AIRPORT SURROUNDING AREA DEVELOPMENT IN CHINA

BY

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DISSERTATION

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ABSTRACT

Urbanization and civil aviation industry have deep impacts on human society, including China where economic growth has been fast. A joint product of urbanization and civil aviation industry is Airport Surrounding Area Development (ASAD). There has been plenty of research on western ASAD and of Chinese ASAD by scholars from each respective side, but communication between the West and China on this topic is sparse.

Growth coalition and urban regime are two rival theories abstracted from US reality of urban economic growth and relationship among various players during this process, but their applicability outside USA needs to be tested. China's ASAD is a good opportunity for this type of test.

The uniqueness of China is discussed in four aspects: government structure, land finance of local government, economy's dependency on fixed-asset investment, and research data availability. Additionally, official plans of ASAD in six Chinese cities are presented to give potential investors a panorama of the situation through the scope of local government. Since there is always a gap between plan and reality, the author used two innovative methods to evaluate the ASAD situation: remote sensing analysis and computational text analysis.

The author chose Xi'an ASAD as a case study. Tax data of Xi'an Airport New City revealed differentiated level of success for various industries around Xi'an airport. Fieldwork on industrial and residential landscape provided first-hand material. The author discussed four special topics in depth: urbanization of existing rural communities near airports with focus on land-lost peasants; environmental issues; interactive

behaviors of government and enterprises; and COVID-19. Perspective business opportunities in ASAD in primary, secondary, and tertiary sectors, as well as precautions, are suggested to investors.

This study fills the gap of Chinese ASAD research outside China. It confirms that in the Chinese context, the rationale of growth coalition theory and urban regime theory remains valid, but the specific roles and behaviors of players differ from their counterparts in the West. The two originally rival theories each explain part of the reality. The government and public sector economy are dominant in China, yet other civil players like private and foreign capital and land-lost peasants cannot be neglected. All players have common interests on airport surrounding area economic development; therefore, they often compromise with each other and cooperate. This study provides international investors with rich and up-to-date information about this huge market. Moreover, China's experience of ASAD exhibits an alternative development approach from the West for other developing countries.

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Chapter 1. Introduction and background

Several centuries ago, cities started to grow in size and number. One hundred years ago, humans first flew in the sky. Since then, urbanization and civil aviation have changed the way humans live and travel. These two things have deep connections: they are both results of economic development and industrialization, and both in return promote further economic growth.

Urbanized populations have increased income, and value their time more. They want to buy fresh, high-quality, and diverse products from all over the world and get them fast. The further division of labor and globalization of supply chains based on comparative advantages intensifies the interurban movement of professionals and products, and prosperous cities have more funding to build and renovate aviation infrastructures.

The civil aviation industry greatly accelerates the flow of people and goods helping economic activities in cities; as a giant collection of industries, civil aviation creates tremendous amount of direct, indirect and induced GDP and jobs for cities, from fueling, aircraft manufacturing and maintenance, airport infrastructure, and airline operation, to aviation finance, aviation education, aviation IT, etc.

Rooted in their deep connections, urbanization and civil aviation jointly generated a concrete phenomenon-- Airport Surrounding Area Development (ASAD) which broadly refers to all urban development activities in the geographic proximity of airports. This proximity is apparently not a coincidence but a necessity considering the important position of civil aviation in modern economy. Indeed, people have realized this necessity

and actively use airports to stimulate development. But before discussing ASAD in depth, I am going to revisit the history of urbanization and civil aviation industry in China.

1.1 A summary of urbanization in China

China in the last 70 years has experienced the largest scale of urbanization in modern human history. According to the National Bureau of Statistics of China(National bureau of Statistics 国家统计局 2019), by the end of year 2018, the urbanization rate in China reached 59.58%, 48.94 percentage points higher than in 1949. Most of the increase happened after 1978.

Shortly after 1949, the Soviet Union aided China to achieve fast industrialization, which transformed a lot of rural peasants to industrial workers in cities. However, the trend was overturned in the 1960s and 1970s when the political and economic situation in China fell into turmoil. During that period, the central government intentionally moved some population from eastern cities to the west. In 1978, the urbanization rate was about 17%.

The Open and Reform since 1978 significantly accelerated urbanization. The relaxation of the Hukou (household registration) system facilitated hundreds of millions of people to move from the countryside to cities in three decades, the largest scale in human history. Three big city clusters gradually formed in Yangtze River Delta, Pearl River Delta and around Beijing. Other cities also grew rapidly. By 2011, for the first time more than half of all Chinese live in cities.

After 2012, the urbanization in China changed from mainly increasing in size and quantity to improvement of quality. More rural-urban migrants started to register as urban households or could enjoy the same benefit as registered urban residents. Municipal management became standardized and legalized. People enjoyed more public services and social benefits. The urban environment was beautified. The central government also tried to balance the national urbanization map by encouraging the development of cities and small towns in non-coastal regions and rural areas.

In China, cities are classified by administrative level as (national) direct-controlled municipality, sub-province level, prefecture-level, county level, and towns, from the highest to the lowest[1]. In 1949, there were 65 prefecture-level cities and above, 67 county-level cities and around 2000 towns. In 1978, the numbers were 101, 92 and 2176 respectively. This amount quickly increased after Open and Reform to 297, 375 and 21297 in 2018. Among all prefecture-level cities and above, 14 have a population over 5 million[2], 15 have 3 million to 5 million, 219 have half million to 3 million, and 49 have less than half million. Growing with the population is the built area of cities. The total urban built area has expanded 6.6 times, from 7438 square kilometers to 56225 kilometers, from 1981 to 2017. Many cities now have more than 3 ring roads and multiple “New Towns”, “New Zones” or “Development Zones”, meaning areas undergoing intensive development.

[1] Generally, the larger the city, the higher the city’s level is, but that is not always true.

[2] All statistics here are defined by cities’ administrative boundary. All national statistics do not include Hong Kong, Macau and Taiwan.

After 70 years of development, and attributed to the Open and Reform policy, China now has a prosperous urban economy. In 1988, the total GDP of all Chinese cities was 70.25 billion, around half of the national total. In 2017, all prefecture-level and above cities generated a GDP of 52.1 trillion, 63% of the national total, which means the economic activities are more concentrated in cities than population. The four first-tier cities each have a GDP of more than 2 trillion, namely Beijing, Shanghai, Shenzhen and Guangzhou.

A prosperous economy gives municipal governments more fiscal assets. In 2017, all prefecture-level and above cities had a total general public budget revenue of 5.57 trillion[3] , which is 100 times more than that of 1978. The ten10 largest cities each have revenue of 100 billion. All cities generate a fixed-assets investment of 63.2 trillion, 98.5% of the national total, within which 8.1 trillion is residential investment.

The tertiary sector is now the most important contributor to the Chinese urban economy. The proportions of added value from primary, secondary and tertiary sectors are 2.9%, 41.4% and 55.7% in prefecture-level and above cities in 2017.

By any means, China has achieved the most massive urbanization in a relatively short period of time compared to any other countries in the world.

1.2 A summary of civil aviation in China

In 1910, in a hunting ground south of Beijing city, the Qing dynasty, the last Chinese dynasty, opened the first airport in China- Nanyuan airport. Interestingly enough, just

[3] All monetary value in this article is in Chinese Yuan CNY, unless otherwise specified.

prior to me writing this paper, on September 25th, 2019, Nanyuan airport closed after the last flight departed. For 109 years, Nanyuan airport not only saw Beijing grew from a pre-modern imperial capital to an international metropolis, but also witnessed the development of Chinese aviation industry.

The same as in other countries, aviation in China was first used by the military. The opening of the 120 km Beijing- Tianjin route in 1920 marked the starting of civil aviation in China. In 1930s, the Republic of China government opened the China National Aviation Corporation (CNAC)[4] jointly with US merchants and opened the Central Air Transport Co. (CATC) jointly with Deutsche Lufthansa.

In November 1949, when the civil war in China came close to an end, the managers, pilots, and over 2000 employees of CNAC and CATC, who were in Hong Kong and overseas, defected to the People's Republic of China government in Beijing with 12 planes. Those people and planes became the beginnings of civil aviation in People's Republic of China. Those two companies were merged as the civil aviation bureau under People's Liberation Army Air Force.

From 1949 to 1987, the Civil Aviation Administration of China (CAAC, or sometimes called General Administration of Civil Aviation of China, GACAC) operated all civil flights and related business in China including all airports[5]. CAAC itself was managed by the PLA Air Force before 1980 and later existed as an independent department under China's central government. The airline it ran was also called "CAAC". Under nation-

[4] Not the same as the parent company of today's Air China, China National Aviation Holdings, which was established in 2002.
[5] After 1949, the Hong Kong branch of CNAC continued to exist as the representative of CAAC in Hong Kong.

wide Opening and Reform, the enterprization reform of Chinese civil aviation started in 1982 when aviation really started to run as a business seeking economic profits. In 1984, the first joint-stock local airlines in China - Xiamen Airlines -was established, ending the monopoly of CAAC. Later, dozens of local airlines and airports were established, but CAAC was still the general administrator as well as the biggest operator.

In 1987, the Chinese government decided to separate airlines and airports. Six state-owned airlines were established: Air China, China Eastern, China Southern, China Southwest, China Northwest, and China Northern. They replaced the CAAC as the airline operators in China. Six regional civil aviation administrations were also established, which were both government agencies supervising aviation activities but also operators of formerly CAAC- owned airports in this region. China National Aviation Fuel Company, China Aviation Supplies Company and Accounting Centre of China Aviation also formed at the same time as the supporting system to the airline companies.

In 2002, the six regional airlines, the three supporting companies as well as some local state-owned airlines, were re-incorporated into China National Aviation Holding, China Eastern Airlines, China Southern Airlines, TravelSky Technology Limited, China National Aviation Fuel Group Corporation and China Aviation Supplies Holding Company. All airports were handed over to local state-owned groups[6]. CAAC is no longer the holder of airlines and airports in China. Instead, CAAC and its regional branches are now government administrators, responsible for the safety, market

[6] Except for Beijing Capital Airport Group, which is owned by CAAC but operates as a separate, marketized enterprise, and airports in Tibet, which are still run by CAAC Tibet branch.

regulation, traffic management, macro-control and international relations of the Chinese aviation industry.

According to CAAC and Zhuang, at the end of year 2018, there are 60 passenger airlines and 9 cargo airlines owned by Chinese conducting 4945 regular routes in China (including domestic, regional and international).(CAAC 中国民航局 2018)(Zhuang 2019)

In 2018, air passenger traffic reached 611.7 million, and cargo traffic reached 2.62 million ton-kilometers. China is now the second largest civil aviation market in the world and will become the largest by 2024-2025, according to IATA's forecast.(xinhua 2019)

At the same time, especially after the handover of airports to local authorities, airports have expanded greatly in number and size. In 1978, there were only 78 civil aviation airports, including 36 shared with the Air Force. At the end of year 2018, there are 235 licensed civil aviation airports in China, among which 37 have over 10 million annual passenger traffic, with a total terminal floor size of 12. 38 million square meters. A hub-spoke network has formed in China with Beijing, Shanghai and Guangzhou airports as international gateways and national hubs and Chengdu, Kunming, Xi'an and Urumqi airports as regional hubs, facilitating the flow of people, goods and information within and beyond China.

The International Air Transportation Association predicts that China will replace the United States as the world's largest aviation market in the mid- 2020s, and by 2037 China will have 1.6 billion air passengers annually.(IATA 2018)

1.3 Research questions

Seeing the urbanization and civil aviation boom during the last 4 decades, naturally people want to ask what the two bring to China. As mentioned before, a joint product of urbanization and civil aviation is airport surrounding area development (ASAD). Geographers may want to ask: in what context does Chinese ASAD occur? How is it now? Who participates in it and how do they behave? How well can Chinese ASAD be explained by existing theories from the West? What are its otherwise unique characteristics?

Investors around the world are eager to learn about ASAD in China, too. This is a huge and potentially profitable market although in an environment unfamiliar to many western investors. What is the business environment? What industries can succeed? What are the opportunities and threats? All the above questions are the research questions of this dissertation. This dissertation is indeed aimed at both academic and practitioner audiences.

The research on ASAD in the West goes back to as early as the 1970s in the UK (Hoare 1974), and more in the early 1990s in the USA (Kasarda 1991). J. Kasarda is a key figure in this field as one of the earliest researchers, positive advocates, and influential practitioners. After 2000, there are rising discussions about ASAD in the West from multiple viewpoints, either supporting it or questioning it (more in the literature review). However, in specific to ASAD in China, English scholarly literatures are few and narrow. (Yan and Yuan 2011)(Ji, Liu, and Su 2014)(Shen and Cao 2016)(B. Wang, Zhao, and Wang 2017) (Y. Jiang et al. 2018)(also non-scholarly: (Kasarda

2015)(Einhorn, Tighe, and Hu 2019)(Kasarda 2019)) Considering the rising status of China in geography research and the global economy, a systematic, comprehensive study about the background, history, situation, and outlooks of Chinese ASAD, as well as its mechanism, written in English for an international audience is necessary.

1.4 Structure of this research

The paper begins by looking at existing literatures related to Airport Surrounding Area Development in chapter 2. They include literatures generally analyzing the influence of transportation mode evolvement on urban form through history, and literatures specifically talking about urban development around airports. The paper realizes people's choices of terms indeed reflect their differentiated perspectives on this phenomenon. Two relevant theories on urbanization process as well as their Chinese interpretation are introduced: growth coalition theory and regime theory.

To help readers, especially those who have limited knowledge about modern China to better understand the logics in following discussion of ASAD in China, chapter 3 briefly introduces the government structure in China, "land finance" of local government, and Chinese economy's dependency on fixed-asset investment. Additionally, this paper talks about data availability during this research.

After explaining all the background, chapter 4 presents the blueprints of ASAD of 6 Chinese cities made by their municipal governments, namely Beijing, Shanghai, Guangzhou Zhengzhou, Chongqing, and Xi'an. This chapter gives audience a panorama of ASAD in government's perspective. Those cities are selected partially

because of data availability, but most importantly because they are among the small set of Chinese metropolises big enough to incubate prosperous ASAD.

However, a blueprint does not always become reality. Therefore, chapter 5 and 6 evaluate the reality of ASAD in 9 big Chinese cities through two type of methods: remote sensing analysis and computational text analysis. Innovative methods are invented and used to simplify research tasks, as well as to save time and monetary cost.

Chapter 7 chooses Xi'an ASAD as a detailed case study. Xi'an is a typical second-tier Chinese city in northwestern China with a hub airport. That choice is based on data availability, researcher's convenience and research cost consideration. The research conclusion should be generalizable to some extent to other Chinese cities. In this case study, after briefly introducing Xi'an and Xi'an Xianyang International Airport, the paper looks at the tax data from Xi'an ASAD to find out what kind of enterprises/industries is successful in ASAD and what is failed, which is useful information for potential investors. Fieldwork on Xi'an ASAD's industrial and residential landscape is then presented. Here the gap between the blueprint and the reality is observed, and the physical landscape of Xi'an ASAD is drawn. I specially pay attention to the life of peasants who lost land during ASAD.

After all empirical studies above, chapter 8 discusses four special topics: the urbanization of existing rural communities near airports with focus on land-lost peasants; environmental issues of ASAD; interactive behaviors of government and enterprises in ASAD, and COVID-19 pandemic and ASAD. COVID-19 pandemic is an ongoing event

and has caused wide-spread and deep health and economic crisis in the world and ASAD is inevitably affected.

Throughout the study, I try to apply growth coalition theory and regime theory on various aspects of ASAD wherever appropriate.

A substantial purpose of this research is to discover some prospective business opportunities in ASAD for investors, which is served by chapter 9. Those opportunities are found in all primary, secondary, and tertiary sectors. In the meantime, this chapter reminds investors to keep a keen awareness of possible obstacles.

The paper finishes with chapter 10 stating conclusions and research limitations.

Chapter 2. Literature review

2.1 Transportation mode and urban form

There is numerous literature talking about how the changes in intra-urban transportation mode have reshaped urban forms. Muller reviewed U.S. cities in the past two centuries and described a four-stage model of intra-metropolitan transport eras. He found that a breakthrough in transportation technology would swiftly lead to the next era of metropolitan expansion and distinctive spatial structures. The four stages are: 1. Walking-Horsecar Era (1800-:1890); 2. Electric Streetcar Era (1890-1920); 3. Recreational Automobile Era (1920-1945); 4. Freeway Era (1945,-present). (Muller 2017) This spatial structural change had already been noticed by Adams in 1970. Adams said that streetcar lines and freeways promoted star shaped deviations from concentricity and foot travel and recreational auto promoted compact, circular urban forms. (Adams 1970)

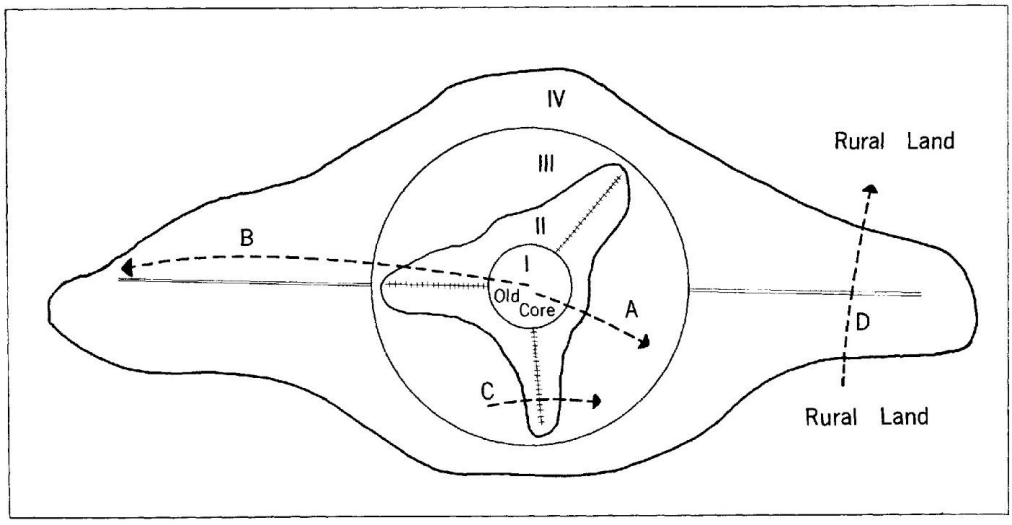

Figure 1: Expected distortions from concentric growth patterns. I, II,III,IV means four stages of transportation mode from early to recent.(Adams 1970)

Hebert further developed the 4 stage-model into a 7-stage model adding the situation when freeway and outer belt were built on city fringe, which was proved by Richmond, Virginia's urban development. He showed that second-level centers appeared discontiguously from current built-up area. (HEBERT 1976)

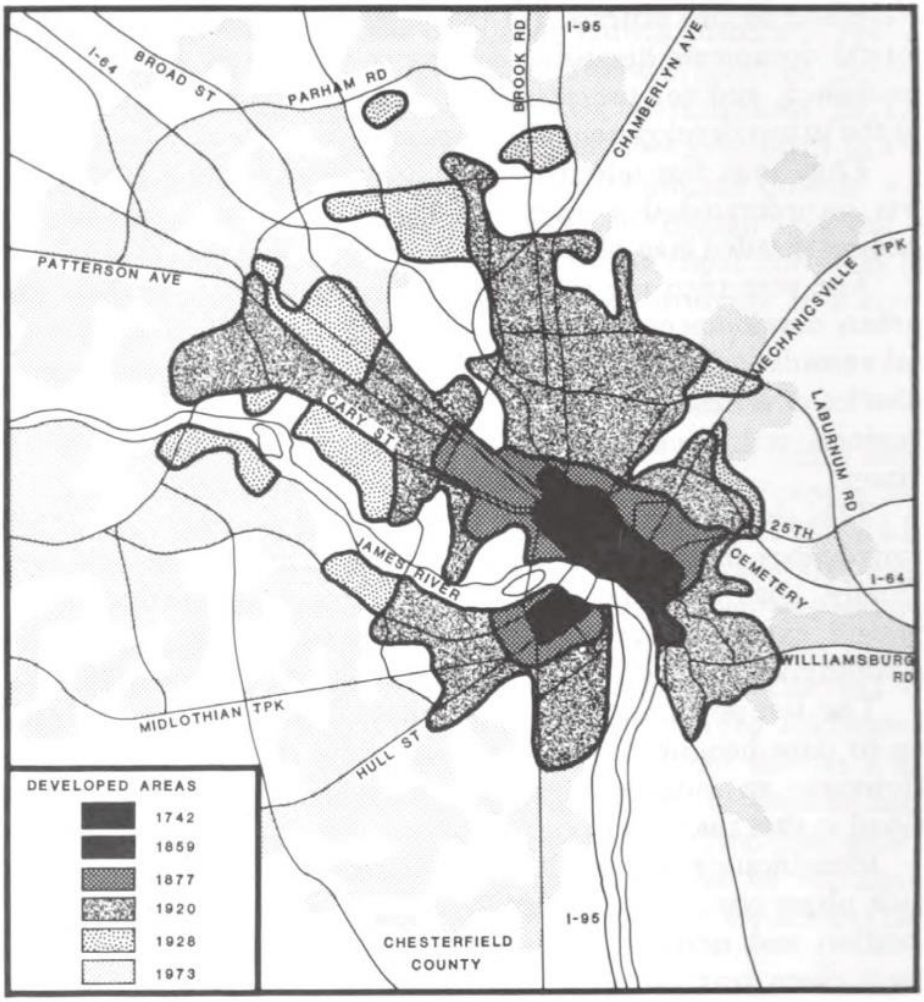

Figure 2: Zones of chronological development of Richmond, Virginia, 1742 to 1973.

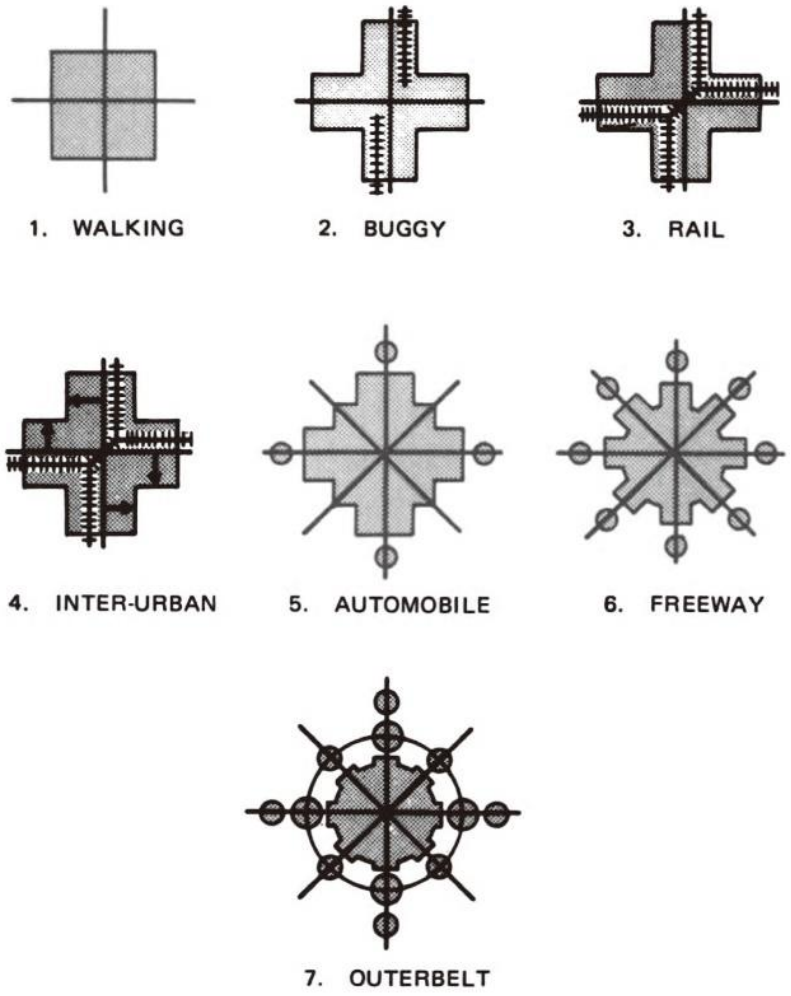

Figure 3: Urban development model. (Hebert 1976)

Many Chinese scholars discussed similar process in China. Wang and Deng studied Chinese settlement history from 4000 B.C. Banpo to modern Guangzhou, Wuhu, Chengdu and Chongqing and found the circle model is the most fundamental form of cities. Today the transportation system creates growth axes because cities and towns of different orders exchange with one another through transportation system and become city belts or megalopolis.(L. Wang and Deng 2003)

Yang et. al reviewed the history of Beijing from 1949 to 2007. They classified the evolution of urban spatial structure into external spatial expansion and internal structure adjustment, and said the former relies on new vehicles and travel mode change, and the latter depends on road network upgrade and transportation optimization within the city. They considered accessibility as the key mechanism of the interaction between urban spatial transportation and urban spatial structure. Additionally, they analyzed the evolution mechanism of suburban growth points. They go through specialty growing points – diversified growing points—satellite towns as economic and social activities become prosperous and diverse here. (YANG, MA, and CHEN 2009)

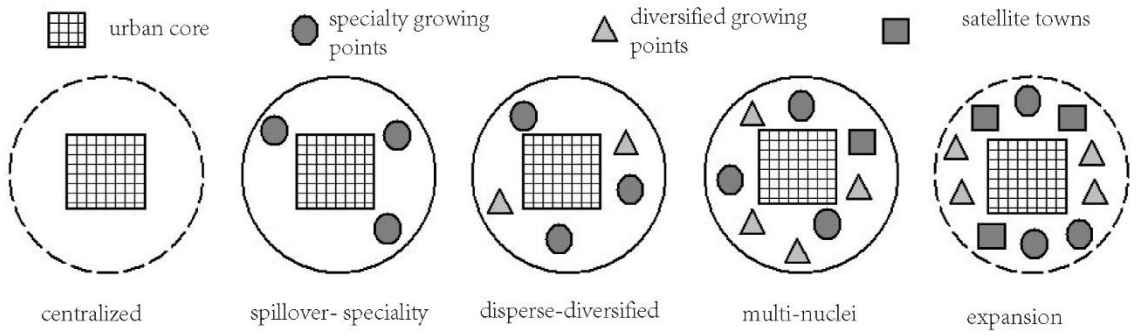

Figure 4: Evolution of urban spatial structure. (Yang, Ma, & Chen 2009)

Based on experiences of Western countries, Shan et al suggested that China needs to build multi-nuclei, dispersed cities, and let transit guide urban development.(Shan et al. 2007)

The above literature only talked about intra-urban transportation's influence on urban form. Air-transportation is not intra-urban transportation but inter-urban transportation.

In his book "The Impact of Railways on Victorian Cities", Kellett provided rich documentation to access the influence of railway building for the physical and social development of five major cities in the U.K during Victorian era. Additionally, he examined what decided the locations of railway facilities in the cities. (Kellett 1969)(Reed 1970) The influence of railway building on Victorian cities can be an analogy of the influence of airports on today's cities: novel transportation modes and terminals exist as growth axes and growth poles in cities.

Another judgement by Muller was that globalization forces simultaneously work to intensify and accelerate the suburban transformation of U.S. metropolis in a number of ways. One is that suburban centers participate strongly when their urban region became a "world city"; another is that some high-order suburban centers even established their own direct international ties.(Muller 2017) Since China is also embracing globalization, and some Chinese metropolis are becoming "world cities", it is natural that the area surrounding airports in Chinese cities are prosperous. If certain activities can be done around the airport, for example: an international convention, people can say the ASAD has its "own direct international ties".

2.2 ASAD

Although an airport's influence on its local economy was noticed as early as the1970s (Hoare 1974), J. Kasarda invented the word "aerotropolis" and markets it to the world. He argues that the modern economy is dependent on speedy transportation and air

transportation is the efficient mode. According to Kasarda, an aerotropolis has an airport core, accommodates aviation industries and other related business activities and leisure activities, and therefore obtains a flow of people.(Kasarda 1991)

Chinese scholars started looking at this phenomenon in the later 1990s. The concepts of airport town and airport economic zone are interchangeable in most word contexts and practices in China, although some scholars try to differentiate them. (L. Zhang, Chen, and Song 2011) Research often discusses the development strategies, including strength, weakness, opportunities, and threats of building airport towns in specific cities. Most studies are policy-orientated. Airport town examples and plans discussed in reviewed literature include: Beijing, Shanghai, Chengdu, Tianjin, Hangzhou, Wuhan, Harbin, Qingdao, Fuzhou, Zhengzhou and Huhhot.

2.2.1 Terminology

People have used various, unclarified terms such as “aerotropolis”, “airport economy zone”, “airport zone”, “airport city”, etc. to describe development activities near airports. I consider all these terms as conceptualization or visions at different stages and aspects of airport surrounding area development, within which some describe early stages and some more advanced forms; some emphasize production space and some living space. Different terms reflect different conceptualization or visions; different conceptualization or visions guide different planning; and different planning results in different physical landscapes and social life around airports.

In this research, I use Airport Surrounding Area Development (“ASAD”, plural form “ASAD”) to broadly refer to all development activities in the geographic proximity of

airports. These activities happen NEAR airports, but are NOT necessarily related to the transportation role of airports, or may not deal with airports at all. The range of this “geographic proximity” varies from case to case. I also use ASAD to refer to the geographic areas under such development.

2.2.2 Motivation of ASAD construction

For the locality and city where the airport locates, an ASAD contributes much GDP and tax revenue. Teng wrote that GDP created in ASAD overcompensated governments’ heavy subsidy to airports.(Teng 2014) Cao, et. al. and Wang & Liu proved that the city districts possessing airports have higher GDP growth rates than city-wide average.(Yunchun 曹允春 Cao, Gao, and Xi 2006)(Huanming 王欢明 Wang and Liu 2007) Ouyang and RRGHPASS also wrote that many cities see ASAD as economic growth engines.(Ouyang 1999)(Research Group of Henan Provincial Academy of Social Sciences 河南省社会科学院课题组 2015) The economic base theory may explain this. According to this theory, export industries are fundamental to local economic growth. Airports together with other transportation infrastructures are necessary for all cities to export goods and services. Many Chinese cities have realized the role of airports and ASAD in helping export industries, which are a focus of China’s Opening and Reform policy. (Tang, Wang, and Zhang 2009)(Teng 2014)(G. Liu and Gong 2013)

Mao compared the proportions of primary, secondary and tertiary sectors in Shunyi District, Beijing from 2004 to 2012 and discovered that airport helps the structural upgrade of the local economy from low-end manufacturing to high-end manufacturing and service.(Mao 2013)

Some scholars think ASAD bring jobs. Satellite cities anchored by major airports but not solely serving air transport are (one of several distinctive types of) employment concentration in todays' polycentric cities. (Appold 2015). However other scholars disagree on this point. Cidell unveils that an airport has no more importance as a sub-regional center than other pieces of major infrastructure.(Cidell 2015) Mukkala and Tervo wrote that in core regions the regional employment growth causes airport activity growth, not the way around.(Mukkala and Tervo 2013) Additionally, ASAD direct urban spatial expansion by attracting industries to fill up the space between the city center and the airport (L. Jiang 1999), although many of these industries do not use the airport itself.

Quantitative evaluation of the economic contribution of ASAD with sound evidence is still too early in China, although similar forecast has been done in the USA. An economic impact forecast was made for the proposed third airport in Chicago's south suburb(al Chalabi 1998), although never tested in reality. A look at the political motivation behind ASAD construction is also missing.

2.2.3 Incubation of ASAD

Only airports beyond a certain size threshold can lead to ASAD around them. (Yang 刘洋 Liu 2006)(Xujiao 王雪娇 Wang 2012)(Yin and Wang 2009)To be precise, 10 million annual passenger volume can be seen as a minimum. ASAD only form when airports' internal capacities are saturated and business is spilled over to nearby areas.(Tang, Wang, and Zhang 2009)(L. Zhang, Chen, and Song 2011) For example, when warehouses inside the airport are in high demand, businesses can store goods in

warehouses next to the airport to save money. Sun, et. al. also claimed that a prosperous regional economy (GDP per capital beyond 3000 USD) is a precondition to the stable development of an airport economy. (B. Sun, Jin, and Cao 2006)

Some ASAD form organically without government planning like Shanghai Hongqiao.(Ouyang 1999) However, most ASAD in China are planned and incubated by the government agencies or professionals hired by the government. Ouyang, Dai & Zhang, Wang & Liu and RGHPASS lists three common ways of ASAD development in China: BT (build-transfer), BOT (Build-Operate-Transfer) and PPP (Public-Private-Partnership). Due to the predominance of the state enterprises in economy and the big power of government, added by the public nature of infrastructure construction, and its potential major impact to city growth, government is the absolute leading power of ASAD planning and realization. Planned ASAD in China have unique characteristics compared with industrial agglomeration and urban forms adjacent to airports in Western countries. (Ouyang 1999)(Dai and Zhuang 2016)(Huanming 王欢明 Wang and Liu 2007)(Research Group of Henan Provincial Academy of Social Sciences 河南省社会科学院课题组 2015)

2.2.4 Scope of ASAD

Most scholars find airport has strong economic influence at 5-10 km radius. Li & Wang said worldwide, a mature airport economic zone usually extends 6 km from the airport. (X. Li and Wang 2001) Weisbrod, et al found “the greatest concentration of business activity around an airport is within 6 km of the airport”.(Weisbrod, Reed, and Neuwirth 1993) Sui, et. al. found many aviation-oriented industries agglomerate within 5 km to the

airport.(Sui, Chen, and Ma 2008) Zhang et al used 5 km as radius for airport economic zone.(L. Zhang, Chen, and Song 2011) Appold & Kasarda and Cidell debated about US airports' economic benefit in terms of employment within radius of 2.5, 5 and 10 miles from airports.(Appold and Kasarda 2013)(Cidell 2015)

In reality, all government plans and most existing research about ASAD are based on each city's official land-demarcation of ASAD (i.e. the administrative boundary of its "airport economic zone" or "airport new city" administrative committee) rather than a circle. This boundary was approved by the central government. In addition, data are only available by administrative area. Therefore, in this research I mainly use governments' demarcation of ASAD as the scope of study (except for remote sensing study).

2.2.5 Industry choice in ASAD

Local governments want to attract certain industries to ASAD to enhance cities' economic competitiveness.(Ouyang 1999)(Tang, Wang, and Zhang 2009)(Yunchun 曹允春 Cao, Gao, and Xi 2006)(Research Group of Henan Provincial Academy of Social Sciences 河南省社会科学院课题组 2015)(L. Jiang 1999)(Xujiao 王雪娇 Wang 2012)(L. Zhang, Chen, and Song 2011)(Dai and Zhuang 2016)(Yin and Wang 2009)(Teng 2014)(Zhuo 2013)(G. Liu and Gong 2013) All these studies found high-tech manufacturing, exhibition and hospitality, logistics, aviation- manufacturing and services, and export manufacturing are welcome by ASAD planners. Compared with ASAD in the U.S. and Europe, manufacturing industries have more weight in Chinese ASAD. This can be an epitome of the overall economic structure in China. RRGHPASS and Dai &

Zhang also observed some company headquarters locating in Beijing ASAD. (Research Group of Henan Provincial Academy of Social Sciences 河南省社会科学院课题组 2015)(Dai and Zhuang 2016)

It is worth notice that the advantageous industries can change in an area depending on the global market. However, building infrastructures in the ASAD is very expensive and puts a long-term financial burden to the city. It is questionable whether a narrow selective of industries can ensure the long-term growth of the city economy in time of industrial reshuffle.

2.2.6 Building factors of ASAD

Two constructing factors of ASAD are financial capital and human capital. Currently much ASAD is funded by local governments in the early construction stage in the form of financial appropriation or city bond. However, without a stable return, it will worsen governments' financial situation. RRGHPASS suggests other capital should join in, such as rent financing, offshore capital, corporate bond, medium term note, trust, industrial investment fund, securities, stocks, venture investment, and etc.(Research Group of Henan Provincial Academy of Social Sciences 河南省社会科学院课题组 2015)

Human capital, especially people with aviation-related industry knowledge, is necessary to the success of ASAD' planning, operation and administration. (Research Group of Henan Provincial Academy of Social Sciences 河南省社会科学院课题组 2015)(Dai and Zhuang 2016) There are two ways to collect this human capital: attracting talent and job training.

A highly-regarded kind of human capital is entrepreneurs. An entrepreneurial community strategy seeks to grow local businesses and create jobs from within the local economy through finding new solutions to existing problems or by connecting existing solutions to unmet needs. Entrepreneurial community requires a critical mass of entrepreneurs, strong support networks, and a community that is ready for change and seeks innovations.(Green and Blakely 2017)

2.2.7 Challenges and issues of ASAD construction

The development of ASAD in China faces various challenges. The most common one is the lack of good transportation infrastructure. (Yang 刘洋 Liu 2006)(Research Group of Henan Provincial Academy of Social Sciences 河南省社会科学院课题组 2015)(L. Zhang, Chen, and Song 2011)(Zhou, Liu, and Zhou 2014)(Dai and Zhuang 2016)(Huanming 王欢明 Wang and Liu 2007)(Teng 2014)(Zhuo 2013)(G. Liu and Gong 2013)The lack of other infrastructures can be a problem, too. This include water, electricity (Ouyang 1999), and fiber infrastructure.

