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REVIEW

Mega-city Planning Challenges——Taking Beijing as an Example

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ABSTRACT

In the past 30 years, China has experienced development at full speed, and the cities have expanded rapidly. There have been dozens of megacities with millions of people. Due to the lack of preparation of various factors, these cities will inevitably also have some urban diseases similar to those in the mega-cities of the world. How to develop mega-cities, especially how to ensure the sustainable development of mega-cities, such as Beijing, Shanghai, Guangzhou, etc., is a question that must be answered. This paper mainly discusses the challenges faced with city planning, especially for mega-cities, taking Beijing as an example and analyzes from following aspects: institutional challenges, demographic challenges, and environmental challenges, and hopes to provide references for city planners.

1. City Background

Beijing, the capital and second largest city in China, has undertaken the culture center and the education center. And Beijing is the core city for the Beijing-Tianjin-Hebei Region, which is the pole of development in the region. Therefore, Beijing is of prime importance in Chinese cultural, politics and economic.[1] The whole city covers an area of 6336 m² and is combined by 16 urban districts and 2 counties. The urban form of Beijing is formed by circular expressways which makes the city as concentric structure. And in 2016, the Beijing government has started designing the 7th ring road. The 4th ring road is halving the line between the urban area and the peri-urban area of the municipality.[2]

Since Chinese economic reform, Chinese cities have begun rapid urbanization and economic development since the 1980s. Beijing, as one of the most important cities in China, is a very typical example of Chinese rapid urbanization of the past 30 years. The total municipal population increased from 9 million in 1980 to 21.7 million in 2015; this number includes the urban population, rural population and migrants. And Gross Domestic Product (GDP) increased from 13910 million Yuan to 2368570 million Yuan (see Table 1). Economic, population and spatial developments have been brought by the rapid urbanization rate and a great number of migrants, and many challenges have also been brought by the rapid urbanization for urban development. Moreover, many cities in the world have put forward the sustainable development of cities since the 1980s.[3] But the policy of Chinese economic reform and rapid urbanization doesn't come down to the importance of sustainable development because a question of questions in Beijing is poverty-solving issue.[4] The poverty problem has led to the urban planners making the city having the capacity of securing more economic benefits rather than sustainable develop-

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ment. Therefore, it is Inevitable to make some challenges during the rapid urbanization.

Table 1. Beijing population and GDP statistics during Chinese Economic Reform.

Years	Population (million)	Gross Domestic Product (million Chinese Yuan)
1980	9.04	13910
2015	21.73	2368570

***Source*:** Beijing statistical yearbook 2016.

In this paper, 3 main challenges will be focused on in Beijing urban development, which are institutional challenges, demographic challenges and environment challenges. These 3 challenges are indeed hinder the urban development of Beijing.

2. City Challenges

2.1 Institutional Challenges

The first challenge is supposed as the institutional challenge. In urban institute, economic benefit, which is evaluated by GDP, always occupies the most important aspect of urban development in the eyes of policy makers.[5] Focus on economic construction is the basic developing line of the Chinese central government, which is called "one central task and two basic points".[6] Therefore, the urban development of Beijing is also supposed to follow the central government, and economic development becomes the reason and the result for urban development.

From the Chinese economic reform, economic development relies a lot on urban development and infrastructure construction.[7] As we have talked, rapid urbanisation in China is not balanced. It destroys a lot of balance, for example, as Liu et al. claimed, "approximately 80% of urban growth has been at the expense of rural settlements (23.42%) and arable land (57.14%) in Beijing", which doesn't take into account the equality of social and spatial.[8][9] At same time, metropolitan area making by urbanisation also brings economic development and restructuring.[10] Although the urbanization makes the gap between urban and rural bigger and bigger, unbalanced urbanisation is still the indispensable cornerstone in order to sustaining economic prosperity of Beijing, even China's top leaders name it as "new form of urbanization". In other words, the urban development system in Beijing, considering economic development as its core, does not concern the life quality of urban residents as the most important part.

