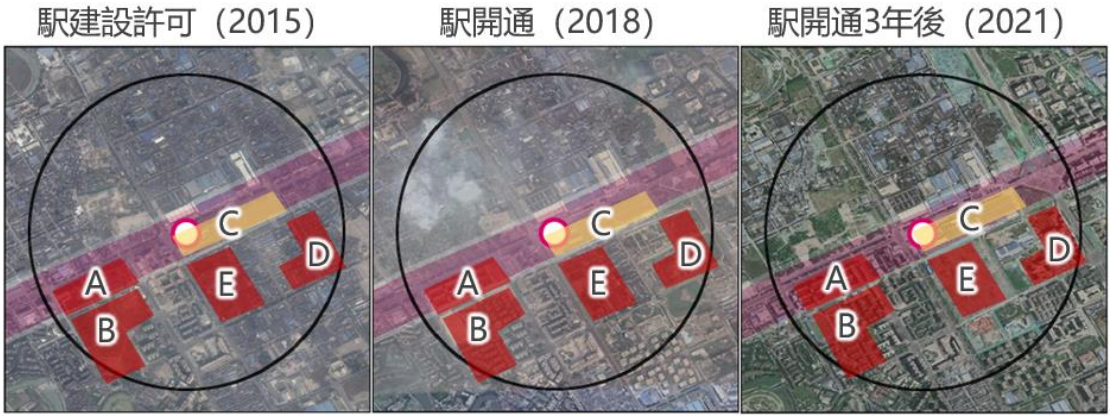

Figure5- 15 Transition of metro station areas

From Satellite map of Chengdu City from Shuijingzhu Co.Ltd, modified by author

Table5- 16 Time series of transition of metro station areas

	2015	2016	2017	2018	2019	2020	2021
交通基盤	駅建設許可			駅開通			
都市計画	都市再計画				「成都市武侯区初のモデルTODプロジェクト」とする		
A街区	土地収用整理	土地有償譲渡（落札者：新希望集団）	建設完成				
B街区	土地収用整理	土地有償譲渡（落札者：成都吉興和投資有限公司）	建設完成				
C街区	土地収用整理（進行不順）						
D街区	土地収用整理	土地有償譲渡（落札者：成都市軌道集団）			成都武侯双鳳七里軌道都市発展有限公司設立、土地開発を行う		開発完成
E街区						土地収用整理	（2022年開発予定）

Figure5- 16 Temporary commercial stores and sandy land in front of Shuangfengqiao Station

By author

Figure5- 17 Effect drawing of open space and shopping center in front of Shuangfengqiao Station

From *Urban Design of Shuangfengqiao TOD*

Hearing to temporary commercial facility operators in front of Block D (July of 2021)

Question: 'According to the construction plan of Shuangfengqiao TOD project, temporary commercial stores here will be demolished three years ago and then rebuilt into high-end stores. What is the reason why so far, these temporary commercial stores still remain opening?'

Answer: 'Government officials have consulted for times for land expropriation, but because the metro station will be built here, temporary store owners tried to request a high compensation fees. They couldn't make an agreement of compensation fee. '

Hearing to resident of Block D (July of 2021)

Question: 'How do you think about the temporary stores?'

Answer: 'A park and some high-class commercial facilities were originally planned in front of the metro station, but until now it is a crowded low-level commercial facility and a desert area and I don't know when to redevelop. The environment is bad and unconfident.'

Results of Cluster Analysis of Type B Phase 1-Cluster 2:

Weijianian Station, Financial City Station, Incubation Park Station, Jincheng Square

Station, Study Station, Yangxi Interchange Station, Yingbin Avenue Station, Jinke North Road Station, Baicao Road Station, Tianhe Road Station, Sanhe Station, Jinhua Temple East Road Station, Botanical Garden Station, Panda Avenue Station, Longqiao Road Station, Yingchun Bridge Station, Mingshu Wangling Station, Huaishudian Station, Chengdu West Station, Yinghui Road Station, Balizhuang Station, Fuqing Road Station