RRGHPASS pointed out poorly coordinated government agencies are another barrier to the development of Zhengzhou ASAD.(Research Group of Henan Provincial Academy of Social Sciences 河南省社会科学院课题组 2015)

Cao, et. al., Yin & Wang, and Wang & Liu claim the lack of producer services hinders the growth of enterprises in ASAD. (Yunchun 曹允春 Cao, Gao, and Xi 2006)(Yin and Wang 2009)(Huanming 王欢明 Wang and Liu 2007)

Other than challenges, there are also issues associated with ASAD. The security and resilience of agglomerated economic activities and infrastructure has always been an issue, traditionally at the dense CBD. For example, after the 9/11 terrorist attack, Johnson and Kasarda wrote that corporate leaders may want to deconcentrate their key assets to multiple cities or suburbs, be they operational infrastructure, products or people.(Johnson Jr. and Kasarda 2003) Charles et al saw the similar issue in the "aerotropolis" as agglomerations of high-value assets and hubs for other critical infrastructure such as rail and road transport. ASAD are exposed to both natural risks (meteorological and seismic disasters), and human risks (terrorism and military incursions).(Charles et al. 2007) Additionally, major infrastructure failure in ASAD (water, electricity, gas, transport, communication) can cause big losses if high-end industries are unprepared.

Fairness is another issue during ASAD. Cidell states that economic benefit of airports may not appear in its immediate vicinity. As a result, the people who have to relocate for the ASAD development and who are harmed by the noise and congestion of the ASAD may not benefit from it enough and will oppose the development.(Cidell 2015) Knippenberger gives an example supporting Cidell's statement: Mörfelden-Walldorf near the Frankfort airport.(Knippenberger 2014)

2.3 Growth coalition theory and regime theory

2.3.1 Growth coalition theory

Growth coalition is an “alliances of urban elites, with shared interests in local economic growth, partnered”(Peck 2009) “to promote the pro-business growth of a city”(Castree, Rogers, and Kitchin 2013a).

Logan and Molotch developed the term “growth machine”. Logan and Molotch stressed the power of rentiers (local landowners) are essential to shape the urban system. (Logan and Molotch 1987) They found in most cities rentiers together with developers, utility companies, the media, and politicians, who all receive benefits from growth, ally to make pro-growth policies and have influence over the physical restructuring of places. (Stoker 1998)

Peck found the growth coalition is centered around the rentier class owning place-based business interests, like “developers, financiers and realtors”. In addition, it has auxiliary players like “universities, media and utility owners, representatives of business and civic organizations, cultural leaders and labour unions.” All of the above people have shared interests in local economic growth, so naturally they work together to shape cities as “business-friendly and market-oriented”.(Peck 2009) But he did not tell why some people’s interests are specially “place-based” not others’, and why some people are called “auxiliary players”. Possibly he categorised people based on the “amount of interests” each person has? And what kind of interests each one has?

Cities are competing with one another for economic growth.(Castree, Rogers, and Kitchin 2013a) Harvey summarized there are four things that cities compete for: competition in the international division of labor on particular advantages for production; competition for attracting consumers; acquisition of key control and command functions; competition for surplus redistribution through the central government (Harvey 1989).

2.3.2 Regime theory

Both dictionaries point to a concept related to growth coalition – regime theory. “Regime theory” comes from Stone’s study of Atlanta, Georgia’s history from 1946 to 1988. (C. N. (Clarence N. (Clarence N. Stone 1989) Regime theory is “a theory of urban governance and development which contends that successful cities are driven forwards by coalitions of actors working in concert with each other.” An apparent difference between regime theory and growth coalition theory is the possessor of city-governance power. Growth coalition theory claims that power is held and wielded by city elites, but regime theory argues that power is negotiated and dispersed, and that “policy and action emerge from the meshing of interests across governmental and non-governmental actors. Diverse groups thus compensate for their individual lack of power by combining to form a more powerful collective regime to produce the capacity needed to achieve agreed aims.” (Castree, Rogers, and Kitchin 2013b)

The crucial question here is “how to build a capacity to act and accomplish goals?” i.e., the model of coordination across institutional boundaries.(Mossberger and Stoker 2001) Regime theory thinks power is fragmented so no single group can have comprehensive control over cities.(Stoker 1998) The reason for the fragmentation power is the division

of labor between market and state.(Elkin 1987)p18 Therefore government must blend its capacities with other players who hold resources necessary to achieve policy goals. (Stoker 1998) Stone defined regime as “an informal yet relatively stable group” who collects multitudinous resources to “have a sustained role” in decision-making in cities. (C. N. (Clarence N. (Clarence N. Stone 1989) The continuity of this collaboration is important, and during this continuity negotiations and compromises take place. “Cooperation is not taken as a given but has to be achieved.” (Mossberger and Stoker 2001)

Some scholars doubt the applicability of regime theory out of US because it is an abstraction of US urban politics and political economy where few but big downtown corporates interplay with a city government . (Pierre 2012)

2.3.3 Two theories’ comparison

Table 1: Key points of two theories

	growth coalition theory	regime theory
members	whose interests are place-based (rentiers); auxiliary players	governmental and non-governmental actors
who has power	mainly urban elites	power is negotiated and dispersed
method	city governance and resource allocation	meshing of interests; diverse groups compensate for their individual lack of power
motivation	shared interests in local economic growth	agreed aims
the alliance	relatively static	relative stable but dynamic

Domhoff traced to the roots of growth coalition theory and regime theory: growth coalition theory centers around the private economic sector and shows why and how it command government, meanwhile region theory centers around the government and studies how officials partner with non-government plays.(Domhoff 2005)

There are some forces on cities that are missed by both growth coalition theory and regime theory, at least original versions. For example, force of globalization, and force of superior government. Today international capitals have influences from global level to local level, and local government needs to cooperate with them.(T. Zhang 2002)

Another missed force is the force of superior government, probably because Logan and Molotch and Stone all theorized from the U.S which is a federal state where higher administrative divisions do not possess absolute power over lower administrative divisions. In a unitary state, all administrative divisions' power source is the delegation of the central government, and the central government can expand, shrink or abrogate such delegation unilaterally. Zhang noticed this difference in his research on Shanghai, China.(T. Zhang 2002)

2.3.4 Coalition theory and China

Many Chinese scholars have borrowed "growth coalition" or "growth machine" theory to analyze Chinese cities.

Sun and Huang analysed the politics of urban growth in Shanghai. They said Chinese local governments have dual goals: to promote economic growth and to manage

development-related conflicts. It is concurrently a growth project instigator, a regulator, a profit-making market participant, and a dispute settler.

They found growth coalitions in Chinese cities extend in scope compared with the ones in the U.S in two ways. Temporally, growth coalitions in Chinese cities exist from pre-development stage to post-development stage. Spatially, they exist from city level to neighborhood level, such as street officers, residents' committees, and property management companies. What's more, different members in growth coalitions have diverse ultimate goals.(X. Sun and Huang 2016)

Zhang and Liu discovered that during the reconstruction of "*chengzhongcun*" in Shanchang Villiage, Zhuhai city, Guangdong, government, real estate developers and villagers formed a close growth coalition, and the boundary between "growth" and "anti-growth" were blurred. Villagers have much say in the benefit distribution. Interestingly, real estate developers first allied with local government and then switched to villagers' side all for profit, and the local government was forced to make concessions (giving villagers more land compensation fees than legal). "Growth coalition" theory cannot be directly applied at Shanchang Village.(Zhengtao 章征涛 Zhang and Liu 2019)

Hu and Zhang examined the cooperation between Nanjing municipal government and Jianye district government during the development of Hexi New Town in Nanjing, Jiangsu, and suggested "growth coalitions" which solely focus on economic growth should be upgraded to "development coalitions" which have comprehensive goals. (J. Hu and Zhang 2015)

Zhang, Chen, and Peng all looked at growth coalitions in the urban real estate market, and claimed “land finance”, official’s rent-seeking, and the appraisal system for officials’ performance are the institutional foundations for the growth coalition of local government and real estate developers. (Zhenhua 张振华 Zhang 2011) (B. Chen 2013)(Peng 2015)

Wang et. al, studied public-private-partnership projects in Nanjing Hushu Industrial New Town, and concluded that an urban growth coalition dominated either by the government or by market force would cause governance problems. The solutions are clarification of rights and responsibilities of the government and market, and multi-participatory city decision making mechanisms and governance models involving various civil players. (Y. Wang, Zhang, and Chen 2018)

Ye reviewed urban renewal stories in Guangzhou and related government policies, and found that a Chinese government-business growth coalition based on the government’s manipulation of land resources accelerated urban development, but meanwhile destructed city culture and impaired residents’ rights. (Ye 2013) Wang did a similar study in Guangzhou.(S. Wang 2017)

Cao et al studied rural growth coalitions through a case study of Guangcheng town, Shandong province. He found that the rural growth coalitions usually consist of village collectives, developers, industrial enterprises, and local governments. He thought rural growth coalition is a useful exploration of rural community revitalization.(Yan 曹炎 Cao, Zhu, and Li 2016)

Chen categorizes local governments' strategies in city development across China in the Opening and Reform era into four spatial governance models. (Y. Chen and Zhang 2016)

2.3.5 Regime theory and China

The voice of businessmen, what businesses participate in the collaboration, and the presence of other civil players (exp, residents, nongovernment organizations, etc.) will vary from place to place and may change over time.(Mossberger and Stoker 2001)

In the original regime theory, the local government's main resources are legitimacy and policy-making authority, and businessmen's main resource is the capital that generates jobs and tax revenue. (Mossberger and Stoker 2001) However, this statement is not accurate in China, a unitary state with dominant public-owned economy and government not elected by the masses. The Chinese government needs to build its legitimacy in another way; local government does not have all the policy-making authority; and the government owns tremendous amount of capital.

Zhang explored regime theory's applicability in China (Shanghai) and listed some claims why regime theory can or cannot be applied. On the positive side, first, China is in transition. The public sector is gradually losing control over resource allocation to nonpublic sectors, especially in southern China. In the Pearl River Delta, the market force is strong enough to be equal to government force. Second, although government still leads on the municipal level, on the urban district level, market force has a strong influence, and many development activities take place on district level. Third,

government still has direct power over other players on political field, but not on economic field.

On the negative side, first, China is a socialist country. In China the public sector controls most political and economic resources. Second, the strong government has direct power over civil players in Chinese society.

Through his research on Shanghai's development after Opening and Reform, Zhang found the regime building in China must be separate into the political dimension and the economic dimension. On the economic dimension, in today's China, the public sector still controls some key development resources such as land and banks, so it is still a leader in the collaboration. However, the nonpublic sector and international capital are acquiring increasing amount of resources in society, so the local government has to partner with them to develop the economy and create jobs. So regime theory applies here.

On the political dimension, every level of Chinese local officials is appointed by their superiors. The source of Chinese government's political legitimacy is not elections, but rather dual-sourced: the ability to promote economic growth and the ability maintain social stability.(X. Sun and Huang 2016) A social control model rather than a social production model can explain politics in Chinese cities. So regime theory does not apply here.(T. Zhang 2002)

In summary, neither growth coalition theory nor regime theory can be directly applied to cities in other countries without modification because they are abstracted from U.S. society. Together with other urban phenomenon, Chinese ASAD has its unique political,

economic, and social background, represented by the government's key and complex roles in China. The following part will discuss the unique characteristics of China in more details.

Chapter 3. The unique Chinese situation

3.1 Government structure in China[7]

The People's Republic of China is a unitary state and a socialist republic.

According to the current Constitution, the national People's Congress (NPC) is the ultimate power of the state and maker of the Constitution and basic laws. All other state organs are elected and supervised by the NPC, including the standing committee of the NPC (legislative branch), the President (a ceremonial head of state), the State Council (synonymous with "Central People's Government" (the executive branch of NPC and the supreme administrative authority, headed by the Prime Minister), Central Military Commission, National Supervisory Commission, Supreme People's Court and Supreme People's Procuratorate.

There are 4 levels of local governments in China. The provincial level includes: 23 provinces (including Taiwan Province), 5 (ethnic) autonomous regions, 4 direct controlled municipalities (Beijing, Tianjin, Shanghai, Chongqing), and 2 Special Administrative Regions (Hong Kong, Macau). Under the provincial level is the prefecture level, including prefecture-level cities, autonomous prefectures, regions, and (ethnic) "*Meng*". Under the prefecture level is county level, including city districts, county-level cities, counties, autonomous counties, and (ethnic) "*Qi*". Under the county level is township level, including towns, townships, ethnic townships, sub-districts (*Jiedao*).

[7] Some term translations are from ("Government of China," wikipedia (English & Chinese versions). n.d.) and may differ from some official documents.

Nominally, on the county level and the township level, citizens directly elect local people's congress. People's Congresses on provincial and prefecture level are indirectly elected by the people's congress of the level immediately below. Each level's people's congress appoints the people's government, supervisory commission, people's court and people's procuratorate on the same level.

It should be noted that in rural areas, the villagers' committee (and in cities, residents' committee) is not a level of government, but a villagers' autonomy organization, yet it performs social management and public service roles. The director of villagers' committee, elected by villagers, is not a public servant even though he has actual power (a cadre).

In practice, the government is a unitary, top to bottom structure rather than a bottom to top structure. This is because article 1 of the Constitution says:

"The socialist system is the basic system of the People's Republic of China. The defining feature of socialism with Chinese characteristics is the leadership of the Communist Party of China."

And article 3 of the Constitution says:

"The division of functions and powers between the central and local State organs is guided by the principle of giving full scope to the initiative and enthusiasm of the local authorities under the unified leadership of the central authorities."

CPC's committee is the de facto governing entity on each level, and the party secretary is the de facto leader. On the central government level, the CPC has the Central

Committee, the Central Political Bureau and the Central Political Bureau Standing Committee. Xi Jinping is the paramount leader of China not because he is the president of PRC, but because he is also the General Secretary of the Central Committee of CPC.

In reality, most civil servants in leading positions on levels of Chinese government are CPC members, and higher level of CPC committee can appoint cadres in lower level's committee. The political discipline of CPC requires lower level party committee to follow the order from higher level. One level's CPC committee proposes the candidates for the same level's government. In this way the Chinese government is organized from top to bottom.

Every civil servant of Chinese government and cadres of CPC has a "level", from national level, deputy-national level, provincial-ministerial level, deputy-provincial-ministerial level, prefecture-bureau level, deputy- prefecture-bureau level, county-division level, deputy- county-division level, township-section level, deputy- township-section level, section member and ordinary staff. The actual levels vary depending on their job titles.

Not only every cadre has a level, but also each government department, CPC department, and state-owned entity has a level. It is called a "X- level unit". For instance, a deputy-ministerial level university, prefecture-level state-owned enterprise, a division-level public institution, etc. Usually a x-level unit is headed by a x-level cadre, but it occasionally it can be different.

Similar to other development zones, ASAD in Chinese cities also have levels. Cities can be either provincial-ministerial level (direct-controlled municipalities), deputy-provincial-

ministerial level (15 big cities in China), and prefecture-bureau level (other big cities), and the ASAD as development zones are usually 1-2 level below their cities' level. For example, Beijing Airport Economy Zone is a deputy- prefecture-bureau level unit, and Xi'an Airport New City is also a deputy- prefecture-bureau level unit. Usually cities will set a level to development zones higher than normal districts to emphasize development zone's importance.

State-owned enterprises also have levels. Enterprises can be owned by the central government, provincial government, or local government. Usually central enterprises (central-government-owned) are very large and controlling the key sectors, followed by provincial enterprises (provincial-government-owned). Local state-owned companies are usually smaller.

A special arrangement in China is called "one agency, two titles" (*一个机构两块牌子*), meaning two government agencies are identical in membership, thus actually forming one identical institution under two different names. It can be purely a government agency. For example, State Administration for Market Regulation also has the title of Standardization Administration of PRC. It can also be a CPC agency. For example, Taiwan Affairs Office of the State Council also has the title of Taiwan Affairs Office of the CPC Central Committee. As for a development zone such as ASAD, its administrative committee usually has the title of "X New City/Zone Development Group. Co. Ltd", meaning it acts both social management and services as well as commercial operations as a state-owned enterprise. Meanwhile, provincial and municipal

governments usually let other state-owned financial institutions and enterprises directly participate in ASAD.

The relationships between new development zones and existing administrative areas can be complex. Since most development zones do not have people's congress, people's court and people's procuratorate, legally they are not a level of government. However, in practice they performs some functions of local government such as market regulation, tax collection, police, environmental inspection and providing social services such as education, healthcare and infrastructure construction. Therefore, some municipal governments let subordinary district governments transfer some functions to development zone administrative committees. The division of labor between area government and administrative committee varies from city to city. Some ASAD's administrative committees mainly focus on attracting investment and building key projects, while others are more comprehensive.

This relationship can also be disagreeable, especially when the ASAD spans across multiple administrative areas. For instance, Guangzhou ASAD is on the territory of Huadu District and Baiyun District, and Xi'an ASAD is entirely in the territory of Xianyang city (another city under Shaanxi Province). In these situations, different cities disagree on power and decision-making, rights and obligations, and costs and benefits, which can result in obstacles of development. For instance, Xi'an and Xianyang had had many years of non-collaboration so the Airport New City had not gone well. This type of obstacle can be cleared when higher levels of government comes to coordinate. For example, Shaanxi provincial government established the Xixian New Area, and let Xi'an municipal government manage Xixian New Area while reserving part of the New Area's

tax revenue to Xianyang government. The Airport New City is one of five “new cities” of Xixian New Area.(Shaanxi Provincial People’s Government 陕西省人民政府 2011) (Guo 2017)

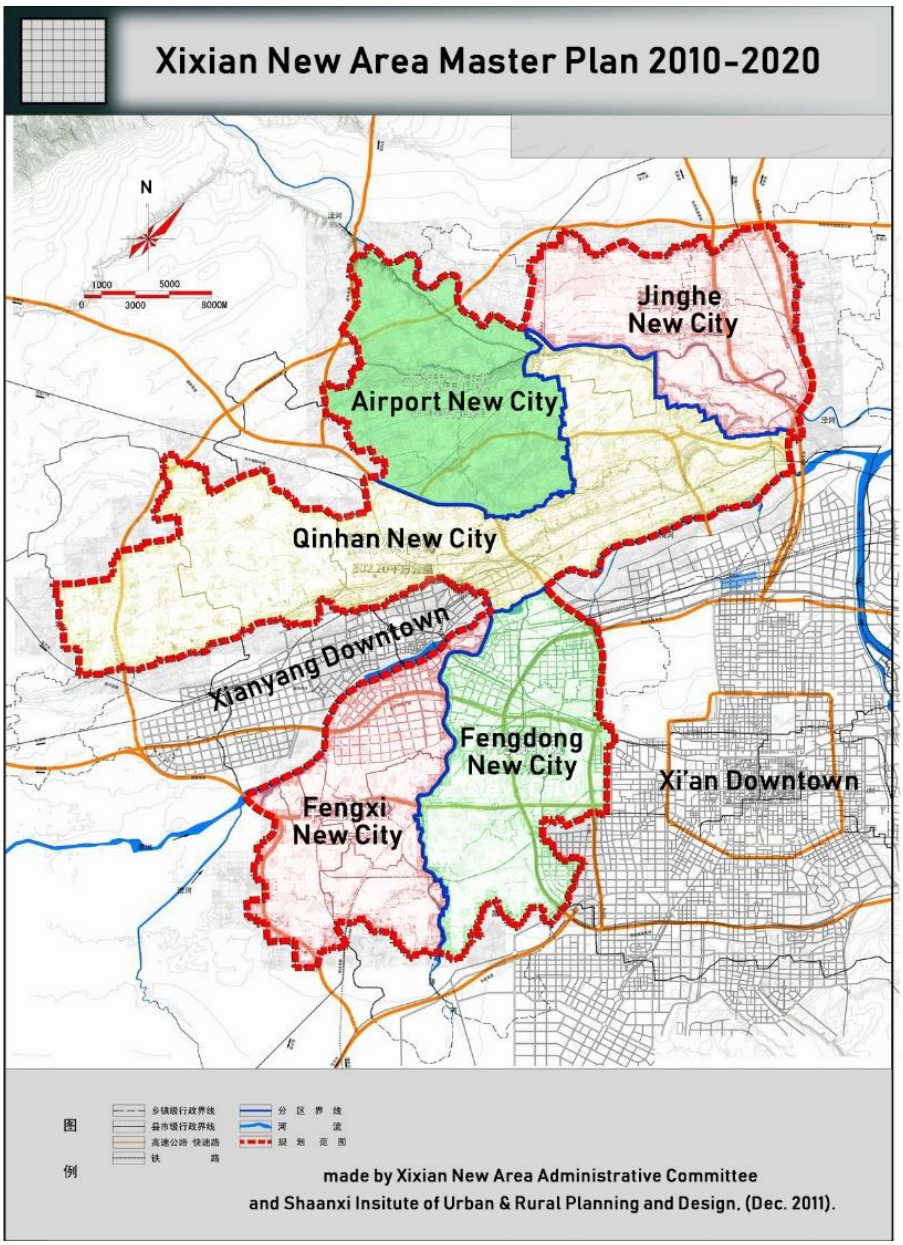

Figure 5: Xixian New Area master plan (Xixian New Area Administrative Committee 西咸新区管委会 2011)

3.2 “Land finance” of local government

In a unitary state, the struggle between the central government and local government on money has always been a theme through China’s long history. From the “Opening and Reform” in 1978 to 1992, China gradually abandoned a planned economy to transfer to a market economy. In 1980s, to encourage economic growth the central government “contracted” taxes to provinces: the provincial government submitted a fixed amount of tax revenue to the central government and kept the remaining. Southeast provinces developed the best and had tremendous fiscal surplus. The proportion of the central government in total government revenue decreased from 46.8% in 1979 to 31.6% in 1993. It even had to borrow from provinces. In 1994, the then prime minister Zhu Rongji decided to implement the “tax-sharing reform”, which later some people said to be the root of “land finance” of local government (Zhenhua 张振华 Zhang 2011)(Peng 2015) although Zhu himself rejected categorically.(D. Wang 2011)

After this reform, the central government and local government established two separate sets of tax bureaus everywhere[8]. The central government collected all tax categories that were stable, extensive and easy-to-collect, including consumption tax and tariff. Corporate tax was divided based on the paying enterprise’s registration. Value-added tax was divided as 75% to the central government and 25% to local. Then the central government gave some money back to local governments. As an offer to local government, Zhu agreed that local government could keep much land leasing

[8] In July 2018, the central government’s tax bureaus and local governments’ tax bureaus merged. This only reorganizes tax bureaus; tax revenues are still shared.

revenue. After 2002, the central government also pays public spending for some poor areas.

After the “tax-sharing reform”, the central government’s revenue increased, but the spending (including most welfare and public services and much infrastructure construction) is still the responsibility of local governments. In 2004, local fiscal revenue consisted 45% of the national total revenue but local fiscal spending consisted 72% of total spending. For municipal, county and township level, the numbers were 17% and 80%. Rapid urbanization is accompanied by soaring spending on public services and infrastructure construction. The mismatch forced local government to find other measures, including collecting miscellaneous fees and leasing out land. (Zhenhua 张振华 Zhang 2011) (Peng 2015)

The population density in Chinese metropolises is very high, so it is a luxury to live in low-density neighborhoods. Where normal people can only afford multi-storey (old) or high-rise condominiums (new), upper-middle class can afford townhouses, and rich elites can buy detached or semi-detached houses. Those houses are called “villas” in Chinese but are different from villas in US as they do not have big gardens.

However, when people buy housing of any kind, they do NOT acquire the ownership of the land. Article 10 of the Constitution of PRC says,

“Land in the cities is owned by the state. Land in the rural and suburban areas is owned by collectives except for those portions which belong to the state in accordance with the law; house sites and private plots of cropland and hilly land are also owned by

collectives. The state may in the public interest take over land for its use in accordance with the law. No organization or individual may appropriate, buy, sell or lease land, or unlawfully transfer land in other ways …"

There are two categories of collective-land: agricultural land) and construction land. Under agricultural land there is cropland, collective-owned forest and grassland, water conservancy facility land, etc. Under collective-owned construction land there is house-site land, commercial-use land, land for public welfare and public facilities, etc. House-site land is allocated only within collective members (household-registered villagers) and cannot be used by outsiders. Commercial-use land can only be used by collective-owned enterprises. Any change of land use is strictly controlled by government.

Before January 1st, 2020, all real estate developers and industrial investors must build on state-owned land because Article 43 of the Law of Land Administration of PRC says:

"Any unit or individual that need land for construction purposes should apply for the use of land owned by the State according to law,…

The term 'apply for the use of land owned by the State according to law' used in the preceding paragraph refers to land owned by the State and also land originally owned by peasant collectives but having been requisitioned by the State." (Law of Land Administration of the People's Republic of China, 2004)

Collective-owned rural land cannot be directly used for urban development. Instead, it must be requisitioned by the state and then used by developers. That was the legal foundation of Chinese local government's "land finance".

Article 55 of the Law of Land Administration (2004) says:

“Construction units that have obtained State-owned land by paid leasing can use the land only after paying the land use right leasing fees and other fees and expenses according to the standards and ways prescribed by the State Council.

Starting from the date when this law comes into effect, 30% of the land compensation fees for new construction land shall be handed over to the central finance, with the rest 70% to be retained by relevant local people's governments.”

This 70% of land use leasing fee became an important revenue source for many local governments. In some area, it can consist 50% of local fiscal revenue.

Theoretically speaking, government needs to compensate peasants using land use leasing fee first, and the remaining part becomes fiscal revenue. However, the proportion paid as compensation is small.

Article 48 of the Law of Land Administration (2004) says:

Compensation fees for land expropriated include land compensation fees, resettlement fees and compensation for attachments to or green crops on the land. The land compensation fees shall be 6-10 times the average output value of the three years preceding the expropriation of the cultivated land. The resettlement fee shall be calculated according to the number of agricultural population to be resettled. … The resettlement fees for each agricultural person to be resettled shall be 4-6 times the average annual output value of the three years preceding the expropriation of the cultivated land. But the maximum resettlement fee per hectare of land expropriated shall

not exceed 15 times of the average annual output value of the three years prior to the expropriation.

The standards for land compensation and resettlement fees for land expropriated shall be determined by various provinces, autonomous regions and municipalities in reference to the land compensation fees and resettlement fees for cultivated land expropriated….

Article 4 of the Provisions on the Assignment of State-owned Construction Land Use Right through Bid Invitation, Auction and Quotation says:

With respect to the land for industry, commerce, tourism, entertainment, commercial housing or other business operations, or on which there are two or more intended land users, the assignment thereof shall be conducted through bid invitation, auction or quotation….(*Provisions on the Assignment of State-Owned Construction Land Use Right through Bid Invitation, Auction and Quotation* 2007)

Government leases out land at its potential value for industrial production or real estate development, but only compensate peasants based on land's agricultural output. Since agricultural products in China are very cheap, the difference between the two is tremendous.

"Land finance" can be seen as a form of domestic industry/agriculture price scissors. Because agricultural products are cheap, land compensation based on agricultural output is low; and because industrial output is high, industries and urban population are willing to auction land from the state with high price. This price scissors first happened

during the New Economic Policy in the Soviet Union in 1923. Both socialist governments have intervened in the market and use price scissors to accelerate industrialization and urbanization at the expense of interests of peasants. Urban residents are also suffering from soaring housing price because land is auctioned, and for sure the government welcomes high land price bringing more fiscal revenue.

On January 1st, 2020, the former Article 43 of the Law of Land Administration was repealed and some collective-owned land can directly enter the land market. The intention is that peasants can share more fruits of economic development and urbanization. However only the 28000 km2 collective-owned commercial-use construction land in China can be used for industry, commerce, and certain types of housing (X. Yuan 2019), but the rest of the 164000 km2 collective-owned construction land (D. Liu and Yao 2013) and 1200000 km2 cropland is still not allowed to enter the land market. However, in reality for many years many villagers have already built housing on urbanized collective-owned land to "sell" to urban residents. This is called "*小产权房* small-property houses" and is illegal. Different cities have different attitude to this phenomenon from reluctant acquiescence to tough demolition. Also, under the new law, land compensation fee will be set by provincial government based on various factors instead of agricultural output, and will be updated every three years. The new law's influence on peasants' interests and on government's "land-finance" still wait to be observed.

3.3 Chinese economy's dependency on fixed-asset investment

Fixed-asset investment, including land clearance, industrial and residence construction, and infrastructure construction, has been a powerful economic engine for China for many years. Gross Domestic Product (GDP) can be calculated by: GDP= consumption+ investment+ government purchase + net export. Investment includes current-asset investment and fixed-asset investment. Among those components, consumption is decided by individual consumers and it has been low in China due to the highest savings rate in the world; government purchase has budget constraints; and the private economy plays an important role in current-asset investment and net export in China. However, current-asset investment and exports are volatile depending on the industrial, national and international business climates. As a result, promoting fixed-asset investment is a tool handy to the government to promote prosperity and enhance stability, especially in localities where consumption, private economy and export lack vigor.

Liu did a linear regression study of GDP growth rates (Y) of eastern, central and western provinces in China on fixed-asset investment growth rates (X) from 1990-2005 .(Yuzhen 刘玉珍 Liu 2010)The results are as following: (t =year).

Table 2: GDP growth and fixed-asset investment

region	Late 1990s	Early 200s
eastern	Yt+1=0.69Xt-0.0265	Yt+1=0.31Xt+0.0041
central	Yt+1=1.57Xt-0.1017	Yt+1=0.93Xt-0.1267
western	Yt+1=1.93Xt-0.2658	Yt+1=1.03Xt-0.1531

The coefficient of X indicates this year's fixed-asset investment's influence on next years' GDP growth. The coefficient was always positive meaning investment helps economic growth. The promoting effect for all regions was greater in the late 1990s than the 2000s. In each time period, western provinces had bigger coefficient than central provinces than eastern provinces, meaning western and central provinces' economy was more dependent on fixed-asset investment than eastern provinces'.

Sun and Yuan compared the urban fixed-asset investment/GDP ratio by province in China in 2009 and found poorer provinces had a much higher investment/GDP ratio, although the level is generally high in China (twice the world average). They claimed in the near future investment would keep dominating economic growth in central and western provinces.(T. Sun and Yuan 2010) Jiang's research confirmed that geographic pattern from 2002 to 2015.(D. Jiang 2018) Ren found in 2018 there were 8 provinces, 6 in western China and 2 in central China, where fixed-asset investment/GDP ratio is more than 100%.(Ren 2019) He said economic growth is apparently driven by manufacturing-related and infrastructure fixed-asset investment in central provinces and by real estate in western provinces.

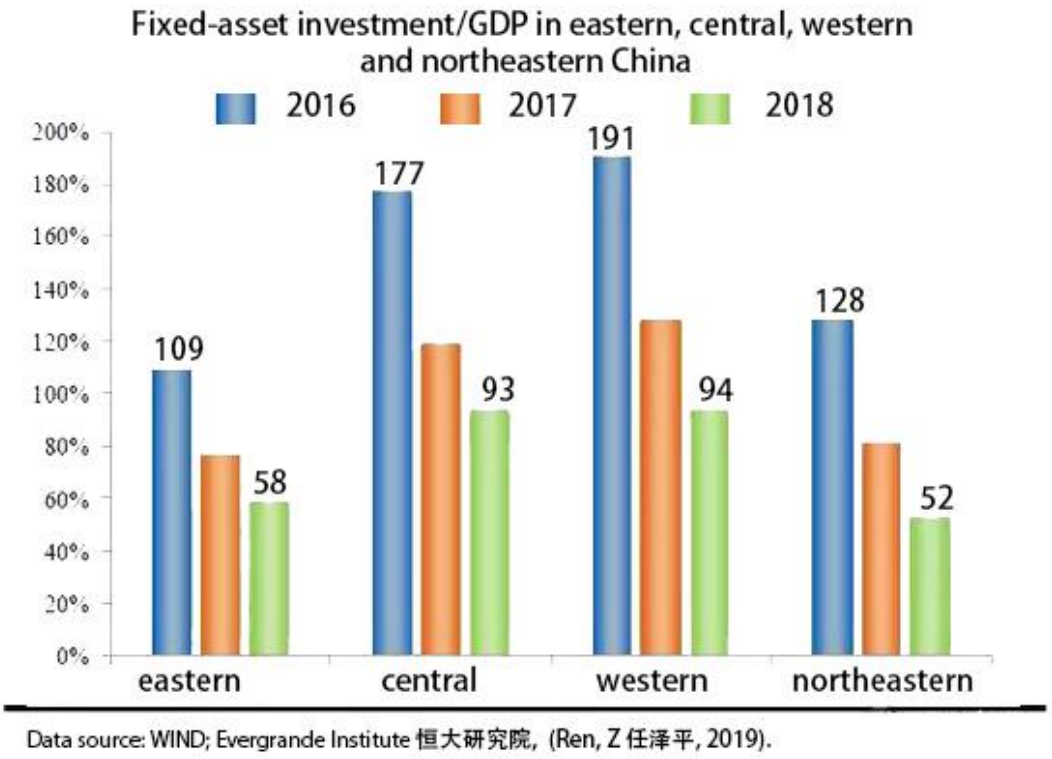

Figure 6: Fixed-asset invest/GDP in eastern, central, western and northeastern China. (Ren, Zeping 任泽平 2019)

Officials in China are not elected, instead their political fortunes rest with higher level officials, while GDP growth is one central criterion of officials' competence. After the global financial crisis in 2008, China's central government launched a 4-trillion- stimulus plan to stabilize economy and employment. A large part of the 4 trillion was channelled into fixed-asset investment, namely housing real estate, urban expansion and infrastructure construction. This explains why airports and other buildup areas expanded quickly in around 2010

Figure 7: regions, provinces and cities in Mainland China. (National bureau of Statistics 国家统计局 2011b)

3.4 Data availability in China

Government official planning documents are the most essential raw material for urban development studies about China. However, these documents are not easily available.

Unlike some western countries which have a long tradition of government transparency, until 20 years ago Chinese government did not feel there was a need to give internal information to ordinary citizens: ordinary citizens were the subjects of governance and only needed to obey the orders from the government; neither did ordinary citizens

realize they had the right to request government information. It was as late as 2007 that the Chinese central government made the first regulations on open government information.

In the Regulations, it said:

"Article 9. People's governments at the county level and above and their departments should determine the concrete content of the government information to be disclosed on their own initiative within their scope of responsibility in accordance with the provisions of Article 9 of these Regulations, and emphasize disclosure of the following government information:

…

2) Plans for national economic and social development, plans for specific projects, plans for regional development and related policies;

…

Article 13. In addition to government information disclosed by administrative agencies on their own initiative provided for in Articles 9, 10, 11 and 12, citizens, legal persons or other organizations may, based on the special needs of such matters as their own production, livelihood and scientific and technological research, also file requests departments of the State Council, local people's governments at all levels and departments under local people's governments at the county level and above to obtain relevant government information."

However, it also said:

“Article 14 … Administrative agencies may not disclose government information that involves state secrets, commercial secrets or individual privacy….” (*Regulations on Open Government Information of the PRC* 2007)

This article is a very broad statement and officials often intentionally or mistakenly cite this article to refuse information requests.

As for planning information, there are specific regulations on open government information.

Article 8 Organs organizing the establishment of urban and rural planning shall publicize legally approved urban and rural planning in a timely manner, except for contents which shall not be disclosed as required by laws or administrative regulations. (*Urban and Rural Planning Law of the PRC 中华人民共和国城乡规划法* 2015)

…

Article 12 After the completion of preparation of a draft detailed control plan, the preparation authority shall make an announcement about it and solicit the comments of experts and the general public by holding demonstration meetings, hearings or other means.

The time period for announcement shall be at least 30 days. The time and place of announcement, as well as the time limit and methods for the general public to submit

comments shall be announced through the government information website as well as the local major news media.

…

Article 17 A detailed control plan shall, within 20 working days as of the date of approval, be announced through the government information website, the local major news media and other means accessible to the general public.(Ministry of Housing and Urban-Rural Development 2011)

Still, many Chinese local authorities are very conservative on opening government information. First-tier cities with more western influence usually have less bureaucratic and more open-minded officials, whereas elsewhere in China many officials are reluctant to give ordinary citizens government information. All research universities and urban planning institutes are public entities in China, and therefore if scholars need any government documents, their institutes will issue office-to-office letters to prove identities and purposes, called "*介绍信 jieshaoxin*" . Additionally, when local governments sponsor or initiate studies to get evaluation and suggestions on urban plans they will certainly provide documents needed. But for individual citizens, government officials are less willing to cooperate and often question the requesters' intention, partially because geographical information, including planning information, can be national security sensitive although many grass-roots cadres are not clear of the exact boundary of state secrets, and partially because knowing urban plans early can bring advantages to developers. To be safe, officials may simply refuse to open information.

