Research on Urban Resource Allocation and Regional Environmental Innovation in Hefei Metropolitan Area

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Abstract. The planning of urban agglomerations and metropolitan areas is to better coordinate the development of urban resources and the environment, coordinate the relationship between urban construction and population distribution, resource development, environmental improvement and infrastructure construction. The practice of urban agglomeration resources and environmental planning in developed countries has a history of nearly 100 years, while China is still in its infancy. Take New York, London, Paris, Tokyo and other metropolitan areas as examples, from the distribution of resources, environmental engineering, industrial layout and transportation route distribution as the research objects, study and analyze the planning and development process of urban agglomeration resources and environment. Summarizes the development model and characteristics of urban agglomerations, and puts forward suggestions on the development of resources and environment in the Hefei metropolitan area on this basis.

1. Introduction

Urban agglomerations and metropolitan areas are a mature and advanced organizational form of cities to a certain stage. As an important part of urban agglomerations, metropolitan areas are the products of the current evolution of economic and social development and urbanization. The six world-class city clusters are mainly New York, Chicago, London, Paris, Tokyo and the Yangtze River Delta. The metropolitan area in each large urban agglomeration constitutes a part of the urban agglomeration development, and Hefei, as an emerging metropolitan area in the Yangtze River Delta urban agglomeration, released the "Changjiang Delta Urban Agglomeration Development Plan" issued in June 2016, which proposed The Hefei metropolitan area is included in the Yangtze River Delta urban agglomeration. It is also mentioned in the 13th Five-Year Plan of Anhui Province that it will promote the strategic upgrade of the Hefei economic circle to the Hefei metropolitan area. Taking the five major development action plans as the starting point, advocating innovation, focusing on coordination, advocating green, thick planting and opening up, promoting sharing, and accelerating the breakthrough to the "national metropolis with important influence".

The Hefei metropolitan area started late, and its overall influence in the urban agglomeration of the Yangtze River Delta is relatively weak. The integrated policy support system in the metropolitan area is not perfect. Especially in infrastructure construction, industrial support, and factor markets, there are still mutual In the situation of competing for resources, it is urgent to strengthen the overall coordinated layout of resources, to enhance the attractiveness of domestic and external competitiveness.
2. Analysis of the current situation of Hefei metropolitan area

In May 2016, the "Development Plan of the Yangtze River Delta City Group" was approved by the State Council. After Hefei City was clearly positioned as Nanjing and Hangzhou, the third sub-center of the Yangtze River Delta City Group, the Hefei Economic Circle was renamed Hefei Metropolitan Circle as one of the five metropolitan areas in the Yangtze River Delta urban agglomeration.

At the same time, the "Implementation Plan for the Development Plan of the Yangtze River Delta City Group" issued in 2017 has increased the Hefei metropolitan area from five previous cities to seven cities. These include: Hefei, Chuzhou, Lu'an, Huainan, Ma'anshan, Tongcheng, Wuhu. The specific development process is as follows:

| Period/year | Name                     | Geographical scope                                 |
|-------------|--------------------------|--------------------------------------------------|
| 2007        | Provincial Capital Circle| Hefei, Lu'an, Chaohu                              |
| 2008        | Provincial Capital Circle| Hefei, Lu'an, Chaohu, Huainan, Tongcheng         |
| 2012        | Hefei Economic Circle    | Hefei, Lu'an, Huainan, Tongcheng, Dingyuan       |
| 2013        | Hefei Economic Circle    | Hefei, Lu'an, Huainan, Tongcheng, Chuzhou        |
| 2016        | Hefei metropolitan area  | Hefei, Lu'an, Huainan, Tongcheng, Chuzhou        |
| 2017        | Hefei metropolitan area  | Hefei, Lu'an, Huainan, Tongcheng, Chuzhou, Wuhu, Ma'anshan |