Table5- 17 Development areas and its distribution

Annually Average Total Newly Developed Area from Metro Construction Permission to Metro Operation for 3 years (ha)	Proportion of Annually Average Newly Developed Area of Metro Construction Period in Total Developed Area			Proportion of Annually Average Newly Developed Area of Metro Operation for 3 years in Total Developed Area			Average distance to the nearest trunk road(m)	Average distance to the center of Chengdu city(km)
	500－800m Sphere	300－500m Sphere	0－300m Sphere	500－800m Sphere	300－500m Sphere	0－300m Sphere		
37ha	21%	10%	6%	42%	13%	8%	224	10
	37%			63%				

Typical TOD areas extraction and hearing for development problems of Type B Phase 1-Cluster 2:

Line 1 Weijianian Station

Figure5- 18 Transition of metro station areas

From Satellite map of Chengdu City from Shuijingzhu Co.Ltd, modified by author

Table5- 18 Time series of transition of metro station areas

	2015	2016	2017	2018	2019	2020	2021
交通基盤	駅建設許可			駅開通			
都市計画		金牛区政府がTOD開発を推進	都市計画調整（住宅街区、公共施設街区調整）		金牛区政府がTOD開発を中止		
A街区				土地収用整理	土地有償譲渡（落札者：旭輝集団）		住宅建設完成
B街区				土地収用整理	土地無償提供	小中学校建設完成	
C街区				土地収用整理	土地有償譲渡（入札不調）		
D街区				土地収用整理	土地有償譲渡（入札不調）		
E街区			土地収用整理	土地有償譲渡（落札者：成都市軌道集団）	市民反対（建設中止）		

Hearing to urban planner of Jinniu District Planning Bureau Mr. Chen

Question: ‘What do you think about the reason why did the Jinniu District Government regard Weijianian station area as a model TOD development project, but it was shelved in 2019?’

Answer: ‘There are two reasons. Firstly, due to insufficient development funds, Chengdu Rail Transit Group sought developers for joint-developing for Block C and Block D. However, because no more than 2 kilometers away from the Fenghuangshan Military Airport, Block C and Block D has altitude restriction while the developer cannot accept. Therefore, development of Block C and Block D shelved.

Secondly, our bureau adjusted the Detailed Land Use Plan in 2017 according to TOD urban design guidelines. Among them, because Block E is closed to the metro station, even if it is going to construct a park, we change it to residential land and the park will be moved to a block far away from the metro station. However, after the adjustment of the plan, the residents of the residential area next to the original park block strongly opposed it, resulting in difficulties in the follow-up work.’

Results of Cluster Analysis of Type B Phase 1-Cluster 3:

Shengxian Lake Station, Sihe Station, Guangdu Station, Military General Hospital Station, Chengdu University Station

Table5- 19 Development areas and its distribution

Annually Average Total Newly Developed Area from Metro Construction Permission to Metro Operation for 3 years (ha)	Proportion of Annually Average Newly Developed Area of Metro Construction Period in Total Developed Area			Proportion of Annually Average Newly Developed Area of Metro Operation for 3 years in Total Developed Area			Average distance to the nearest trunk road(m)	Average distance to the center of Chengdu city(km)
	500－800m Sphere	300－500m Sphere	0－300m Sphere	500－800m Sphere	300－500m Sphere	0－300m Sphere		
0ha	0%	0%	0%	0%	0%	0%	172	11
	0%			0%				

Results of Cluster Analysis of Type B Phase 2:

Type B (Land Consolidation not Completed within 800 meters)

Phase 2 (Line 5,6,8,9,10,17,18)