As for Xi'an ASAD's tax data and Guangzhou's planning, I got data and documents from anonymous sources. Research about these materials cannot be open to the public based on the confidentiality agreement with the source, which is a huge drawback.

In most cases, in order to get first-hand full planning documents I applied to relevant government departments under article 13 of the Regulations on Open Government Information of the PRC.

To request government information formally, the first step is knowing whom to request from. Many government branches do urban planning, including municipal development and reform commission, housing and urban-rural development bureau, ASAD administrative committee, etc. Usually newpapers in China would not specify the exact officials' name or department name when reporting, so I had to call around to know who had the information.

Shanghai has one of the most open-minded and "rule-of-law" local governments in China so the application for Shanghai's planning document was quite easy. I submitted my request for "Shanghai Hongqiao Airport Economy Demonstration Zone Development Plan (2018-2030)" online to Shanghai Municipal Development and Reform Commission on September 10th 2018, and received a friendly call several days later to confirm my request. On September 30th, I received the full document through mail. The same officer even called me to confirm the delivery.

On August 2018 I submitted my request for "Zhengzhou Airport Economy Zone Conceptual Master Plan" online to Zhengzhou Municipal Government and was immediately directed to Zhengzhou Airport Economy Zone Administrative Committee. In

the mail I received from the Economy Zone's Bureau of Planning, Municipal Construction, and Environmental Protection under the Administrative Committee, it said the full plan contains classified content such as essential pipelines and infrastructures and according to related laws and regulations, only partial content of the master plan can be publicized. If I needed to view or copy the full content, I had to go to the Bureau in person to verify my identity, complete the secret review procedures and sign the confidentiality agreement first. I called the Bureau stating I lived far from Zhengzhou, and I only wanted the full plan other than the classified content and an officer from the Bureau said they would discuss my request. On September 12th the Bureau sent me the non-classified content through email.

On October 8th 2018 I submitted my request for "Guangzhou Airport Economy Zone Detailed Control Plan" online to Guangzhou Airport Economy Zone Administrative Committee. On October 25th I received an email reply approving my request and asking me to go to the Committee in person. I asked if they could send me a copy through mail. On November 7th, the Economy Zone Bureau of Land and Planning send me plans through email.

I request the most quantities of information from Xi'an Airport New City.

On July 27th I requested three sets of documents from the Airport New City's Administrative Committee: environmental impact evaluation documents for construction projects from 2013 to 2018, "smart-airport" Phase I PPP (public-private-partnership) contract, and Airport New City Detailed Control Plan. On August 14th, the Committee

informed me the first two documents can be publicized, but the decision on the Control Plan was postponed.

First, I went to the Environmental Protection Bureau for the evaluation documents. A friendly officer copied all documents I needed to my USB drive without any question, and said if I needed anything in future I could directly contact her.

Then I went to the Administrative Committee's general office for the PPP contract. An officer allowed me to read the contract and manually copy on the spot but not photocopy. The contract was very long (more than 20 pages) so I could only copy the key paragraphs.

The request for the Control Plan was the most difficult. Actually the detailed control plan was already publicized on Xixian New Area's official website (www.xixianxinqu.gov.cn/xwzx/tzgg/11249.htm, Airport New City's superior) but the pictures were of very low resolution. When I went to the New City's Bureau of Planning for the first time, they refused my request claiming that detailed control plan was classified information which cannot be open to public. I refuted them citing the fact that the material was already publicized online and opening this information was clearly required by laws. Then they tried to find several excuses to refuse including questioning my identity as a possible spy for some real estate developers or foreigners.; then they simply admitted that it was their bureau director who disapproved regardless of laws. I did not give up and escalated the issue to the New City's Party Committee but did not receive much positive response. I went to the Bureau every day and told them I would

call media to express my dissatisfaction. Finally on August 19th, I and the officer reached a compromise: the Bureau gave me 12 out of 27 high resolution images.

Later in October 2019, the latest “Xi’an Airport Economy Demonstration Zone Development Plan (2019-2035)” was approved and I requested this document online from the Development and Reform Commission of Shaanxi Province. A week later I received this document through mail.

I submitted my request for “Beijing Airport Economy Core Zone Detailed Control Plan” online to Beijing Airport Economy Core Zone Administrative Committee on August 14th, 2018. A week later I received a mail reply saying that “sub-district level control plan would only be made after district-level plan was finished. Since the plan for Shunyi District had not been approved yet, the sub-district level control plan involving the Airport Economy Core Zone had not been initiated yet.” The information I requested was nonexistent. On February 20th, 2020, PEK Airport Economy Demonstration Zone Overall Scheme was approved by Beijing Municipal Government.((Beijing Municipal Commission of Development and Reform 北京市发改委 and Shunyi District People’s Government 顺义区人民政府 2020) I applied to Beijing Municipal Commission of Development and Reform for this document on February 24th and a friendly officer called me to confirm on the 26th. I received the Scheme on March 2nd.

To summarize, open government information is a relatively new mechanism in China, and the results largely depend on established personal connections, officials’ character and will, and requesters’ determination. In many cases there are no set rules on giving

or not giving, but only negotiations. Additionally, there are regional differences in governments' attitude toward open government information.

Another possible reason for government officials to conceal government information on planning is that development is a process involving many interests and struggles. There is even room for government-commons conflicts, grey benefits exchange and non-compliance operation. Officials want as few people as possible to know certain information to avoid "troubles" now or in the future because "right to know" is the precondition for "right to participate". A book published by the Party School of the CPC Central Committee admitted that "power has an innate repulsion of supervision. This is determined by the natural property of power. I.e., power only likes obedience, not supervision, and power has the character of anti-supervision." (L. Xu 2004)I want to emphasize that I do not conjecture about the intention of any official I met.

Chapter 4. ASAD in six cities[9]

As discussed earlier, different cities have different conceptualizations of ASAD, i.e. different emphasis on its function and prospect. Those conceptualizations are further drawn into local governments' development plan, and (hopefully by officials) eventually materialized into different landscapes of ASAD among cities. The conceptualization can also differ among successive officials in one city. Through reading of published, official plans, people can understand plan-makers' conceptualization and perspectives. This chapter is specially dedicated to investors interested in Chinese ASAD, because here the government is in a dominant position so smooth cooperation with the government is essential to business success. Knowing the government's thoughts is the first step to develop a wise investment strategy.

4.1 Beijing Shunyi

Beijing is the capital of the People's Republic of China and one of four direct-controlled municipalities under the central government. It is the center of politics, culture, foreign contact, education and innovation in China. It is also an Alpha+ world city named by GaWC with a highly developed economy.

As of 2018, Beijing consisted of 16 districts with 16410 km2 of administrative area including1401 km2 of buildup urban area. Its total population was 21.5 million (2018) and regional GDP was 35.3 trillion (2019), both ranked second in China after Shanghai. Beijing has an economy based on the tertiary sector. Beijing owns 56 global Fortune

[9] Data about cities and airports are from entries in Baidu Baike, an online encyclopedia (retrieved in February 2020) and 2018 Statistical Communique (CAAC 中国民航局 2019), unless specifically cited.

500's headquarters, the top one worldwide. Many of the 56 are China's central-government-owned monopolies. In recent years, Beijing has grown so big that a series of social problems is generalized by over-sized population. To respond to these problems Beijing plans to expel some "non-core" industries and population, mostly low-end manufacturing and commerce.

Beijing and Tianjin are cores of Jing-Jin-Ji (Beijing-Tianjin-Hebei) city cluster of over 110 million population and 85 trillion GDP (2018).

Beijing Capital International Airport (IATA: PEK,ICAO: ZBAA) is a 4F class airport located 25 km northeast of city center in Shunyi District (part of the airport is on an administrative exclave of Chaoyang District). First opened in 1958, it was the only civil international airport in Beijing until September 2019. After several rounds of expansion, as of 2018 Capital Airport has 3 terminals of 1.42 million m2 floor size and 3 runways, 314 gates and 2 control towers.

Capital Airport is the hub airport of Air China, the PRC's sole flag carrier, Hainan Airlines, and China Southern Airlines. It is the most accessed international gateway of China where 105 domestic and foreign airlines operate flights to 131 international destinations in 65 countries, and 160 domestic destinations.(Beijing Municipal Commission of Development and Reform 北京市发改委 and Shunyi District People's Government 顺义区人民政府 2020) All three major international airline associations have an active presence in Capital Airport. In 2018, its passenger traffic reached 100 million, ranked 2nd in the world after Atlanta, USA. Its cargo traffic reached 2.07 million metric ton ranked 2nd in China. In 2017, Capital Airport and related business contributed

1.828 trillion of GDP and 731 thousand jobs to Beijing, equal to 6.53% of Beijing's total GDP and 5.86% of total employment.(Beijing Capital International Airport Co. Ltd. 2020) In September 2019 the Beijing Daxing International Airport opened, but the specialty of these two airports are unclear.

Beijing Shunyi airport economy zone is the earliest ASAD in China since the early 1990s. In 1992, the then Shunyi County government decided to boost the regional economy taking advantage of the airport. In 1993, a 4.16 km2 microelectronic industrial zone was opened to the east of the airport. In 1994 a 6.6 km2 airport industrial zone was planned. In 2000 a 1.25 km2 Beijing Tianzhu Export Processing Zone was established. After 2000, this airport-centric development strategy was formalized. In 2002, the airport logistic park was planned to the north of the airport, and the first master plan for the whole area was made. After 2004, the local government hired scholars and urban planners to further detail the plan for PEK Airport Economy Zone. (Ke ti zu 课题组 2006)p69 On July 23th 2008, State Council approved to establish the Beijing Tianzhu Comprehensive Bonded Zone[10] of 5.94 km2. On February 27, 2019, National Development and Reform Commission and CAAC jointly approved the PEK Airport Economy Demonstration Zone (发改地区[2019]375 号), the 13th and latest one so far. According to news about this approval, this demonstration zone covers 115.7 km2 and will be managed by Shunyi District government. In February 2020, the PEK

[10] A bonded zone (area) is a special trade zone created within national border. It has special arrangements for customs duties, import/export duties and several supervision approaches. For instance, foreign goods can be imported to the zone without paying duties, be processed, and exported. The manufacturing and trade inside the zone can be exempt from value added and sales taxes. (FTZ-SHANGHAI n.d.) Bonded processing/logistics means processing in/logistics through the bonded zone.

Airport Economy Demonstration Zone Overall Scheme was approved by Beijing municipal government and based on that Scheme more detailed plans will be formulated soon.

The demonstration zone positions itself as “an important gate for China opening to the world, an area of innovation in airport economy, and a port-city integration with international character”. Currently there are more than 400 aviation related companies and 151 high-tech companies in the demonstration zone. In 2018, the total revenue of all businesses in the demonstration zone reached 374.9 billion. According to the Overall Scheme, the demonstration zone aims at 550 billion total revenue in 2022, of which 95% should be from the service industry.

The demonstration zone consists of one core, one belt and four functional groups as shown below. The core is the Capital Airport as an international air transportation hub. The Belt is an urban forest and waterfront park along Wenyu River. The Airport Group is located west of the airport fence, focusing on aviation services (general aviation, corporate jet, aviation asset management, base service), convention and exhibition (based on China International Exhibition Center (new hall)), and aviation finance. Some company headquarters and R&D centers are planned here. The Bonded Zone Group is in the north around the Tianzhu Comprehensive Bonded Zone. Air logistics and international trade (bio-medical trade, aviation equipment trade, and cultural and art trade) are the main industries here and aim to serve the whole Jing-Jin-Ji area. *Guomen, 国门* (“national gate in Chinese”) Group is in the south and east accommodating high-end service industries, including technological services (R&D), Beijing (Sino-Germany)

International Cooperative Industrial Park, and producer services. Other consumer services like tourism, shopping, and high-end hotel develop all around PEK.

The Overall Scheme specifically mentions the international talent community where talents from all over the world can work and live conveniently. The Demonstration Zone will provide them with apartments, international high-standard healthcare and education, and a beautiful living space while hosting various international cultural events.(Beijing Municipal Commission of Development and Reform 北京市发改委 and Shunyi District People's Government 顺义区人民政府 2020)

According to the Overall Scheme and several other policy brochures(Shunyi District People's Government 顺义区人民政府 2018), manufacturing industries, including electronics and automobiles, do not fit into Beijing's role as the national capital and an international exchange center, and therefore are no longer encouraged here. The Overall Scheme hardly mentions the residential/living space in the Demonstration Zone.

Figure 8: Boundary of PEK Airport Economy Demonstration Zone.

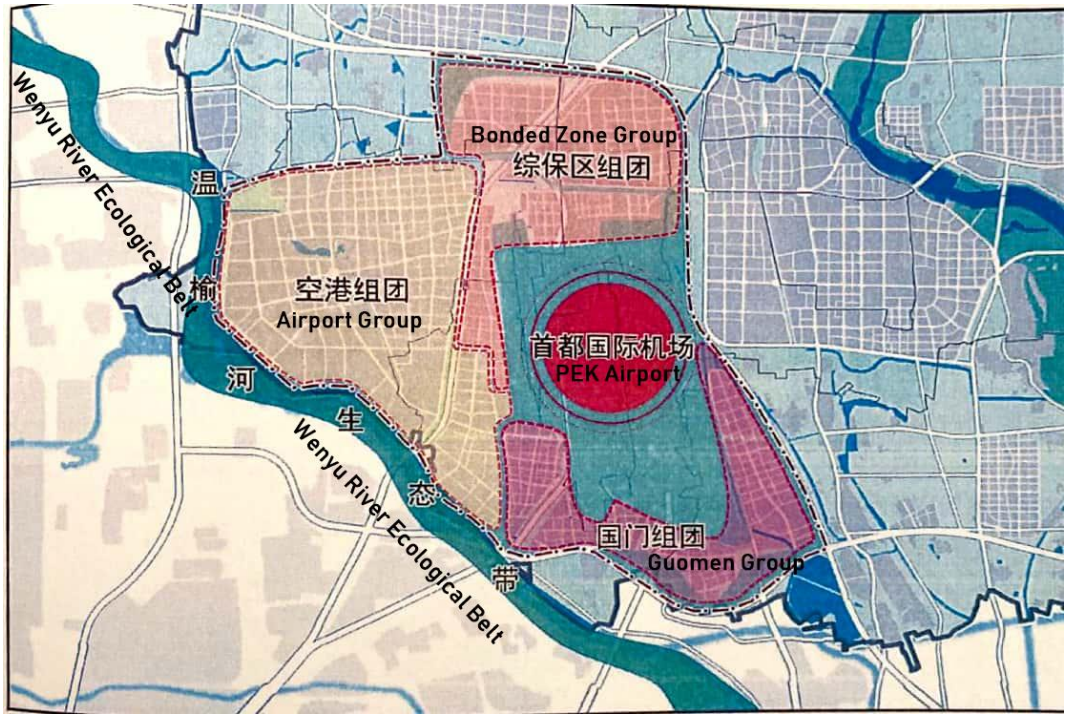

Figure 9: Zones of PEK Airport Economy Demonstration Zone. (Beijing Municipal Commission of Development and Reform 北京市发改委 and Shunyi District Government 顺义区政府 2020)

4.2 Shanghai Hongqiao

Shanghai is the most populated city in China and one of four direct-controlled municipalities. It is the center of economy, finance, trade, shipping and innovation. It is in the junction of the biggest river in China -Yangtze River and the frontier of Western influence – southeast coast. Shanghai is the biggest city in Yangtze River Delta city cluster of 150 million population and 210 trillion GDP (2018).

Soon after its opening to British in 1840, Shanghai became a “paradise for adventurers” with concessions of Western powers and the origin of Chinese-owned industries. By 1900, Shanghai had become the largest city in East Asia. After 1949, Shanghai was still the most important industrial base in the then planned economy in China but lost its most international connections and was surpassed by Tokyo, Seoul and Hong Kong economically. After the Opening and Reform in 1978, Shanghai once again became China’s economic pioneer.

As of 2018, Shanghai consists of 16 districts with an administrative area of 6340.5 km2 including buildup area of 1563 km2. Shanghai had regional GDP of 38.15 trillion in 2019 and population of 24.23 million in 2018, both the top in China. Shanghai is an GaWC alpha plus world city in 2018. Currently, Shanghai’s economy is based on both service industry and manufacturing and has more private and foreign elements than Beijing. Shanghai trades with more than 200 countries and regions in the world and the Port of Shanghai has been the busiest container port in the world since 2010. 30% of China’s imports go through Shanghai, as does 30% of exports. Meanwhile, thousands of foreign

banks and companies present in Shanghai. Shanghai also has the second most universities and institutes in China.

Shanghai Hongqiao International Airport (IATA: SHA,ICAO: ZSSS) is one of two main airports in Shanghai. It is located at Changning District, 13km from city center. It was originally built in 1921 and rebuilt in 1950. Today it is a 4E class airport with 2 runways. As of 2017, it has two terminal buildings of 444.6 thousand m2 floor size and 89 gates, and a corporate jet terminal. In 2018, Hongqiao airport had passenger traffic of 43.62 million, ranked 8th nationwide; its cargo traffic was 407.4 thousand metric ton, ranked 9th in China. It is one of the hubs of China Eastern Airlines.

Although indeed an international airport, Hongqiao Airport mainly serves domestic, point-to-point routes whereas Shanghai Pudong International Airport is the international gateway of Shanghai and China. Hongqiao Airport originates several routes to neighboring countries and regions (Hong Kong, Macau, Taiwan (Songshan), Japan (Haneda) and South Korea (Gimpo)). Because it is closer to the city center, it also connects to other airports closer to city center. Shanghai was the first Chinese city with two international airports.

Shanghai Hongqiao Transportation Hub, opened in 2010, is the biggest single transportation hub worldwide (TVB 2009). It consists of Hongqiao Airport, Hongqiao Highspeed Railway Station (the second largest station in China by passenger volume), long-distance bus station, subway station (the second busiest in Shanghai) and joins several elevated roads. More than one million people go through here every day. (W. Wu 2017)

Shanghai Hongqiao is another ASAD in China that started early. In the early 2000s, Changning District government proposed an airport economic park aiming at “Hongqiao gateway and headquarters economy”, and set “informational service, modern logistics and high-tech industry” as the direction. Shanghai Hongqiao Development Zone is 5.5km east of the airport and was the first national level development zone aiming at service industry and foreigner service. This airport economic park has developed to today’s 86 km2 “Hongqiao Business Zone”, whose core functions are a comprehensive transportation hub and a business center.

When Pudong airport opened in 1999, Shanghai planned an airport city around it and the development around Hongqiao Airport was restricted. Yet the Pudong airport city plan was not implemented, and area near Hongqiao Airport attracted some aviation supporting services. After 2010, the development of Hongqiao Airport Town is again on schedule. (Su 2015)

In 2016, National Development and Reform Commission and CAAC jointly approved the Hongqiao airport economy demonstration zone (发改地区[2016]2811). According to the latest official planning – “Shanghai Hongqiao Airport Economy Demonstration Zone development plan (2018-2030)” made by Shanghai municipal government, the demonstration zone has 13.89 km2, with 7.15 km2 of airport operation zone and 6.74 km2 of industry agglomerated zone. The overall goals of the demonstration zone are to become an international aviation hub, an international aviation enterprise headquarter base, an agglomeration of high-end service industries around airport, a national corporate jet operational base, and a low-emission “green town”.

In the plan, the demonstration zone has one core: Terminal 1 zone providing aviation ground services, and three functional zones: airport operation zone (runway and tarmac); aviation management and aviation service agglomerated zone (airlines headquarters, aircraft trade and maintenance, airline labor training, aviation professional services, general aviation and aviation finance), and airport service industries agglomerated zone (service industries taking advantage of the convenience of the transportation hub, such as trade and business, enterprise headquarters, IT, innovation industry, finance, exhibition and high-tech industry). A map of these functional zones is in below. Since the Hongqiao airport is relatively close to city center, the plan emphasizes high-density and mixed land use, and low-emission and environmental protection.

Figure 10: Map of Shanghai Hongqiao Airport Economy Demonstration Zone (Shanghai Development and Reform Commission 上海市发改委 2018)

4.3 Guangzhou

Guangzhou is the capital of Guangdong province, the pioneer of China's Opening and Reform. It is one of four first-tier cities in China (together with Beijing, Shanghai and Shenzhen) and a GaWC alpha world city in 2018. It is designated as the international trade center of China, as well as the political, culture, education, and transportation center of China's south coast. Guangzhou is in the north of the Peral River Delta, close to the South China sea.

Guangzhou is also one of three central cities in the Pearl River Delta city cluster (or called Yue-Gang-Ao Greater Bay Area) of around 70 million population and 108 trillion GDP (2018). The Greater Bay Area is special in China because it has three GaWC alpha- or above cities. Guangzhou, Shenzhen and Hong Kong each has its strength and features.

Guangzhou has a long urban history over 2000 years. Before 1000 A.D., Guangzhou was the only big city south of the Yangtze River. Since 3rd center A.D., it has been the biggest seaport in China and the main port of the maritime Silk Road. From 1640 to 1840, the Qing Dynasty implemented the "locking-up" policy and Guangzhou was the only legal international trade port in China (Thirteen-hong Merchants 十三行). In 1840, Guangzhou was in the first 5 cities open to British. After that, many Western powers established concessions in Guangzhou and brought modern industries and European culture. From 1912 to 1949, Guangzhou also saw several turning points of Chinese politics. Before 1949, Guangzhou was the biggest city and political, military, economic and cultural center in the Pearl River Delta. Between 1949 and 1978, Guangzhou's

economy was surpassed by Hong Kong. After 1978, Guangzhou once again became the frontier of Opening and Reform. But unlike Shenzhen which is a brand new immigrant city, Guangzhou preserves its special local culture.

As of 2018, Guangzhou administrates 11 districts with administrative area of 7434 km2 including buildup area of 1249 km2. Its total population was 14.9 million with 86% being urban population, yet the actual number is higher because many immigrant workers from other places are not counted. Since 1957, China Import and Export Fair (Canton Fair) has been the largest international trade event in China held twice per year. Today, Guangzhou is called “the capital of the Third World” because many merchants from other countries live here to trade. Guangzhou has very strong personal and cultural connections to Hong Kong, Macau, and overseas Chinese which bring many investments.

Guangzhou is an important city in the “Belt and Road Initiative” and owns a large number of foreign company offices and more than 8700 high-tech enterprises. It has the highest Human Development Index among Chinese cities. In 2018, its regional GDP was 22.859 trillion Yuan. Its economy is based on service industry and manufacturing. Peral River Delta area’s private economy and small business is the most prosperous in China. Guangzhou also has the third most universities and colleges (83 by 2018) in Chinese cities.

Guangzhou Baiyun International Airport (ICAO: ZGGG,IATA: CAN) is located across the border of Baiyun District and Huadu District in Guangzhou. It is 28 km north of the city center. It is a 4F class airport and one of three international gateway airports in

China. The current Baiyun Airport is a young airport first open on August 5th 2004 after the old Baiyun Airport was closed. Today it has 2 terminal buildings and a ground transportation center with a total floor space of 1.40 million m2 and 269 gates (including FBO), and 3 runways. More expansion projects are under construction.

In 2018, Baiyun Airport had passenger traffic of 69.72 million, ranked 13th in the world and 3rd in China. Its cargo traffic also ranked 3rd in China (1.89 million metric ton). Baiyun Airport is the headquarter and base of China Southern Airlines, the airlines with most airplanes in China. Around 80 Chinese and foreign airlines connect to more than 220 destinations in the world including around 90 destinations outside mainland China. (official website of Baiyun Airport) Due to its location in the south, it is China's key gateway to Southeast Asia and Oceania.

Baiyun Airport has always had fierce competition with Shenzhen Bao An International Airport and Hong Kong International Airport. Peral River Delta city clusters is therefore the only metropolitan area in the world with more than one world top 30 airports; indeed, it has three.

Guangzhou ASAD's planning has gone through several stages. Since 2008, Guangzhou local government started to discuss the development of airport economy zone. In July 3rd 2010, State Council approved to establish the 7.385 km2 Guangzhou Baiyun Airport Comprehensive Bonded Zone (国函[2010]65 号), and some bonded processing and trade companies started business inside. In the same year, Guangzhou started to do planning for its ASAD. In 2013, the Guangzhou Airport Economy Zone Core Zone (Phase I) Detailed Control Plan was made which covered 84.87

km2.(Municipal Airport Committee 市空港委 2013)p1 From March 2016 to January 2017, Guangzhou Urban Planning Institute & Design Survey Research Institute and Singaporean JURONG International together made the Guangzhou Airport Economy Zone Starting Area Detailed Control Plan Revision. (Guangzhou Airport Economy Zone Adminitrative Committee 广州空港经济区管理委员会, Guangzhou Urban Planning Institute & Design Survey Research Institute 广州市城市规划勘测设计研究院, and Singaporean JURONG International 2017) p5 On Jan 2017, Development and Reform Commission and CAAC jointly approved to establish the Guangzhou Airport Economy Demonstration Zone (发改地区[2016] 2810 号).

The demonstration zone written on the official document from the Development and Reform Commission and CAAC covers 135.5 km2. The exact locational relationship between the 135.5 km2 demonstration zone, the 116 km2 Airport Economy Zone, the 84.72 km2 Airport Economy Zone Core Zone (Phase I), and 11.26 km2 Airport Economy Zone Starting Area is unclear. It is possible the planning has been constantly revised over the years.

In the old Guangzhou Airport Economy Zone Core Zone (Phase I) Detailed Control Plan, Core zone Phase 1 south is 54.18 km2 (47.06 km2 in Baiyun District, 7.12 in Huadu District) and is planned for multiple business projects. Core zone Phase 1 north is 17.82 km2 and is planned for air cargo and aircraft maintenance. Bonded zone north is 4.72 km2 (including 2.2 custom area) and is planned for bonded logistics and electronics industry. Bonded zone south is 8.6 km2 (including 4.53 km2 custom area) and is planned for bonded logistics and advanced manufacturing. (Municipal Airport Committee 市空港委 2013)

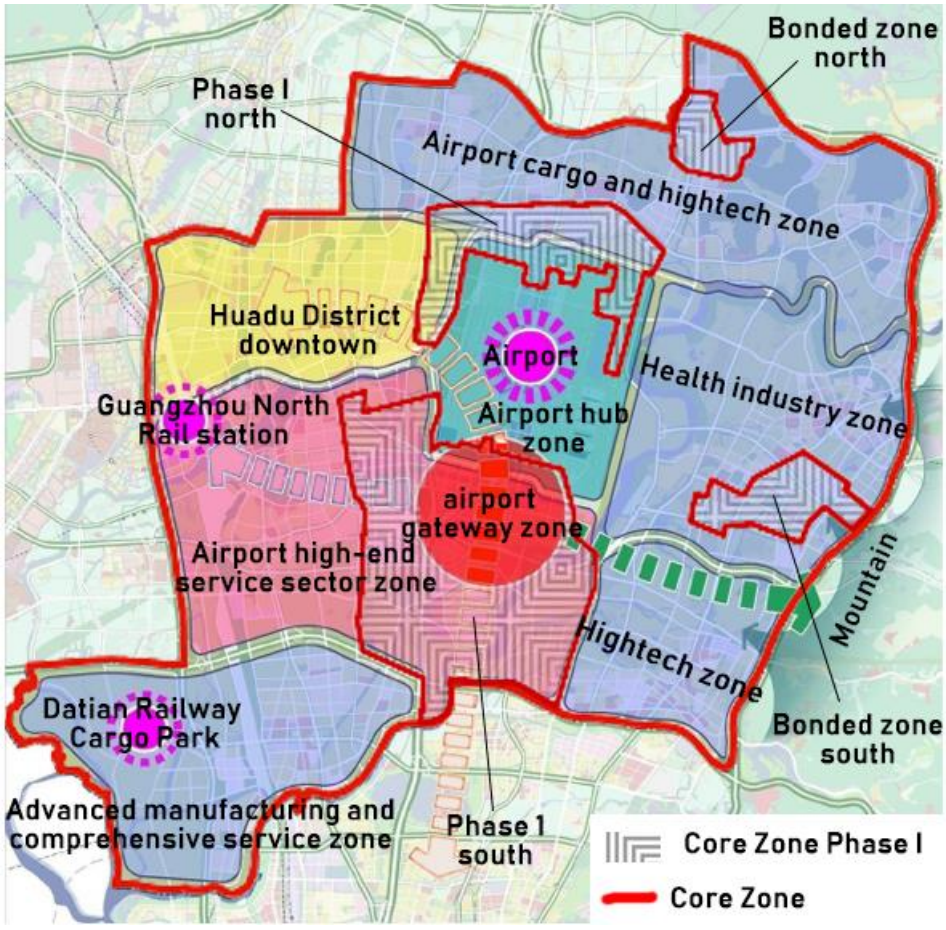

Figure 11: Guangzhou Airport Economy Zone Core Zone (Phase I) Detailed Control Plan (old plan) (Municipal Airport Committee 市空港委 2013)

Guangzhou Airport Economy Zone, Baiyun Airport Comprehensive Bonded Zone and Guangzhou Airport Economy Demonstration Zone are managed by the same administrative committee; therefore these names probably can be used interchangeably. The Economy Zone Administrative Committee's official website says the Guangzhou Airport Economy Zone is 116 km2 (Guangzhou Airport Economy Zone Adminitrative Committee 广州空港经济区管理委员会 2018), so the 2017 plan made by Guangzhou Urban Planning Institute & Design Survey Research Institute and Singaporean JURONG International is now the latest and legal planning. The general pattern of the Economy Zone is "business in the south, transportation in the north, downtown in the west, green space in the east". Three ports co-work here: Baiyun Airport, Guangzhou North Railway Station, and Datian Railway Cargo Park. A number of transportation corridors radiate from the central airport to connect industrial groups. The Economy Zone's strategic measures are noted as "strength international air hub and network; green and smart airport town; airport-related high-end industries agglomeration; and innovations on regulations and governance."

The Economy Zone starting zone, in the north of the Economy Zone, consists of one green belt, one logistic park, one manufacturing park, one residential community, and two business centers. This is the initial area to develop.

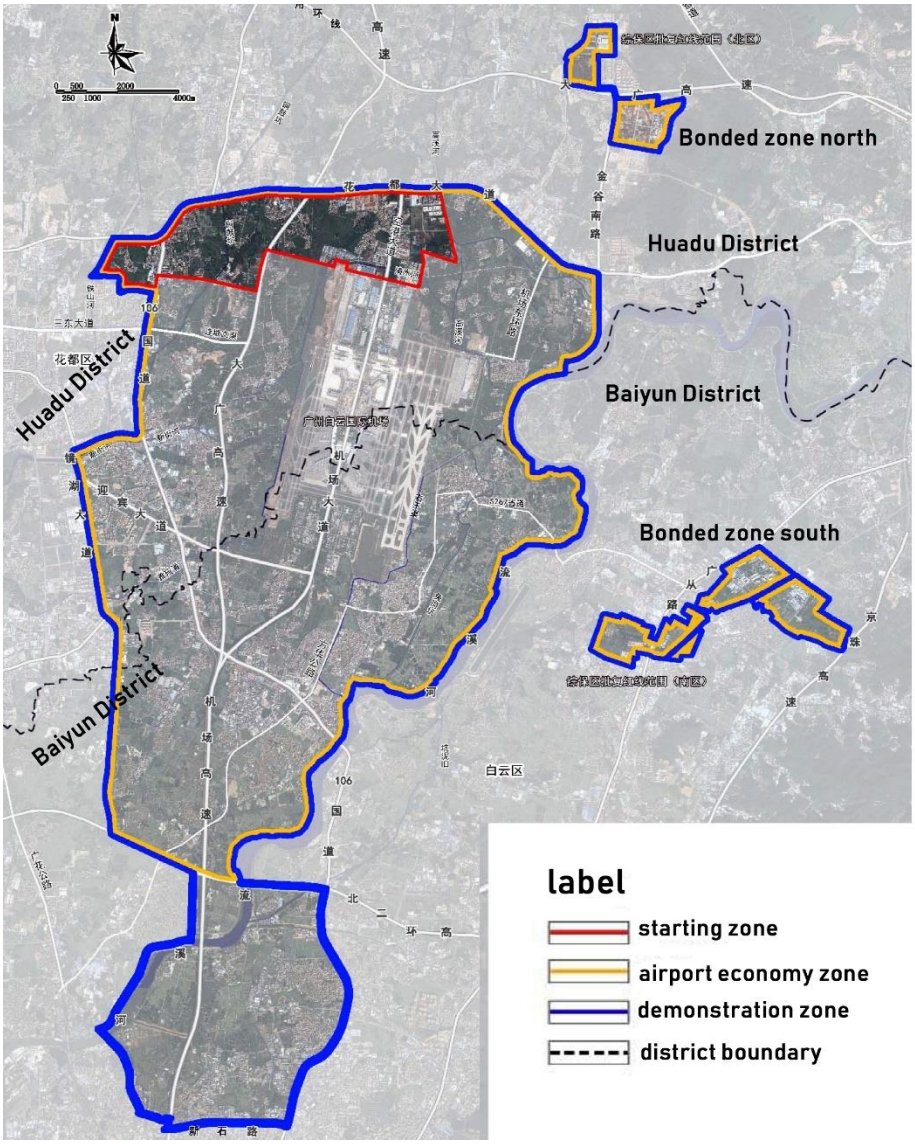

Figure 12: Map in Guangzhou Airport Economy Zone Starting Area Detailed Control Plan Revision. (new plan)(Guangzhou Airport Economy Zone Adminitrative Committee 广州空港经济区管理委员会, Guangzhou Urban Planning Institute & Design Survey Research Institute 广州市城市规划勘测设计研究院, & Singaporean JURONG International 2017)

4.4 Zhengzhou

Zhengzhou is the capital of Henan province in central China. It located at the middle reach of Yellow River.

Zhengzhou has over 4000 years of history. Before AD 230 Zhengzhou was a big city in China but after that declined into a county town, until it became the provincial capital of Henan in 1954. Zhengzhou has 2 UNESCO world heritage sites and 74 national level cultural relics protection units.

Zhengzhou is a national transportation and logistics junction. Several railways, high-speed railways and highways connecting west and east, north and south intersect in Zhengzhou. Actually, modern Zhengzhou city developed from the intersection of Jingguang railway (Beijing-Guangzhou) and Longhai (Lanzhou-Lianyungang), the two most important railways in China. Today Zhengzhou North Station is still the largest marshalling yard in Asia.

As of 2018, Zhengzhou administrates 6 districts, 5 county-level cities and one county with an administrative area of 7446 km2 including buildup area of 549 km2. Its total population was 10.1 million of which 75% was urban (2018) (including urban population in county-level cities). Zhengzhou Commodity Exchange is the earliest of four commodity exchanges in China, focusing on agricultural commodities. Due to its convenient location at the center of China, many logistics and e-commerce companies set up warehouses in Zhengzhou. Zhengzhou has a prosperous food industry and electronic manufacturing industry (cellphone assembly). In 2018, the regional GDP was

10.143 trillion. It is also the central city of Zhongyuan city cluster of 163.5 million population and 67.7 trillion GDP (2017).

The main weakness of Zhengzhou's development is a lack of universities, research institutes and high-end service industries. Its economy is based on agricultural and mineral product processing, labor-intensive or OEM manufacturing, and fixed-asset investment. Its exports have "high volume, low profit rate". Zhengzhou's advantage is its strong attraction to 100 million population, as well as resources, in the province.

Zhengzhou Xinzheng International Airport (IATA: CGO,ICAO: ZHCC) is a 4F class airport in Xinzheng city, a county-level airport under Zhengzhou city. It was first open in 1997 and the expansion project II was finished in December 2015. Currently Zhengzhou Airport has 2 terminal buildings but only T2 is in use. T2 has total floor space of 486 thousand m2 and 79 gates for passenger planes and 4 bays for cargo planes. It also has a ground transportation center to change to inter-city railway, subway, and buses.

Zhengzhou Airport is one of 8 regional hub airports in China. By the end of 2018, 55 passenger airlines operated 208 routes to 116 cities and 21 cargo airlines operated 34 cargo routes to 40 cities. In 2018, Zhengzhou airport had passenger traffic of 27.33 million and cargo traffic of 514.9 thousand metric ton, ranked 12th and 7th respectively nationwide.