Since 2007, the construction of the Hefei economic circle has entered a new stage. As can be seen from Table 2, each city is dominated by the secondary industry, with the secondary industry accounting for 48.81% of GDP and the tertiary industry accounting for 45.19%. The primary industry accounted for 6%, the entire Hefei metropolitan area accounting for 51.01% in 2007, the tertiary industry accounted for 38.02%, and the primary industry 10.97%. In 2007, the specific distribution of cities in the Hefei metropolitan area is shown in the table 2:

| Area         | Regional GDP (100 million yuan) |
|--------------|----------------------------------|
| Hefei City   | 1334.2                           |
| Maanshan City| 540                              |
| Wuhu City    | 581.12                           |
| Huainan City | 358.7                            |
| Lu'an City   | 439.83                           |
| Chuzhou City | 443.93                           |
| Tongcheng City | 77                          |
| Total        | 3774.78                          |

In 2016, the Hefei metropolitan area was officially established. The coverage of the Hefei metropolitan area reached 5,7591.1 square kilometers. At the end of the year, the total registered population reached 28.529 million. The metropolitan area achieved a GDP of 1420.63 billion yuan, of which the primary industry was about 104.24 billion yuan the secondary industry is about 732.3 billion yuan, and the tertiary industry is about 584.1 billion yuan.

However, this change is only a change in name and concept. As the core city of the metropolitan area, Hefei's 2016 GDP was 50.7% of the secondary industry, 45% of the tertiary industry, and 4.3% of the primary industry. In the entire Hefei metropolitan area, the secondary industry is 51.55%, the secondary industry is 41.12%, and the primary industry is 7.34%. It can be seen that the industrial structure of the Hefei metropolitan area has not changed significantly from 2006 to 2016. Although the Hefei metropolitan area has made remarkable achievements in the past 10 years, in the entire Yangtze River
Delta urban agglomeration, with the neighboring Nanjing and Wuhan metropolitan area projects, there is a clear gap, especially the synergy effect with other member cities in the metropolitan area is still not obvious enough. In addition, in the metropolitan area, the development level of Hefei is much higher than other cities. There is no reasonable urban system layout in the metropolitan area, and the coordination effect of division of labor has seriously affected the coordinated development of the metropolitan area. See Table 3:

### Table 3. 2016 Main Economic Index Summary Table of Hefei Metropolitan Area

| Area          | Land area (Square kilometers) | Year-end household registration (Ten thousand people) | GDP Total (100 million yuan) | Primary industry | Secondary industry | Tertiary Industry |
|---------------|------------------------------|------------------------------------------------------|------------------------------|------------------|-------------------|-------------------|
| Hefei City    | 11445.1                      | 729.8                                                | 6274.4                       | 270.2            | 3181.2            | 2823              |
| Maanshan City | 4049                         | 229.3                                                | 1493.8                       | 83.8             | 827.5             | 582.5             |
| Wuhan City    | 6026                         | 387.6                                                | 2699.4                       | 126.9            | 1506.3            | 1066.2            |
| Huainan City  | 5533                         | 389.1                                                | 963.8                        | 118.4            | 454.6             | 390.8             |
| Lu'an City    | 15451                        | 587.4                                                | 1108.1                       | 189.4            | 490.6             | 428.2             |
| Chuzhou City  | 13516                        | 454.1                                                | 1422.8                       | 225.5            | 707.2             | 490.1             |
| Tongcheng City| 1571                         | 75.6                                                 | 244                           | 28.2             | 155.6             | 60.2              |

Due to the low level of regional integration and wide field in the Hefei metropolitan area, the development of the tertiary industry is seriously insufficient. The industrial structure between the member cities is similar, and the lack of a reasonable division of labor has led to a low level of cooperation between the entire cities. There is insufficient motivation to co-build the metropolitan area, and the initiative of each city is poor, which limits the development of the Hefei metropolitan area.

3. **Historical coordination experience of the international metropolitan area**

The five major foreign urban agglomerations currently include New York, Chicago, Paris, London, and Tokyo. The development and planning of the five urban agglomerations have gone from small to large, from weak to strong. Compared with the construction of metropolitan areas in other parts of the world, each metropolitan area is relatively successful in terms of its current scale and degree of integration, and its promotion of economic development. However, due to the different locations and environments of the metropolitan area, there must be differences in its development path. The development of anything must necessarily go through the three stages of budding formation, development and maturity. In these three stages, the planning of the metropolitan area by the government and relevant organizations plays an important role. Each planning of the metropolitan area is to summarize the past experience and lessons and propose new goals and directions based on the new economic and policy environment.