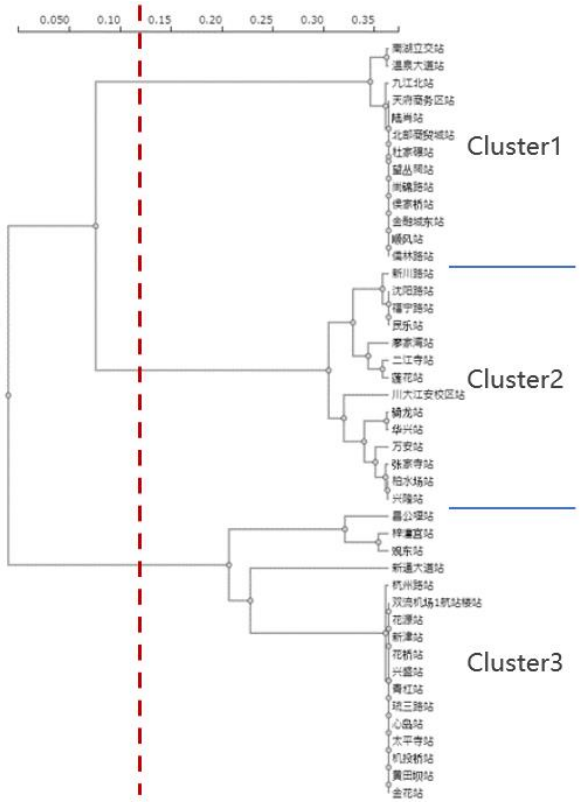

Figure5- 19 Result of Cluster Analysis of Type B Phase 2

By author

Results of Cluster Analysis of Type B Phase 2-Cluster 1:

Dujianian Station, Nanhu Interchange Station, Wangcongci Station, Shangjin Road Station, Houjiaqiao Station, Financial City East Station, Luxiao Station, Tianfu Business District Station, Shunfeng Station, Rulin Road Station, Wenquan Avenue Station, Jiujiang North Station

Table5- 20 Development areas and its distribution

Annually Average Total Newly Developed Area from Metro Construction Permission to Metro Operation for 3 years (ha)	Proportion of Annually Average Newly Developed Area of Metro Construction Period in Total Developed Area			Average distance to the nearest trunk road(m)	Average distance to the center of Chengdu city(km)
	500－800m Sphere	300－500m Sphere	0－300m Sphere		
12ha	90%	10%	0%	437	17

Typical TOD areas extraction and hearing for development problems of Type B Phase 2-Cluster 1:

Line 6 Luxiao Station

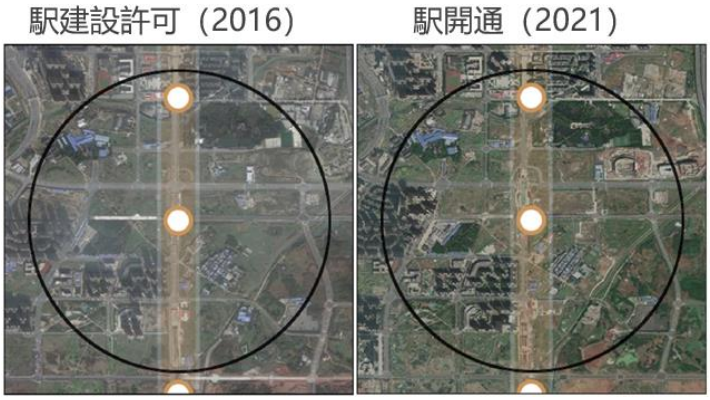

Figure5- 20 Transition of metro station areas

From Satellite map of Chengdu City from Shuijingzhu Co.Ltd, modified by author

Table5- 21 Time series of transition of metro station areas

	2016	2017	2018	2019	2020	2021
交通基盤	駅建設許可			駅開通		
都市計画		双流区政府がモデルTODプロジェクトとして推進	都市計画調整（商業、公共施設を駅に近接させ）			
A街区			土地収用整理	土地有償譲渡（落札者：成都市軌道集団）		
B街区			土地収用整理	土地有償譲渡（落札者：成都市軌道集団）		
C街区			土地収用整理	土地有償譲渡（落札者：成都市軌道集団）	住宅開発	
D街区			土地収用整理	土地有償譲渡（落札者：成都市軌道集団）	住宅開発	

Hearing to Project Manager of Chengdu Rail Transit Group, Mr. Gou

Question: ‘Chengdu Rail Transit Group owns four blocks of Luxiao Station TOD. What do you think about it developed two residential blocks away from the station

first rather than jointly development?'

Answer: 'The main reason is our company's capital constraints. Among the TOD projects participated by Chengdu Rail Transit Group, the land use right transfer fee alone is more than 20 billion yuan, plus the construction cost, the investment is expected to exceed 50 billion yuan. At the same time, Chengdu Rail Transit Group is promoting the construction of metro phase 4, which also requires a large amount of construction funds.