A characteristic of Zhengzhou Airport is its strong cargo operation. It is unusual for a Chinese airport to have cargo traffic ranking a lot better than passengers. It can be ascribed to the prosperous food industry and electronics manufacturing industry. Also, Zhengzhou cooperates with Cargolux Airlines, a cargo-only airlines in Luxembourg, to

expand its international air cargo network through a “dual-hub” strategy (Asia↔ Zhengzhou↔ Luxemburg↔ Europe and US), which is praised as “Silk Road on Air” by Changqing Huang, Chinese Ambassador to Luxemburg. (Pan 2019)

In October 2007, Henan provincial government approved the Zhengzhou Airport Zone and in October 2010, the State Council approved the Zhengzhou Xinzheng Comprehensive Bonded Area. In April 2011, the Compressive Bonded Area Administrative Committee was set up as a satellite agency of the provincial government. (Zhengzhou Airport Economy Zone Adminitrative Committee 郑州航空港经济综合实验区管委会 n.d.)

On March 7th 2013, the State Council passed the “Zhengzhou airport economy comprehensive pilot zone development plan (2013-2025)” and approved the establishment of “Zhengzhou airport economy comprehensive pilot zone”(国函[2013]45号) (abbr. “Zhengzhou airport economy zone” “Airport zone”). It is the first ASAD in China approved on the national level and the only one approved by the State Council (later ones were jointly approved by State Council’s subordinates: National Development and Reform Commission and CAAC). At initial stage, Zhengzhou ASAD focused on air cargo industry and electronics manufacturing, which both have achieved good results.

From March to May 2013, Zhengzhou municipal government publicly collected schemes of its ASAD worldwide and invited officials from the central government, scholars from universities and institutes, urban planners, engineers from aviation and airport industry

and logistics industry to form a 14 people expert review committee. Six companies from China, USA, France, UK, Japan and Netherlands submitted schemes and Shanghai Tongji won the highest score. On May 14th 2013, Henan provincial government decided to commission Shanghai Tongji Urban Planning & Design Institute Co. Ltd. to make the Airport Zone conceptual master plan synthesizing the previous six schemes, and commissioned John Kasarda from University of North Carolina, USA and Yunchun Cao from Civil Aviation University of China Institute of Airport Economics to do industrial development studies. On January 2014, the Airport Economy Zone conceptual master plan (2013- 2040) was passed by Henan Provincial Government. In January 2016, a more detailed Zhengzhou Airport Economy Zone Master Plan (2014-2040) was finished, which is the latest official plan of Zhengzhou ASAD.

According to the latest official plan, Zhengzhou Airport Economy Zone covers 415 km2 (350 km2 in Zhengzhou city's territory and 65 km2 in nearby Kaifeng city's territory). The planned population size will be 1.3 thousand by 2020 and 2.6 million in 2040. By 2040 the buildup area will reach 278 km2. The airport zone has three key business concentrations called "center": an aviation finance center, a producer service center and an airport exhibition center.

On the west is the 54 km2 aerial port, the core of the airport zone. This area is the air passenger and cargo transportation hub, including 4 terminals, 5 runways and 3 cargo zones (in plan), the comprehensive bonded zone, and an aircraft maintenance zone.

On the north is the 98.5 km2 urban comprehensive service area with 1.19 million planned residents. This is the development focus at this stage. The aviation finance

center is located here. It has an education&healthcare node, together with several waterfront residential communities, a sport park, an apparel retail park, and an outsourcing industry park.

On the east is the 92.8 km2 port business & exhibition area with 32 thousand planned residents. The center is the Donghu Lake Park, surrounded by the highspeed railway Zhengzhou South Station and three airport exhibition complexes. Two air cargo parks locate north and south on the South Station, and several industrial parks each focus on new material, electronics, bio-medical and new-energy.

On the south is the 180.5 high-end manufacturing concentrated area with 1.09 million residents. It puts residential communities in the middle. In the north end is a producer service center, and several high-end manufacturing and high-tech parks are on the periphery.

The Airport Economy Zone has five strategic positionings: an international air cargo center; a modern industrial base led by aviation industry; an inland gateway for opening-up to the world; a modern airport city; and a growth pole of Zhongyuan city cluster.

The plan puts a lot of attention to integrative transportation networks, with emphasis on the convenient exchange for cargo among air, railway, highway, and city road, and for passenger among air, subway, tramcar, and bus. Transit is fast and dense. Highway G107 and Yingbin Avenue are the east-west and north-south axes of the zone and 3 rings of roads connect different functional zones and industrial parks. (Yang and Yuan 2018)p35, 143, 145,166;(Zhengzhou Airport Economy Zone Planning and Land

Resources Bureau 郑州航空港经济综合实验区规划与国土资源局规划勘测编制中心 2016)

This all-sided Master Plan (2014-2040) includes economic development, social services and residents' housing and employment, and building a "smart city" and "green city".

Henan and Zhengzhou governments have continuously sponsored research projects (Geng 2015)(Geng 2016)(Geng 2017)(Geng 2018)(Gao 2015)(Zhancang 张占仓 Zhang and Gao 2016), held many ASAD theme forums, and hired many world famous experts as consultants (Aerotropolis Institute China n.d.). Therefore, Zhengzhou has had the most detailed and scientific planning for its ASAD among all Chinese cities so far (Yang and Yuan 2018).

Figure 13: Map of Zhengzhou Airport Economy Zone. (Zhengzhou Airport Economy Zone Planning and Land Resources Bureau 郑州航空港经济综合实验区规划与国土资源局规划勘测编制中心 2016)

4.5 Chongqing

Chongqing is one of four direct-controlled municipalities in China, and the only one in mid and western China. It is a significant city in the upper reach of the Yangtze River in terms of economy, science and technology, and shipping. Chongqing is located in the east of Sichuan Basin and at the confluence of Jialing River and Yangtze River. Chongqing has a hilly terrain and is called “hilly city”, “3D city”. Many buildings have two ground entrances on different floors on opposite sides.

During its long history, Chongqing was a normal, middle sized city in Sichuan Basin. However, from 1937 to 1945 during the China-Japanese war, the then Chinese government retreated to Chongqing together with many factories and populations from the coast. Chongqing suddenly became an industrial city and the political, military, economic and cultural center of Chinese-controlled territory and the Allied Forces’ headquarters in the Far East. After 1954, Chongqing once again belonged to Sichuan Province until 1997. In the 1960s, Chongqing became a defense industrial base due to its interior location far from the coast and the Soviet Union.

Unlike other three municipalities in China, Chongqing is a “quasi-province”: it has 26 districts and 12 counties of a total administrative area of 82400 km2 and total population of 31.24 million (2018). When the central government decided to incorporate the municipality in 1997, it joined Chongqing main city with several cities and counties in Sichuan Provinces. The corporation of Chongqing municipality was also related to the Three Gorges Project. Only 48.6% of the registered population within Chongqing’s administration is urban, and residents of many districts and counties have few

connections with the main city. Therefore, Chongqing's statistics cannot be simply compared with other cities in China. Here I only talk about Chongqing's main city (nine districts). As of 2018, the main city has a buildup area pf 808 km2 and population of 8.75 million. Its regional GDP in 2018 was 8.208 trillion. (J. Chen and Guo 2019) Chongqing's economy is based on manufacturing, finance and trade. Chongqing has the biggest electronic industrial agglomeration (laptop and cellphone) in the world and the biggest automobile industrial agglomeration in China. In terms of transportation and shipping, Chongqing is a main gateway to southwest China and an intermodal exchange for railway, road, and inland waterway. Chongqing has abundant educational and technological resources, owning 65 universities and colleges by 2018. Chongqing's positionings are to become the "strategic pivot in China western development" and the "junction of Yangtze Economic Belt and the 'Belt and Road Initiative' ". (Chongqing Municipal People's Government 重庆市人民政府 n.d.) Chongqing and Chengdu are cores of Chengyu city cluster of 95 million population and 57 trillion GDP (2018).

Chongqing Jiangbei International Airport (IATA: CKG,ICAO: ZUCK) is a 4F class airport in Yubei District, Chongqing. It is 21 km northwest to the center of Chongqing main city. It was first opened in January 1990, and was expanded three times in 2005, 2010, and 2017.

Currently, Chongqing Airport has three terminals but T1 is not in use. T2 has floor space of 180 thousand m2 and T3 has 537 thousand m2, together having 180 gates.

By the end of 2018, Chongqing Airport had 244 domestic passenger routes and 3 cargo routes, connecting to 142 cities; it also has 68 international, Hong Kong, Macau and

Taiwan passenger routes and 14 cargo routes connecting to 61 cities. In 2018, Chongqing Airport had passenger traffic of 41.59 million (including international 3.01 million) and cargo traffic of 382 thousand metric ton (including international 147 thousand), ranked 9th and 10th respectively in China. Within this volume, 66 thousand metric tons were electronic products. (official website of Chongqing Airport)

Chongqing Airport Economy Demonstration zone was approved by Development and Reform Commission and CAAC in October 2016 (发改地区[2016]2209 号). The demonstration zone is bounded by Yulin Highway to the east, Jialing River to the west, Houhe and mountains to the north and southern boundary of Yubei District to the south, covering 147.48 km2.

The demonstration zone has five strategic positionings: an inland gateway through air; a low carbon emission, livable airport metropolitan with “smart growth” and “compact growth” principles; a high-end manufacturing concentration around airport; an international trade center around the airport; and a leader in innovation. Specifically, by 2020, manufacturing and services around the airport should contribute more than 50% of local GDP, and R&D input should reach 3.5% of GDP. Annual air passenger and cargo traffic should reach 50 million and one million metric tons respectively. For existing enterprises, the demonstration zone will incubate up-stream and down-stream enterprises to complete value-chains.

According to the latest official plan -- “Chongqing Airport Economy Demonstration Zone Overall Scheme” published by Chongqing Municipal government in May 2017, the

demonstration zone has one core and five functional zones. The Overall Scheme only gave outlines whereas detailed plan has not been formulated yet.

The core is the Airport Economy Zone Core which covers 42.32 km2 including a 12.2 Sino-Singapore Aviation Cooperation Project and Jiangbei International Airport. Airline headquarters, air passenger and cargo transportation, aircraft maintenance, aviation personnel training, aviation exhibition, in-flight food industry, and airline services are planned here.

In the five functional zones, the air logistics zone covers 2.22 km2 and has railway Mu'er Station and Mu'er Logistic Park to develop intermodal transportation between air, railway and road. The bonded zone covers 9.72 km2 and focuses on bonded processing, trade and storage.The manufacturing zone covers 36.42 km2 and develops both advanced manufacturing and R&D to establish complete value chain. Key products include smart devices, smart automobiles and new energy automobiles. The business zone covers 38.91 km2 and is a work-life mix. High added-value service industries related to the airport, residential service industries develop here, and dormitories and housing of airline employees locate here, too. The exhibition zone covers 18 km2 and will hold conventions and exhibitions in Yuelai Exhibition Town. Chongqing International Exhibition Center here has 204 thousand display area and claims to be the second largest one in China. (official website of Yuelai Investment Group Co. Ltd. www.cqyuelai.com/yuelai_content/2018-05/02/content_426671.htm)

The plan also designs nine ecological landscape corridors and three urban parks to beautify the area.

Unlike airports talked earlier, Chongqing Airport is not on a plain but surrounded by hills on the east and northwest. Although this hilly terrain confines urbanization in some directions, Chongqing should have rich experience in building over difficult terrain.

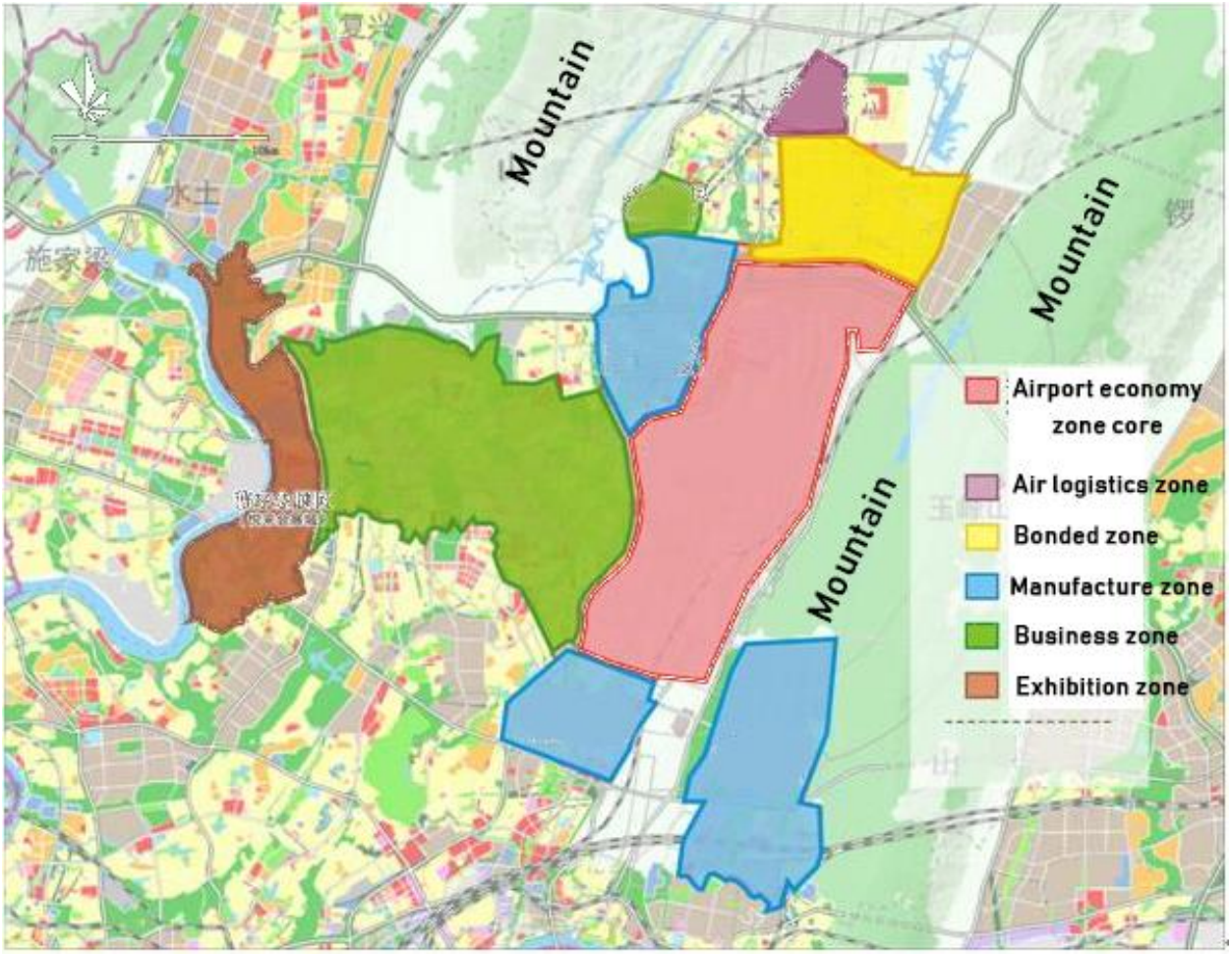

Figure 14: Map of Chongqing Airport Economy Demonstration Zone. (Chongqing Municipal People's Government 重庆市人民政府 2017)

4.6 Xi’an

Xi’an is the biggest city in northwestern China as well as the provincial capital of Shaanxi province. It lies on Weihe Plain at the northern foot of Qinling Mountains.

Xi’an is one of the oldest cities in China with more than 3000 years of urban history and 1100 years as the most important capital of ancient China. It was the origin of the Silk Road and has countless historical heritage including 2 UNESCO world heritage sites.

By the end of 2018, Xi’an has 11 districts and 2 counties and also administrates the Xixian New Area, a grand initiative to integrate Xi’an city and the nearby Xianyang city (“Xi-xian” joins the first character of each city’s name). Xi’an’s administration covers 10752 km2 and has a population of 10.0 million with 74% being urban population. The regional GDP in 2018 was 83.49 billion, ranking around 20th in among Chinese cities.

Today Xi’an is a national center in culture, tourism, education, and research owning more than 1000 institutions. It is also a base for high-tech manufacturing and defense and aerospace industry. China wants Xi’an to become an international metropolis with historical and cultural features, a gateway towards Asia and Europe, a pivot on the “Belt and Road Initiative”, and one of 12 international transportation junctions in the country. Xi’an is also the core of the Guanzhong Plain city cluster of 38.6 million population and 21 trillion GDP (2017). It is now a focus for accelerated economic growth and referred to as an emerging megalopolis and an “internet celebrity city” (i.e. popular among young people) in China.

Xi’an is at the geographical center of China. 75% of Chinese territory and 85% of GDP are within 2-hour flight from Xi’an, and all provincial capitals are within 3.5-hour flight. It is also the junction of multiple national railways, high-speed rails and highways.

Xian Xianyang International Airport (IATA: XIY, ICAO: ZLXY) is the only commercial airport of Xi’an. It is located officially on the territory of Weicheng District, Xianyang city, 25 km northwest to Xi’an’s city center. It is a 4F class airport with 3 terminals and 2 runways and currently undergoes expansion project. It is the biggest airport in northwestern China and one of eight regional hub airports nationwide. In 2018, it is the 7th busiest airport in China and 45th in the world by passenger traffic (44.65 million); 65 airlines operate 345 routes to 211 domestic and foreign destinations; its cargo traffic ranked 13th in China. (official website of airport). Xi’an airport is also a hub of China Eastern airlines and Hainan Airlines.

Xi’an airport is managed by China West Airport Group, a state-owned enterprise under Shaanxi provincial government. During the civil aviation system reform in 2002, CAAC handed over 4 airports (Xi’an, Yulin, Yan’an and Ankang) to Shaanxi government who established the Shaanxi Airport Management Group Co. to manage those airports. In 2004 and 2006, Shaanxi Airport Management Group Co. merged Ningxia provincial airport company and Qinghai provincial airport company to incorporate China West Airport Group. In 2015 and 2016, the Group took over more airports in northwestern China. So far China West Airport Group manages 3 hub airports, 16 regional airports and 3 general aviation airports in 4 provinces and is the second largest airport management cooperation in China with more than 10000 employees. Its core businesses are airport management and ground service, but its subsidiaries also deal

with adverting, construction, transportation, hotel, real estate and IT. Non-aviation income has exceeded 50% of the Group's total income. (China West Airport Group 西部机场集团, n.d.)

Xixian New Area Airport New City ("The New City" below) was approved as a national aviation city pilot zone by CAAC on May 14, 2014, and as a national airport economy demonstration zone by National Development and Reform Commission and CAAC on April 25th 2018 (发改地区[2018]635 号). It is the 12th of this kind in China and the first in the northwestern region.

The New City is bounded by highway G70 to the south, Jing River to the north, the administrative boundaries of Beidu sub-district and Dizhang sub-district to the east and west with a total land area of 144.1 km2.

The New City is one of the five components of Xixian New Area. According to the latest "Xi'an Airport Economy Demonstration Zone Development Plan (2019-2035)" made by the government, the New City has four goals by 2035: an international aviation hub on the "Belt and Road Initiative", an innovation high ground with airport economy characteristics, an international cultural exchange gateway, and a green and livable town.

On Development Plan (2019-2035), the nucleus of the New City is the International Airport. The East and West gates are at two highway entrances of the airport and are planned for CBD, headquarters, financial and high-end hotels. The Airport Service Ring consists of roads serving airport passenger and cargo traffic. The Urban Development

Ring connects different functional zones in the New City. The five functional zones include airport tech and civil-military integration zone (aviation manufacturing, high-tech manufacturing, and industries for both military and civilian use), air logistics zone, country and agricultural zone (nature sightseeing and agro-tourism), business, trade and innovation zone, and culture, exhibition and urban life zone (residential services). Currently the ASAD is connected to downtown Xi'an by two highways and one inter-city railway. More highways and inter-city railways are in plan. The zonal map of the New City is shown below.

The Airport New City Administrative Committee is not a level of government but is the governing authority and public service provider of the New City (see "government structure in China" part). It also fully owns the Airport New City Development and Construction Group Ltd., a state-owned enterprise of 2.922 billion registered capital which operates in multiple fields: real estate investment, infrastructure construction, aviation industry, trade and logistics, culture and tourism, property management, investor services, etc.(Xixian New Area Airport Group 西咸新区空港集团 2020) Just like its counterparts in other ASAD, the Airport New City Administrative Committee fits into "a growth project instigator, a regulator, a profit-making market participant, and a dispute settler"(X. Sun and Huang 2016).

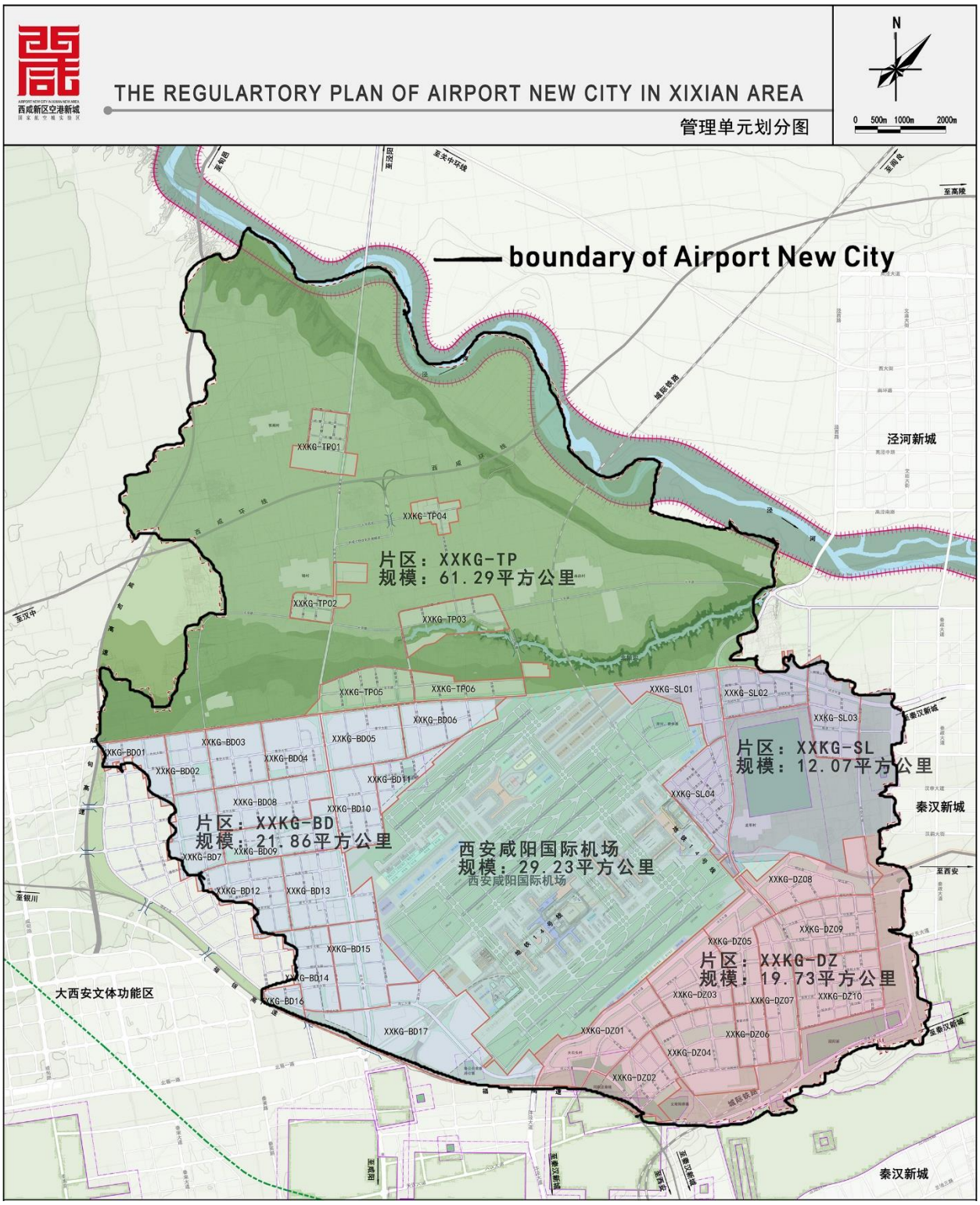

Figure 15：Boundary of Xixian New Area Airport New City. (Airport New City Administrative Committee 空港新城管委会 2018)

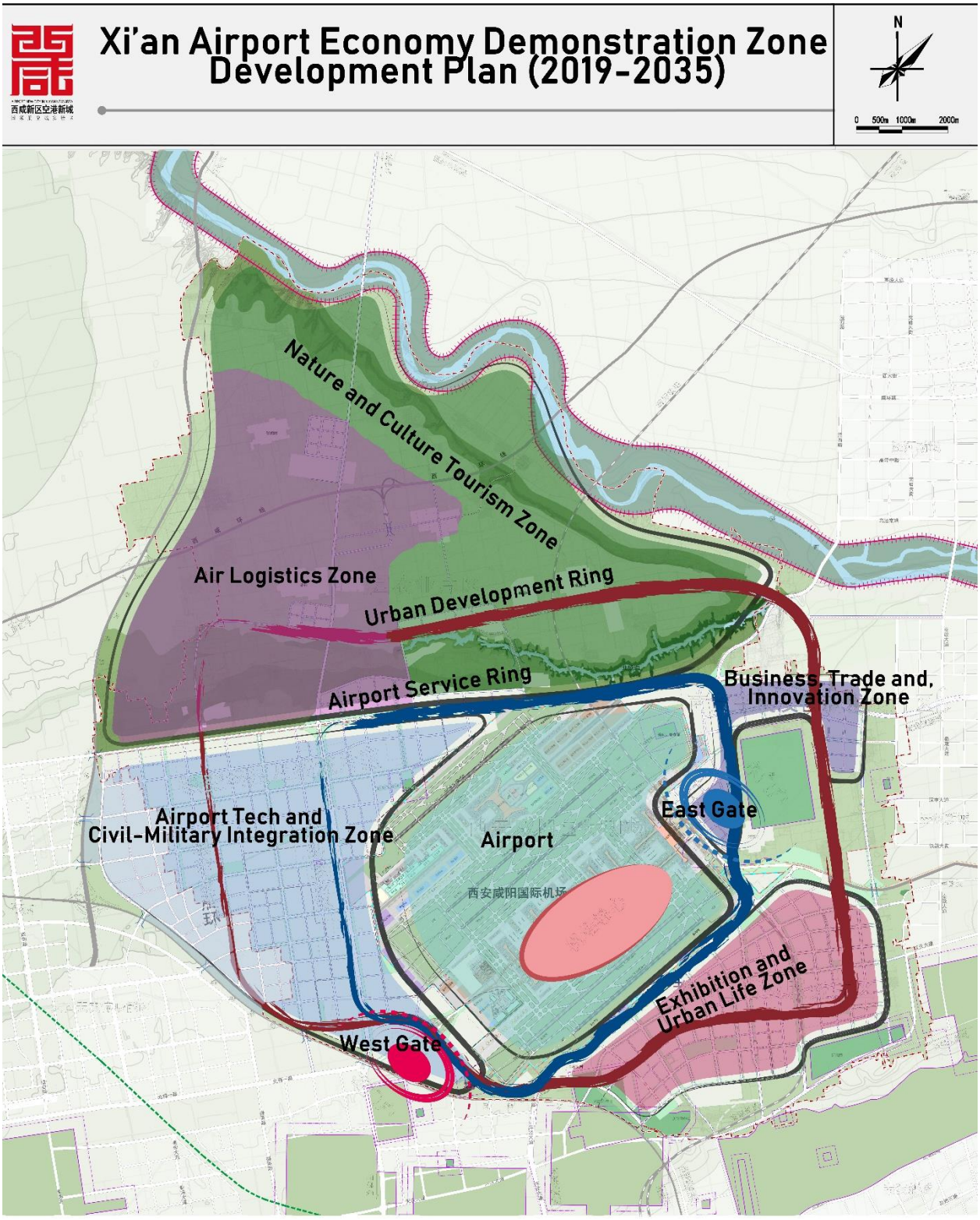

Figure 16: Zones of Xixian New Area Airport New City. (Airport New City Administrative Committee 空港新城管委会 2018)

Chapter 5. Land cover and land use analysis based on remote sensing data

5.1 Method

It is an often-used method in urban geography to trace the change of land cover and land use through remote sensing data to infer human activities. Scholars do not often have the resources to go to the field and record people's activities, but scholars can look at satellite and aerial imagery to determine land cover. Land cover and land use are two terms often used interchangeably but they are indeed distinguishable. Land use refers to "the purpose the land serves", whereas land cover refers to "the surface cover on the ground, whether vegetation, urban infrastructure, water, soil or other". Remote sensing measures land cover, and this property is joint with ancillary data and prior knowledge to tell land use. (Coffey 2013)(Natural Resources Canada 2015) There are seven major land cover types: forest, grassland, shrubland, developed, agriculture, wetland, and other (including barren areas, ice, snow and open water) The same land use can happen in different land cover types. For example, farmers can plant apples in shrubland or grassland or agriculture land. One land cover can reflect different land uses. For example, open water can be used for fish farming or sightseeing.

Urbanization processes can change both land cover: agriculture replaced by developed, and land use: crop field replaced by factories. Understanding both land cover and land use of an area is crucial to understanding the behaviors of human in that area. As a result, this research synthetically considers land cover and land use change.

In populated rural areas, there are usually two types of land cover: agriculture and developed. In areas with river or lake or on the seashore, there is also open water.

There is also limited forest, grassland, and shrubland. Removal of vegetation or demolition of old buildings can leave barren land. Another source of barren land is land reclamation in the sea.

Developed land in the countryside can be peasant residences, greenhouses, roads and infrastructure. After urbanization, new buildings are erected as urban housing and industrial space. Often roads become denser and wider.

An airport is its own unique type of land use. First, it is also the earliest built part of ASAD, especially when the airport is far from the urban center. Second, the airport is both the spatial and functional core of ASAD. Many economic activities are related to the airport. Land rent usually declines by the distance to the airport. Third, it is a very large piece of land including all runways, terminals and green space, and is relatively independent part of ASAD since most of the airport land space is fenced or controlled access.

Synthesizing the above land cover and land use, I classify ASAD land as: “open water”, “buildings and infrastructure”, “airport”, and “other”. “open water” includes rivers, lakes and sea. “Buildings and infrastructure” include all developed land except for airport. “Airport” includes runway, terminals, and auxiliary buildings. Specially, if a piece of land is entirely encircled by airport runways, terminal buildings, or ditch and fence, it probably has controlled access and is classified as “airport” regardless of the actual land cover and land use. “Other” includes all other spaces, mainly cropland, barren land, forest, but also including urban parks. Those four classes are mutually exclusive and complementary exhaustive.

The first step to do study land use and l is to define a research area, which in this research means to define the range of ASAD. Some cities have official delineation of “airport town” or “airport development zone”, but the official boundary is often hard to locate since many boundaries are along new roads not on maps. Additionally, urbanization usually does not stop at administrative boundary, so I did not use official ASAD boundary in land cover and land use change study.

Three methods have been used in existing studies to define the range of ASAD, either by distance to the airport, by drive-time to the airport, or by delineating connected buildup area.(L. Zhang, Chen, and Song 2011) Delineating connected buildup area ignores the part of ASAD not yet developed. The other two methods each has its problem.

If people accept the assumption that the airport is the functional core of the ASAD and all other activities happen around it, then land rent in ASAD is dependent on accessibility to the airport. However, that accessibility is not fully equal to the physical distance to the airport’s geometrical center, because the airport is not evenly connected to nearby region – a large area of the airport is segregated by the airport fence and ditch. Instead, the highest accessibility to the airport exists at the entrance to the terminal buildings, also high along the roads radiating from there. Then it seems drive-time to airport entrance is a good parameter to define ASAD. Unluckily drive-time range is only good when doing static research while having a detailed, vector road map of the ASAD, which are both unavailable in this research. Without detailed vector road maps of any historical past, I cannot calculate drive-time areas. Moreover, roads are quickly being constructed in Chinese ASADs, and therefore the drive-time defined ASAD range

is always enlarging, which prevents historical comparison of each land class in the same base.

Taking one step back, I find the physical distance to airport's geometric center is an acceptable parameter to define ASAD even with inaccuracy. The size of ASAD is fixed across time once the distance is set, so historic comparison becomes possible. And the blockade effect of airport in road network is less important when the road network in ASAD becomes very dense, and when an airport has multiple outlets on different directions. The only remaining problem is that as airports expand, the exact geometric centers also change. However, in most cities although new runways were added, terminal buildings remain together, so I did not relocate those airports' geometric centers in analysis.

Based on existing studies(X. Li and Wang 2001)(Weisbrod, Reed, and Neuwirth 1993), I decide the research area of land cover and land use change to be 6 km radius from the geometric center of the airport. I want to emphasize that setting the 6km radius is only to compare the land use and land cover change among different cities on a universal base. It does not mean ASAD is restricted to this 6 km radius. Additionally, each city has its ASAD administrative committee's legal boundary.

To do land cover and land use classification on street level, high-resolution satellite or aerial imagery is necessary. For instance, LANDSAT 8 has 11 bands measuring electromagnetic wave from 0.43μm wavelength to 12.5μm wavelength. Only band 1 to 4 sense visible light. Bands 2, 3, and 4 are visible blue, green, and red. Identifying

different land cover needs more than visible bands. A common combination is given by table 3.(ESRI 2013)

Table 3: Some common band combinations applied to LANDSAT 8. (ESRI 2013)

Natural Color	4 3 2
False Color (urban)	7 6 4
Color Infrared (vegetation)	5 4 3
Agriculture	6 5 2
Atmospheric Penetration	7 6 5
Healthy Vegetation	5 6 2
Land/Water	5 6 4
Natural With Atmospheric Removal	7 5 3
Shortwave Infrared	7 5 4
Vegetation Analysis	6 5 4

This multispectral high-resolution imagery is very expensive, priced over $8 per km2. If each city's ASAD is 6 km radius and I need imagery over several years, only imagery purchase would cost tens of thousands of dollars, which is infeasible for this research. Free image sources like LANDSAT have lower resolution (30m) which is not useful here.

Luckily, Google Earth makes high-resolution satellite images over history freely available to public. Scholars who used Google Earth images to do land cover classification have used both supervised classification(Tilahun and Teferie 2015) and object-based methods(Q. Hu et al. 2013), and found the accuracy rate is about 80%, slightly lower than results from Quickbird satellite images. However, since Google Earth images only show visible bands, it cannot distinguish objects with similar shape and context but different spectral signature, like black road and black soil. Since I look at not only land cover but also land but also land use, unsupervised classification cannot give

the needed result and supervised classification would require big training data. Scholars tried techniques like deep learning to identify objects on meter- level images and draw maps(Jiao 2018)(Z. Xu et al. 2018), but those techniques are very complicated and computationally intensive, and digress from the theme of this research. Therefore, I decided to classify land in ASAD manually using Google Earth images.

First, I obtained all Google Earth historic images of research areas from 91weitu, a satellite image service company who provides images at low price. Those images only have visible RGB bands and are at a spatial resolution of 2.09 m; the size of each image is a 6 km radius circle; the satellites are the SPOT system operated by Centre National d'Etudes Spatiales (CNES)/Airbus Defense & Space; the time span is from 2003 to 2018. Next, I get rid of images that combine blocks taken at different time, that have large cloud cover, or that were taken soon after the previous ones (less than 10 months). The images are in geotiff format.

Second, I use Wacom Intuos, an electronics pen and tablet kit to draw on satellite images* in Adobe Photoshop. I paint “open water” and “airport” area with distinguishable color. I also paint either “buildings and infrastructure” or “other” depending on which one is smaller.

Next, I use R to read those painted geotiff files. Each land class painted in a distinguishable color would have its own band signature. Dividing the number of pixels bearing each band signature by the total pixel number in the image, I got the proportion of each land class in the whole research area at a specific date. For instance, “open water” was painted as pure yellow and pixels in it would have values of band 1 (R)=255

AND band 2 (G)= 255 AND band 3 (B)= 0. There are *x* pixels with R=255 AND G= 255 AND B=0 and *y* pixels in the whole image taken on date *z*, then *x/y* is the proportion of "open water" class in the research area on date *z*. If one class is left unpainted, its proportion would be 1 minus the sum of all other classes.

Then the painting and reading procedures are repeated on images of all other dates. Due to the high manual labor input, I only did quantitative analysis on Guangzhou, Shenzhen, Xi'an, Zhengzhou and Chongqing ASAD. For Beijing, Chengdu, Hangzhou and Shanghai ASAD, I visually evaluated the general trend shown by imagery. Those cities are distributed in different regions of China.

In practice, the delineation of the airport's boundary is not always clear-cut, and sometimes it can be arbitrary. It is because an airport, as a special transportation hub, is both heavily secured from and closely integrated with nearby urban space. For example, in figure 17, an image of Zhengzhou Airport on 2015, August 22nd, the north, east, and south boundary is easy to draw along the ditch, but the west boundary is unclear. Area 1 connects to the runway and is relatively distinct from the surrounding green space, separated by narrow roads (marked as dotted line), so probably it is part of the airport. What about area 2? It is adjacent to the runway, so they can be cargo terminals or airport warehouses. But it can also be independent industrial area or hotel group. And its eastern boundary is indistinguishable. Area 3 is apparently the terminal building and part of the airport, but what about area 4? Are they auxiliary buildings like airport's offices or facility buildings, or are they third party hotels and warehouses?