Therefore, analyze and compare the planning background, content and ideas of each metropolitan area, and compare the results, to find out whether there are certain common laws in the development of the metropolitan area, in order to propose development suggestions.

### Table 4. Overview of five major urban agglomerations

| Central city | City composition                                                                 |
|--------------|----------------------------------------------------------------------------------|
| New York     | New York, Washington, Boston, Philadelphia, etc. a total of 40 more than 100,000 people |
| Chicago      | Chicago, Detroit, Cleveland, and more than 20 cities with more than 1 million people |
| Paris        | Paris, Amsterdam, Rotterdam and other 40 cities with more than 100,000 people      |
| London       | Greater London, Birmingham, Sheffield, Liverpool, Manchester                      |
| Tokyo        | Tokyo, yokohama, shizuoka, Nagoya, Kyoto, Osaka, kobe                              |
Due to New York and Chicago belong to the United States, the two very similar in the planning and development, therefore, the main of four New York, Paris, London and Tokyo metropolitan circle's development is analyzed

3.1. New York metropolitan area
The first stage: from 1921 to 1929, the New York metropolis carried out the first plan, which mainly focused on the re-centralization of the urban area, applied the layout principle of the city to the metropolitan area, redesigned the municipal center, and strengthened the construction of the transportation network. And the industrial layout of the suburbs along the transportation hub.

The second stage: In 1968, the New York Metropolitan Region carried out its second planning, which emphasized the re-aggregation of the New York Metropolitan Region, the revival of the old city and the continued construction of the regional landscape and transportation network. But this time the layout is not ideal, and the phenomenon of "industry hollowing" has appeared in the central city.

Third stage: In 1996, New York formulate the "economy", "environment" and "equity" "3E" standards for judging the quality of life in the metropolitan area. At the same time, the New York metropolitan area implements five strategies "vegetation, labor, mobility, center, and management" to improve the quality of life in the metropolitan area through the five strategies.

Three plannings in 1921, 1968 and 1996, the first was aimed at suburban development, the second attempted to establish a polycentric city, and the third, the construction of a modern urban belt along the Atlantic coast of the United States to restore New York's global metropolitan area planning. Although the three plans are different, they all adopted a strategy of giving priority to the development of public transportation.

3.2. Paris Metropolitan Area
The first stage: In 1934, the plan aimed to limit the diffusion of cities, limit the scope of urban construction land, and protect non-construction land such as important historical landscapes for future urban development.

The second stage: from 1956 to 1960, five satellite cities were built in the built-up area of Paris, and a unified and coordinated urban system was formed with the Paris urban area. The basic industrial industry was transferred, and the tertiary industry was concentrated in the urban area, especially services industry. The functions of the five satellite cities are also different.

The third stage: In 1976, Paris launched a new round of regional control and planning, establishing a new urban sub-center on the main axis of urban development and the axis of transportation to further guide the urban population to the suburbs. .

The fourth stage: In 1994, the "Paris Region Master Plan" was formed. The main idea of the plan is to coordinate the development and division of labor among the cities in the Paris metropolitan area, and to maintain the competitive relationship between each other and form a balanced development of space. Pattern.

In the development process of the Paris metropolitan area, the layout of the main transportation lines was consciously incorporated into the planning, to build a regional transportation network to control the layout of the regional spatial system, and to guide urban development through the construction of transportation infrastructure. Secondly, establish a new city, guide the industrial and population transfer in the Paris urban area, reduce the population and traffic pressure in the center of Paris, and transfer the functions of some Paris cities, promote the migration of the central urban population, and provide funds to develop the new city and accelerate Subcenter development.