In order to solve the capital problem, our company implements the strategy of "residential first, commercial later" for TOD projects. It means that use the profits from residential development and housing sales to support the commercial development.'

Question: 'What do you think about the hidden danger of such 'residential first, commercial later'?'

Answer: 'This way depends on the prosperity of the real estate market. Once the real estate market is depressed, the follow-up development will be difficult to finish. According to the TOD development policies of Chengdu city, Chengdu Rail Transit Group takes responsible for the development of the land adjacent to the metro stations. If the current development mechanism and investment mode are not changed, I think it difficult to guarantee the effect and efficiency of subsequent development.'

Results of Cluster Analysis of Type B Phase 2-Cluster 2:
Baishui Station, Liaojiawan Station, Funing Road Station, Minle Station, Qilong Station, Erjiangsi Station, Zhangjiasi Station, Xinchuan Road Station, Wan'an Station, Shenyang Road Station, Jiang'an Campus Station of Sichuan University, Lianhua

Station, Huaxing Station, Xinglong Station, Zitong Palace Station, Guandong Station, Changgongyan Station, North Trade City Station, Xintong Avenue Station, Hangzhou Road Station

Table5- 22 Development areas and its distribution

Annually Average Total Newly Developed Area from Metro Construction Permission to Metro Operation for 3 years (ha)	Proportion of Annually Average Newly Developed Area of Metro Construction Period in Total Developed Area			Average distance to the nearest trunk road(m)	Average distance to the center of Chengdu city(km)
	500－800m Sphere	300－500m Sphere	0－300m Sphere		
18ha	53%	33%	13%	598	15

Results of Cluster Analysis of Type B Phase 2-Cluster 3:

Xingsheng Station, Qinggang Station, Liusan Road Station, Xindao Station, Taiping Temple Station, Jituqiao Station, Huangtianba Station, Jinhua Station, Shuangliu Airport Terminal 1, Huayuan Station, Xinjin Station, Huaqiao Station

Table5- 23 Development areas and its distribution

Annually Average Total Newly Developed Area from Metro Construction Permission to Metro Operation for 3 years (ha)	Proportion of Annually Average Newly Developed Area of Metro Construction Period in Total Developed Area			Average distance to the nearest trunk road(m)	Average distance to the center of Chengdu city(km)
	500－800m Sphere	300－500m Sphere	0－300m Sphere		
0ha	0%	0%	0%	162	14

5-4 Cluster Analysis and Hearing for Development Problems of Typical TOD in Type C

Results of Cluster Analysis of Type C Phase 1

Type C (Land Consolidation Completed while Urban development not Completed within 800 meters)

Phase 1 (Line 1,2,3,4,7)

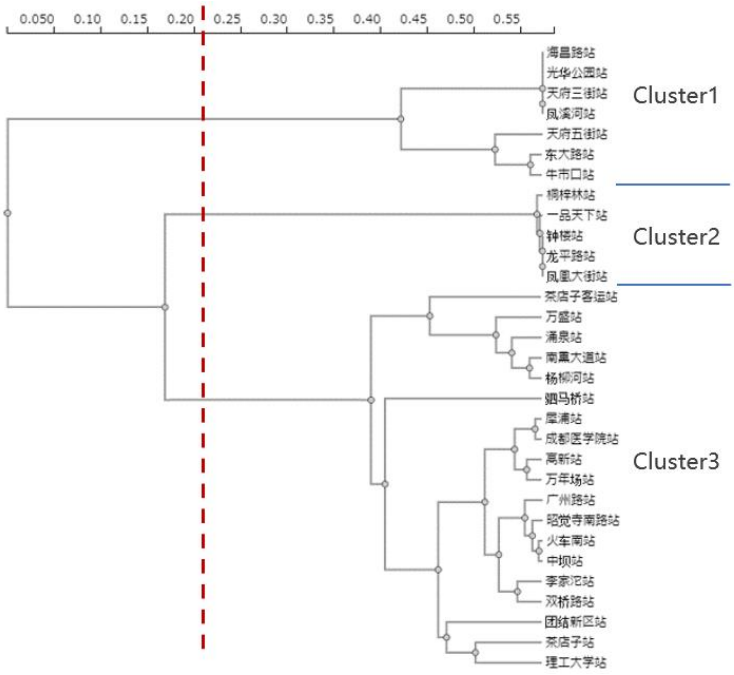

Figure5- 21 Result of Cluster Analysis of Type C Phase 1

By author

Results of Cluster Analysis of Type C Phase 1-Cluster 1:

Tianfu 3rd Street Station, Tianfu 5th Street Station, Haichang Road Station, Dongda Road Station, Niushikou Station, Guanghua Park Station, Fengxi River Station

Table5- 24 Development areas and its distribution

Annually Average Total Newly Developed Area from Metro Construction Permission to Metro Operation for 3 years (ha)	Proportion of Annually Average Newly Developed Area of Metro Construction Period in Total Developed Area			Proportion of Annually Average Newly Developed Area of Metro Operation for 3 years in Total Developed Area			Average distance to the nearest trunk road(m)	Average distance to the center of Chengdu city(km)
	500－800m Sphere	300－500m Sphere	0－300m Sphere	500－800m Sphere	300－500m Sphere	0－300m Sphere		
26ha	10%	2%	0%	58%	23%	8%	32	14
	12%			88%				

Typical TOD areas extraction and hearing for development problems of Type C Phase 1-Cluster 1:

Line 4 Guanghua Park Station

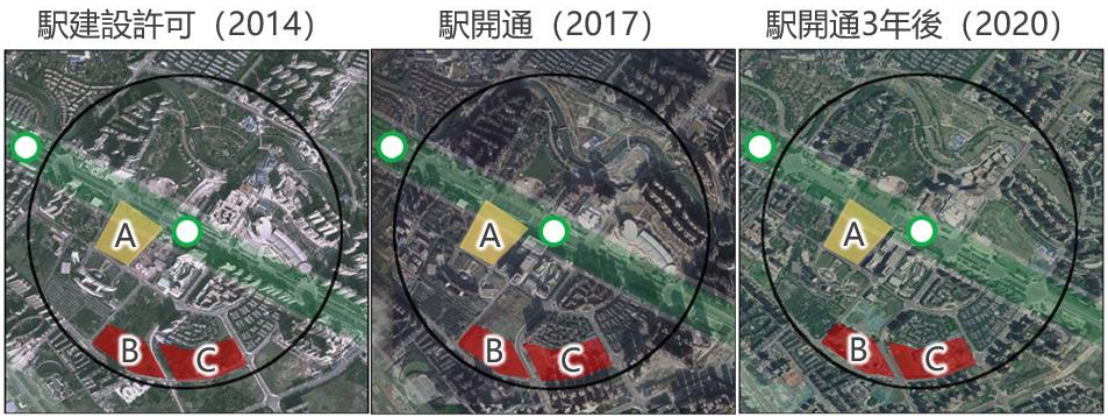

Figure5- 22 Transition of metro station areas

From Satellite map of Chengdu City from Shuijingzhu Co.Ltd, modified by author

Table5- 25 Time series of transition of metro station areas

	2014	2015	2016	2017	2018	2019	2020	2021
交通基盤	駅建設許可			駅開通				
都市計画								計画調整中
A街区	土地収用整理	土地有償譲渡（入札不調）				土地有償譲渡（入札不調）		
B街区					土地収用整理	土地有償譲渡（落札者：雅居楽集団）	住宅開発	
C街区			土地収用整理	土地無償提供	小学校開発			

Hearing to project manager of foreign urban design firm

Question: ‘Why the land near the site has been vacant and cannot be developed’

Answer: ‘This land is located in front of the Wenjiang District Government. The government required the developers which obtains land use right to build a large-scale greenway in the middle of Block A and has the obligation to build an underground passage and an overpass walkway from the government building to the metro station. At the same time, the government building should not be obstructed due to limited requirements.

TOD Urban Design Guidelines requires to plan open space and public facilities. Developers pursue profit and capital efficiency but the current TOD policies of Chengdu city lack of incentive and subsidy for development. Therefore, it is difficult to attract developers to participate in high standards development. I assume that

blocks with requirements of public space construction could be rewarded with plot ratio.'

