

The Exploration and Development of New China's Urban Transportation Planning

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Abstract: The modern urban transportation planning did not appear in China until the late 1970s. Through more than 40 years of study and practice, China continuously absorbed the theories and methods of social, economic, management and other disciplines in order to adapt to social requirements and urban growth. Gradually, it has formed a set of multi-disciplinary theories and techniques for planning, as well as a multi-level planning management system. In transportation planning field, studies and practices have been mutually promoting the evolution of each side. Domestic tests and overseas lessons have resulted in the advancement of urban transportation planning concepts and techniques. This article is intended to review the development process of urban transportation planning in China, as well as to analyze the main factors that have impacts, such as personnel training and technical development. This article will reemphasize four issues related to the uncertainty of future urban transportation development and the diverse implementations and management of urban transportation planning.

Keywords: Urban Transportation, Urban Comprehensive Transportation System, Urban Comprehensive Transportation Planning, the Compilation of Urban Transportation Plan, Historic Review, China

Introduction

The urban road network is a component and a skeleton of the urban form. Based on an urban layout, the old road network plan extended to 1950s determined qualitatively the structure of road network, road function, road grade, etc. During the 1950s and 1960s, the qualitative approach of the old road network plan did not change fundamentally, though there was the concept of traffic volume in the road network plan. China carried out the policies of reform and opening-up in the late 1970s. Since then, China has been adhering to learn the theories and techniques of urban transportation planning from developed countries. Those theories and techniques have driven the shift of the road network planning approach from qualitative to quantitative. Along with the fundamental change of planning idea and technique, the subject of the modern urban transportation planning

changed the urban comprehensive transportation system from the urban road network. The new perspective is on recognizing the general traffic pattern and on rationally allocating the urban comprehensive transportation system. More concerns have emerged, including the regulation of traffic demand, the optimization of the provisional allocation of various traffic resources and mechanism, the coordination of transportation and land use, and so on.

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1 Overview of urban transportation planning development

1.1 The road network plan until the late 1970s

The urban transportation planning dated back from 1950s was to lay down road networks; the modern urban transportation planning did not appear in China until the late 1970s ^[1]. In the early days of People's Republic of China, large-scale developments of infrastructure were carried out to cooperate with the development of 156 industrial projects assisted by the former Soviet Union. Planning experts from the former Soviet Union helped launch a number of urban planning in many major cities, with regards to the Soviet Union' quota indicators, planning regulations, and qualitative layout patterns of the road network. However, the modern traffic conception was not integrated into the road network plans ^[2], as the urban traffic was not complicated or immense at that time. Those road network plans mainly focused on the layout of primary, secondary, and branch road networks, and the cross-section forms of those roads.

The urban development of China was virtually stagnated between 1958 and 1976. We experienced the Great Leap Forward in 1958, the major natural disasters from 1959 to 1962, and the "Cultural Revolution" from 1966 to 1976. Since the reforming and opening-up in 1978, China and the world has seen a period of time for rapidest growth of various urban developments in the human history. Unfortunately, the contradiction between the infrastructure supplies and the transportation demands soon broke out in the city and urban region, where traffic jams were extensive. The qualitative approach of the road network planning was not suitable to be used as an exclusive approach, failing to meet the requirements of the modern urban transportation planning.

1.2 The establishment and the early prototype of the modern urban transportation planning

Beijing and Shanghai developed respectively their surveys of urban freight vehicles in 1978^①. Tianjin held a survey of resident travel and of cargo movement from 1981 to 1983^②. Those surveys expanded urban transportation study and fundamentally changed the techniques used for transportation planning in China. Besides road facilities, the urban transportation study started to look at sources of traffic generation, the rules of traffic generation, and the travel distribution. Transportation planning began to use a combination of quantitative and qualitative analysis, thereby not just relying on empirical judgment but also the quantitative model based on the survey data. The theoretical methods of modern urban transportation planning have also been developing since then.

The Road Traffic Plan of Shenzhen Special Economic Zone in 1984 was the first case that shifted from the road network planning to the modern urban transportation planning. The four-stage analysis of traffic generation, traffic distribution, mode division, and traffic assignment was spearheaded by the planning agency from the creation of the of this plan, following the Urban Master Plan of Shenzhen Special Economic Zone in 1984. As a result, traffic forecast was connected to urban land use planning and became a quantitative basis for the layout patterns of the road network and the determination of road performance level. The four-stage analysis method became a key tool in many cities in the late 1980s. During this period, urban transportation planning in China focused on the planning study and used traffic analysis to identify issues and problems to solve, which then provided a concrete support for the layout of urban road infrastructure^[3].