Figure 17: An remote sensing image of Zhengzhou Airport

To know the exact answer to those questions, the ideal way would be to have a detailed map of this area of the exact same time as the satellite imagery. However, published maps are not up to date and the exact temporal information of features on the map is usually unavailable. It is especially problematic in ASAD where features change very fast during the development. Another way is to have the official land ownership records in ASAD, so I know the boundary of the airport. However, that information is also unavailable as discussed in previous chapter about open government information in China. Therefore, it is sometimes necessary to draw boundary of the airport arbitrarily along some roads.

In delineating “Buildings and infrastructure”, county roads and local roads are ignored; only highways and arterial roads are included. It is because county roads and local roads occupy lesser land in the whole area, and I am more interested in the general trend of land use change instead of precise values.

5.2 Results

Land in Guangzhou, Xi’an, Zhengzhou and Chongqing ASAD is classified into 3 categories, whereas in Shenzhen is classified into 4 categories because Shenzhen airport is by the sea (Pearl River estuary). The results are shown in table 4 to table 8. (water = “open water”, building= “buildings and infrastructure”). The first column shows the time, and other columns show proportion of total area (total =1).

Table 4: Guangzhou

date	Guangzhou		
yy-mm--dd	airport	building	other
061230	0.15002	0.21091	0.63907
121209	0.16874	0.24364	0.58761
141005	0.17047	0.25175	0.57777
151219	0.16952	0.25604	0.57444
170206	0.17107	0.26624	0.56269

Table 5: Xi’an

date	Xi’an		
yy-mm--dd	airport	building	other
061219	0.03206	0.10142	0.86652
101014	0.04255	0.09888	0.85857
120930	0.07916	0.10808	0.81276
150122	0.08038	0.13468	0.78494
160206	0.0804	0.13681	0.78279

Table 6: Zhengzhou

date	Zhengzhou		
yy-mm--dd	airport	building	other
091227	0.02846	0.12751	0.84403
150103	0.06371	0.20801	0.72828
150822	0.06371	0.20184	0.73444

Table 7: Chongqing

date	Chongqing		
yy-mm--dd	airport	building	other
090729	0.027982	0.127861	0.844157
131013	0.040886	0.178491	0.780622
180417	0.112906	0.233398	0.653695

Table 8: Shenzhen

date	Shenzhen			
yy-mm--dd	airport	building	other	water
090109	0.08157	0.39023	0.29047	0.23774
100331	0.08002	0.38893	0.29849	0.23256
131203	0.1126	0.3947	0.27508	0.21762
141123	0.11256	0.39525	0.27504	0.21715
151018	0.11256	0.38945	0.28212	0.21587
170302	0.11238	0.39399	0.27776	0.21586

Each city has its characteristics in ASAD process. For Guangzhou and Shenzhen, airports did not expand a lot during the last 10 years. But for Xi'an and Zhengzhou, airports expanded about 250%. It is impressive that in Chongqing the airport even expanded 4 times. It is also in Xi'an, Zhengzhou and Chongqing which buildings and infrastructure land increased the most. The buildings and infrastructure land in Chongqing doubled. In Guangzhou the growth is moderate and in Shenzhen it is almost stagnant. The "Other" category, mostly including cropland or natural land, decreased in all 5 cities.

In Guangzhou, the airport itself did not increase much, but buildings and infrastructure land increased about 25%. It is because other 4 airports were built around 1990 and recent increase in traffic required expansion projects, but Guangzhou airport just opened in 2004 so it can accommodate current traffic volume (more details in city introduction). The outer ring of the ASAD is apparently more urbanized than the inner ring adjacent to the airport. The reason might be the airport has strict clearance requirement for flight safety, or the airport authority reserved nearby land for future expansion. Except for the area immediately to the north of the airport, no other large

industrial cluster is observed. Neither did I observe sizeable urban high-rise residential neighborhood. Most factories are of small to medium size, or even workshops, and blended with low-rise residential communities developed on originally rural collective-owned land, called *chengzhongcun 城中村* in Chinese. A close view of such communities would be like figure 18 and 19. Most of the expansion of buildup area happened evenly around every existing villages or communities.

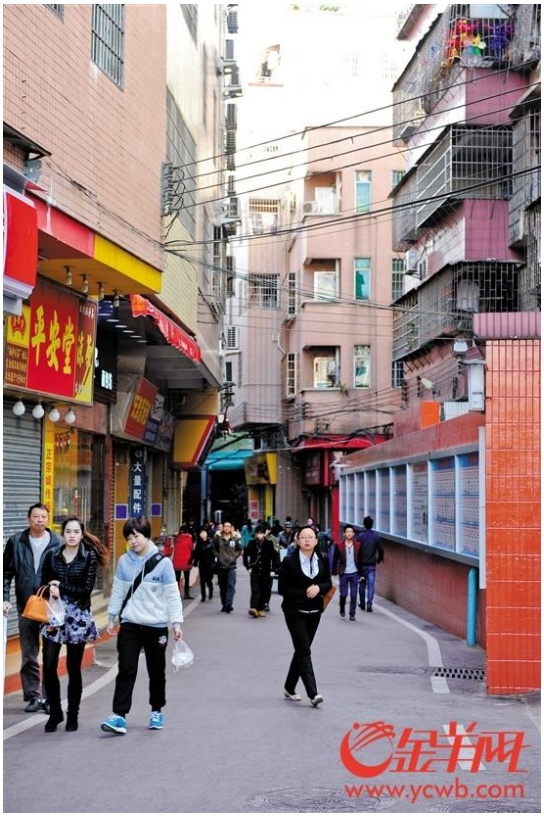

Figure 18: Chengzhongcun 城中村 in Guangzhou(www.65at.cc/image/3025953924_2081905686.html)

Figure 19: Chengzhongcun 城中村 in Guangzhou(www.65at.cc/image/3913550119_9945127.html)

In Shenzhen, the airport expanded about 40% during 8 years. On the south end the expansion was on a small piece of former cropland, and on east side it was by sea reclamation. It should be noted that bare land from sea reclamation without any construction is classified as “Other”. Shenzhen always has the highest proportion of buildings and infrastructure land within ASAD among the five cities (40%). All land around the airport is densely urbanized. To the north and east is industrial area, and to the south are several high-rise residential neighborhoods. Sizeable cropland has disappeared by 2017. Shenzhen was created as a Special Economic Zone in 1978 and has a hard border (quasi-national-border) to its south with Hong Kong, with a hilly terrain, so land resource has always been scarce. The 29.7 km2 Fenghuangshan Forest Park (a low mountain) and the 1.9 km2 Lixin Reservoir consist most of the “Other” land, which means all developable land in Shenzhen ASAD has already been

developed. Because after 2018 China's central government no longer approves new sea acclamation project (the State Council 国务院 2018), in future the land cover in Shenzhen ASAD should keep fixed. Another thing observed in Shenzhen ASAD is the demolition of old low-rise residence Chengzhongcun. That space is transformed to new, high-rise residential communities. Shenzhen developed from a village to a metropolis in just 40 years first by light manufacturing, and those Chengzhongcun gave affordable housing to many low skill, low income immigrant workers. But recently the government is trying to upgrade the economy to high-tech and service, and therefore the dwellings of low-income people are seen as low-value, messy and unsafe which should be demolished to beautify the city as well as to give space to middle-class, high-rise housing. A positive thing is that after demolition, no bare land was left for long, and the land was quickly either afforested or reused.

Zhengzhou and Chongqing are similar in vast airport expansion, apparent increase in buildings and infrastructure land, and decrease in "other". The difference is that Zhengzhou ASAD's terrain is flat whereas Chongqing's is hilly so there are a lot of terraces in Chongqing. There were more villages around Zhengzhou airport than Chongqing's in the countryside. A shared characteristic of the two ASAD is the obvious focus of development: in both cities large "*new zones" (新区)* were created, represented by continuous construction sites or barren land waiting for construction, continuous empty blocks within road grid, industrial clusters, and large high-rise residential neighborhoods each with dozens of buildings. Within these "*new zones*" old villages were completely wiped out; outside these "*new zones*" a lot of rural landscape remained.

Xi’an airport expanded 2.5 times, adding Terminal 3 and the second runway in the south in 2012. Xi’an ASAD had a slow and mild increase in buildings and infrastructure by 2016. New urbanization occurred in two areas: one immediately to the southwest of the airport along the connecting highway, and another further south. A few new highways and arterial roads appeared on the ground but had not formed a network. Two high-rise residential neighborhoods and two industrial concentrations were found, albeit much smaller than their counterparts in other cities. No continuous construction sites or bare land waiting for construction were found. By 2016, the vast majority of the rural landscape kept unchanged and Xi’an had the largest proportion of “other” land in those five cities. In the recent three years the construction of Xi’an ASAD has probably accelerated based on my on-site observation in summer 2019. More details about my fieldwork will be provided in chapter 7.

I visually evaluated the satellite images of Beijing, Chengdu, Hangzhou and Shanghai ASAD in the following time.

Table 9: Beijing, Chengdu, Hangzhou and Shanghai’s satellite images’ date

city	date	yy--mm--dd			
Beijing	030831	041118	060214	070425	080530
Beijing	090628	101108	120915	130926	150810
Beijing	170804				
Chengdu	011028	070626	100317	130126	170414
Hangzhou	031122	091125	130817	160208	170402
Shanghai	050320	110417	120527	131118	141214
Shanghai	170122				

In Beijing, the airport doubled in size by adding Terminal 3 and a new runway. Other than that, the urbanized area grew moderately. This area was already highly urbanized

in 2003 (estimate 30% land) and was more in 2017 (estimate >50%). The west and east side of the airport is more urbanized than the south side.

In Chengdu, from 2001 to 2017, the area around the original airport runway and terminal buildings has almost been fully urbanized. Furthermore, a new runway is constructed 2 km to the south, and the area east and northwest of the new runway has also been urbanized. Chengdu has the biggest absolute increment of developed land around airport among all these cities.

In Hangzhou, continuous urbanized area only existed along the Qiantang River in 2003. By 2017, there have been several areas with concentrated industrial buildings (along the river, west of the airport, south of the airport, and a lot of the ASAD is occupied by buildings. But those industrial aggregations are generally small, and landscape change has been gradual and ubiquitous without one location dominating.

In Shanghai, the Pudong international airport expanded more than twice from 2005 to 2017. The airport expansion was on both a large area of formerly densely populated villages to the west and on sea reclamation on the east. Considering the size and former population density, Shanghai airport expansion project may have replaced the most people among airport expansion projects in all these cities. Factories are concentrated along a narrow north-south belt west of the airport, and on the area northwest of the airport. During observed time, new factories were added closely around previously existing ones. In 2017, further west of the industrial belt were dense residential neighborhoods. The rural area south of the airport experienced little change

during the 12 years. Except for the airport itself, urbanization in the ASAD has been gradual; The absolute increment of “buildings and infrastructure” land is not big.

5.3 Discussion

The heterogenous pace of urbanization in ASAD may reflect dissimilar development models among cities, especially among eastern, coastal cities and inland, western cities. In eastern, coastal cities (Guangzhou, Shenzhen, Beijing, Hangzhou, Shanghai) urbanization is generally gradual and organic, whereas in inland, middle or western cities (Xi’an, Zhengzhou, Chongqing, Chengdu) it is often in large-scale and arranged.

In eastern Chinese cities, private and foreign enterprises prosperous, and local government is more used to market economy. Population density was always high. After three decades of fast economic growth, land price became high and land acquisition compensation was also high. Large infrastructure was relatively complete by 2000s. As a result, real estate developers or factory owners would, based on their business plans, choose to develop new projects or expand current factories little by little, and probably around existing ones, instead of converting a large piece of cropland into urbanized area. Therefore, urbanization around airports in eastern China is gradual and organic. Admittedly, I can still see separate clusters of industries and housing on remote sensing imagery, so government’s zoning still exists.

As discussed in prior chapters, fix-asset investment is an important engine of the economy, especially in western and central China. In middle and western Chinese cities, population density is relatively low, infrastructure is incomplete, and private economy and export are not as prosperous as in the east, so local government feels it is

necessary and effective to stimulate economic growth and attract external investment through direct actions such as infrastructure construction, large scale industrial parks building, and residential and industrial real estate development by state-owned enterprises. Moreover, in middle and western China, land acquisition compensation to peasants is directly set by local government with little marketized negotiation, and government policy tends to give low acquisition compensation (Hui Wang et al. 2017) so land acquisition is cheaper than in eastern China where peasants have more says on the compensation standard. First, the government- enterprise dual-identity ASAD administrative committee uses power to acquire land from peasants, then prepare land and build infrastructures. Later the committee will either sell land to other real estate developers and factory owners, or it will directly build office and factory buildings to attract enterprises, as well as residential neighborhoods. This is the practice of government's "land finance". That's the reason why satellite images show in many western cities near the airport, continuous cropland was cleared and divided by new roads, and large industrial agglomerations and residential neighborhoods were erected. Urbanization near airports in these cities are therefore in large-scale and arranged. This does not imply that urbanization in eastern Chinese cities occurred without government plans, but rather it emphasizes that local governments directly take developer's job in middle and western cities. Indeed, on the blueprint by Kasarda, the innovator and enthusiastic advocate of the concept "aerotropolis", "aerotropolis" is a planned city. So ASAD in middle and western China are closer to Kasarda's model.

Why do eastern cities' ASAD show different characteristics than middle and western cities'? As Zhang wrote, there are various types of levels of "the state" in transitional

China. In some cities, the public sector dominates most resources; in others, the market controls most resources, and local government has to work with the nonpublic sector (foreign investors, private entrepreneurs) in city development.(T. Zhang 2002) According to regime theory, the power balance in the coalition depends on each player's resources. In central and western Chinese cities, the nonpublic sector is weak, and local governments easily get land resources from acquisition. In eastern Chinese cities, the nonpublic sector is strong and has huge capital, while local governments' land requisition is hard since population density is already high. The power of peasants is also stronger in richer, coastal regions and weaker in poorer, inland regions. Different resources lead to different power balance, and different power balance reflects different development patterns: gradual and organic growth in the east and large-scale and arranged growth in the central and west. Still, no matter where, no single group is able to exercise comprehensive control in a complex world.(Stoker 1998) Local government, businesses and other civil players have to negotiate and compromise with one another, and combine their power to able to realize development. Consequently, in central and western cities land use and development status still deviate from the government's official plan somehow; and in eastern cities there are still government-planned industrial parks.

In short, land cover and land use change in ASAD in different cities proves Mossberger and Stoker's claim: " the relative strength of business, the composition of particular businesses engaged in the coalition, and the presence of other interests, such as neighborhood groups or environmental groups, will vary from place to place and may change over time." (Mossberger and Stoker 2001)

Additionally, as it is shown in Shanghai, and Shenzhen, the closer the airport is to an already urbanized area, the less room is left for further urbanization around airport. Here aviation related economy is likely to mix with other activities in nearby urban blocks rather than exist in separate zones.(Tang, Wang, and Zhang 2009)

Chapter 6. Computational text analysis of news articles[11]

6.1 Method

I did a computational text analysis on official newspaper articles about ASAD to observe local governments' perspective on city planning and governance, as well as opinions of civil players including scholars, entrepreneurs and the masses.

While official plans are static and ideal, news articles can reflect ongoing events in broader society. It is noteworthy that news does tell how the government sees the ASAD and how it wants general public to see the ASAD, instead of revealing an all-around, in-time and accurate image of the ASAD. It is because media in China is strictly controlled by the government, and in fact each provincial and municipal committee of the Communist Party of China (CPC) publishes an official newspaper called "X Daily". For instance, CPC Beijing Committee has "Beijing Daily", CPC Shenzhen Committee has " Shenzhen Special Zone Daily", and CPC Guangdong Committee has "Nanfang Daily". As the industry manager, CAAC also publishes "CAAC News" as the sole official newspaper for the civil aviation industry.

Computational text analysis means using a computer to explore meanings embedded in texts. Traditionally, scholars in social science and humanities read scripts manually to gather information. Starting from around 2010, with the advancement of techniques in natural language processing, information retrieval, text mining, and machine learning,

[11] The idea of doing computational text analysis is my own, but the design of the analysis was jointly done by Mr. Zhaosong Zhang, Mr. Jiaqing Liu, and me. Zhang and Liu are students in the Department of Computer Science at the Northwestern University in China. Zhang and Liu did finished the programming and running of the analysis, while I interpreted the results.

people have developed a range of theories, models, and algorithms to use computer “as a tool for discovery and measurement of prevalent attitudes, concepts, or events in textual data”. (O’Connor, Bammany, and Smithy 2011) Some praised computational text analysis as “a revolutionary method for the analysis of text at an order of magnitude never before possible”. (Brown 2016)

According to O’Connor et.al, the rich variety of computational text analysis methods can be measured on two axes: domain assumptions, i.e. how much knowledge of the specific subject containing the research question is used in analysis; and computational and statistical complexity, i.e., how much calculation the computer does. In choosing a method, people need to balance between simplicity and expressiveness.(O’Connor, Bammany, and Smithy 2011)

Surely as a new set of methods, computational text analysis in social science is still developing, and there are many debates about its advantages and drawbacks, tips and cautions, meaningfulness and limitation of results, etc.(DiMaggio 2015)(Grimmer and Stewart 2013). The purpose of using computational text analysis in my research is to advocate that innovative set of methods in the subject of geography, and to speed up research progress, instead of engaging in philosophical or technical discussions of computational text analysis.

Keyword extraction is a popular aim in computational text analysis.(Monkeylearn n.d.) Next, I am going to demonstrate how to use the simple Term-Frequency-Inverse-Document-Frequency (TF-IDF) method to extract keywords from news articles.

The logic of TF-IDF is that if a word is relatively rare in daily language environment but frequently appears in the aim article, then that word probably reflects the character of that article.(“TFIDF 介绍[TFIDF Introduction]” 2016) Term-frequency (TF) is the number of times word X appears in the aim article. To standardize TF among articles of varied length, I calculate TF by:

$$TF(x) = \frac{number\ of\ appearances\ of\ word\ X\ in\ aim\ article}{length\ of\ aim\ article}$$

For example, if “people” appears 5 times in a 500 words article, then its TF is 5/500=0.01.

IDF (inverse-document frequency) is a weight given to each word, inversely proportional to the commonality of that word in daily language environment. Here I need a corpus (a database of large quantity of daily language) to simulate the real language environment. This corpus should be representative and covering all aspects of social life. It exists independently of the study aim. I calculate IDF by:

$$IDF(x) = log\frac{number\ of\ articles\ in\ the\ corpus}{1 +\ number\ of\ articles\ in\ the\ corpus\ that\ contain\ word\ X}$$

In this research, I chose the corpus generated by Li from Fudan University (R. Li and NLP group of international database center of school of computer science at Fudan university, n.d.) because the program I use is adapted from Li’s code. It contains about 20000 Chinese articles.

I calculate TF-IDF by:

$$TF - IDF(x) =\ TF(x) * IDF(x)$$

High TF-IDF indicates high representativeness of the character of the aim article.

In calculating the TF-IDF of all words in a news article, I did not calculate for “stop words”, which are function words in grammar, i.e. articles, prepositions, conjunctions, and interjections.

After getting the TF-IDF of all words in one article, I wanted to find common characters among all news articles of the same city. However, it is clear by its definition that IF-IDF calculated from different articles cannot be added up directly. Therefore, in one article I first found 5 words that have the 1^{st} to 5^{th} highest TF-IDF, called them “key keywords words” and gave them a score of 1; I found the next 5 words that have the 6^{th} to 10^{th} highest TF-IDF, called them “keywords” and gave them a score of 2. Next, I collected all “key keywords” and “keywords” in articles about the same city and aggregate their scores among articles. I thought words with the highest aggregated scores best represent the common characters of that city’s news articles.

In the realm of computer science, computational text analysis requires “big data” to generate meaningful results, and “big data” here is usually on the magnitude of at least tens of thousands of articles. However, in social science, the articles about a specific topic are often limited, and therefore people can only observe results within this limitation. China Core Newspaper Full-text Database by CNKI is a database collecting 605 Chinese newspapers’ full text since 2000. It contains the official CPC newspapers of all provinces and big cities as well as industry administrations. Commercial or entertainment newspapers are not included. I did a title search with the colloquial synonym of ASAD (“airport new zone”, “airport new city”, “airport economic zone”) to

look for aim articles. Some cities only have few articles, probably because the database is incomplete. The quantity of news articles for each city is as following:

Table 10: Count of news articles collected by city

city	count of news articles
Beijing	86
Chengdu	21
Chongqing	1
Guangzhou	8
Hangzhou	2
Shanghai	3
Xi’an	16
Zhengzhou	28
total	165

6.2 Results

The results of 10 “key keywords” and “keywords” with the highest aggregated scores of each city are as following:

Table 11: Key keywords and keywords by city

city	words(aggregated scores)
Beijing	airport(78) development(65) beijing(59)**[12] industry(59) economy(49) tianzhu(37)** capital(35) company(31) (27) core area(26)
Chengdu	chengdu(33)** airport(27) development(21) international(20) city(13) construction(12) industry(10) aviation(8) culture(8) center(7)
Chongqing	(industrial)park(2) airport(2) industrial(2) innovation(2) industry(2) development(1) company(1) project(1) construction(1) research(1)
Guangzhou	development(13) airport(9) industry(9) guangzhou(8)** huadu(7)** aviation(5) new(5) baiyun district(4)** city(4) economic zone(4)
Hangzhou	airport(4) hangzhou(3)** aviation(2) demonstration area(2) development(2) economic(2) flight(2) industry(2) demand(2) airspace(1)
Shanghai	economic(5) airport(4) aviation(4) freedom(4) international(4) development(3) trade zone(3) center(2) industry(2) yangtze-delta(2)**
Xi’an	development(28) airport(25) economic(18) aviation(15) industry(15) construction(12) international(10) new town(10) xi'an(10)** city(8)
Zhengzhou	development(45) aviation(44) zhengzhou(32)** economic(27) experimental area(19)** industry(19) airport(14) construction(14) economy(13) port(9)

[12] Double-starred words are place names.

6.3 Discussion

While each city has its character, apparently all those news articles emphasize “economy”, “industry” and “development”, and most cities are interested in “aviation” and “construction”. As said earlier, these news articles reflect local governments’ perspective on city planning and governance. I can conclude that local governments take a pro-growth perspective with economic growth as the center goal and encouraging certain industries in the ASAD as the method.

In their book “Aerotropolis: The Way We'll Live Next”, Kasarda and Lindsay draw a blueprint of “aerotropolis”, a city built around the airport. The aerotropolis is a combination of giant airport, planned city, shipping facility and business hub. The airport is the center of the city because it keeps workers, suppliers, executives and goods in the aerotropolis connected with the global market, but the city is a diverse place.(Kasarda and Lindsay 2011) Many enterprises locate there, and many people live there not because they are in aviation-related industries or utilize air transportation every day, but are attracted by convenient transportation, a beautiful environment and the aggregation of capital, technology and talent. Overemphasizing aviation-related industry in ASAD is a misunderstanding. As Marshall wrote, companies of many different industries in an agglomeration benefit from input sharing (shared infrastructures), labor market pooling, and knowledge spillovers, which is described as “urbanization economies”. Urbanization economies are a type of external economies of scale.(Marshall 1920) Industries have direct, indirect, and induced effect on one another. An industry can provide raw material, services and market to other industries. An area

having a diverse economy is more resistant to economic volatility. A prosperous, sustainable and robust city must be a diverse one.

The pro-growth perspective of local government can be explained by growth coalition theory. In western countries, private land-owners, developers, financiers and realtors comprise the rentier class.(Peck 2009) But in China, local government is the biggest member of the “rentier class” because local government has core political and economic interests in local economic growth. On the political dimension, the legitimacy of levels of Chinese government does not come from elections but achievement on promoting economic growth, raising people’s living standard (through industrial employment) and maintaining social stability.(X. Sun and Huang 2016). So local economic growth is essential for improving the legitimacy of government and the political performance of local officials. On the economic dimension, because local government is the biggest land-owner in the city and the biggest developer in ASAD, it benefits hugely from the “land finance” in ASAD discussed earlier. It also receives tax revenue from industries. Naturally, local government will take a pro-growth perspective on city planning and governance in ASAD.

Chapter 7. Case study Xi'an ASAD

Mossberger and Stoker pointed out that the power balance and the composition of business and other civil players in urban regimes varies from place to place.(Mossberger and Stoker 2001) In north China, the public sector is dominant in the economy, but in the south the marketplace controls most resources and local government has to work with other players in governance. (T. Zhang 2002) Zhang and Liu commented in their study about city renovation in Shanchang Village, Zhuhai that each city's renovation process is different due to local political structures. The formation of Shanchang's growth coalition led by developers and villagers depends on the relatively mature civil society and enough autonomy and participation of villagers in coastal areas. In some other cities, the growth coalition ignores social costs and only pursues capital return and government's achievement. (Zhengtao 章征涛 Zhang and Liu 2019) In order to correctly comprehend the internal mechanism of ASAD, i.e. the participants and their behaviors and interactions, I need to do a case study.

Additionally, through study of the land cover and land use change using remote sensing data and the computational text analysis of news articles of each city's ASAD, I found that ASAD in China have some similarities, while each ASAD is somehow unique in its history, current status and future plan. This means some findings from the case study are generalizable to other ASAD, while others are specific to this city.

I choose Xi'an as a case study because Xi'an is a typical second-tier city in China and Shaanxi province often ranks in the middle in many national rankings. Xi'an Xianyang International Airport is one of eight region hub airports in China, and most Chinese

ASAD form around international gateways and regional hubs. Xi'an Airport Economy Demonstration Zone is one of 13 of its kind approved by the central government. The findings from Xi'an can therefore reflect the general trends of ASAD in China. Also, the data were relatively ample about Xi'an ASAD.

7.1 Tax data analysis

Tax data can reflect the prosperity of each industry in Xi'an ASAD. Individual tax can reflect the situation of the job market. Xixian Airport New City Tax Bureau oversees the tax collection from all individuals working in and businesses operating within the administrative boundary of the New City, the core part of Xi'an ASAD. Since employers also deduct employees' individual tax and pay social insurance to the tax bureau, they need to report the employee numbers. The following analysis is based on tax data from the Bureau in 2016 and 2017. In the first three sections, I will present individual tax data, cooperate tax data and employment data. A combined discussion section follows.

7.1.1 Individual tax

Chinese tax law requires individuals of high annual income to file tax reports to their workplaces' local tax bureau yearly. The standard is set by the central government at 120000 (≈ 17000 USD) nationwide, or 3 times of the per capita annual disposable income of Xi'an urban residents.

Of all high-income individuals in 2016 in the New City, 60% worked in the China West Airport Group or its subsidiaries. 8% worked in general aviation industry, and 33% worked in other industries.

Among all high-income individuals, those who worked in “other unspecified service”, “tourist hotel” and “motor vehicle fuel retail” has the highest average income, while the lowest average income is observed in “property management”, “general cargo road transport” and “general administrative agency”.

High-income individuals mostly consist of company owners, high level managers and experts. The nationality composition of high-income individuals can tell how much international talent the ASAD can attract. in 2016, 699 high income individuals are China mainland residents, 5 are Hong Kong and Macau residents, and 4 are foreigners. In 2017, 1838 are China mainland residents, 4 are Hong Kong and Macau residents, and 11 are foreigners.

By employer, in 2016 over 62% high-income individuals work in the China West Airport Group or its subsidiaries. Five land and real estate rent or developing companies each has 2.1%, 1.4 %, 1.4%, 0.56% and 0.56% individuals. In 2017, the Airport Group and its subsidiaries still employs over 64% high income individuals, and the Hainan Airlines Modern Logistic Company has the second most, 3.34%. No other company has more than 1% share of high-income individuals.

In both 2016 and 2017, more than 99.9% of total income received by high-income individuals were wages and salary, only less than 0.01% were interest, stock dividends and stock bonus. Professional service payment was even less.

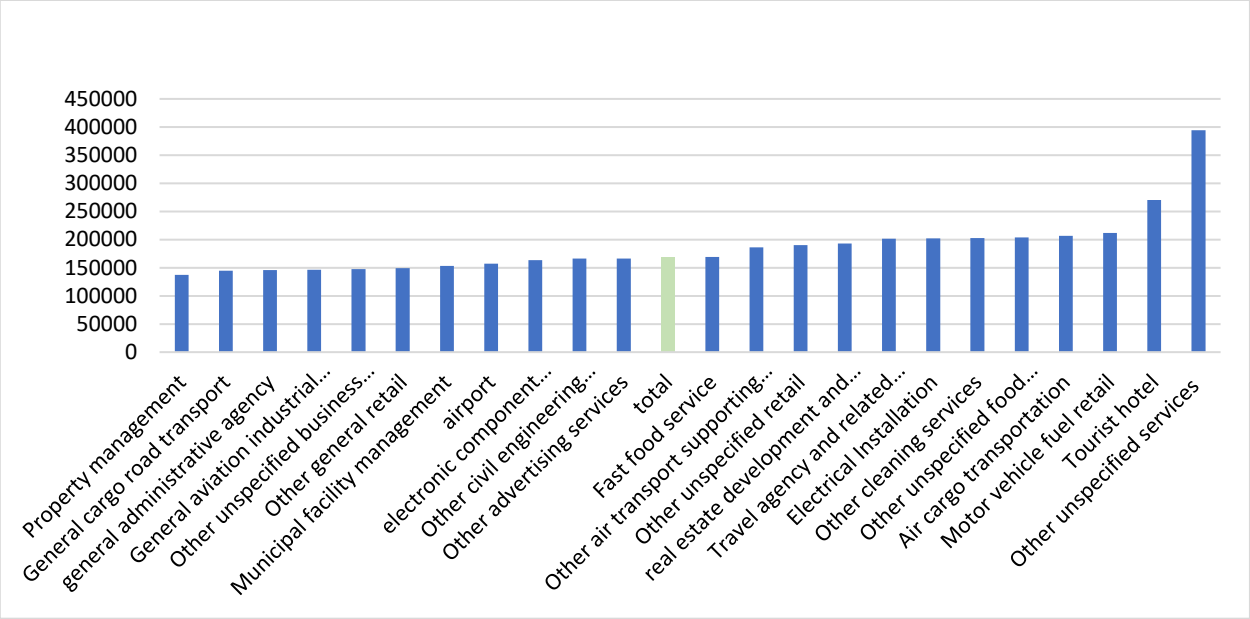

Figure 20: Average income of high-income individuals by industry.

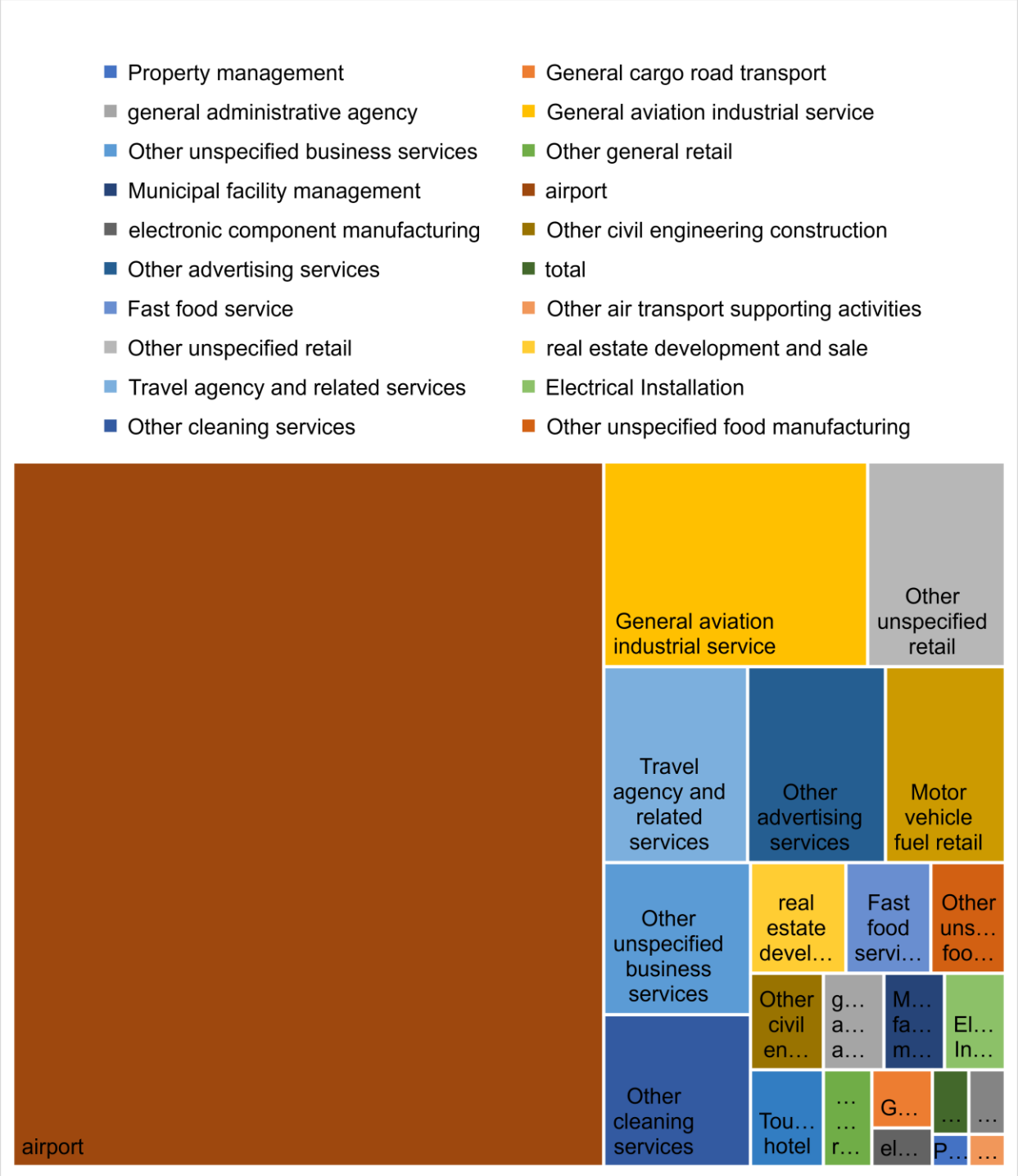

Figure 21: Number of high-income individuals by industry.

Individuals can also run a business without registering a company, which is called self-employed or sole proprietorship. It is often micro-business or street vendors. Owner of sole proprietorship with less than 100000 monthly revenue does not pay value-added tax but counts profit as personal income and use the same tax rate as wage and salary. In the New City, the following industries have more than 2% of the total number of sole proprietorships running by July 2018.

Table 12: Sole proprietorships divided by industries (over 2%)

Industry	Proportion in all sole proprietorships
Budget lodging	24.88%
restaurant	14.63%
Grocery retail	8.1%
Other general lodging	4.2%
homestay	2.54%
Hairdressing and beauty	2.44%
Other residential service	2.24%
Telecom device retail	2.24%
Clothing retail	2.05%

7.1.2 Corporate tax

Other than sole proprietorships, business can also be registered as companies. By Chinese Company Law all companies are limited companies where the liability of company members or subscribers is limited to their stake in the company by way of investments or commitments. A company needs to pay company corporate income tax, value-added tax, and other surcharges.

In China any company who has temporary business (less than 180 days) outside the city it registers in needs to report to that local tax bureau. If the business lasts for more than 180 days, this company needs to register a local subsidiary. The number of

temporary reporting companies can reflect how much commercial interaction a city has with other regions. In the New City, 30% of all registered companies in 2018 were temporary reporting companies based in other cities.

The following industries have more than 2% of the total number of companies running in the New City by July 2018.

Table 13: Companies divided by industeis (over 2%)

industry	Proportion in all companies
Budget lodging	7.87%
Other unspecified construction	6.92%
Other construction and installation	6.6%
restaurant	5.15%
Residential housing construction	4.64%
Grocery retail	3.87%
Public building decoration	2.84%
Other civil construction	2.84%
Chicken farm	2.13%

Besides basic information, each company also reports its operation condition to the tax bureau to calculate tax. This information can tell if certain industry is prosperous and profitable in the New City. In 2016, the 10 industries with the highest company average revenues were: other air-transport supporting activities; real estate rent operation; tourist hotel; electricity and gas installation; other advertising service; courier service; cosmetics and hygiene product retail; other residential service; other road, tunnel and bridge construction; real estate developing.

The 10 industries with the highest average profits (revenue + non-operational income operation cost - fixed-asset devaluation - non-operational cost) were: other air-transport supporting activities; other advertising service; electricity and gas installation; other civil

construction; real estate rent operation; cosmetics and hygiene product retail; real estate developing; courier service; other road, tunnel and bridge construction;

Industries with the biggest loss were: rice, flour and cooking oil wholesale; alcohol, beverage and tea wholesale; other unspecified manufacturing; investment and assent management; restaurant; budget hotel chain; café; other cleaning service; accounting, audition and tax service; fast food service; travel agency; lodging; residential housing construction; public building decoration.