3.3. London Metropolitan Area
The first stage: In 1944, the "Greater London Plan" divided four levels from the spatial structure. The plan used London as the economic, financial, trade, and scientific and technological center to radiate and promote the development of surrounding cities.
Second stage: In order to solve the outstanding contradictions such as the increasing population concentration, traffic congestion and housing difficulties in London, with a view to achieving the coordinated development of economy, population and city in a larger area, in the 1960s, London implemented a satellite city with a radius of central London Development and construction. Promote the evacuation of excess population in large cities.

The third stage: The London metropolitan area has formed a multi-center industrial network layout. The surrounding major cities all have characteristic advanced production and service industries, which respectively undertake different urban functions. The development situation of a core and multiple sub-centers in the metropolitan area has effectively guided the reasonable layout of population and industry.

In the planning of the London metropolitan area, a highly sophisticated transportation system was used as a guide. A rail system centered on the city of London was formed, covering major cities in the London metropolitan area and connected to the subway systems of various cities. The entire metropolitan area. Promote the division of labor and cooperation among cities, form a sub-center of the metropolitan circle with its own characteristics, and give full play to the leading role of the central city.

3.4. Tokyo Metropolitan Area

The first stage: From 1958 to 1975, when the population and industry in Tokyo were excessively concentrated and urban traffic was congested, green isolation zones were set up within the built-up area to prevent the expansion of the built-up area; and a satellite city was built to absorb Population and industrial mobility.

The second stage: From 1968 to 1975, Tokyo was used as the central hub for rapid economic growth. At the same time, in the new development areas of surrounding cities, the development policy of the sub-center city continued to be promoted.

The third stage: from 1976 to 1985, it proposed to change the form of centralized development in the center of Tokyo, promote suburban industrial development and population migration, and strive to form a multi-level multi-layer broad urban composite structure.

The fourth stage: From 1986 to 1999, in order to cope with the situation of economic internationalization, Tokyo strengthened the global financial functions and high-level center management capabilities of the core area. Therefore, it proposed to develop a sub-center to undertake some functions of the center area; strengthen each component Union between regions.

Fifth stage: Re-emphasize the establishment of the spatial model of the "decentralized Internet structure" of the regional multi-center city, and actively build a regional structure that balances work and residence.

The success of the Tokyo metropolitan area cannot be achieved without government leadership and promotion. Up to now, the Tokyo metropolitan area has undergone five plannings. In the five plannings, all attach great importance to the construction of an integrated transportation system, emphasizing the formation of "public transportation" as a guide. Rail transit is the core. Second, build a unique multi-center structure, gradually shift manufacturing bases such as manufacturing factories to local areas, corporate headquarters and R & D institutions gather in Tokyo, and cities and counties around Tokyo actively carry out industrial transfer and function acceptance based on their own characteristics.

4. Conclusion

The overall plan is crucial to the construction of the metropolitan area. In the future planning and construction process, the Hefei metropolitan area also needs to rely on active urban planning to determine the future development direction of the urban area.

From the development experience of Paris and Tokyo, we can see that the development of the regional planning of the metropolitan area needs to break through the obstacles of administrative divisions. Without crossing the barriers of administrative regions, the development of the metropolitan area will inevitably be hindered.

The construction of the metropolitan area focuses on the foundation and leading role of transportation. Accelerate the construction of inter-city railways in the metropolitan area, seamlessly connect with
neighboring cities in the Yangtze River Delta, and transform and upgrade the highway network and track network of Hefei City and other member cities. To build a regional aviation center in Hefei, and actively promote the development of the Hefei Airport Economic Zone, aviation capabilities do not simply exist as a means of transportation, but are also an important means of regional internationalization.

The international metropolitan area has formed an obvious regional functional zoning system based on its own characteristics. Cities in major metropolitan areas, based on their own different development conditions, try to maximize their regional advantages on the basis of division of labor, collaboration, and complementarity. Hefei has a national scientific research and education base, a strategic emerging industry cluster, and a national high-tech industrial base. It should actively promote high-end manufacturing and service-oriented manufacturing to ensure the leading innovation of core cities, and further enhance Hefei's core competitiveness and international influence at the same time, some functions will be transferred to drive the economic and social development of cities and regions in the surrounding metropolitan area.

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