A research on the planning mode of the urban comprehensive transportation system of large cities (sponsored by the scientific and technological research program of the “Seventh Five-Year Plan”, initiated by the State Science and Technology Commission) summarized the aim, the structure, the content, the procedure of comprehensive transportation planning, and the quantitative dynamic method to analyze the supply-demand

① Beijing conducted an all-day cargo flow survey of 3,236 vehicles in the city's main transport units, and Shanghai conducted a full-scale survey of 39,925 trucks throughout the day.

② In 1981, the research team of “Improving the Comprehensive Passenger Transport Capacity of Tianjin” studied the experience of traffic survey and planning in Tokyo, Japan; and organized the first survey using computer technology that carried out traffic division and calculated parameters including sampling rate and residents' trips. In 1983, the “Comprehensive Study of Tianjin Goods Flow Law” research group conducted a survey for urban cargo flow and freight motor vehicle flow, followed by studying on distribution of cargo flow, freight traffic composition, freight flow generation and distribution model, etc.

balance. This study became a foundation for the development of theoretical and technological system of modern urban transportation planning in China.

1.3 The upgrades of the urban transportation planning theories

The upgrades of the planning theories in China has been generally problem-oriented and has played an important role of China's urban transportation planning. In the 1980s, there were three major issues in China's urban transportation: the over-load of bicycle traffic, the public transit with extremely poor services, and the serious shortage of road facilities. The urban transportation planning theories at that time focused on "increasing new urban transport facilities and improving existing old urban transport facilities" in order to cover the facility shortage. In the 1990s, problem is urban transportation became: the growth of private cars, the acceleration of urbanization, and the rising of automobile traffic congestion. With the introduction of planning concepts, such as the transit-oriented development (TOD), the transit metropolis, and transportation demand management, transportation planning changed the target to "satisfy the movement of people and things instead of the movement of vehicles". The leading policy at that time was targeted on "coordination, collaboration, and integration" ^[4]. Since 2000, in response to the resource and environmental constraints, the deterioration of the ecological environment, and other prominent issues, the urban transportation planning aimed to "put people first" and "encourage green transportation", while adapting to the global trends of low carbon and green development. The transit-oriented development has been highly supported; the consolidation of the urban comprehensive transportation system and urban function layout has been largely emphasized.

1.4 The legal basis for urban transportation planning

Code for Transportation Planning on Urban Road (GB 50220-95) is a national wide technical standard, developed in 1987 and implemented in 1995. It specifies the main contents of the transport planning on an urban road, and establishes the planning aspects of urban public transport, bicycle transport, foot transport, urban freight transport, road system, and transport facility. Although the code focuses on road planning without the provisions related to the general strategy of the urban comprehensive transport system, it has been only technical code as a legal basis for the urban transportation planning in more than 20 years ^①.

The City Planning Law of the People's Republic of China (1990) clearly

① The "Urban Integrated Transportation System Planning Standards" (GB/T51328-2018) was launched on March 1, 2019, and the "Code for Transportation Planning on Urban Road" (GB 50220-95) was rescinded.

states, for the first time at the legal level, that urban master plans should include urban comprehensive transportation system. The Law on Urban and Rural planning of the People's Republic of China (2008) highlights a list of requirements including land conservation, intensive development, energy conservation, public safety, and implementation of the plans. It also stipulates that the master plan of a city or town should include the comprehensive transportation system. Urban Planning Compilation Measures (1991) and Urban Planning Compilation Measures (2005) contain clear regulations for the specific planning objectives of an urban comprehensive transportation system. The Measures for the Planning of Urban Comprehensive Transportation Planning and the Guidelines for the Planning of Urban Comprehensive Transportation System Planning, issued by the Ministry of Housing and Urban-Rural Development in 2010, both emphasize on the management and the compilation of the urban comprehensive transportation plans.

2 The study and practice of urban transportation planning

2.1 1979-1990: Start-up stage

The establishment and development of urban transportation planning in China is the result of domestic urban transportation practice and study combining with the lessons from other countries. Borrowing the relative disciplines from the Soviet Union, Chinese universities started to train the professionals of road planning, design, and development in the 1950s; some offered the programs on urban roads and transportation under the civil engineering major. In 1979, a Chinese American Mr. Zhang Qiu held the workshop on traffic engineering in China and introduced the theories and methods of transport planning overseas to China. This workshop promoted the development of China's transportation engineering discipline. Since then, Tongji University, Southeast University, Beijing University of Technology, Chang'an University, etc. established their teaching and research sections on transportation engineering based on this tradition.

From 1979 to 1981, China established academic societies successively, such as the Metropolitan Transportation Panel of the Academic Group of the Urban Planning Academic Committee of the Chinese Architectural Society, the Shanghai Transportation Engineering Society, and the Beijing Transportation Engineering Society. In 1979, the Metropolitan Transportation Panel of the Urban Planning Academic Committee of the Architectural Society of China proposed the concept of comprehensive governance, aimed to combine transport planning with urban planning and focuses on the measures and methods to reuse existing road systems and to increase road capacities.