In next 5 to 10 years, if we still Beijing developing by choosing the most profitable institutional way, the urban economic may enhance development successfully, but social equality, environment and urban design processes will be broken. Actually, for Beijing urban design processes, because it is the capital of China and the core city of regional development in Beijing-Tianjin-Hebei Region, Beijing there are many "vanity projects" and high-end properties in Beijing although many basic needs of urban residents are not resolved.[11] That may make over-urbanization which may lead to housing price bubbles. If the majority of housing cannot suit the majority of people, a grievous social inequality will be inevitable in Beijing future urban development.

2.2 Demographic Challenges

As the capital of the most populous country, demographic problem cannot be neglected. The Beijing Statistic Bureau claims that the Beijing population is 15.3 million in 2005, 19.6 million in 2010 and 21.7 million in 2015, so it is very clear to know the rate of population growth is declining, which declined from 28% in 2010 to 11% in 2015.[12] But there is still 11% population growth in Beijing, so if the rate retain 11%, the population will reach 24.1 million in 2020. It is a population explosion because Beijing Overall Urban Planning (2004-2020) determines the total population size control in 18 million people and control the urban infrastructure and other related indicators for 20 million people.

As the central city of the Beijing-Tianjin-Hebei Region and the capital of the People's Republic of China, Beijing has a relatively high level of economic development and a large number chance of job, which has become the main driving force for the large number of rural migration which has led to the population explosion.[13] Apart from that, as the political center, cultural center and education center of the country, the diversified functions of the capital also have great attraction to rural migration, which also leads to a lot of talent to Beijing. Another reason is the inner demand in Beijing, which may have a link with population structure. Beijing has 2.46 million people aged 60 and above which accounts for 12.5 percent (China Data Online [CDO]). A city with more than 10% of the population aged 60 and above is named aged city. Therefore, the economic development of Beijing demands a large number of young people, which brings vitality to the sustainable development of Beijing.

In next 5 to 10 years, as a major resource-oriented city, Beijing has a shortage of natural resources, and 98% of its energy is imported.[14] 100,000 non-agricultural increasing population will increase the direct need of living energy consumption about 14.21 million tons and the indirect need of energy consumption about 23.46 million tons per year. As we have talked, in the future the population

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explosion brings more than 6 million people for Beijing which will demand the more resources for the city. Water, land, housing and other resources are demanded in a larger number, but it is difficult to supply full supporting resources which may bring a lot of risk and uncertainty to Beijing urban development.

2.3 Environmental Challenges

As it already mentioned the demographic challenge and rapid urbanization in Beijing, the excessive population growth and the development of urban area have a direct influence on the environmental challenges. In the case of green space, the scarcity of green space per capita in Beijing was 1072 square meter, which fell to 705.2 square meter in 2010. In terms of resource consumption, Beijing needs to import 13,000 tons' food from other areas and 777,000 tons' water (China Data Online [CDO]). Apart from that, there are 17,000 tons of household garbage, 3.8 million tons of polluted water and 310 tons of SO2 in 2010. As we have talked, rapid urbanization is happening in Beijing, which brings population aggregation and urban sprawl to cause ecological space occupied.[15] In a not very long time, the rapid urbanization will make Beijing become a cosmopolitan city, and that also means a large number of resources are demanded. In this process, the consumption of huge quantities of resources is beyond the capacity of local resources, and pollutant emission is also beyond Beijing environmental capacity at the same time.

In next 5 or 10 years, Beijing rapid urbanization is going on, and the population aggregation and urban sprawl will continue to increase. So, green spaces will be broken sequentially, and the pollutant emission will sustain to destroy sustainable development. We may pay the economic price to solve consequences which are made by environmental disruption. From the social perspective, hostile environment also has a bad effect on Urban Livability. Therefore, it is foreseeable that the environmental challenges will get an intricate location in Beijing urban development.

3. Conclusion

As we have talked about 3 main challenges, institutional challenges, demographic challenges and environmental challenges, in Beijing urban development, Chinese rapid urbanization is unbalanced development with many flaws. For our planners, we are supposed to solve these challenges by reasonable and scientific planning.

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