“other air-transport supporting activities” had a company average cost way higher than other industries.

The industries with over 10% profit rate were (high to low): other civil construction; real estate developing; property management; art and craft retail; other advertising service; cosmetics and hygiene product retail; electricity and gas installation; other construction and installation; legal service; other air-transport supporting activities; real estate rent operation.

Rice, flour and cooking oil wholesale, investment and assent management, and alcohol, beverage and tea wholesale had profit rates of -1644%, -10758%, and -20912% respectively, all were way much than other industries.

In 2017, the 10 industries with the highest company average revenues were: real estate rent operation ;other air-transport supporting activities; tourist hotel; other advertising service; cosmetics and hygiene product retail; courier service; real estate developing;

other road, tunnel and bridge construction; other residential service; property management.

The 10 industries with the highest average profits were: real estate rent operation ; other advertising service; cosmetics and hygiene product retail; other civil construction; courier service; property management; other residential service; other road, tunnel and bridge construction; general freight road transportation; real estate developing.

The industries with over 10% profit rate were (high to low):other civil construction; other advertising service; real estate rent operation; cosmetics and hygiene product retail; general freight road transportation; restaurant; other cleaning service.

Other food retail, rice, flour and cooking oil wholesale, other unspecified manufacturing had profit rates of -425.25%, -738.85%, and -807.34% respectively, all were way much than other industries.

7.1.3 Employment

Companies not only contribute a lot of tax but also provide jobs. The New City tax bureau had a selection of companies with numbers of employment on record by July 2018, yet the criteria of selection and the representativeness of these companies are unclear. These 151 companies employed 7899 workers. These companies were categorized in the following table.

Table 14: Count of companies and their total workers by company size

Company size (number of workers)	count of companies	Total workers
⩽10	107	457
11~50	25	636
51~100	6	424
101~500	7	1264
⩾501	6	5118

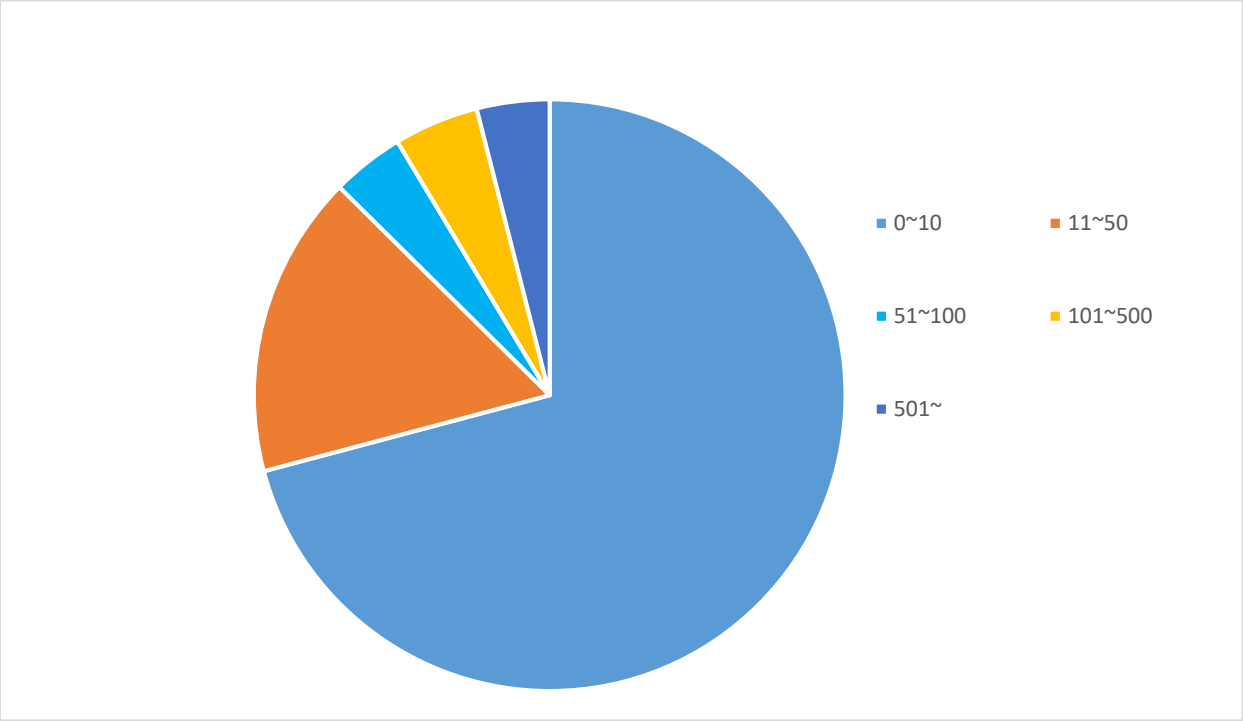

Figure 22: Count of companies by size

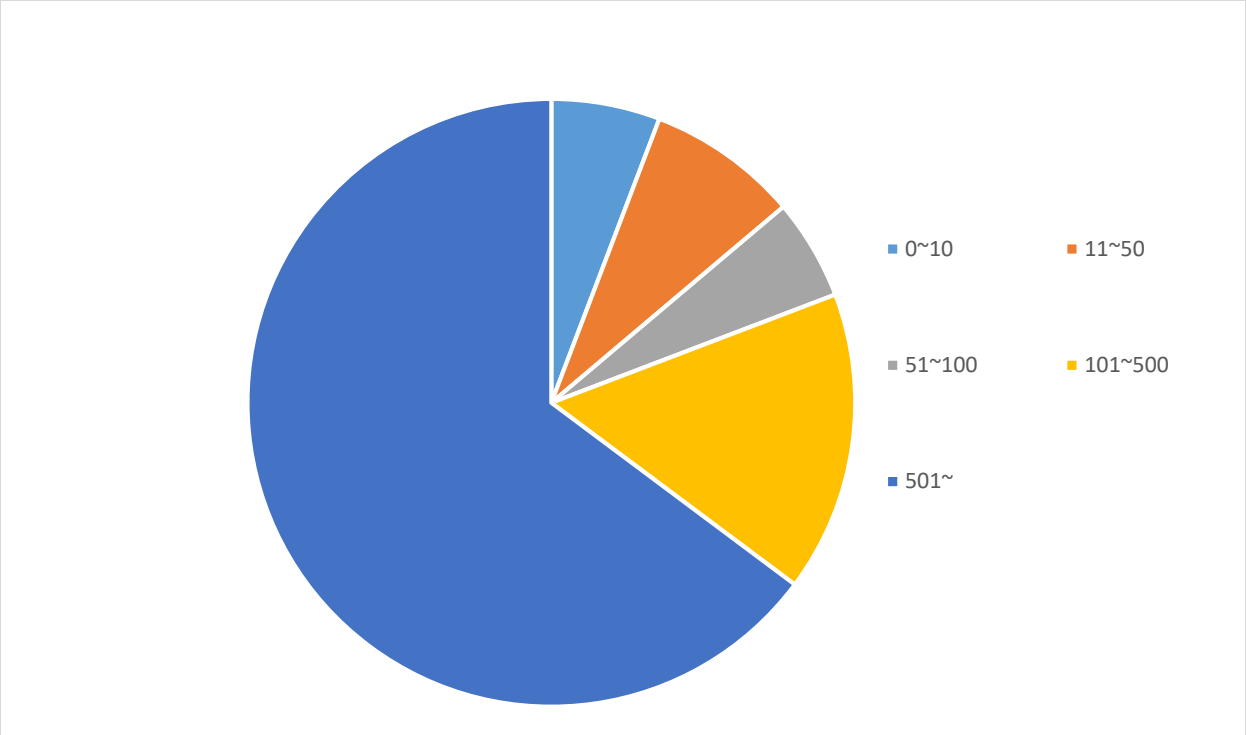

Figure 23: Total workers by company size

According the 2018 tax record, a few industries provide a considerable proportion of jobs. Other air-transport supporting activities and other residential service each employs over 1000 people. Tourist hotel, passenger air-transport, property management and courier service each employs 500-1000 people. Other unspecified service and residential housing construction also employs over 200 people each.

The largest employers in the New City (and their employers) are: Airport Group ground service ltd (1467), Airport Group airport cleaning company (1100), Chang'an Airlines (738), Airport Group tourism ltd (685), and Airport New City property management company (owned by the Airport New City Administrative Committee) (604).

7.1.4 Discussion

Here I will discuss the observations from individual tax data, corporate tax data and employment data in order.

From individual tax data, the China West Airport Group (and its subsidiaries) was not only the concentration of high-income individuals, but also the largest single overall employer in the New City. If looking at the revenue, it is clear the New City economy was heavily dependent on the airport itself without enough diversification. Other market participants were too weak to have a meaningful contribution, and voice, in the ASAD. The small spillover effect of the airport is an indicator that the ASAD is still at an infant stage.

The small number of Hong Kong and foreign high-income individuals in the New City may suggest three things. First, the ASAD still had a very limited attraction to international talent. Second, since foreign invested enterprises are keen on hiring foreigners, a low proportion of foreign managers corresponded to limited quantities of foreign enterprises in Xi'an. Third, most companies in the New City still focused on local- or domestic- demands because high-end service industries targeting at global customers hire more international talent then local-based companies do.

Both growth coalition theory and regime theory have not generally considered the force of globalization, but nowadays if a city wants to be influential it must deeply integrate with globalization. Incoming investors and professionals can be key participants in local growth coalitions. Their monetary and intellectual inputs accelerate the progress of ASAD, during which the assets of local government, residents and foreign investors in

the ASAD all appreciate. Alternatively speaking, foreign investors and professionals cooperate with local players to build an urban regime for a common goal. The local government needs foreign direct investment (FDI) to create tax and jobs and political achievement; local businesses need FDI, the latest advanced know-how in industry and commerce; foreign capital and professionals need new market; and local residents need jobs and supply of world-class goods and services. A prosperous economy is their common goal.

A way to attract talent is to increase the non-wage proportion of total income. Many startup companies give their employees stocks to encourage employees to work hard and grow with the company, rather than simply giving them high wages. Enterprises in ASAD can also try this method. Also, the payment for professional service was neglectable, which means little external talent were barrowed by the ASAD in the form of purchasing services instead of employment.

From corporate tax data, in both sole proprietorship and company, lodging of all kinds had the largest quantity of entities. Lodging is a very flexible industry with low access threshold, huge variation of capital investment and labor input. It can be as small as a homestay or as big as a five-star hotel. However, another possible factor that can explain this high quantity is that lodging is a very highly surveilled industry in China because the government wants to ensure every citizen is traceable. Almost no informal economy exists in lodging industry in China and therefore the government has very accurate records of entities in this industry.

Those industries with the highest revenue, profit, and profit rate are outstanding. “Other air-transport supporting activities”, including ground service and aircraft maintenance is an example of high access threshold, highly regulated, high capital input, high revenue, but moderate profit rate industry. Real estate developing is similar. On the other side, “other advertising service”, “real estate rent management” were profitable, when there were only 3 to 4 companies of each industry in the ASAD and several were owned by the China West Airport Group or the New City Administrative Committee. Construction and installation industry benefited from urbanization in the ASAD and it is also an industry with sufficient competition and low access threshold in China. Cosmetics and hygiene product retail is a special case because it is a monopoly in the New City: the duty-free shop in the airport. This shop is only accessible to international travelers flying the airport. Other than contributing profits to the Airport Group, it has no spillover effect beyond itself and will not have in future due to its nature.

Food and beverage wholesale and retail had an astonishing bad performance in the New City with unreasonable number: loss rate over 10000%; but the only company registered in food whole industry is the New City Urban-Rural Development Company, and therefore I suspect it was an error in the tax data. The negative number of “investment and asset management” and “other manufacturing” may result from that companies reported up-front costs in current year while generating revenue in future, or from a data error.

From employment data the job market is polarized. Giant companies (>100 employees) consist only 4% of all companies but provide 65% of all jobs. Micro-business (⩽10

employees) consist 71% of all companies but only provide 6% of all jobs. Because these data represent only a selection of companies, I do not know if this polarization applies to the whole ASAD. Three out of the five largest employers were subsidiaries of the Airport Group, and another was the general service company of the ASAD administrative Committee. Both private enterprises and small businesses provided limited jobs, or their employment information was not recorded accurately by the tax bureau.

Based on my fieldwork in 2019 there are many industrial and commercial projects recently finished or still under construction in the New City. So far, the ASAD's economy has been overdependent on the airport itself, but it may soon become diverse.

It should be noticed that like in many other developing countries, agriculture and the urban informal economy in China provide significant employment especially in rural and rural-urban transition areas, although their output is small compared with the formal economy. Since China does not have agricultural tax, both agriculture and urban informal economy are not reflected in tax data. This may lead to an overestimate of big companies' weight in the overall job market, but not in mid- to high-income job market. Moreover, this analysis of industries should cover most economic output in the ASAD and most fields in which investors are interested.

It should also be noticed that some development is happening outside the administrative boundary of the New City and therefore not was reflected in the New City's tax bureau's data. For instance, I saw several industrial parks under construction south of highway G70 during my fieldwork. However, these parks are relatively few

compared with projects within the New City and did not have any output yet, so ignoring them will not prevent me making a basic judgement of Xi'an ASAD.

Regime theory realizes that the relative strength of businesses and the composition of particular business in the coalition will change from time to time.(Mossberger and Stoker 2001) In ASAD, this is especially true for the Airport Group, construction and installation, manufacturing, residential service, lodging, and restaurant.

China West Airport Group performs well on profitability and employment from the tax data. Owning a lot of resources, it has strong power in the governance of the New City which is reflected in urban planning. For example, Xi'an Airport Intercity Railway was built mainly for the airport and several other inter-city railways are planned to interchange at the airport. The airport will continue to be essential in the New City as air transportation keeps workers, suppliers, executives and goods in Xi'an connected with the global market. If the New City can develop as planned, the proportion of the Airport Group in the whole regional economy and job market will shrink although the airport business continues to grow. A prosperous, sustainable and robust regional economy must be a diverse one.

At present, construction and installation industries are profitable because the New City is quickly urbanizing: numerous factories, office buildings, hotels, and housing neighborhoods are under construction. Many local land-lost peasants work at these construction sites.(Shi 2014) After most of the New City is urbanized, local construction and installation business will vastly decrease. By then some construction companies will disband and others will move to other places, and many land-lost peasants will need

vocational training in order to transfer to other jobs. When factories are complete and new urban residents move in, manufacturing, especially high-tech, high added-value manufacturing, and residential service industry will gain importance.

The future status of lodging and restaurant businesses in the New City will diverge depending on their market positioning. Currently they are the biggest in quantity but small in size and profitability. If the New City can attract high-tech industry, convention and exhibition industry, enterprises headquarters, middle class residents, and tourists, middle to high-end hotels and restaurants will have more opportunities.

In summary, the general trend is that regional economy in successful ASAD will continue to grow and diversify.

7.2 Fieldwork

During August 2018 I did an observation-only fieldwork in the Xixian New Area Airport New City near Xi'an airport, covering most urbanized area in the New City.

Urbanization is a complex progress, both visibly as the change of landscape, and invisibly as changes in social network and psychology. In chapter 5, I classify land around airports based on remote sensing imagery. Remote sensing only measures land cover; in order to know land use people need ancillary data and prior knowledge (Natural Resources Canada 2015), so my classification was only an estimation. Also, the latest remote sensing imaginary I got of Xi'an ASAD was in 2016, and according the New City's official website many projects started in the last 3 years. Fieldwork is another way to get accurate and updated land use information other than remote sensing.

In China all news media are state-owned or censored, but government itself has economic and political interests in ASAD, so news report may be biased. News is more likely to report progress than problems. Fieldwork is a way to see the real status of ASAD, especially what industries are prosperous there, and the living condition of land-lost peasants.

As Zhang mentioned, China is in transition. The public sector is gradually losing control over resource allocation to nonpublic sectors; and although government still leads on the municipal level, on the urban district level, market force has a strong influence, and many development activities take place on district level.(T. Zhang 2002) Consequently, local governments need to negotiate and combine power with businesses and other players (residents) to achieve agreed aims.(Castree, Rogers, and Kitchin 2013b) But Zhang's study was about Shanghai in 2002-- Xi'an would be different from Shanghai and 2019 would be different from 2002. Therefore, I want to compare the government's plan with the real status of Xi'an ASAD to know how much power the government has to realize its plan, and test if regime theory's judgement that "power is fragmented so no single group can have comprehensive control over cities" (Stoker 1998) applies to Xi'an ASAD. I will illustrate my fieldwork by factory, office and commerce buildings, and then housing and public service facilities. Each category is followed by a discussion.

Figure 31 is a map of sites I observed during my fieldwork.

7.2.1 Factory, office and commerce building

Immediately to the southeast of the airport's passenger terminals is the airport freight area, consisting of China Eastern Airlines Air Cargo Terminal, Xi'an Airport Air Cargo

Terminal, Yuantong Express Transfer Center and China Post Mail Processing Center all at the eastern part and Xi'an GLP Airport Base and Yunda Express Transfer Center at the western part. Air Chang'an, an airline company under HNA Group, also builds its operation base across the highway on the north of this area.

To the southwest of the airport freight area until the national highway G70 is an area of office buildings, including the Airport International Business Center already in use, and the office buildings of China Southern Airlines, Sichuan Airlines and Shenzhen Airlines under construction.

Airport International Business Center is the seat of the Airport New City Administrative Committee and several of its subsidiary departments and companies. The New City Comprehensive Service Hall is where all government departments set up counters together for the convenience of the masses. A Ytel, a mid-level chain hotel also locates here. I saw many pilots and flight attendants going in and out the hotel. Airlines not based in Xi'an Airport may choose this hotel as a rest place for its crew members due to its proximity to the airport. Agricultural Bank of China and China Construction Bank, two of the largest banks in China, both have branches in the Center. Among all office or industrial buildings that I visited in the New City, the Center was the most populous one besides airport terminals.

Further south across the highway G70 are several industrial parks under construction: smart automobile industrial complex of Baoneng Group, Qinhan industrial park, and HNA Group industrial park. Even only 3 – 5 km from the airport, land on this side of G70

is not within the administrative boundary of the Airport New City, but in another development zone- Qinhan New City.

To the north of the office building area and closely west of the airport, several industrial and office complexes are located along the Zimao Avenue, a north-south arterial road in the New City.

The southmost one is Baoneng Xi'an Airport Enterprise Headquarter Base project developed by the private-owned Baoneng Group. The project is planned on 98400 m^2 of land with 243740 m^2 of floor space according to the New City Administration Committee's website. It is planned to consist of commercial buildings, office buildings, furnished apartments and hotels. When I visited its planned site, tall grass grew on the fenced and vacant land and there wasn't any trace of ongoing construction. Baoneng Group fell into financial (Xixian New Area Airport New City Adminitrative Committee 西咸新区空港新城管委会 n.d.)

Two blocks north of the Headquarter Base is an aero-blade production and processing facility. The owner is Shaanxi Langwei Blade Manufacturing Co. Ltd. The project is planned on about 26700 m2 of land with 29300 m2 of floor space. It was scheduled to be constructed between 2016 and 2018, but when I visited the site the land was fenced and vacant and there wasn't any trace of ongoing construction.. (https://www.xxanc.gov.cn/zwgk/ggzypz/cdjsxm/6909.htm)

On the north of the aero-blade facility is the HNA Group Chang'an-Tianyu flight training center. According to an official newspaper *Shaanxi Daily*, this project is planned

on122666 m2 of land with an estimated total investment of 3.72 billion in 3 years. It was designed to train pilots, flight attendants and other technicians. When finished it would be the largest flight training center for aviation professionals in China.(J. Yuan 2018) When I visited the site, there were several large two-storey buildings with some equipment inside, but the detailed activities were unknown.

On the north of the training center was the aerospace energy-saving and environmental-friendly material manufacturing facility. It is owned by Shaanxi Houyi Technology Co. Ltd, a company specializing in harmless treatment and recycle of heavy metal pollutant. It was designed to have 71.8 thousand m2 of floor space including office, plant, research and development center, and warehouse. It was scheduled to be constructed between 2016 and 2018, but when I visited the site, I saw the concrete frame of two 5-storey buildings without roofs. Those two buildings only occupied a small corner of the fenced land. The construction was ongoing. (https://www.xxanc.gov.cn/zwgk/ggzypz/cdjsxm/6908.htm)

Two blocks northwest of the manufacturing facility is the plant of Shaanxi Meili-OH Animal Health Co. Ltd. The first phase project would cost 840 million and was planned on 100000 m2 of land. (https://www.xxanc.gov.cn/dzkg/yldcdxm/9301.htm) I found. This site when finished would have animal vaccine production plant, research facility and other buildings. When finished, this factory will be the flagship in biomedical industry in the New City. When I visited the site the plant buildings' foundation was under construction.

Two blocks north of the manufacturing facility is the Fuli Global Commerce and Trade Port. Two large 7-storey apartment buildings had been finished, the facades were installed but the interior were undecorated and vacant. The construction was ongoing.

On the west of the Fuli Port was the Shaanxi Cross-Border E-Commerce Parcel Industrial Park. The construction was ongoing.

On the east of the Fuli Port was the Shaanxi Xi'an Bonded Area. It started operation on July, 2016 and was planned on 0.36 km2 of land. It had 3 main parts currently: Xixian Bonded Logistics Center, the Free Trade Mall, and the Customs Clearance Service Center office building. The bonded zone is an important part of Shaanxi Pilot Free Trade Zone. The Logistics Center was a large close-access yard with many warehouses, but I did not see any trucks or goods around, and most of the warehouses were closed. The Free Trade Mall was a large, round 6 storey building with 62000 m2 of floor space, but I only found 3 stores on the first floor selling imported groceries. The stores were not busy. 4th,5th and 6th storeys were used by Xixian Airport New City Development and Construction Group, a business entity owned by the Airport New City Administrative Committee, but there was also a lot of vacant space. The 5-storey Service Center office building has 7800 m2 of floor space. The administrator of the Bonded Zone and the state-owned Shaanxi Airport Comprehensive Bonded Zone Investment Co. Ltd were located here. Some space on the first floor of the Center was vacant. There was also a Super-8 budget hotel open in the Bonded Zone.

On the north of the Bonded Zone is the Xi'an CEA Safran Landing Systems Services Co. Ltd. (XIESA). XIESA is a joint venture created on November 2016 by China Eastern

Airlines and Safran, a French aerospace and defense group. CEA Safran operates landing gear maintenance, repair and overhaul in China. It was designed to have 11000 m2 of floor space including 8700 m2 of workshops. The construction started in July 2017 and the plant was scheduled to open in early 2019. When I visited the site, the plant was open and operating.

Going north, there was the Core Logistics Enterprise Service Area along Zhengping Avenue, an east-west arterial road in the New City. Zhengping Avenue was also the current north limit of urbanized area in the New City. In the Service Area were Xixian Airport International Cold Chain Transport Center , Mapletree Xixian Airport Logistics Park, and GLP Park Xi'an Airport North. Freshhema Xi'an Fresh Food Processing Center locates inside the Cold Chain Transport Center. Freshhema, owned by Alibaba Group, is the biggest online fresh food retailer in China.

On the east of those logistics centers is the Airport Innovation and Start-up Industrial Park (mistakenly translated as "Double Wound Industrial Park"). It has 10 factory buildings with 150000 m2 of floor space. I saw two companies' signs inside, one of which is Shaanxi Houyi Technology Co. Ltd.

Between the northeast side of the airport and the Tangshunling Relics Park is another industrial and office agglomeration. In the middle is the already finished Aviation Investment Mansion. The Mansion is a three-point-star shaped, 5-storey building with 43000 m2 of floor space. The subsidiary departments and companies of the Airport New City Administrative Committee are located here except for the ones in the Airport

International Business Center. Tianju Aviation, an aviation service and plane rental company, also sets its headquarter in the Mansion.

On the north of the Mansion is the Civil Aviation Scientific Industry Base Incubator. It was planned on 61733 m2 of land with 9 buildings of 100167 m2 of floor space in total. . It was built to provide workshops for start-up companies in aviation related manufacturing and repair and to help them with all business services. Companies can arrange the interior space in those buildings according to production needs. I found several plants were operating on the first floor (e.g. Xi'an Tianyuan Aviation Technology Co. Ltd.), but overall the buildings were sparsely used.

On the northwest of the Mansion is the Hotel Cluster project developed by Shaanxi Chang'an Aviation Tourism Co., Ltd. The first phase project had 3 buildings of 4 to 6 storeys with 43202 m2 floor space, and the second phase had one 8 storey building with 56726 m2 floor space. The first phase project was undergoing exterior and interior decoration, and the second phase just started pit excavation.

An Airport ECO Center project was planned on the south of the Mansion. It was planned on 30000 m2 of land with 550 million investment. It has office space, apartments and retail space. I did not find any construction on its planned location during my visit, so probably the project had not started.

On the southeast side of the airport I found the Project Management Office of Xi'an Airport Intercity Railway. Construction of the Intercity Railway started on Dec.30th, 2011 and the railway started service on Sept. 29, 2019. This 29.31 km line, also called Xi'an Metro Line 14, connects Xi'an highspeed rail station and Xi'an Xianyang International

Airport. With 10 stations thought the Airport New City and the nearby Qinhan New City, it promotes the integration of Xi'an's urban core and the Xixian New Area.

7.2.2 Discussion one

The government requisitioned continuous, large areas of cropland from peasants to develop industrial and commercial projects, and these projects basically follow the zoning set by the government. Additionally, many projects are constructed by the Airport New City Development and Construction Group Ltd owned by the Administrative Committee (exp: Airport International Business Center, Civil Aviation Scientific Industry Base Incubator) or other state-owned enterprises (exp: Hotel Cluster). All these reflect that the government has huge political and economic power. The public sector still controls key resources such as land and huge capital, therefore leading in the coalition.(T. Zhang 2002)

However, there are also many private (exp: Fuli Global Commerce and Trade Port) or foreign owned (exp: Xi'an CEA Safran Landing Systems Services Co. Ltd.) factories in the New City. Several factories do not fit in government zoning. This reflects that the public sector has to approach nonpublic sectors (foreign investors, private enterprises, etc.) in securing economic development. Facing globalization, decentralization and privatization, local governments must "accept game rules exercising in international society and cooperate with nonpublic sectors who control resources".(T. Zhang 2002) As their relative power changes, they continuously negotiate and compromise. Of course, they all have an agreed aim-- economic growth. The role of other civil players (land-lost peasants and incoming urban residents) was not seen here.

In short, regime theory can explain the economic dimension of urban governance in Xi'an ASAD. Local government is currently leading the coalition of actors, but even local government does not own enough resources to finish ASAD all by itself, so all players have to combine individual power to form a more powerful collective regime (Castree, Rogers, and Kitchin 2013b) to have the capacity to implement ASAD.

An interesting phenomenon in Xi'an ASAD is that non-real-estate enterprises can also be members of the rentier class in growth coalition theory. These non-real-estate enterprises own large quantities of land and their interests are "place-based"(Peck 2009). In order to lure investment, local governments often lease land to enterprises at a discounted rate. Many enterprises will lease more land than their current operational need, both to prepare for future expansion and to profit from land appreciation through sub-leasing land to other enterprises. This may be why at many sites factory buildings only occupied a small part of the fenced land, and why many warehouses were built even though most were empty.

7.2.3 Housing and public service facilities

Residential real-estate development thrived in the New City. It can be roughly divided into two types: resettlement neighborhoods for peasants who lost cropland and original residence to the New City construction, and commercial housing for incoming residents.

There are three big resettlement neighborhoods in the New City:, one to the southwest of the airport called *Konggang-huayuan, KH* (literally means as "airport garden"), one to the northwest of the airport called *Konggang-yangguangli, KY* (literally means as "airport sunshine neighborhood"), one to the southeast of the airport called *Konggang-*

xingfuli, KX (literally means as “airport happiness neighborhood”).Those neighborhoods were constructed mainly as resettlement of and compensation to land-lost peasants in the New City, but also provide affordable housing and low-rent housing to incoming blue-collar labor.

KH is in the southwest side of the New City. This neighborhood has 4500 units of 331.7 thousand m2 total floor size in plan. The first period of the neighborhood was completed on the end of 2014. The KH neighborhoods mainly resettles land-lost peasants from area of Zhouling subdistrict north of highway G70, including 771 households in 4 villages.

By the time I visited, it looked many units were already occupied probably because this is the earliest resettlement neighborhood in the New City, but many units on higher storeys still looked vacant. Condominiums here have 6-storeys but do not have elevators which I learned from residents. Shops and restaurants were prosperous along the street. I also noticed the Airport No.1 Kindergarten and Konggang Garden Primary School were open. The original Beidu township clinic was renovated as Konggang Garden Community Health and Family Planning Service Center with cooperation with several big hospitals in downtown Xian and Xianyang. The kindergarten, school and service center looked as modern and well-equipped as their counterparts in downtown Xi’an. Adjacent to the finished neighborhood, I saw enclosed land for the following periods of the neighborhood construction.

KY is in the west side of the New City. This neighborhood has 1096 resettlement units of 110 thousand m2 and 600 low-cost rental housing of 31 thousand m2 in plan and

resettled land-lost peasants from Beidu Township. The construction was divided into multiple periods and by the time I visited, 37 5-storey condominium buildings had been largely finished except for interior work. They did not have elevators, either. Looking through the window, I found those units were all vacant, but cars were parked inside the neighborhood and on street. It was unsure whose cars those were. Shops along the street were few although some were doing interior decoration. The Konggang Yangguangli Primacy School and a senior apartment building had also finished construction except for interior work. Following periods of the neighborhood were mentioned in government planning but I did not find enclosed land nearby as construction sites.

KX is in the southeast side of the New City, and peasants from Dizhang Township were resettled here. Apparently, this neighborhood is designed more than as resettlement: it is much larger than the previous two. All condominium buildings here were 18 to 20 storeys high with elevators, and just the resettlement housing part would have 530 thousand m2 floor size in plan.

The construction was also divided into multiple periods. By the time I visited, several high-rise condominiums (116 thousand m2 according to a sign) had been completed and residents had moved in, and dozens of more buildings were under construction in nearby blocks. Businesses along streets here were fewer and less prosperous than in KH, but better than in KY. I did not find any school, senior apartments, or clinic open or under construction in KX although they were mentioned in government plan.

Two commercial housing projects I observed were the Xi'an International Art City and Airport Greenland New City.

The Art City was developed in the name of "art museum and artists' community" but is indeed a luxury housing project. It has convenient access to the airport and downtown, located right next to a station on the Xi'an Airport Intercity Railway. It has four parts: a "artists' small town" with semi-detached villas, a " artist residence" with 16 modern, mid-low density condominium buildings (6 to 16 storeys). Across the street were the Banlan-xiaozhen (literally means "colorful small town") to be constructed: 3 mixed-use commercial-office buildings and 4 commercial buildings in plan; and the Art Museum Cluster: Xi'an International Children's Art Museum, the only facility in the project really related to art. The museum was about 1/6 the size of the existing villa neighborhood.

The salesman emphasized the luxuriousness of the villa, priced at 30 to 50 million each. Villas' facades have European style, but the interior condition was unclear. According to the salesman I talked with, almost all units were gone shortly after sales started, but no one had moved in so far. On the blueprint more villas were to be built nearby. The villa neighborhood would be fully guarded and serviced by housekeepers and have beautiful green space. The sales of the condominiums had not started when I visited the site, so the exact price was unknown, but from the sandbox model the community would have very beautiful environment. Potential buyers in the sales office all drove here and seemed to be urban middle-class. The advertisement boards and brochures all emphasize the convenience of the location to the airport and downtown, shopping area, advanced healthcare, good quality international education, urban parks and museums nearby, and the potential appreciation in the value of this real estate. Interestingly,

although decorated luxuriously, the sales office wanted to disguise the real estate project as a cultural and art park: the advertisement bulletins outside were not about real estate, but about an nonexistent “international piano contest”. And the villas are not called “villas” on the brochure, but “artists’ studio to provide a space to artists to create, communicate and live” even common artists cannot afford it and big stars will not live here. Since building villas is illegal nowadays in China, the developer probably colludes with government officials and camouflages the real content of the project.

The Airport Greenland New City was developed by Greenland Group, a real-estate giant in China. According to its advertisement it would be an urban life complex with enterprise offices, shopping malls, luxury hotels, innovation industry, and high-end housing. However, the only thing I actually saw were commercial housing: semi-detached villas and townhouses in guarded neighborhoods with well-maintained green space, already complete and probably sold, but vacant inside; and many high-rise condominium buildings under active construction.

From appearance and design, those villas and condominium for sale were more elegant than the resettlement condominiums. For instance, all commercial housing has elevator, underground parking, and large, well-maintained green space.

An important educational facility in the New City is the New Maple Leaf International School-Xi’an on the south side of the New City. The school buildings were built by Airport New City Administrative Committee and the school was operated by the private-owned Dalian Maple Leaf Education Group. Maple Leaf Group is a school chain and has 83 international schools in 21 Chinese and Canadian cities. It provides bilingual

education successive from kindergarten to high school and mainly attracts students who want to go abroad for universities.

The International School was on summer vacation when I visited, so I did not see any students. But an admission officer introduced the school and gave me a tour on campus. The school opened in September 2016. At that time kindergarten to high school were all on the same campus, but a new campus across the street was undergone fitment and from fall 2019 semester would become the campus for the high school. Unlike nearby public schools which are day-only and free, this is a boarding school and students have to pay a pretty high tuition. The goal of the school is “providing an elite education through blending the best of China and the West”. The unique features, as described on a brochure, are bilingual and international education. Teachers include both Chinese and foreigners. Elementary school and middle school train students on English language while satisfying curriculum standard by Chinese government, The high school is accredited by British Columbia, Canada educational authority as all English-speaking teachers have Canadian teacher’s certificates and teach English, math, science, AP classes and scores more subjects with the English textbooks. Chinese-speaking teachers teach Chinese, history and geography. The Maple Leaf Schools also have innovative classes like theater performance, golf, robotics, programming, etc. Students here participate in many extracurricular activities, such as study abroad camps, community service, model United Nations, and business internships. As for graduates, they do not take the *gaokao* *高考* (college entrance examination in China), but go to universities overseas: 73% go to Canada, 12% to USA, 5% to Australia, and etc. Since I did not go inside local public schools, I could not compare the International School’s

facilities with theirs, but I observed the International School's campus was bigger, and its facilities and environment were no worse than top schools' in downtown Xi'an. Based on the tuition rate, the curriculum, the target schools of graduates, and words of the admission officer, this school aims to serve the increasing middle class from Xi'an and other big cities instead of children of land-lost peasants or incoming blue-collar labor in the New City. However, since the school buildings were constructed by the Administrative Committee, the facades did not look as splendid as international schools' in other cities.

Official plan also mentions the Airport International Hospital, the biggest and highest-level hospital in the New City, located near the International School. When I visited there the land was vacant and construction had not started.

According the hospital's official website (kggjyy.net), the hospital is a 1.18 billion joint venture of domestic and international capital. The framework is designed by HKS Architects from the US on 78666 m2 of land with 180 thousand m2 of floor space and 700 beds. Clearly it has a different positioning from the previous mentioned Konggang Garden Community Health and Family Planning Service Center. This hospital will be the only class-III grade A (the highest rank in Chinese health care system) hospital in the New City. Having 35% of the campus as green space, the International Hospital was planned to be "in garden, and utilizing information technology and best equipment and technology". It also advertised to "take advantage of its location near the airport and within the Shaanxi Pilot Free Trade Zone to pioneer in equipment and medicine import, foreign doctors' practice, and medical services to foreigners". The website says this hospital will "become the core of the healthcare system in the New City, and provide

healthcare to the Xixian New Area, Shaanxi Province, northwest China and even countries along the 'Belt and Road Initiative'". Although this announce may be a brag, apparently this hospital's design and perspective (if came true) far exceeds a hospital just for current residents in the New City.

From plan to price, these commercial housing, international school and international hospital aim at urban middle-class and the rich who will live in the New City when the New City becomes a mature urban area, or even middle-class from further places, rather than the land-lost peasants and blue-collar labors in resettlement neighborhoods nearby.

The original rural township did leave a little physical trace in urbanized areas. For example, I found the original township government, now called subdistrict office, of the Beidu Township. On the short street, besides the township government, I also found the electric power company's office, post office, judicial office, and many other grassroot government agencies. According to the spatial structure of other rural townships in China, this street was probably the original town center. After urbanization, businesses moved with resettled land-lost peasants, but government agencies remain.