Results of Cluster Analysis of Type C Phase 1-Cluster 2:

Tongzilin Station, Longping Road Station, Yipintianxia Station, Bell Tower Station, Phoenix Street Station

Table5- 26 Development areas and its distribution

Annually Average Total Newly Developed Area from Metro Construction Permission to Metro Operation for 3 years (ha)	Proportion of Annually Average Newly Developed Area of Metro Construction Period in Total Developed Area			Proportion of Annually Average Newly Developed Area of Metro Operation for 3 years in Total Developed Area			Average distance to the nearest trunk road(m)	Average distance to the center of Chengdu city(km)
	500－800m Sphere	300－500m Sphere	0－300m Sphere	500－800m Sphere	300－500m Sphere	0－300m Sphere		
15ha	97%	3%	0%	0%	0%	0%	107	13
	100%			0%				

This cluster metro stations are located inside the developed blocks, so the new development is distributed more than 500 meters away from the metro station.

Results of Cluster Analysis of Type C Phase 1-Cluster 3:

South Railway Station, Gaoxin Station, Guangzhou Road Station, Xipu Station, Chengdu Medical College Station, Tuanjie New Area Station, Zhaojuesi South Road Station, Simaqiao Station, Lijiatuo Station, Wannian Station, Shuangqiao Road Station, Zhongba Station, Chadianzi Station, University of Technology Station, Chadianzi Passenger Station, Yongquan Station, Nanxun Avenue Station, Yangliuhe Station, Wansheng Station

Table5- 27 Development areas and its distribution

Annually Average Total Newly Developed Area from Metro Construction Permission to Metro Operation for 3 years (ha)	Proportion of Annually Average Newly Developed Area of Metro Construction Period in Total Developed Area			Proportion of Annually Average Newly Developed Area of Metro Operation for 3 years in Total Developed Area			Average distance to the nearest trunk road(m)	Average distance to the center of Chengdu city(km)
	500－800m Sphere	300－500m Sphere	0－300m Sphere	500－800m Sphere	300－500m Sphere	0－300m Sphere		
41ha	42%	20%	15%	16%	5%	2%	164	12
	77%			23%				

Results of Cluster Analysis of Type C Phase 2

Type C (Land Consolidation Completed while Urban development not Completed within 800 meters)

Phase 2 (Line 5,6,8,9,10,17,18)

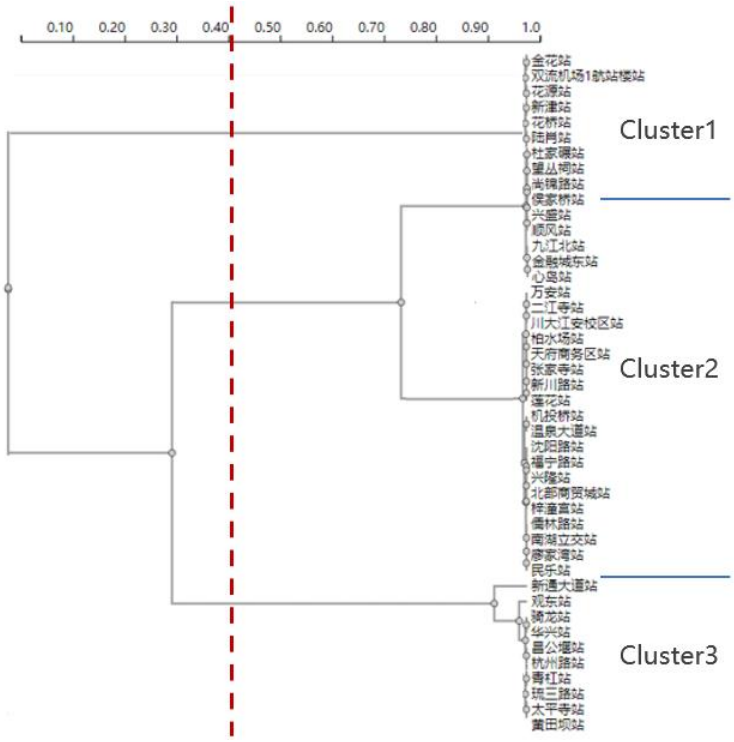

Figure5- 23 Result of Cluster Analysis of Type C Phase 2

By author

Results of Cluster Analysis of Type C Phase 2-Cluster 1:

Wuzhuaishi Station, Zhonghe Station, Shilidian Station

Table5- 28 Development areas and its distribution

Annually Average Total Newly Developed Area from Metro Construction Permission to Metro Operation for 3 years (ha)	Proportion of Annually Average Newly Developed Area of Metro Construction Period in Total Developed Area			Average distance to the nearest trunk road(m)	Average distance to the center of Chengdu city(km)
	500－800m Sphere	300－500m Sphere	0－300m Sphere		
3ha	17%	0%	83%	201	8

Results of Cluster Analysis of Type C Phase 2-Cluster 2:

Dafeng Station, Shixi Park Station, Huanghua Garden Station, Shiyang Interchange Station, Shiyi Hospital Station, Jincheng Lake Station, Police Academy Station, Pitong Station, Honggao Road Station, Xingye North Street Station, Lushan Avenue Station, Eastern Suburb Memory Station, Donghu Park Station, Wenxing Station, Peifeng Station, Jiaozi Avenue Station, Dayuan Station, Heping Street Station,

Zhujiang Road Station, Dongzikou Station, Dongguang Station

Table5- 29 Development areas and its distribution

Annually Average Total Newly Developed Area from Metro Construction Permission to Metro Operation for 3 years (ha)	Proportion of Annually Average Newly Developed Area of Metro Construction Period in Total Developed Area			Average distance to the nearest trunk road(m)	Average distance to the center of Chengdu city(km)
	500－800m Sphere	300－500m Sphere	0－300m Sphere		
16ha	69%	22%	9%	342	11

Results of Cluster Analysis of Type C Phase 2-Cluster 3:

Shuxin Avenue Station, Mengzi Station, Jinshi Road Station, Wannian Road Station, Sanyuan Station

Table5- 30 Development areas and its distribution

Annually Average Total Newly Developed Area from Metro Construction Permission to Metro Operation for 3 years (ha)	Proportion of Annually Average Newly Developed Area of Metro Construction Period in Total Developed Area			Average distance to the nearest trunk road(m)	Average distance to the center of Chengdu city(km)
	500－800m Sphere	300－500m Sphere	0－300m Sphere		
0ha	0%	0%	0%	92	12

Charpter6: Influencing Factors of TOD Policies and Suggestions for Future Promotion of TOD in Chinese City

6-1 Influencing Factors of TOD Policies

6-2 Suggestions for Future Promotion of TOD in Chinese City

6-1 Influencing Factors of TOD Policies

Firstly, TOD policies on obtaining sustainable funding for metro construction and operation has turned the operating status of Chengdu Rail Transit Group from deficit to surplus, which has successfully supported Chengdu Rail Transit Group to continue its future metro construction and operation. However, the measures such as ‘giving priority to Chengdu Rail Transit Group to obtain land with high value near metro station’ also reduce the participation of developers in TOD development, resulting in the failure of some TOD land use rights transfer cases.

Secondly, at present, the realization TOD policies on promoting the intensive and mix-used development around the metro station is low. It can be seen in Chapter 5 that the most of development distributes in the 500–800-meter sphere while few developments in the 0–300-meter sphere which was planned to develop mix-used areas. Hearing study in chapter 5 finds that the measures of TOD urban design guidelines implement well. However, Chengdu Rail Transit Group owned most of using right of land adjacent to metro stations, but it lacked of experience and talents to promote commercial development and it took the strategy of ‘residence before commerce’, resulting in plenty of land near by metro station to be developed. Although Chengdu Rail Transit Group has tried to cooperate with developers, it needs time for them to reach an agreement.

Thirdly, the realization TOD policies on improving the synchronization and integration between metro stations and their surrounding areas is also low. The reason is that it took a long time to made urban planning readjustment which delayed the progress of TOD development. Besides, lack of experience and talents of Chengdu Rail Transit Group also slowed the TOD development. Thirdly, the residents' objection led to the stagnation of Land Expropriation and TOD development.

