

Enlightenment from the Evolution of Transportation Development Strategy of World-Class Cities

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Abstract

With the rapid development of urbanization process, urban spatial structure is also rapidly evolving. In order to cope with the challenges of urban spatial evolution and sustainable rapid development, it is necessary to formulate a traffic strategy for coordinated development with urbanization, so as to provide a basis for the development goals and strategies of urban traffic. Firstly, this paper introduces three representative methodologies in the strategic planning of urban transportation: trend research, challenge response and goal oriented; Then, the evolution of transportation development strategies of New York, London and Tokyo, three world-class cities, are summarized. Finally, some enlightenment is summarized from these world-class cities.

Keywords

Transportation Development Strategy; Evolution; Enlightenment.

1. Introduction

As urban traffic is facing new technology, new environment and new situation, how to do urban traffic strategic planning under this background is a problem worthy of serious consideration. The main problem to be solved in the urban traffic development strategy is to effectively deal with the relationship between the traffic demand generated by the urban sustainable growth space and the limited supply capacity of traffic facilities on the whole, so as to maintain the sustainable development of the city. Therefore, it is very important to understand the methodology in urban traffic strategic planning and summarize the experience from the traffic evolution process of world-class cities.

2. Methodology in Urban Traffic Strategic Planning

The representative methodology of urban traffic strategic planning has trend research, challenge response and goal oriented[1].

2.1. Trend Research

The representative case is "Global Trends 2030: A Changing World", published by the US National Intelligence Council. The idea is to identify key trends and then combine them with hypothetical events to build a framework for further strategic planning.

2.2. Challenge Response

The representative case is the "2030 Global Strategic Forecast", published by the Institute of World Economics and International Relations of the Russian Academy of Sciences. It is pointed out that after two decades of transformation and development, Russia has entered a long-term strategic development stage and is faced with new challenges at home and abroad. Therefore, it is necessary to make clear the future challenges and risks through strategic analysis on the basis of predicting the international situation and Russia's current development situation.

2.3. Goal Oriented

The representative case is "Asia 2050: Achieving the Asian Century", published by the Asian Development Bank. It proposes to try to provide new values and insights in clarifying the risks of Asia's rise, breaking the middle-income trap, constructing a scenario analysis model, constructing a regional cooperation framework, and strengthening Asia's global responsibilities.

3. The Evolution of Transportation Development Strategy of World-Class Cities

A world-class city is one that directly affects global affairs at the social, economic, cultural and political levels. The following is an introduction to three world-class cities: New York, London and Tokyo, about the evolution of transportation.

3.1. New York

The evolution of New York's urban transportation development strategy can be roughly divided into the following stages, as shown in [Table 1](#) below[2].

(1) New York promulgated the first urban planning law in 1916 and carried out the first regional planning in 1921. At this time, New York was faced with the problem of disordered urban development and sprawl. This plan strengthens the construction of CBD, establishes regional road network and railway network, and lays the framework for subsequent development. The urban rail transit network has been basically completed since the 1930s.

(2) Since the 1950s, the rapid popularization of private cars and the construction of expressways have greatly extended people's activity space. The low-density suburbs have spread rapidly, and the population and employment in the central area of New York have declined, resulting in the decline of the central area. In this context, the second regional plan of New York in 1968 proposed the planning goal of curbing urban sprawl, reclustering of centers and sustainable development of regions. The plan proposed the construction of multi-center cities, strengthening transportation, connecting the transportation system within the region, and laying the foundation for the vigorous development of the region afterwards. But suburbanization continued until the 1980s, when private cars quickly took over and efforts to curb the decline of urban centers were limited.

(3) After the 1990s, New York's position in the international economy was challenged by the economic and oil shocks. Therefore, the main goal of the third regional plan in 1996 was to improve New York's competitiveness in the global economy. Meanwhile, the plan proposed to establish a new transportation network, re-strengthen New York's centrality, promote regional sustainable development and improve New York's ability to concentrate global capital. Large-scale transportation infrastructure construction to this period basically ended.

(4) In the 21st century, the planning goal of New York has shifted to the consolidation of the city's central position and sustainable development. The 2002 strategic plan for New York City, which aims to make New York a city of opportunity and sustainable development, strengthens New York's ties with other world-class regions and improves the city's competitiveness.

Table 1: New York's Traffic Strategy at Different Times

Time	1921	1968	1996	2002	2007
Plan	the First Regional Plan	the Second Regional Plan	the Third Regional Plan	the Strategic Plan for New York City	the Master Plan for New York City
traffic strategy	transportation infrastructure construction	transportation strategy exploration	Transportation strategy maturity	transportation system quality improvement	

3.2. London

The evolution of London's urban transportation development strategy can be roughly divided into the following stages, as shown in [Table 2](#) below.

(1) The history of urban planning in London can be traced back to the "Garden City" theory put forward by Howard in 1898, which proposed to build a new garden city around the central area and connect it with the central area through traffic arteries. Although this planning practice was not successful, it had put forward a relatively complete planning thought system, which had played an enlightening role in the modern urban planning theory, and had an important impact on the later satellite city theory.