7.2.4 Discussion two

As for commercial housing development, local government and real estate developers forms a growth coalition because they share "place-bases" interests. In western countries most land in cities is privately owned. But in China, local government is the sole urban land-owner. Its economic interests in commercial housing development were already talked in the " 'land finance' of local government" part. A similarity between the

West and China is that real estate developers have tremendous interests in commercial housing development. Considering the high housing price relative to average income in China, the low construction cost, the enthusiasm to own condominiums in Chinese culture, and barriers to entry, real developers in China earn “excess profit”, i.e. “profit of a firm over and above what provides its owners with a normal (market equilibrium) return to capital” (Deardorff 2016). Because local governments and real estate developers are in the growth coalition, they will conduct city governance and resource allocation on behalf of business and market. For example, the local government must have known the developer of Xi’an International Art City was building villas illegally but did not forbid it. Local government even helped the developer to camouflage it by drawing this area as culture and art land on map.

Resettlement neighborhoods for land-lost peasants will be talked after the “urbanization of the countryside” section.

Chapter 8. Four special topics

8.1 Urbanization of the countryside

The transformation when rural peasants turn into urban residents involves many aspects: power and governance at grassroot level, mode of production, psychology, culture, lifestyle, and landscape. These issues are sensitive topics in Chinese political environment: grassroot democracy, rule of law, private rights and public power, officials' rent-seeking, coalition between capital and government, welfare of land-lost peasants, etc. Additionally, many Chinese scholars in ASAD fields have close ties and interest with the government, which makes them even less willing to discuss those topics.

Official media stories are always harmonious. During the development of ASAD the interests of land-lost peasants are well taken care of. They get fair compensation for land and good job opportunities near home. But the reality is often complicated and hostile. Here I take the urbanization of rural villages in Xixian Airport New City as an example.

There were four township level divisions overlapping with Airport New City: Beidu subdistrict (former Beidu township), Dizhang subdistrict (former Dizhang township), and Taiping township. The area of Zhouling subdistrict north of highway G70 is also part of the New City. Before the designation of the New City, there were 56 villages and more than 80 thousand residents, 97% of which were agricultural population.(Shi 2014) Figure 24 shows the location of those four townships in the New City area. After the designation, township government was renamed as subdistrict office (except for Taiping

Township) and transferred a lot of power and service functions to the Administrative Committee of the New City and its subsidiaries.

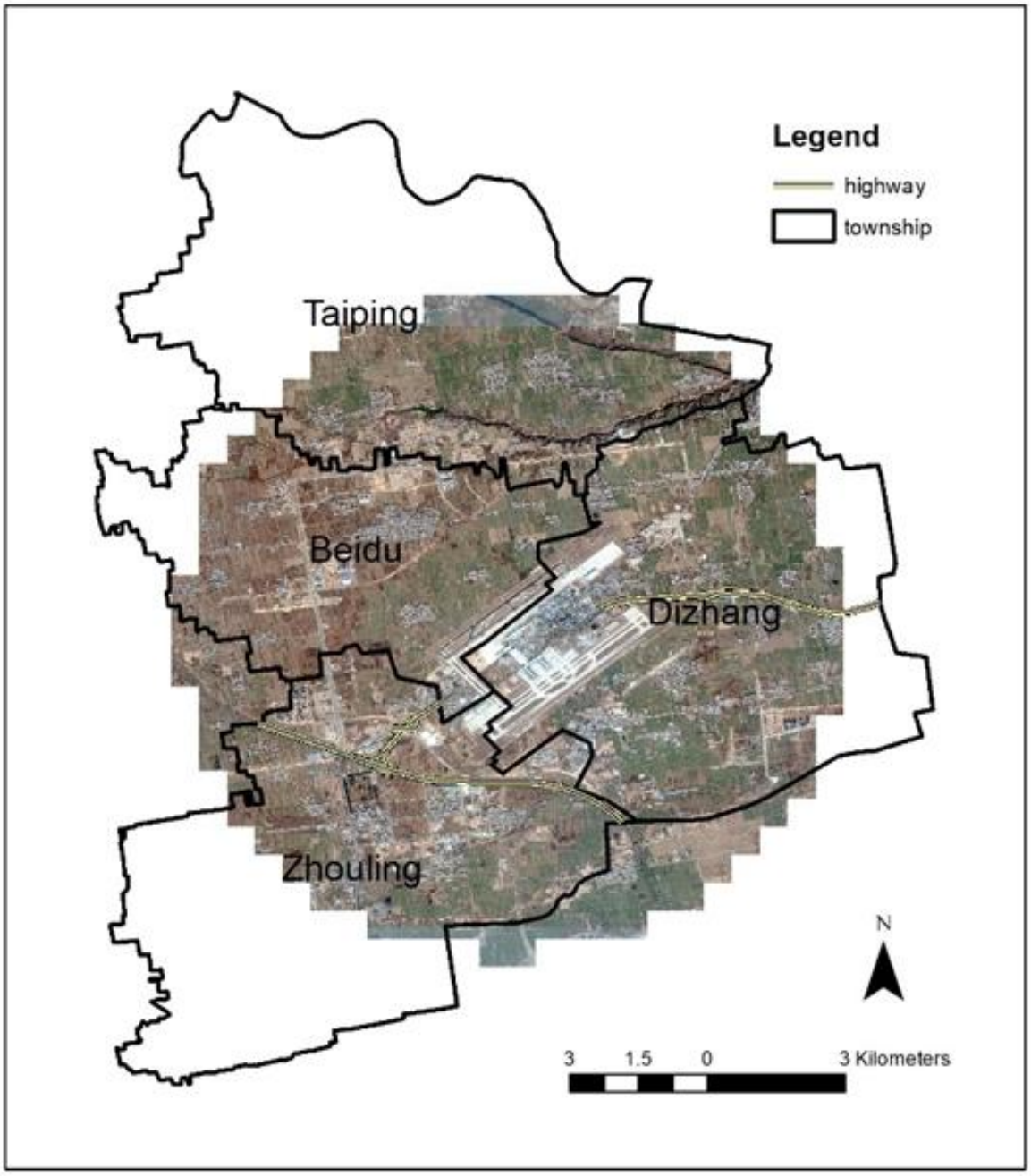

Figure 24: Four townships overlapping with Airport New City

8.1.1 Story one

During my field study, I saw some billboards made by various government agencies of the New City in the Aviation Investment Mansion showing their work and achievement. Those billboards tell some interesting stories during the urbanization process.

The duties of Bureau of Integrated Urban and Rural Development are multifarious: “integrated urban and rural development”, small town construction, village construction, water resource and hydraulic projects, agricultural product quality inspection, poverty alleviation, land acquisition and peasant compensation and resettlement, meteorological disaster response, forest and city greening, safety regulation, etc.

Figure 25: A billboard made by Bureau of Integrated Urban and Rural Development with the Bureau’s name and “Airport New City Development and Construction Group Ltd.” in parentheses. Photo taken by author, August 2019.

The first billboard was the “rural collective property rights system reform in Taiping and Dizhang townships”, made by Bureau of Integrated Urban and Rural Development. By law, land (including home sites and cropland) in rural area is owned by village collective and the ownership cannot be traded on market. Before 1978, all peasants worked together in collective land and shared products based on working hours. After 1978, the family contract responsibility system was established where land was divided into each household according to family size, and each household work by themselves. The product and income from that land, except for small parts given to the collective for public services and to the state as tax, all belong to the household. The village collective’s duty was to provide public services and utilities, as well as to operate some industries. When all people were running agriculture, this benefit distribution system was simple. The small income from collective-owned industries was used for public services and utilities. However, when rural area is urbanized, land is still owned by the collective but cannot be divided and farmed, and how to distribute the benefit becomes an issue.

The reform was divided into 7 stages: advocacy and propaganda→ asset checkup → collective member identification→ share quantification→ establishing cooperatives→ documentation of resolution→ making industrial plans. Nominally this reform is a grassroot “democratic decision-making, participation, and supervision” program. Actually, the state (here is New City Administrative Committee) initiated, guided and monitored every stage. All rules were made by national and provincial government

already, e.g. Code *Nongjingfa [2017]11 (农经发[2017]11)and* Code *Shannongyefa [2018]21(陕农业发[2018]21)*.

First, peasants were told the reform was going to start by the village committee and other advertisements, often with beautiful blueprints of the future of the New City and education in relevant laws and policies. A working group is also formed often jointly by village's CPC committee members and envoys from superior government.

Next comes the asset checkup. Collective assets include three categories: resource assets including land, water surface, forest, etc; operating assets include commercial buildings, collective-owned tools and equipment, agricultural infrastructure, collective-owned enterprises, share of other entities owned by the collective, cash, credits and debts of the collective, and intangible assets; non-operating assets include assets for public services like village schools, clinics, fitness equipment, etc.

Next step is collective member identification. This step is to identify members of the village collective, i.e., owners of the collective's share. Usually members are counted by household. The main base is the household registration, *hukou* but there can be inconformity agreed by villagers: unborn children, daughters married into other villages without moving out hukou, and daughters-in-law married in without moving in hukou, households migrating out long time ago without moving out hukou, etc. The identification results need to be publicized three times and consulted with all villagers.

The next step is share quantification. Collective assets' value is assessed and standardized in dollar numbers, which consist the total equity of the collective joint-stock

economic cooperative (in preparation). Based on the result of collective member identification, total equity is allocated to individual members (stockholders). The billboard showed that besides individuals, entities can also be special shareholders. I assumed some shares were reserved by the collective so the collective could have income for public expenditure, but the real situation was unclear. The share quantification draft has to pass on villager representatives' meeting, but it is unclear who can vote. The draft also has to be approved by the subdistrict office and publicized. At last, all collective members would receive stockholder certificates to certify their shares. The allocation is not always even but with a lot of negotiation, compromise and conflict of interests. For instance, a person who had made more contribution to the collective may want more shares than a disabled person. Households who originally had pig farms on their land may want more shares than households who originally had barren cropland. Those also evolve issues left over from history.

At the same time the collective joint-stock economic cooperative was formed. Even though every household gets stocks, many resources and properties have to be managed collectively in an urbanized era. For example, article 49 of the Law of Land Administration of the People's Republic of China says:

"Rural collective economic organizations shall make public to its members the receipts and expenditures of the land compensation fees for land requisitioned and accept their supervision." (*Law of Land Administration of the People's Republic of China* 2020)

The cooperative receives land compensation fee from the state and re-distributes it to land-lost peasants. It also manages collective-owned enterprises. When government

builds resettlement neighborhoods for land-lost peasants, street storefronts in those neighborhoods also belong to the cooperative. All cooperatives were required to have rules and institutions on election, daily management and dividend, and be supervised by villagers. Whether these rules can be implemented and really empower villagers to supervise cooperative managers needs observation.

All resolutions of above steps were recorded into the government's database to prove the successful completion of the reform.

At last, under the guidance of local government, economic cooperatives plan for future industrial development. In reality, in urbanized area those plans usually copy the government's blueprints.

As said on the billboard, "Rural collective property rights system reform is a comprehensive, politically-sensitive, and hard job". Since rural China is a clan society around kinships, close relatives by blood and marriage often group together to protect their interests. Families with more sons or with acquaintances of government officials are often more powerful in original villages and tend to make rules and decisions good for themselves in the name of "collective decision" and "villager autonomy". Smaller families and females have to struggle for their interests. Additionally, there can be many forms of corruption during and after rural collective property rights system reform just as repeatedly reported.(Song and Gao 2015) If anyone is unsatisfied with the distribution of benefits, he can appeal for help through "*shangfang 上访*" (lodge complaints to the governments at all levels and relevant departments through correspondence, E-mails, faxes, phone calls, visits, and so on), but in many officials' eyes *"Shangfang"* is a form

of social instability and needs to be quelled, while judicial procedures are hardly used because most villagers lack the knowledge, time and money. The specific situation during the reform in the Xixian Airport New City was unclear, but many violent and non-violent conflicts erupted elsewhere in the nation and jeopardized “social stability”, an important duty of Chinese government officials.(Fang 2019)

8.1.2 Story two

The second story was from the billboard of Airport New City Public Security Bureau (police):

(Title) *Airport New City Public Security Bureau cracked down X Zhang for provocation and disturbance*[13]

Yanjiazhai Village of Dizhang subdistrict, Airport New City was demolished according to government planning in 2016.In order to fleece the state for crops compensation, Suspect X Zhang planted corns on the requisitioned land in violation of regulation, and asked separate compensation fee from the government after his mother had already received compensation fee of his household. Because of this, clerks of the subdistrict office communicated with X Zhang many times, but X Zhang insisted his illegitimate requests. Later, in order to achieve his illegal goals, X Zhang leapfrogged appealing many times in Beijing Tiananmen, Zhongnanhai (locations of national government and CPC Political Bureau), the Public Complaints and Proposals Administration, and were admonished two times by the public security bureau of Beijing. Given repeated warning

[13] “Provocation and disturbance” is a broadly defined crime under article 293 of Criminal Law of PRC. It shall be sentenced to fixed-term imprisonment under five years, criminal detention or public surveillance.

X Zhang refused to correct his way and continued withstanding the government and public security bureau. In early September 2018 X Zhang once again went appealing maliciously in sensitive area in Beijing, which was a serious violation of the "Criminal Law of the PRC" and "Regulations on shangfang" and disturbed the normal work of state organs. On September 11th, polices of the New City public security bureau took X Zhang back from Beijing and put X Zhang under criminal detention on suspicion of "provocation and disturbance". In mid-October People's Procuratorate of Weicheng District of Xianyang City approved to arrest X Zhang, and now he was prosecuted.

Figure 26: A billboard made by Airport New City Public Security Bureau about X Zhang's case. Photo taken by author, August 2019.

8.1.3 Story three

An magazine article was published by the government summarizing the land requisition in the New City(Shi 2014). Here are some excerpts of the long article:

"'the development of the Airport New City is not simply requisitioning land and building cities, but really bringing benefits to local people and sharing bonus with them, while

aggregating airport related industries', said the director of the Airport New City Administrative Committee, Xuedong Wang."

"the New City rewarded villagers who actively cooperated with the (land requisition) working team. The earlier they vacated old houses, the earlier they got compensation fee, and had priority in choosing units in the resettlement neighborhoods. Those who illegally built additional buildings to fleece compensations could not got any bonus, and those who do not build actually received extra rewards."

"H. Chen, a clerk responsible for explaining policies to villagers, said 'I want to let villagers clear that the development of the New City is good for them, only that we can get the support from villagers. I know people were working in the fields at daytime, so I visited one household after another at night."

"The New City gave students 1500 as transportation subsidy, disadvantaged groups 3000 per person as life allowance, 2000 as agricultural machinery compensation and 3000 as moving expenses. In Zhuoxing Village, the working team bought wheelchairs for 5 disabled people and let them choose new units ahead of others. In Xiaozhai Village, moving trucks were waiting in the village and free to use. In Deng Village, X Xiao stored tons of peaches purchased from nearby farmers. The working team helped him to find new storage location and fruit traders. In Huayang Village villagers had difficulty getting drinking water because of project construction, and the New City immediately dug 40 wells for free. To smooth the transition, the working team went to all 40 estate agencies to find cheap and convenient temporary housing for villagers. Many cultural events were organized to preserve local culture and nostalgia. The New City

hired professional photographers to take photos of villages to be demolished as a memory.

"The New City built resettlement neighborhoods in prime locations near the airport. So far, 7230 units were constructed and 3500 were completed. Each person got 60 m2 of semi-furnished resettlement housing. By 2015, near 50000 peasants from 56 villages would be resettled, and then the masses can really share the benefits of city development."

"The New City let land-lost peasants do simple earthwork at construction sites to earn income. To give people stable and lasting income, the New City provided 10 m2 of commercial space to every land-lost peasant. That commercial space would be managed by the economic cooperative and generate dividends to members annually. Just in front of the Konggang Huayuan resettlement neighborhood, 20 sessions of job training were held for land-lost peasants in the "Integrated Center". More than 1000 new urbanites had completed job training in cleaning, logistics, hotel services, and finance. Peasant Q. Li said, 'I chose cleaning and my husband chose cooking. The teachers were very professional and taught us much new knowledge which enabled us to work in cities.'"

"The New City requires all incoming labor-intensive enterprises to reserve 20% to 30% jobs to local people so new urbanites can find jobs near home. It is expected that within three years the employment problem can be solved for the locals. Also, the New City established pension, health insurance and medical aid systems for all land-lost

peasants the same as urban residents' and has raised 340 million Yuan as social security funds."

And on another billboard made by Bureau of Integrated Urban and Rural Development in the Aviation Investment Mansion, it advertised:

Figure 27: A billboard made by Bureau of Integrated Urban and Rural Development advertising five income sources of land-lost peasants in the New City. Photo taken by author, August 2019.

"Land-lost peasants earn incomes from five sources: rent from vacant apartments, dividends from collective economic cooperative owned commercial space, cash as land compensation fee, salary from jobs near home, and pensions to the elderly. The government also held job fairs and established the labour resources database to

communicate with enterprises in and outside the New City to help people find jobs. The government actively seeks overseas jobs for land-lost peasants to help them increase income and broaden their horizons."

8.1.4 Discussion

In short, the New City Administrative Committee used "the carrot and the stick" in land requisition. This is the common practice of Chinese local government in the last 40 years. Urbanization in China may be nonvoluntary and forced; not run by market but by state violence. That notably expedites urbanization in China in the last 40 years, but also impairs peasants' autonomy. Although the absolute income of peasants indeed rises during urbanization, peasants could have shared more of the fruits of development if they had big bargaining power. And within the society of land-lost peasants, different personal abilities and power in original villages cause wealth gap to widen.

Regime theory can apply to the urbanization of the countryside in ASAD. In regime theory, power is fragmented and all players need the power of one another, and they have to negotiate to combine individual power to form a more powerful collective regime to be able to achieve agreed aims.(Castree, Rogers, and Kitchin 2013b) In this process, all players need to compromise with one another. In the countryside in ASAD the local government requisitioned peasants' land. Local governments wanted the standard of land compensation fee to be low, but peasants wanted it high, and after negotiation both made concessions. On the local government's side, it gave land-lost peasants five sources of income as advertised on the billboard in addition to resettlement housing: rent from vacant apartments, dividends from collective economic cooperative owned

commercial space, cash as land compensation fee, salary from jobs near home, and pensions to the elderly. The resettlement housing compensation is usually more than actual family need, e.g. a family of three may get two or three apartments. Unlike “small property housing”, the resettlement housing has full property right and therefore can be rented or sold legally to anyone. The local government also invested in public schools, senior apartments and public health services. On the peasants’ side, they accepted land compensation fees far less than the land’s current market value, and more importantly lost future benefits from land appreciation.

Stone mentioned that “consensus is formed on the basis of interaction and the structuring of resources. This is achieved through selective incentives”.(Mossberger and Stoker 2001)(C. N. (Clarence N. (Clarence N. Stone 1989)(C. N. Stone 1993) “Selective incentives are private goods made available to people on the basis of whether they contribute to a collective good. Selective incentives can either reward participants or punish nonparticipants.”(Oliver 2013) In the New City, the Administrative Committee rewarded peasants who actively cooperated with the (land expropriation) working team with extra cash bonus, priority in choosing units, and other assistance; the public security bureau punished X Zhang. These are examples of using selective incentives to achieve collaboration.

8.2 Environment in ASAD

An outstanding land cover change in ASAD as shown on satellite images is that large area of cropland is converted to imperviable, concrete surface. And many small ditches and creeks are covered or eliminated. Several consequences can be expected. First, it

will change the local ground water balance since rainwater cannot replenish groundwater but only to become urban stormwater. Second, if the stormwater cannot be drained in time, water logging will pose danger to infrastructure and traffic participants. When stormwater is drained, it is often mixed with sewage due to the lack of separate pipelines. A heavy rain will overload the sewage treatment plant to force it to discharge untreated or undertreated sewage to rivers. Third, in sloppy areas after plants are cleared and before construction finishes, bare soil is exposed and open to erosion.

ASAD will also change the rural habitat. As cropland, bush and forest disappear, and human disturbance increases, some rural wildlife will disappear such as rabbit, frog, snake, owl and wolf. Some others will adapt to new environment and become urban wildlife such as sparrow. Some species benefit from increased human density, such as cockroach. Generally speaking biodiversity is reduced in the process of urbanization.

Besides the common environmental impacts brought by urbanization, noise pollution and airplane exhaust gas pollution are special issues in ASAD. Noise pollution and air pollution is aggravated not only because expanded airport and new highways increase the noise and exhaust volume, but also more people become victims of these pollutions when living and working in ASAD. As illustrated by Cidell and Knippenberger , the group who suffers from the environmental deterioration in ASAD often diverge from the group who benefit from ASAD’s economic growth, and the environmental justice issue must be addressed.(Cidell 2013)(Knippenberger 2014)

As required by law, all cities write environmental goals into ASAD planning, require construction projects to do environmental impact evaluation in advance, and are trying to beautify the ASAD.

For instance, three parks have been built in Xixian Airport New City: Tangshunling Relics Park, Xiaohe & Caocan Relics Park, and Tang-zhaorong-shangguan's Park. They were all planned around officially protected historical and cultural sites (ancient tombs). The Administrative Committee's Environmental Protection Bureau did detail environmental impact evaluations on all big construction projects. Zhengzhou plans several waterfront parks along the river north of the airport and a Donghu Lake Park in the business and exhibition area. Beijing plans a city forest park (ecological belt) with riverfront and forest along Wenyu River on the west of ASAD.

Residents are the most sensitive to environmental deterioration including pollution and lack of green space. Zhang said community power (residents) is the weakest among players in urban regimes in both China and the US. In China, it is because Chinese people do not have political rights (election) to restrict the government.(T. Zhang 2002) In fact, community power can sometimes explode in China. Although there are not Western style elections in China, the masses can exert pressure on local government through "mass incident *群体性事件*" (mass protest or mass *"shangfang 上访"*). Zhang explained urban governance in China has two dimensions: political dimension and economic dimension.(T. Zhang 2002) During city development, government has both economic interest and political interest -- establishing political legitimacy. The Chinese government's political legitimacy is not from elections, but from the political achievement

of BOTH promoting economic growth AND maintaining social stability.(X. Sun and Huang 2016) The central government especially emphasizes on maintaining social stability as a way to claim political legitimacy.(Cai 2008) For local government officials, social stability maintenance is a criteria in their performance as crucial as GDP growth.(X. Sun and Huang 2016)

Environmental pollution is the most common reason for “mass incident” in Chinese cities, especially for the middle class. When there isn’t a “mass incident”, the economic and political interests of local government and personal interests of government officials are aligned. But when a “mass incident” happens, local governments will often make a compromise to postpone or cancel controversial projects or the superior government will intervene, because maintaining social stability is a current necessity while GDP growth is a long-term interest. Although the local government uses police and media censorship to claim these events, it still feels the pressure from the masses. There are numerous examples of this, mostly in coastal regions where the masses have stronger participation in civil topics but also increasingly in inland regions. For instance, PX (paraxylene) is a toxic but important chemical product. After people went on to the streets against planned PX plants in Xiamen, Fujian in 2007 and in Kunming, Yunnan in 2013, both local governments cancelled the plan. After a mass-incident in Jinshan District, Shanghai against PX plant plan, the municipal government rejected they had such a plan.(Wen, Gao, and Mudie 2015)(Christoph Steinhardt and Wu 2016) Of course, some local governments still approved projects even after “mass incidents”. (exp: anti-PX-plant event in Chengdu, Sichuan, 2013)

Residents protest environmental deterioration not only because of quality of life, but also because residents have place-based interests and therefore are members of the growth coalition. Housing properties' value is influenced by the surrounding environment, and housing property is now the largest asset in most Chinese families. Office building, commercial building and commercial housing developers are important members in growth coalitions, too, because their interests depend on land value which is affected by the nearby environment. Indeed, the Chinese local government also benefits from high land value because of "land finance". Therefore, during the urbanization process when developers and local government have a lot of land in hand, they easily form a "environmental growth coalition" with residents to prevent and treat environmental pollution and beautify the city, as I see in ASAD at this moment.

The real question is: after local government leases all land to developers and developers sell or rent all properties to businesses and residents, i.e. when the ASAD matures, will they continue protecting the environment and beautifying the area? That's when the growth coalition should transform to a "rights community": a mechanism to satisfy balanced public rights, market rights, and property-owners' rights simultaneously.(Ye 2013)

Environmental carrying capacity is the prerequisite consideration of industrial development. In ASAD the environmental carrying capacity should be calculated in a dynamic way. For example, when total carrying capacity is fixed, doubling the number of flights will double the amount of carbon monoxide emitted by airplanes and ground vehicles, thus leave less allowance for manufacturing emission. In most big Chinese airports, the actual increase rate of air traffic exceeds original plans, so allowing

manufacturing to emit as original plans will cause the total emission to overstep the limit after several years. Maybe the emission intensity will decrease with time as technology advances, but that is unpredictable.

8.3 Interactive behaviors of government and enterprises[14]

Ping An Bank has built tripartite cooperative relations with local government (economy zone administration) and other enterprises in Zhengzhou Airport Economy Zone through the “government-bank deep synergism strategy”. This case can help interpret the interactions between enterprises and government, and among enterprises, in ASAD.

Ping An Bank is holding subsidiary of Ping An Insurance (Group) Company of China, Ltd. The Group has the most comprehensive financial licenses in China and is the 29th in Fortune Global 500 and one of top 3 insurance companies in China. Ping An Bank opened Ping An Bank Zhengzhou Airport Economy Zone branch (hereinafter “the Bank”) on Dec 19th, 2014, 21 months after the central government approved Zhengzhou Airport Economy Zone.

In the tripartite relations, everyone gets what they want: Ping An Bank meets local government’s financing demand with a diverse collection of products; local government creates profits for the Bank by good credit and rich administrative resources; other enterprises gets funding.

[14] Case is from Y. Zhou and G. Zhou in (Zhancang 张占仓 Zhang and Gao 2016) p321. Y. Zhou is an associate professor in Zhengzhou University Business School, and G. Zhou is the president of Ping An Bank Zhengzhou Airport Economy Zone branch.

8.3.1 Motivations for cooperation

The local government needs funds for regional development and public services especially in China where governments directly participate in the market. After the 1994 tax sharing reform, local governments have had limited sources of tax revenue. At the same time, they take responsibilities of a broad range of local development, management and services, and the result is local fiscal deficit. Many localities solve this deficit by land finance as discussed earlier or issuing local government bonds. Moreover the 2008 global financial crisis aggravated the deficit as local government needed to expand investment to fuel economic growth, and therefore local government is looking for new access to finance.

Second, the local government wants to be highly efficient on the construction of the airport economy zone. In 2014, the economy zone administration made plans for 3, 5, and 10 years: by 2015 key transportation channels should be finished, and the buildup area should reach 50 km2 with 600 thousand population; by 2017 the framework of the airport city should be built, and the buildup zone should reach 100 km2 with 750 thousand population and 3 industrial agglomerations; by 2022 all four parts of the airport city should be completed. The buildup area should reach 220 km2 with 1.2 million population and 8 industrial agglomerations. The government's pursuit of high speed and fast results is driven by fierce inter-city competition and performance appraisal of government officials. The first steps in those development plans are land requisition and clearance, which require lots of money as land compensation fee and demolition cost without generating any revenue. The ready funds from the Bank helped the economy

zone Administrative Committee requisition land efficiently and smoothly to prepare for following construction projects.

Third, the economy zone administration attracts enterprises of different sizes to come in by advertising the abundant financial products offered by the Bank and guaranteed by the government, hoping these enterprises realize local government's GDP, tax, and employment goals. Especially as of mid- and small-enterprises, they are the most numerous enterprises in China and create more than three quarters of all jobs.

Enterprises need the Bank in several ways. For strong enterprises already in the zone, daily operation needs lots of liquidity, so does fixed asset investment to increase production capacity. For strong enterprises newly coming in, factory construction and equipment procurement need initial capital. For large quantity of mid- and small-size enterprises with light asset, little collateral, and no warrantor, financing is often hard and expensive, though they have demand for funds. If they cannot borrow from formal banks, they must borrow from shadow banking.

The Bank wants to cooperate with local government and other enterprises for bigger profit and lower risk. The "reform and opening-up" in financial industry makes traditional loan business competitive and reduced profitable. The economic slowdown in China reduces the demand of loans. The Bank needs to find new, credible borrowers, which happen to be Zhengzhou Airport Economy Zone: the local government owns a lot of valuable resources and is backed by tax revenue and superior government, and strong enterprises in the zone have enough assets and collateral. The government borrows money from the Bank as land compensation fee to land-lost peasants, and entrusts the

Bank to distribute the fee to peasants; the Bank takes this opportunity to expand its personal banking business. With the high saving rate of Chinese households, that money often comes back to the Bank. The result is that the Bank has more creditors rights without losing liquidity.

Loans to mid- and small-enterprises in the zone have higher risk than the loans to local government and strong enterprises. To control that risk, the Bank gets real time and authentic land use, business registration, tax and social security information of those small-enterprises from local government through the “government-bank deep synergism strategy” and therefore can react promptly to any changes in enterprises’ operation.

Close cooperation with local government also builds a good brand image for the Bank. Because the airport economy zone is also a pilot Free Trade Zone, the Bank in the zone can get pilot financial licenses in international businesses not yet open elsewhere in China.

8.3.2 “Government-bank deep synergism strategy” projects

The Bank set up the Ping An Bank Industrial Investment Fund of 50 billion. This fund was invested into: land-lost peasants resettlement projects, Zhengzhou Xinzheng Airport Phase II construction project, 2017 China Horticultural Exposition construction project, suburban railway project, and Economy Zone CBD and industrial park projects. The Bank is the fund trustee. The Bank also provides 5 billion of “structured finance” to the Land Reserve Center of the Economy Zone administration to be used in land requisition and clearance. The above funds are indeed loans to the local government.

The Bank acted as the financial broker in public private partnership (PPP) projects in the zone. Local government used the Bank as a financing vehicle to collect private funds. The Bank managed 5 billion mixed public and private funds in the Xinzheng Bonded Zone Phase III project and 8 billion mixed funds in the 2017 China Horticultural Exposition construction project.

“Government information loan” is designed by the Bank for mid- and small- enterprises in the Economy Zone. The Bank connects with the database of Economy Zone administration to collect enterprises’ information such as land use, registration information, tax, and social security to set credit lines for enterprises and monitor their operations. This loan waives collateral but focuses on the profit potential; the interest rate is moderate; the application is simplified and expedited, and the terms are flexible. On average the loan was 2 to 6 million per enterprise.

In the Xinzheng Comprehensive Bonded Zone, the Bank also runs offshore financial businesses, including international settlements, offshore account, and foreign currency loan, etc.

The Bank used two tactics to acquire customers in batch. Vertically, the Bank started from the company central in the industrial chain to upstream and downstream companies. Horizontally, the Bank worked with several industrial parks to become a “soft supporting facility” readily available to incoming enterprises.

8.3.3 Achievements of the cooperation

The “government-bank deep synergism strategy” has brought rich fruits to three parties. Within just 10 months after opening, the Bank had achieved:

Table 15: Ping An Bank Zhengzhou Airport Economy Zone branch’s assets in October 2015.

personal	number of accounts	24000
	deposit	1 billion
	loan	~
company	number of accounts	1000
	deposit	11 billion
	loan	10.5 billion
profit		0.2 billion

By 2016, the Economy Zone administration had got more than 10 billion funds from the Bank to spend on land compensation and resettlement projects to land-lost peasants, as well as infrastructure construction. For January to August 2015, the Economy Zone had achieved:

Table 16: Zhengzhou Airport Economy Zone’s achievement in January to August 2015

	value	Year-on-year increase
regional GDP	26 billion	25%
valued added from secondary sector	19.7 billion	30%
fixed-asset investment	31 billion	89.8%
including:		
manufacturing industry	13.4 billion	122.9%
service industry	1.74 billion	81.3%
infrastructure construction	6.86 billion	188.2%
real estate	10.5 billion	58.5%
import and export	25.8 billion USD	49%
fiscal revenue	23.3 billion	137.7%
tax revenue	3.6 billion	44.8%
new coming enterprises	39	

Enterprises in the Economy Zone got abundant funds in startup and operation. In the first half of 2015, manufacturing enterprises above a designate size had 100.06 billion operational revenue in total, a 24.9% year-on-year increase and had become the first 100-billion level industrial agglomeration in Henan Province. Accordingly, enterprises of various sizes created lots of jobs.

In summary, the “government-bank deep synergism strategy” had rewarded the Bank, the local government, and other enterprises. Local residents also got benefits in forms of jobs and public services provided by local government.

Besides, it is noteworthy whether that cooperation causes unfair competition or monopoly in financial market or has room for government officials’ rent-seeking.

Regime analysis views power as fragmented and regimes as the collaborative arrangements through which local governments and private actors assemble the capacity to govern. The primary reason for the fragmentation of power is the division of labor between market and state.(Elkin 1987)p18 Both local government and business possess resources needed to govern— legitimacy and policy-making authority, in the case of government; and capital that generates jobs, tax revenues, and financing, in the case of business.(Mossberger and Stoker 2001)

8.4 COVID-19 pandemic and ASAD

Since January 2020, the coronavirus (COVID-19) pandemic has caused a major disturbance in the world. As of May 4th, the virus has infected 3.5 million people and caused 248 thousand deaths in 6 continents (Johns Hopkins University 2020) and is not

yet under control. The real number may be higher. According to the Chinese Ministry of Transportation, during 2020 spring festival holiday session (1/10-2/18), air passenger traffic in China (to domestic and international destinations) was 47.5% below its level last year.(张旭 2020) ICAO reported that some 70 foreign airlines cancelled all flights to and from mainland China and another 50 airlines curtailed operations by February 2020. Many countries implemented travel bans.(ICAO 2020). As the pathogen continues to spread, this pandemic's impact continues to enlarge. This recalls Parfomak's report in 2008 saying infectious disease can possibly disrupt key infrastructures by infecting critical workers or stopping their jobs (Parfomak 2008). In the case of ASAD, not only can it be disrupted by infectious disease, but also its existence raises the risk of infectious disease. A large volume of passengers and goods go through the airport every day, connecting the city and the world. As the area surrounding the airport develops, its connections to the central city and to the outside world will further intensify. Incoming pathogens will arrive first in ASAD, and pathogens from ASAD will easily transmit to every place in the world even before people realize and take countermeasures. That is regarding the flow of people through ASAD.

In the near future, the global economy is forecasted to contract sharply by -3% in 2020, much worse than during the 2008–09 financial crisis according to the International Monetary Foundation.(IMF 2020) In the long term, the pandemic may break up the integration of the global economy and consequently affect ASAD. In an interview by *The Beijing News*, a famous Chinese entrepreneur Cao Dewang said this pandemic may lead to a de-globalization trend especially in industrial chains. Cao said in the last several decades, industrial chains in every country were connected as a global

industrial chain. However, in this pandemic, the mistrust and sense of crisis will arise in every country, and many countries will start to build a more independent, complete and secure domestic industrial chain. Although not likely to be realized in the short term, de-globalization may finally be inevitable.(Hou 2020) For instance, some American politicians are urging to bring all medical production back to U.S..(The White House 2020) Since a significant portion of products and services in Chinese ASAD are related to import and export, and many industrial projects are funded by foreign direct investment, deglobalization will for sure slow the development around airports. The degree of it depends on the length and severity of the current pandemic.

Chapter 9. Prospective business opportunities

An important application of this research is to inform global investors of the opportunities and challenges in Chinese ASAD. Here I explain those opportunities and challenges by the order of primary sector, secondary sector and tertiary sector. As found in this research, the local government plays a key role in ASAD; therefore, in order to be supported and successful, enterprises should first carefully study each city's ASAD industrial plans. In this chapter I summarize different cities' ASAD industrial plans and help investors set strategies accordingly

9.1 Primary sector

Primary sector in ASAD is an often-neglected topic. Although the ASAD is an urbanization process in terms of landscape, economy and culture, primary sector still has its place in ASAD.

The head of Guangzhou Baiyun Distric said in 2004 the area closely surrounding the airport is not suitable for industry or residence for aviation safety and noise concerns, but is perfect for modern agriculture: vegetable cultivation or horticulture serving the metropolis, or leisure and sightseeing agriculture which improves the environment of the airport.(Ke ti zu 课题组 2006) p245 . In 2013 this idea was written in to the draft of Guangzhou Airport Economic Zone Industrial Development Plan (2013 -2020): A 7.3 km2 Baiyuan Liuxiwan Modern Agricultural Park was planned in the airport service functional area, with emphasis on leisure agriculture , agricultural technology exhibition, high-quality fruit cultivation, processing of agricultural products and ecological protection. The plan promoted the integration of agriculture and tourism to improve peasants'

income. (Guangzhou Airport Economy Zone Adminitrative Committee 广州空港经济区管理委员会 2013)

The plan of Zhengzhou Airport Economy Zone pointed out that urban farmland simultaneously satisfies cities' productive, living and ecological needs. Urban agriculture around airport can be linked with manufacturing, logistics and tourism to become agricultural product processing, agricultural logistics and sightseeing agriculture. 2 agricultural areas were planned in Zhengzhou Airport Zone: the International Horticultural Base along the Airport-Xinmi Expressway, and urban agriculture land along the S102 road. The later is further divided into agricultural experience zone, leisure and entertainment zone, and health regimen zone. (Yang and Yuan 2018) p175, p186

As of Xixian Airport New City, modern agriculture is also mentioned in the plan. In the latest official planning- "Xi'an Airport Economic Demonstration Zone Development Plan (2019-2035)", two agricultural projects are placed along the Jing River north to the airport. The first one is a farming experience estate, providing farming experience, modern agricultural technology showcase, garden maze, flower garden and pasture, and farm home-stay. The second one is the Apricot Orchard, which has creek in flower field, aromatic garden, orchard mansion, fruit pick-up experience, and camping ground. (Shaanxi Development and Reform Commission 陕西省发展和改革委员会 2019)p29.