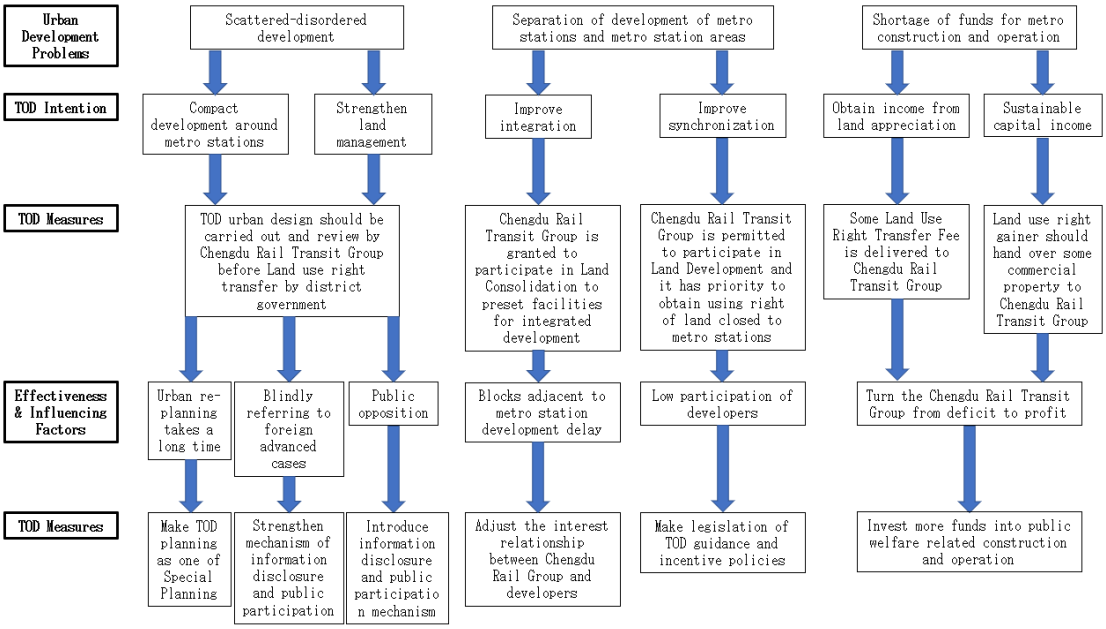

Figure6- 1 Effectiveness and influencing factors of TOD policies and suggestions for future promotion of TOD

By author

6-2 Suggestions for Future Promotion of TOD in Chinese City

For TOD development located in undeveloped areas:

In view of incongruity between TOD planning and other urban planning, the author suggests that Chengdu city could consider TOD planning while making City Master Plan and Detailed Land Use Plan. At the same time, the author suggests that Chengdu city could make TOD planning as one of Special Planning, which is prepared together with Business Planning and Transportation Planning to make the allocation of resources reasonable.

In view of blindly referring to foreign advanced cases and pursue large-scaled development by government, the author suggests that Chengdu city could strengthen the mechanism of information disclosure and public participation. During making TOD planning, the government could encourage professional teams, research institutions, colleges and universities to participate in the research of TOD development in Chinese cities and give their advice. During the re-urban planning of

TOD, the government could explore to establish a public opinion conference composed of representatives of the National People's Congress, representatives of developers and representatives of TOD scholars to listen to various opinions.

In view of stagnation of Land Use Right Transfer since low participation of developers, the author suggests that Chengdu city could adjust the interest relationship between Chengdu Rail Group, the district governments and developers to ensure the fairness and encourage developers' participation.

For TOD development of metro station located in areas Land Consolidation not completed within 800 meters:
In view of public opposition for implementation of TOD project caused by public resource reconfiguration, the author suggests that Chengdu city could introduce an information disclosure and public participation mechanism to release TOD policy, project planning, construction to ensure the public's right to know. For the planning of the TOD development projects, the opinions of close stakeholders could be collected before the release to ensure the participation of the people.

For TOD development of metro station located in areas Land Consolidation completed:
In view of the problem that the Land Use Right Transfer is shelved due to the additional conditions of the government are unacceptable to developers, the author suggests that Chengdu city could make legislation of TOD guidance and incentive policies. For example, the relevant expenses for the development of public welfare space could be reduced or the floor area rate could be awarded for the development of public welfare space.

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