In early 1980s, inspired by Tokyo, Tianjin held a residents' field survey, which became a basic model of the similar surveys in China. It was gradually improved through a lot of practices in various cities in the mid-to-late 1980s.

In the mid-1980s, the large-scale road infrastructure development not only prompted urban transportation planning in many cities but also drove the comprehensive study on urban transportation, including urban transportation policies^①, the techniques of transport planning, and traffic management.

2.2 1990-2000: Expansion stage

With the acceleration of economic growth and social development in this period, the old issues relevant to urban transportation were not resolved completely, and the climax of urban development was here. In the meantime, the soaring car ownership in cities added new development requirements to urban transportation. The studies of the strategy and relevant policy of urban transportation to solve the development issues with the more and more complexity became once again the focus. China Urban Transportation Development Strategy Research launched by China with the World Bank, from 1992 to 1995, eventually formed Beijing Declaration: China's urban transport development strategy^[5]. Its core includes five principles, four standards and eight actions^②, which become the values and methodology of urban transport policy and transport planning. The Declaration has profoundly impacted China's urban transportation planning and development till the present.

① China Academy of Urban Planning and Design led the research on the development direction of urban transportation. 17 agencies participated in the research; the research results were included in "China's Technology Policy—Urban and Rural Construction" (National Science and Technology Commission Blue Book No. 6) and released in 1985.

② The five principles should be used to guide the planning, construction, and operation of urban transportation that is compatible with China's current socio-economic development: the purpose of transportation is to achieve movement of people and things, not vehicles; transportation changes; transportation changes and fees should reflect the entire social cost; transportation system reform should be further penetrated within the socialist market economy principles to improve efficiency; the government should direct the development of transportation; private sectors should be encouraged to participate in the provision of transportation services. Transportation development policies and plans should meet four criteria: economic viability; financial feasibility; social acceptability; and environment sustainability. In line with the five principles and ideological standards, it is recommended to implement eight actions: reform the urban transportation administrative management system; improve the status of urban traffic management; formulate countermeasures to reduce motor vehicle pollutions; establish policies to control transportation demands; formulate strategies for developing mass transit public transport; reform public transport management and operations; formulate financial strategies for transport industry; strengthen training on urban transport planning.

The monographic studies of urban transportation planning made great progress in this period. Among them, the planning technique of parking lot system in a bigger city was a monographic study initiated by the national Ninth Five-Year Plan for scientific and technological study. The monographic study systematically explored the roadmap and techniques to solve urban parking problems in China's urbanization and motorization. It established the model of the parking policy in city centers, the model of parking traffic analysis. It summarized the parking lot layout planning techniques. It compiled the allocation standards of a subsidiary of a building parking lot. This monographic study resulted in Guidelines for Urban Parking Lot Planning. Through demonstration and application, this monographic study has played a positive role in promoting the compilation of parking planning and the industrialization of parking lot development in China.

Key techniques study for development decision-making of urban road transportation was another monographic study. The monographic study systematically studied the development law and trend of urban motorized mobility in China, the relationship between urban land use and traffic mode, road network planning and construction, road traffic system efficacy evaluation method and index, etc. This monographic study took shape the technical and economic policies and the evaluation methods related to urban transportation planning and development in China.

With the in-depth study on the urban transportation model in the period, it gradually shifted to independent study and development from reference. Beijing, Shanghai, Guangzhou and other cities one and another carried out the analysis and the modeling of urban traffic through international cooperation with the organizations and consulting firms outside. From 1987 to 1990, the Shanghai Municipal Government cooperated with Barton Ashman of the United States to establish a Shanghai traffic model based on EMME/II, an analysis tool brought by Barton Ashman. In 1990, the Beijing Municipal Government cooperated with the Hong Kong Government Development Agency to carry out the transplantation and development of the LOTU model. Later, when implementing the Sino-British government science and technology cooperation agreement, the Beijing Municipal Government also cooperated with the British MVA to introduce the TRIPS transportation planning software package and developed Beijing urban transportation planning strategy model. In 1993, the Guangzhou Municipal Government cooperated with the MVA designated by the World Bank to carry out the Guangzhou Traffic Planning Research and established the Guangzhou Transportation Planning Analysis Model.

The international cooperation study carried out in these three cities has played a significant role in promoting the study and development of urban transportation planning model technology in China, and it has promoted the study and development of urban transportation planning analysis tools in China.^①

2.3 Since 2000: Transformation stage

The modern urban transportation planning has not only been an inseparable part of urban and rural planning, but also an important branch of transportation engineering. The exploration of the theories and practices of modern urban transportation planning has been more widely than ever before. With the growth of urban transportation demand and the various conflicts relevant to the shortage of urban transportation supply and the adaptation among sub-systems of urban transportation, the connotation, and extension of urban transportation planning have undergone profound changes.