(2) In 1944, when the European theater of World War II basically ended, London carried out the "Greater London Plan", aiming at building infrastructure, evacuating population and improving residents' living conditions, and proposed to construct concentric urban structure and build satellite cities[3]. The plan created a skeleton of urban spaces and roads, but added to the burden of commuter traffic as population growth far exceeded forecasts and the new town was not yet fully developed.

(3) In the 1960s, London also experienced a decline in the city center, population and employment. Between 1964 and 1976, London proposed a series of plans, collectively known as the "Greater London Development Plan", to prevent the city centre from declining. The plan promoted regional infrastructure and integrates efficient public transport systems. The London municipal government was dissolved in 1985 and was not re-established until 1999. The absence of government management led to a series of urban problems. At this time, London was faced with such contradictions as the high concentration of central functions and the decline of accessibility.

(4) In 2000, the mayor of London started to solve the traffic problem. In 2001, the first round of "Mayoral Transport Strategy" was launched, with the goal of improving the efficiency, quality and reliability of London's transport system[4]. During this period, London began to manage the demand for cars, paid attention to the integration of different modes of transportation, and formed a differentiated transportation policy.

(5) Due to the growing population and awareness of the environment, London proposed the "Long Term Transport Plan 2025" in 2005, which aims to promote economic development, tackling climate change, improve transport services and develop public transport. The plan promoted the construction and maintenance of rail transit and buses, improved the efficiency of the public transportation system, and began to systematically develop pedestrian and bicycle transportation in London, which gradually formed the trend of pedestrian and bicycle transportation around 2006.

(6) Five years after the implementation of the plan, people have put forward higher requirements for the fairness, safety, environmental protection and convenience of transportation services. In 2011, London proposed a new "Mayoral Transport Strategy", which aims to improve the quality of life of citizens, improve system services, cope with

climate change and secure the Olympic Games. Thus the urban traffic system enters the condition of optimization and improvement.

Table 2: London's Traffic Strategy at Different Times

Time	1944	1964	2001	2005	2011
Plan	Greater London Plan	Greater London Development Plan	Mayoral Transport Strategy	Long Term Transport Plan 2025	Mayoral Transport Strategy
traffic strategy	transportation infrastructure construction	transportation strategy exploration	Transportation strategy maturity		transportation system quality improvement

3.3. Tokyo

The evolution of Tokyo's urban transportation development strategy can be roughly divided into the following stages, as shown in [Table 3](#) below[5].

(1) The kanto earthquake in 1923 left Tokyo's urban fabric in ruins. Tokyo proposed a "Disaster Recovery Plan" that year to restore infrastructure and promote imperial capital recovery. The plan organized the land division, promoted the construction of roads, railways, canals and disaster prevention buildings and broke the old urban block pattern since the edo period, which laid the foundation for Tokyo to become a modern metropolis.

(2) In 1945, Tokyo was once again in ruins due to the heavy bombing in the Second World War. Therefore, the "War-Restored City Plan" of that year focused on the construction of infrastructure and put forward the idea of delimiting the area of the capital circle and building a satellite city. But the rapid postwar demographic shift to Tokyo, coupled with fiscal austerity, has turned the plan into an exercise in rhetoric. After the war, Tokyo developed rapidly due to the economic revival. In order to control the urban sprawl and relieve the traffic pressure, Tokyo introduced the first "Capital Circle Reconditioning Plan" in 1956. It is proposed to build the circular green belt and the sub-center of the city within 5~15 km from the city center to improve the transportation capacity of the transportation system. Since the urban expansion far exceeded the expectation, the implementation effect of this plan was not good, but after that, the rail transit in Tokyo began to enter a period of rapid development.

(3) In 1968, Tokyo introduced the second capital circle reconditioning plan, which planned to build a new city in a zone 30 to 40 km away from the capital, vigorously build a rail transit system, and relocate some institutions to guide population evacuation and disperse high density pressure in the central area. However, due to insufficient capital investment in the early stage and lagging supporting facilities in the new city, it had little effect on the evacuation of the population, and the flow of people aggravated the traffic load.

(4) After the 1970s, after a long period of construction, the new town began to flourish, and the regional rail transit network basically took shape. In 1976, Tokyo launched the third capital circle reconditioning plan, planning to continue to build more new cities in a wider area, so as to decentralize some central functions of the central area. During this period, the number and quality of new cities in Tokyo grew steadily, and a virtuous circle began to form. With the further improvement of rail transit and the maturity of the new city, the metropolitan area of Tokyo began to prosper gradually after the 1970s.

(5) In 1986, with the economic globalization and informatization, Tokyo launched the fourth capital circle reconditioning plan, in order to strengthen the international financial function and high-level management function of the city center and disperse more urban functions to the new city. The plan also proposed to improve the public transport network and increase rail transit capacity. In the late 1990s, due to the problem of the hollowing out of the capital

circle caused by the bursting of the economic bubble, Tokyo proposed the fifth capital circle reconditioning plan, hoping to promote the transformation of infrastructure and the reorganization of urban space functions by cultivating and relying on the development of new cities. The plan improved the public transportation network, increased rail transit capacity, promoted the formation of a multi-center, multi-circle urban system, and the Tokyo metropolitan area entered a boom phase.