The former director of the New City Administrative Committee also discussed the possibility of an international flower trade center in the New City, learning from the Schiphol Airport City in Amsterdam, Netherlands.(Xuedong 王学东 Wang 2014)p205

Unlike planners in Zhengzhou who plan for flower cultivation, he saw Xi'an airport as a

gateway for incoming flowers to Xi'an and northwestern China. Flowers from southern China or abroad can finish custom clearance here and be traded, or stored in refrigerated warehouses. The flower trade center can bring about related industries such as landscape engineering, gardening supply trade, cold chain logistics, and leisure and sightseeing. I already saw cold chain logistic enterprises in my fieldwork but mainly for food.

In cities where land around airports is relatively abundant, agriculture should be incorporated into plans. To be economically feasible, it must be agriculture with high added value, such as leisure and sightseeing agriculture, horticulture, or controlled-environment agriculture. However, food safety should be inspected because plants near the airport inevitably absorb some pollutant from airplanes' exhaust, fuel leakage or deicing agent. Animal husbandry is not a good option due to communicative disease threat in such a densely populated area closely linked to other regions.

Given the various potential of agriculture, it often gets minimal attention in ASAD planning. Except for the 3 cities mentioned above, no other Chinese cities talk about agriculture in their plans. Even in those three cities' plans the texts about agriculture are less than one thousandth the total length. Plan makers falsely regard agriculture as a primitive department of economy with low output, and the disappearance of agriculture is the very content of urbanization. Truly, agriculture in ASAD is not a residual of the pre-urban period; it has its renewed roles in the city. Agriculture should be upgraded and re-discovered, rather than eliminated in urbanization process Plan makers should value urban agriculture not only on its economic output, but also its use in

environmental beatification and people's psychological comfort. Since agriculture in ASAD provides ecological and social service, it should be subsidized by the government.

Agriculture in ASAD also provides jobs to original peasants, especially the disadvantaged groups. For old or illiterate people, the necessary training to get manufacturing jobs in the urbanized hometown may be overwhelming. Local government either simply let them stay home and live on subsistence allowances, or put them at very low-end service jobs. However, experience in Western countries prove that letting unemployed people perennially live on social welfare may jeopardize their mental health. Those people with little school education but rich farming experience can be trained in proper ways to work in modern agriculture, which not only increases people's income but also helps their mental health.

Agriculture in ASAD exists as an emotional and cultural tie to the area's history. In recently urbanized areas, people keep many customs and heritage rooted in agriculture, and land-lost peasants have strong emotion to the old days. Since traditional agriculture largely depends on climate and soil, it is highly localized and heterogenous, so is the derived culture phenomenon; industrial society and culture is more homogeneous across regions. Urban agriculture can preserve many customs and cultural heritage to be a live museum for descendants of former peasants. Additionally, the plant landscape and countryside customs are also a kind of tourism resource attracting people tired of the hustle and bustle of cities.

9.2 Secondary sector

Secondary sector includes mining, manufacturing and construction.(National bureau of Statistics 国家统计局 2011a) China is called the “world factory”. Compared with developed economies, China generated a significant proportion of wealth from secondary industry.

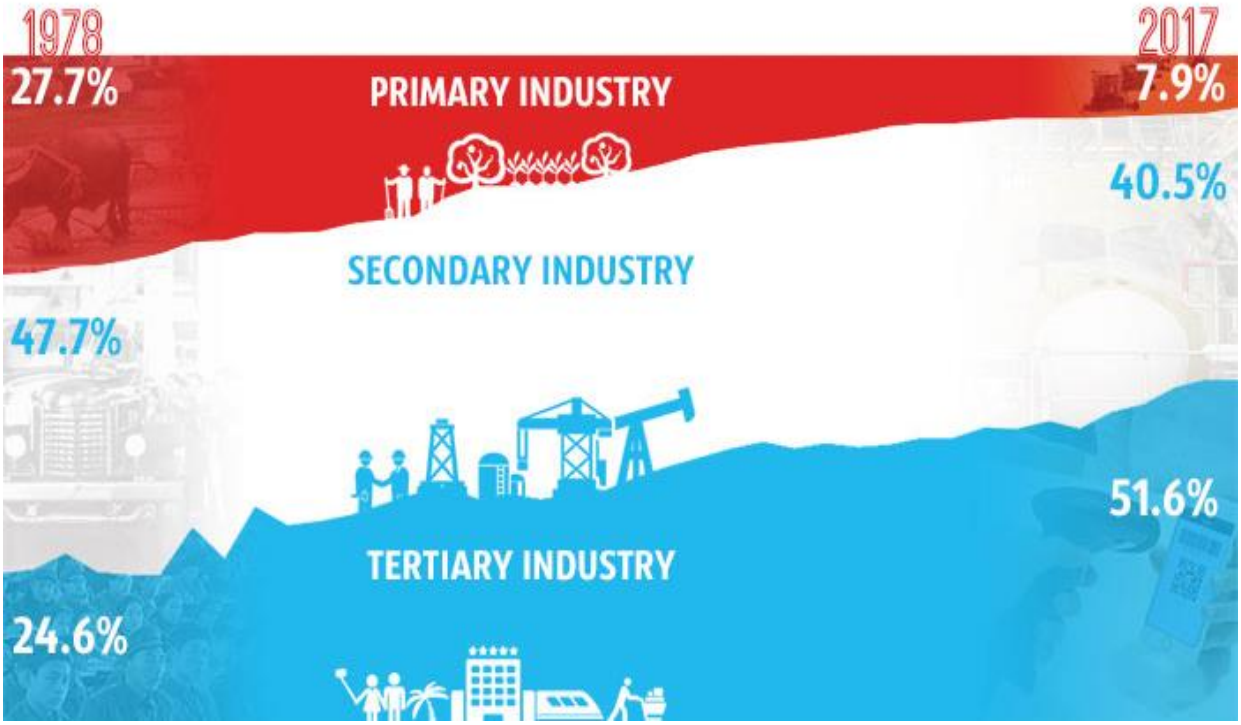

Figure 28: China’s Industrial structure’s change, 1978- 2017 (National Bureau of Statistics; figure made by Globaltimes.cn)

Manufacturing is welcomed by many officials because it can bring a definite amount of investment and job opportunities and GDP growth in a short period of time, which is essential to officials’ further promotion and local tax revenue.

Zhengzhou has the most detailed and comprehensive manufacturing industry so far among all cities. (National Development and Reform Commission 国家发展改革委 2013)(Zhengzhou Airport Economy Zone Planning and Land Resources Bureau 郑州航空港经济综合实验区规划与国土资源局规划勘测编制中心 2016) (Yang and Yuan 2018)One pillar industry is electronics manufacturing, specifically cellphone and PC assembly. The planned 20 km2 Zhengzhou Airport Zone Intelligent-terminal (Cellphone) Industrial Park opened in January, 2014. Foxconn is the leading enterprise, followed by Zhengwei, K-touch, ZTE, and Skyworth.

Foxconn is the largest contract manufacturer in the world, making cellphones and computers for brands like Apple, Qualcomm, and Lenovo. But its factories are indeed sweatshops in IT industry. The biggest problem with electronics manufacturing industry in Zhengzhou is that it only does assembly and low-value component production. The design of cellphone and manufacturing of processor chips take place in US or Europe or Shenzhen. Zhengzhou lacks a big brand in the cellphone industry. Contract manufacturers themselves are at the bottom of value chain and they set up factories in Zhengzhou only to take advantage of its abundant, cheap labor. In a few years, as labor cost in China increases and global trade protectionism arise, assembly may move to cheaper countries or back to US. Although Zhengzhou tries to improve its position in the value chain by encouraging R&D and brand building, the results needs further observation.

The other key manufacturing category of Zhengzhou ASAD is bio-medical. Enterprises here make vaccine, antibiotics, veterinary medicine, as well as disposable medical

supplies (Geng 2017)p25. Bio-medical products often need fast and environmental-controlled transportation which is best done by air transport, meanwhile they are highly valued and light-weighted. Its strategy is “let buyers find products easily; let research convert to products easily; and let products get delivered easily”—attracting R&D, sales and trade, and enterprise headquarters and working on the whole value chain of bio-medical industry. (Yang and Yuan 2018)p219 From this perspective, the bio-medical industry in Zhengzhou was more upgraded than electronics manufacturing. By the end of 2015, there were 20 bio-medical projects in the Airport Economic Zone biomedical industrial park with total investment of 24 billion. The goal was to have 50 bio-medical enterprises with 20 billion sales by 2017, and 80 enterprises with 40 billion sales by 2020. (Zhancang 张占仓 Zhang and Gao 2016) p173

Zhengzhou also attracts enterprises in aviation manufacturing, and most succeeds in the subcategory of general aviation aircraft and cooperate jet manufacturing.(Geng 2015)p64 By 2016 there were cooperative programs with Mooney Airplane Co, US, and Zhonghui-Huayi (Sinowing) General Aviation Investment and Management.

Xixian Airport New City’ development plan encourages three categories of manufacturing industry: aviation manufacturing centered around airborne equipment and system, aircraft parts, and aircraft disassembly and modification; IT and electronics manufacturing centered around intelligent terminal, integrated circuit, and electronics component; and bio-medical manufacturing centered around vaccine and diagnostic reagent, Chinese herbal preparation, medical biomimetic material, and diagnostic equipment. The strategies taken by Xi’an include military-civilian integration based on

Xi'an's advantage on defense industry, and industry-academia-research cooperation with large number of universities and institutions.(Su 2015) Several companies already started operation in the New City, such as Xi'an CEA Safran Landing Systems Services Co. Ltd. and Shaanxi Houyi Technology Co. Ltd. which I visited, and Shaanxi Meili-OH Animal Health Co. Ltd. factory under construction. There are also two factories in the works which produce optical cables and LED lights. (Xuedong 王学东 Wang 2014)p187, p200

Chongqing ASAD only has a very brief manifesto about its manufacturing development plan. It has four focuses: cutting-edge technology such as robotics, 3D printing, new material, biomedical, new-energy automobile, and photovoltaics; applied electronics such as automobile electronics, integrated circuits, and electronics security; smart equipment such as numerically-controlled machine tool, instrument, smart power grid; aviation manufacturing such as aircraft disassembly; and manufacturing in bonded zone for export.(Chongqing Municipal People's Government 重庆市人民政府 2017)

Tianjin ASAD has Airbus' first final assembly line outside Europe, so manufacturing in Tiajin ASAD focuses on whole aircraft manufacturing including Airbus, helicopter, and general aviation aircraft. Based on that, Tianjin plans to expand downstream industries such as aircraft maintenance and repair.(Lian 2017) p70 (Su 2015) p116

Guangzhou Airport Economic Pilot Zone sets aviation manufacturing as one of its three leading industries and plans 100 hm2 of land for it. Four sub-categories are named: aero-engine, aircraft parts, fuselage material, and airborne equipment. The strategies are to introduce leading enterprises in the industry, to interact with aircraft maintenance

enterprises, and to cooperate with electronics industry in greater Guangzhou area. The plan also gives 80-100 hm2 of land to high-added-value and high-tech manufacturing at further distance to the airport. Here high-added-value industries include smart equipment, integrated photovoltaic equipment, auto-parts; high-tech manufacturing include IT manufacturing, precision instrument, and bio-medicals. (Guangzhou Airport Economy Zone Adminitrative Committee 广州空港经济区管理委员会, Guangzhou Urban Planning Institute & Design Survey Research Institute 广州市城市规划勘测设计研究院, and Singaporean JURONG International 2017)

Chengdu Southwest Airport Economic Development Zone focuses on new energy industry. Enterprises here covers solar energy, civil nuclear energy, wind energy. It also develops bio-medicals, new material, electronics and food industry. It declared itself as the most comprehensive and potential new energy industrial base in China, with sales goal over 200 billion in 2017. (Su 2015) p102

In earlier years (Ke ti zu 课题组 2006) p149, Beijing planned three manufacturing industries based on existing enterprises around the airport: auto-parts manufacturing centered around automobile electronics , electronics component manufacturing centered around microelectronics and integrated circuits, and equipment manufacturing centered around integrated photovoltaic CNC machine tools. However, the above plan did not realize well to form big industrial agglomerations. In the latest government's incentive policies (Shunyi District People's Government 顺义区人民政府 2018), manufacturing already disappeared from the favorable industry list. Since aircraft industry is developed in Tianjin and Hebei, under the background of Jing-Jin-Ji regional

integration, it is suggested Beijing not developing aircraft manufacturing and maintenance.(Lian 2017) p70

Qingdao Liuting Airport Economic Zone concentrates on apparel, food, woodwork, building material and fine chemicals manufacturing. However, none of those products are very suitable for air transport.

Shanghai Hongqiao Airport Economic Zone did not mention manufacturing in its plan from the beginning. (上海虹桥临空经济示范区发展规划(2018-2030 年), 2018) because Hongqiao Airport is close to city center and land nearby is scarce.

Most cities want to foster high value added and high-tech manufacturing. Aircraft manufacturing, modification and maintenance, bio-medical, electronics are three most popular choices, but the reality is that most manufacturing enterprises in ASAD do not have R&D and marketing and only grasp the lowest part in the value-chain (Zhancang 张占仓 Zhang and Gao 2016) p180. This reality is described as “enclave economy”: a foreign or non-local owned export-oriented industrial zone within but partially autonomous from the locality(Rogers, Castree, and Kitchin 2013), or “double-outside industry *两头在外企业*” in Chinese: both upstream raw material and downstream market are located elsewhere, and dependent on external investment. In order to allure investors local governments often give companies tax breaks and discounted land; but in return “double-outside” industries contribute very limitedly to the formation of a complete and resilient industrial chain locally. In long term local governments will find it worthless.

More fundamentally, although creating tax revenue and jobs at first, low-end “double-outside” industries will always look for places of cheaper land and labor; but as discussed earlier, the local government as a rentier in the growth coalition benefits from increased land value, or say, needs to increase people’s income in order to form an urban regime with the masses. This means that the coalition between the local government and low-end “double-outside” industries is inherently unsustainable. The consequence is that many local governments will want to replace these industries with full value-chain enterprises or high added-value industries as ASAD mature. The turn of Beijing ASAD industrial plan is an example and will be followed by other cities in future.

In contrast, manufacturing enterprises that can grasp high part in the value chain, e.g., design, branding, marketing, patent, and standard-setting, or produce high added-value products, are truly potential and sustainable in ASAD and will always be welcomed by governments.

9.3 Tertiary sector

Manufacturing industries utilizing airports, especially enclave industry, are location-compatible because the host cities only need to provide land, power, water, and labor. Their exact location choice more depends on non-locational factors: government relationship, tax incentives, etc.

In contrast, service industries have far more connections and interactions with the place. Unfortunately, many Chinese ASAD have generic tertiary sector development plans. Table 17 shows airport zone tertiary sector industries that are mentioned by local governments’ development plans. (Su 2015)p81-p102

Besides industries listed in the table, almost some cities mention R&D but is often mixed up with high-tech manufacturing. Every airport has hotels nearby, so catering and accommodation are not listed specially.

Chengdu has the least words about developing tertiary sector in the Southwest Airport Economic Development Zone compared with other cities. It puts more attention to high-tech electronics and new-energy industries.

It is natural for an airport to perform air passenger and cargo transport. Nonetheless there are many industries favored by a lot of cities: 11 cities want convention and exhibition, 8 cities want to foster headquarters economy, and leisure, entertainment and tourism in ASAD, 6 cities encourage trade and e-commerce, office space, and finance, and 5 cities pay attention to general logistics and bonded logistics, and shopping in ASAD. However, cities should realize that every industry has specific requirements : Exhibition industry and headquarters economy requires a city to be a primary node in the global economic network; Healthcare and R&D require large number of professionals in specific fields; financial industry requires lax regulatory environment; tourism industry requires unique natural landscape or cultural heritage. Industries in tertiary sector should not become “me-too product” among cities: “Creating me-too products is considered risky because the company may lack the knowledge or expertise necessary to create a competitive product.” (“Me-Too Product” 2009)

Enterprises must carefully analyze a city’s position in national and international economic networks, as wells as its resource endowment and comparative advantages, prior to investing in tertiary sector in ASAD.

Another obstacle in tertiary sector development in Chinese ASAD in the strict entry & exit regulation. Smooth flow of goods across international border is a catalyst for manufacturing to develop around airports, and correspondingly free flow of people is a catalyst for tertiary sector around airports to attract international customers. Convention and exhibition, headquarters economy, leisure and tourism, and aviation training are only internationally competitive when people can come in conveniently. For example, visitors from over 145 countries or regions are permitted visa-free entry for periods ranging from 7 to 180 days to Hong Kong SAR, China for tourism or certain business-related activities. Those include all major economies in the world. With that in mind, many transnational corporations set their offices in Hong Kong, any many conventions take place in Hong Kong every year. In contrast, mainland China allows citizens from only 18 countries to visit without visa for tourism and business, and Japan is the only developed country that enjoys this treatment. Only conventions with dominant Chinese participants will be hosted in mainland China. Visiting mainland China for business is not convenient for foreigners, let along working in China. Apart from the movement of people, the free movement of services across border can also help ASAD but is more restricted than the movement of goods.

As Pritchett said in his book on international migration, in this increasingly integrated and liberalized global market, capital and goods and services move relatively easily, but cross-border movement of people, especially labor is still highly restricted and heavily regulated. Allowing people to move freely can promote development. (Pritchett 2006) This is not limited to China but is seen in every country. I already discussed earlier how

growth coalition theory and regime theory both miss the role of globalization; here I look from another viewpoint.

In either a federal state or a unitary state, entry and exit policy, immigration policy and cross-border trade barriers are beyond the control of local government and are matters of national sovereignty controlled by the central government. However, the effects of these policies act on the local level. Growth coalition theory and regime theory both miss the force of superior government, but the reality is that cities are not self-governing entities. The Elysee Palace's acceptance of refugees can worsen the security of Lyons, and the White House's immigration reform can change the labor market in San Diego. In turn, the central government needs the cooperation of local governments to implement it policies. To take care of both local interest and national interest, local government, the business and other actors in the city must negotiate and coordinate with central government to find and realize common interests while accommodating one another's concerns. Growth coalitions should be coalitions beyond the city-level. Alternatively speaking, building urban regimes needs the combined power from actors within and out of cities. Since airports connect cities and the rest of the world, and ASAD develops from such connections, any restriction on these connections will hinder the development of ASAD. The central government can set special entry and exit policy to let people come in easily to foster the tertiary sector in ASAD. Enterprises in ASAD need to consider entry and exit policy when determining their target customers.

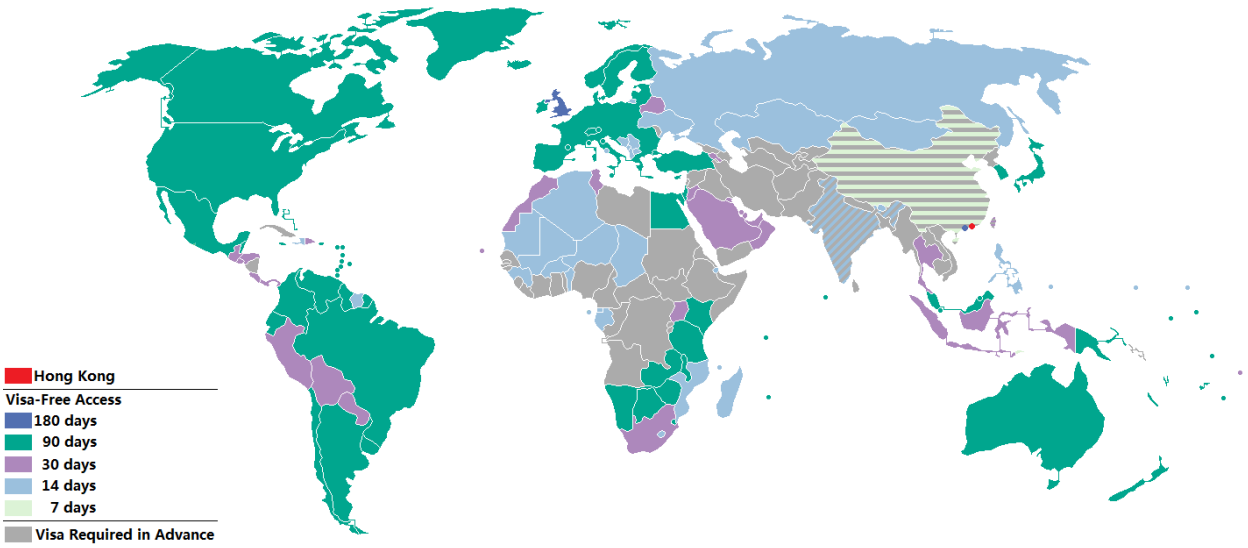

Figure 29: Visa policy of Hong Kong for holders of ordinary passports (data source: wikipedia, as of Jan. 1. 2020)

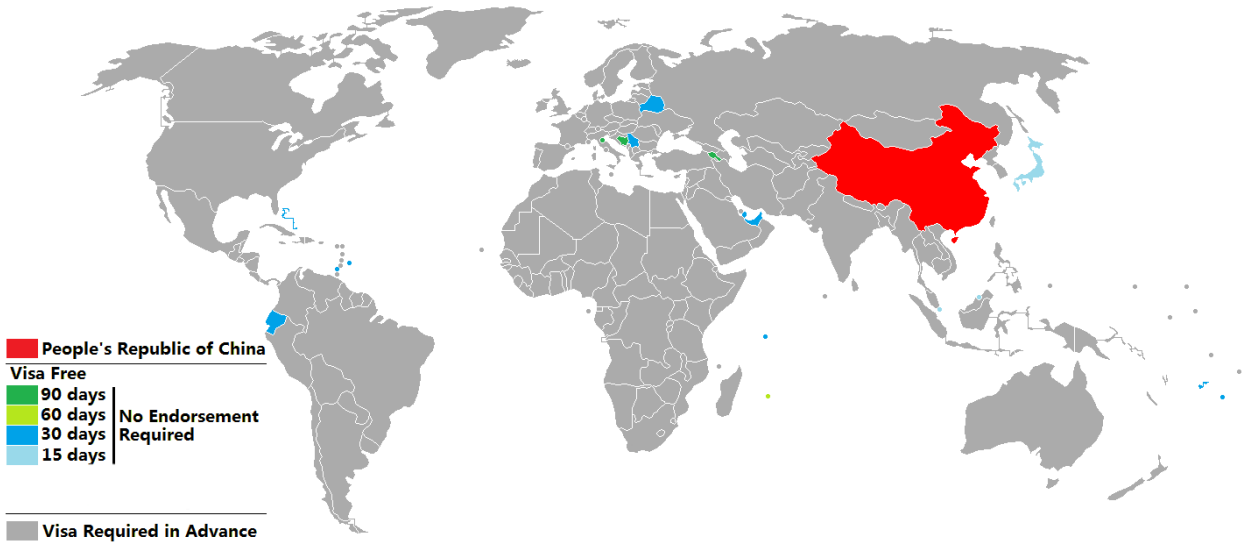

Figure 30: Visa policy of Mainland China for holders of ordinary passports (not including passport with “For Public Affairs” Endorsement (data source: wikipedia, as of Jan. 1. 2020)

Chapter 10. Conclusions and limitations

This research set out to apply two western theories of city power structures to Chinese practice of urbanization. Power structures are built on the interactive relationships among various players. Those relationships In Chinese ASAD are summarized in table 18. The study confirms that in the Chinese context, the rationale of both theories remains valid, but the specific roles and behaviors of players differ from their counterparts in the West. When observations do not fit into theories, it is important to consider the scope of application of theories.

The growth coalition theory claims that urban elites have shared interests in local economic growth and therefore form an alliance to promote the pro-business growth of cities. Those elites include the rentier class who have place-based business interests, politicians, and other auxiliary players. In contrast, regime theory recognizes power is fragmented and no player has absolute control over a city. Instead, the government and non-government players combine their power through a relatively stable relationship to form a collective regime to realize agreed goals. Nevertheless, the original versions of the two theories are both abstracted from U.S. society, which vastly differs from China. Therefore, these two theories can help to explain some phenomenon in Chinese ASAD but not perfectly fit.

The division of labor between the public sector and the private sector is complicated in China especially by two things that are hardly seen in western countries: one is the government's sole ownership of urban land, and the other is a large quantity of state-owned enterprises. More interestingly, due to the existence of "one agency, two titles"

phenomenon, local government in ASAD combines the two things above, i.e., the ASAD administrative committee requisitions land from peasants and therefore monopolizes land, the most important resource in urbanization; and meanwhile the administrative committee is (or owns) a for-profit state-owned development company operating many businesses in ASAD, mainly real estate development. In this process, the government earns a huge amount of revenue from land. However, its ultimate goal is to create a new town. Industrial parks, office buildings and housing neighborhoods built by the government are not only rent-generating real estate but also infrastructure to attract investment, incubate industry and accelerate urbanization, just like culture medium for bacteria. Local government does not only have economic interests but also political interests in shoring up its legitimacy, because the CPC claims its legitimacy on its achievement in promoting economic development and raising people's living standard.

Non-governmental players are active in the ASAD, too. Businesses, peasants and financiers all contribute their resources to ASAD and pursue their own interests in the blueprint drawn by the government. Real estate developers are the biggest non-government beneficiary, while some non-real-estate enterprises also try to profit from land appreciation. The industrial structure in many ASAD needs to diversify beyond aviation-related or transportation-related industries. Land-lost peasants become members of the rentier class in growth coalition theory after the local government compensates them with housing properties and collective-owned commercial space. In a fast-growing economy like China, all players have a consensus that their interests are best realized by economic growth, i.e., making the cake bigger, rather than interest re-distribution, i.e., cutting the cake better. This consensus is the basis of cooperation.

Interestingly, the two theories are considered rivals since they have opposite opinions on who owns the power in cities.(Domhoff 2005) But in my study, I used both of them to explain some phenomenon in ASAD in China, which highlights the complexity and diversity of the real society.

The methods used on remote sensing and computational text analysis in this research may not be technically advanced; however using them itself is another contribution to geography research, especially human geography, and other realms, because they illustrate how anyone with entry-level skills can comprehend and utilize simple GIS and computer techniques to greatly enhance geographical analysis. This is especially inspiring to government officials, businesses and the masses who want to practice decision-making and supervision based on scientific, sound understanding their cities.

Places do not exist in a dichotomy of urbanized and rural, rather they are in a constant process of changing. In a country as vast and diverse as China, ASAD in each city shares common points while all having unique characteristics. Computational text analysis of news articles about ASAD on official newspapers reveal all ASAD make economy and industry as the center goal. Yet according to remote sensing data, the ASAD process in eastern cities is gradual and organic while in central and western cities is often large-scale and arranged.

A case study of Xi’an Xixian New Area Airport New City further unveils the behaviors of local government, businesses and peasants in ASAD. Local government as the sole urban landowner has big place-based interests and is leading the development, but it still needs to negotiate and make compromise to civil players. Enterprises in different

industries have varied performance. Peasants' life is dramatically changed by urbanization.

This research gives investors, especially foreign investors, who may be interested in Chinese ASAD a panorama of it. To business circles, ASAD opens a huge market horizon in many industries, from agriculture to manufacturing to service. Before entering China, foreign investors should carefully learn the business environment and how to deal with local governments and other civil players.

As part of the big story of China, ASAD shows other developing countries an alternative approach to economic development and urbanization than the free market economy in developed countries, and that is "government-lead, market-participation, and government-enterprise cooperation". Surely the Chinese model is not a perfect model, for example the weak community power in development process mentioned by Zhang(T. Zhang 2002), but it has made remarkable success in certain goals. Additionally, China's approach forms a comparison with the free market economy and triggers an exploration of each one's pros and cons.

Admittedly, there are limitations of this research in both research methods and scope of research. Interviews are a usual qualitative method to collect subject's thoughts and attitudes but are not used in this research. It is because conducting interviews in China, especially of government officials and the masses, is very difficult for researchers without official endorsement. People are not used to expressing their real thoughts in such a society.

Several meaningful issues in ASAD are not discussed in detail in this paper, such as informal economy, government officials' personal interests, and non-economic effects of development on people. In a transitional country like China, the role of the informal economy should not be underestimated. Although after 40 years of high-speed economic growth the volume of the informal economy is not dominant in total GDP, many people's livelihood depends on the informal economy, often disadvantaged groups in society. Land-lost peasants are also a disadvantaged group because most of them lack the school education and vocational training to find decent jobs in mid- and high-end industries. Besides low-end manufacturing jobs and jobs provided by the government, many land-lost peasants become street vendors (e.g., food and grocery vendor), cash and temporary labor in construction sites and service businesses (e.g., restaurant waiter), self-employed handyman and residential service provider (e.g., housemaid, locksmith). Working in the informal economy does not always mean minimal income, but people lack income stability and labor welfare (such as insurance and pension benefit). The informal economy is not included in the research because a lack of statistics.

Government officials have their personal political and economic interests and sometimes these interests can be a main consideration in officials' decision making. Some interests are legal, for example, local economic growth as an achievement helps the promotion of officials; some interests are illegal, for example, bribery in land leasing auction and public project bidding. (Indeed, it is a hotspot in government officials' occupational crimes). Sometimes interests can be grey, for example, when officials give preferable opportunities to one another's acquaintance reciprocally. Even officials'

illegal interest does not necessarily hurt the masses' interests, sometimes it is even realized concurrently with the overall interests of local economy and residents. And the masses do not always hate officials' pursuit of personal interest. Instead, they will accept that as long as their own interests are realized though economic growth in the region, i.e. "A competent but corrupt official is better than a uncorrupt but mediocre official." is many Chinese people's answer to the moral dilemma. However, this is a very sensitive topic in China, and it is nearly impossible to get any sound evidence of this. As a result, this topic is not expanded here.

During the transition from peasants to urban residents, land-lost peasants experience not only changes in economic life such as a large sum of land compensation fee and change of occupation, but also changes in lifestyle, living environment, and interpersonal relationship, which together will have unquantifiable impacts on people's health and psychology. For instance, many peasants farmed outdoors in the past, and now they will probably work indoors. This may affect their health. It would be informative for future research to conduct interviews of land-lost peasants to comprehend their real experiences in ASAD.

As ASAD in China continues to proceed, many new phenomenon and issues will arise. Hopefully this research will spark wider interests around the world in exploring them.

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Appendix A: Tables and figures

Table 17: Tertiary sector industrial development plan by local governments in Chinese ASAD. (data source: (Su 2015)p81-p102 and development plans of each city)

	air passenger transport	general logistics and bonded logistics	air logistics	convention and exhibition	headquarters economy	trade and e-commerce	leisure, entertainment, and tourism	office space	adverti se-ment	finance	shopping	aviation training and service	information service, law, and consulting
Northern													
Beijing (Capital)	✓	✓	✓	✓	✓	✓	✓		✓	✓		✓	
Tianjin	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
Eastern													
Shanghai Hongqiao	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓		✓
Shanghai Pudong	✓		✓	✓		✓	✓	✓			✓		
Hangzhou	✓		✓	✓	✓		✓			✓		✓	
Southern													
Guangzhou	✓		✓	✓	✓		✓	✓		✓			✓
Shenzhen	✓	✓	✓	✓	✓	✓		✓					✓
Central													
Zhengzhou	✓		✓	✓		✓				✓	✓	✓	✓
Western													
Xi'an	✓		✓	✓	✓		✓	✓			✓		
Chongqing	✓	✓		✓	✓	✓							
Kunming	✓		✓	✓		✓	✓						
Chengdu	✓												

Table 18: Relationships between various players in ASAD. This table does not include informal economy, government officials' personal interests, non-economic and non-political interests.

	A	local government	enterprises (including state-owned, collective-owned private, foreign investment, and mixed)	banks	peasants	new urban residents
B	A gives B					
local government		coordination between different government branches	tax, land use fee	development funding	land, political legitimacy, social stability	
enterprises		supportive policies, land, financial subsidy, infrastructure	business transaction and cooperation; "urbanization economies"; competition for market and resources	initial funding, operation funding	labor force (mainly low-end)	labor force (from low-end to professional and management)
banks		deposit of public funding, commission business	deposit, corporate banking profit	competition for business	deposit, retail banking profit	deposit, retail banking profit
peasants		land compensation fee, public service, social welfare, public service jobs	jobs, goods and services	retail banking services	negotiation and compromise during the "rural collective property rights system reform"	rent income, income from "small property housing"
new urban residents		public service, social welfare, jobs in the government	jobs, goods and services	retail banking services	"small property housing"	

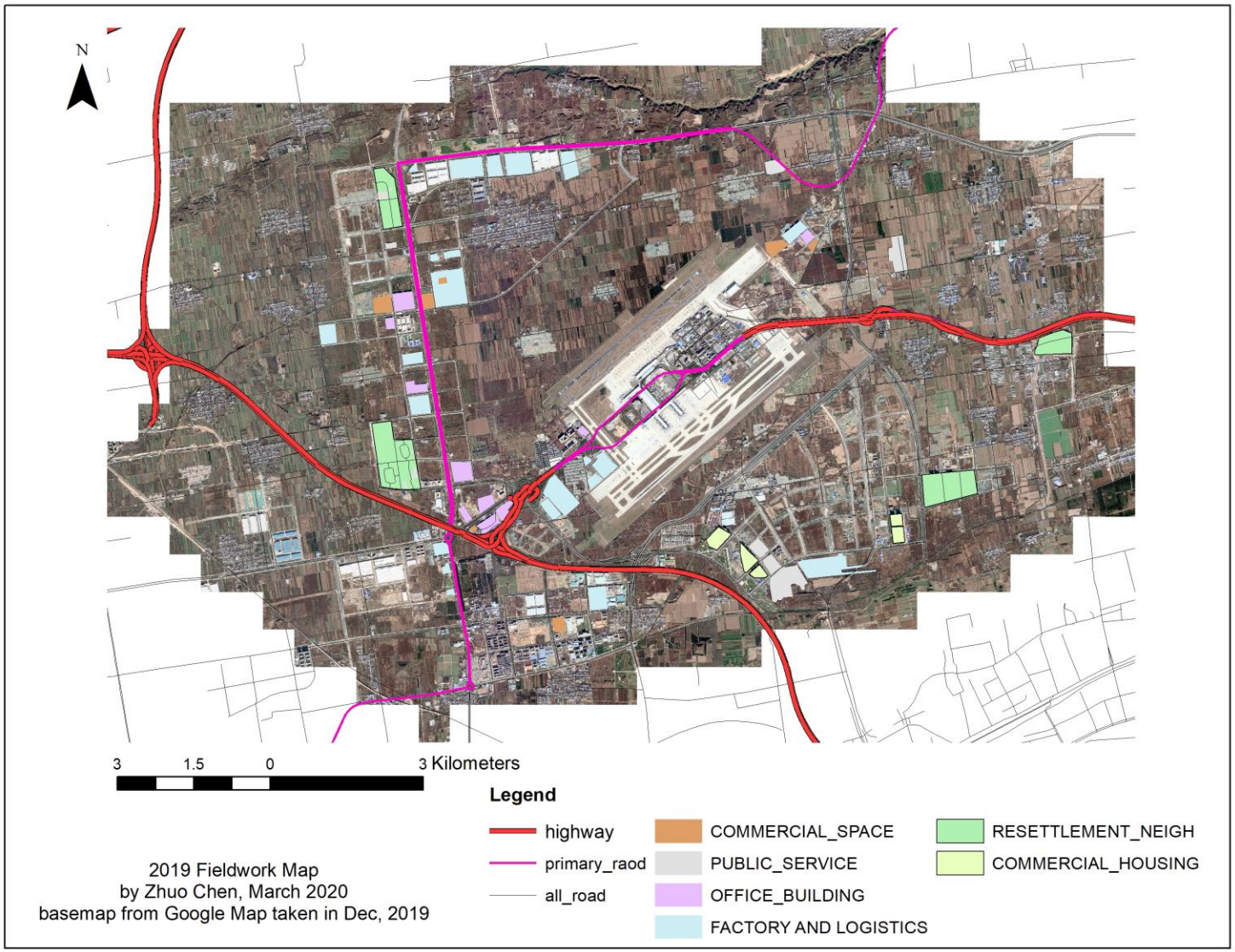

Figure 31: Fieldwork map. A map package can be downloaded from https://uofi.box.com/s/53yp0maia7szfam3q8dcdpebu0r2wbno . Download and open the file with ArcMAP.