(6) In 2006, taking the bid for the Olympic Games as an opportunity, Tokyo put forward the "Tokyo in 10 Years Plan", which promoted the capital's central ring line and other infrastructure construction, alleviated traffic congestion and met freight demand, drew a blueprint for subsequent construction, and optimized the transportation system service. In 2011, the east Japan earthquake changed the external environment of Tokyo so much that the city revised the previous round of planning and became known as "Tokyo 2020".Based on the post-disaster situation, the plan aimed to further improve the service quality of the transportation system by strengthening the transportation network, constructing high-speed loop, reducing carbon emissions, reducing logistics costs and improving disaster prevention capacity.

Table 3: Tokyo's Traffic Strategy at Different Times

Time	1945	1956	1968,1976	1986,1999	2006	2011
Plan	War-Restored City Plan	the First Capital Circle Reconditioning Plan	the Second, the Third Capital Circle Reconditioning Plan	the Fourth, the Fifth Capital Circle Reconditioning Plan	Tokyo in 10 Years Plan	Tokyo 2020
traffic strategy	transportation infrastructure construction	transportation infrastructure construction	transportation strategy exploration	Transportation strategy maturity	transportation system quality improvement	transportation system quality improvement

4. Elightenment to the Transportation Development Strategy

4.1. Appropriate Traffic Patterns are the Foundation of Development

The choice of traffic mode is the strategic judgment of traffic development. Only reasonable traffic mode can support and guide urban development. In the process of urban development, world-class cities attach great importance to the formation of reasonable traffic patterns, which mainly include three types[6,7].

(1) A model dominated by private cars

The rate of private car ownership in America is generally high, and New York is a typical private car dominant mode. The travel ratio of private car and public transportation is about 5:1. But in downtown New York, mass transit still dominates during peak commuting hours, accounting for about 70 percent of motorized travel.

(2) A model dominated equally by private cars and public transport

This mode is represented by London and Paris, where the proportion of private cars and public transportation is relatively balanced. The central area of the city is dominated by public transportation, while the outer area is dominated by private cars.

(3) A model dominated by public transportation

Asian cities represented by Tokyo, Singapore and Hong Kong are the representatives of this model. In the urban traffic structure, public transportation (rail transit + regular buses) dominates. Tokyo is the absolute dominant mode of rail transit. The travel ratio of private cars,

rail transit and regular buses is about 0.7:1.0:0.1. The comparison shows that public transport plays an important role in the traffic structure of world-class cities.

4.2. Rail Transit is the Key to Development

The public transportation system in the metropolitan area of a world-class city basically includes three main modes: intercity railway, urban rail transit and conventional public transportation. Among them, intercity railway is mainly responsible for the transportation connection between the city center and the suburbs, while urban rail transit is the backbone transportation system for daily city travel, and conventional public transportation is generally used as supplementary connection. The main modes of commuting in the center of world-class cities are rail transit, accounting for more than 70% of the share of public transportation. Tokyo, with a developed rail transit system, has the highest utilization, accounting for 90% of the share of public transportation. Take shinjuku, the sub-center, as an example. Shinjuku station has access to nine rail transit lines, with an average daily passenger volume of up to 3.4 million[8].

The experience of the development of world-class cities shows that the rail transit system plays a dominant role in the intra-urban travel and inter-city connections between metropolitan areas, which is determined by the characteristics of large capacity and intensive rail transit.

4.3. Improving Transportation System Quality is the Trend of Development

Paying attention to the quality improvement of the transportation system is a sign of the maturity of the transportation system. On the one hand, with the promotion of environmental protection awareness and the approaching energy crisis, people pay more and more attention to green transportation; On the other hand, people's requirements for travel quality are also improving. To build a comfortable, convenient and safe transportation system and build a more livable, inclusive, safe and fair city has become an important goal for the future transportation development of world cities. For example, New York has tried to change Willoughby street in brooklyn from a motorized street to a pedestrian and bicycle road, with plans for a "Greener, Better New York"; Both London and Paris have vigorously promoted public bicycle programs and improved walking and cycling conditions; Singapore and Hong Kong are committed to improving the seamless connection and comfort of the transportation system, and attach importance to meeting the travel needs of vulnerable groups[9].

5. Conclusion

Urban transportation strategic planning is an important part of the planning system. To do a good strategic planning, it needs to understand the methods of relevant urban transportation strategic planning, and choose flexibly according to the requirements of the development of cities. This means that there is no need to follow a certain work template. At the same time, urban transportation strategic planning is a link in the process of strategic regulation and control, and the implementation process of planning is actually a regulation and control process.

With the continuous development of globalization, more and more large cities will further participate in global competition, which requires high-level transportation systems to support urban development. World-class cities are the forerunners of urban transportation development. Fully understanding the inherent laws of the evolution of world-class urban transportation development strategies can provide reference and guidance for the formulation of transportation development strategies in other large cities.

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