Since the year 2000, urban transportation planning as a basis for the development of major urban transportation infrastructure has been more clearly defined in relevant national policies^② The compilation of urban transportation planning has begun to pay attention to the policy orientation of the plan and the specific arrangements of its implementation. Shanghai and Beijing developed studies on the urban transportation development strategy. The studies became the programmatic document for the Beijing Municipal Government, guiding the formulation and implementation of transportation planning, transportation policies, and implementation

① In 1996, supported by the national “863” program, China Academy of Urban Planning and Design hosted the “Development of Urban Traffic Demand Analysis Software Supported by GIS” and developed a traffic modeling and analysis system based on GIS technology. Professor Want Wei of Southeast University has developed the “Transport Star—Transtar” software.

② Guobanfa [2003] No.8 “Notice of the General Office of the State Council on Strengthening the Management of Urban Rapid Rail Transit Construction” requires that “the cities of the proposed urban rail transit projects should organize the formulation of urban rail transit construction plans based on the master plan and the urban transport development plan, with respect to the requirements of urban development and financial situation. In the “Opinions on Priority Development of Urban Public Transport” (published by the Ministry of Construction and other departments, and forwarded by the State Council Office of the State Council’s Guobanfa [2005] No.46) requested that “viewing the public transport as the core, establish a public transportation-oriented urban development and land use model, using scientific allocation and utilization of transportation resources, through the preparation and implementation of the urban comprehensive transport system planning, public transport special planning, and rail transit construction planning.

plans ^①. The implementation of transportation planning for urban comprehensive governance is more favored by local governments. Parking plan, hub plan, bus network plan, transportation facilities and management plan, traffic optimization design and traffic organization are all gradually incorporated into the urban transportation system planning.

In terms of planning theory and technique, the combination of transportation engineering and urban planning has been more closely integrated. The rapid development of information technology, big data technology, and internet technology, has injected new vitality into the studies and practices of urban transportation planning. The application of new technologies has made up for the shortcomings of old traffic survey and planning methods. With big data, it has deeply described the traffic demand generation, traffic travel behavior, traffic space distribution, and facility use efficiency ^[6]. Thus, the traffic demand analysis has been no longer limited to the basic framework of four-stage analysis. New analytical methods such as trip chains and service chains have increasingly been used in urban transportation planning.

Generally speaking, urban transportation planning has carried out extensive exploration and study in survey methods, data analysis, model accuracy, prediction technology, strategic study, planning theory, and transportation design. In terms of theoretical methods and disciplines such as transportation engineering, information technology, and intelligent technology, an in-depth cross-study is being conducted. Instead of a static network and facility, urban transportation planning is dealing with a comprehensive transportation system with the people and the goods as the core of urban transportation planning. Moreover, the transportation and urban space structure, land use, trip behavior, intelligent services, ecological environment, the coupling mechanism and synergy between operation control and other aspects, all have become the focus and direction of the study of urban transportation planning.

3 The compiling system of urban transportation planning

Through more than 40 years of study and practice for urban transportation planning, we have established the compiling system of urban transportation planning with Chinese features. We have been including the content of urban transportation planning to adapt to the specific conditions of China. Since the late 1970s, the expansion of urban spatial and the agglomeration of urban function with China's urban development

^① In 2002, Shanghai released the "Shanghai Traffic White Paper", in 2004, Beijing released the "Beijing Traffic Development Outline".

have resulted in the rapid growth of transportation demand. The urban dominant mode of transportation has evolved from bicycles in the 1980s to motor vehicles. Therefore, there have been fundamental changes both in the characteristics of transportation demand and in the supply and demand structure of transportation.

With this development, the structure and content of urban transportation planning show the progressive evolution characteristics of aggregation, separation, integration, and adjustment. First, early urban transportation planning focused on planning studies. It included almost all contents of urban transportation planning, from macro, meso to micro levels, in a single plan. It also included planning, development, and management. Certainly, it made the planning content more difficult to define so that the executive body of the plan was difficult to implement. Next, in order to cope with the key changes in urban planning and development, urban transportation planning was gradually divided from a single plan into various types of plans with clear orientation each plan such as transportation strategy plan, comprehensive transportation plan, public transportation plan, parking plan, etc. Although there were more and more types of plans, the conception including all contents was actually not changed. The contents of urban transportation planning were too many, from macro to micro, from facility layout to operation management. Thus the relationship among the plans was chaotic. Their objectives were inconsistent. And the implementation of plans was without coordination. After that, the systematic and hierarchical nature of urban transportation planning has been further integrated and adjusted with the improvement of relevant planning regulations and technical specifications.

To sum up, these changes in the structure and content of urban transportation planning have been carried out around two aims. One is to strengthen the connection with the urban planning system, to support the layout and the functional arrangement of urban planning. The second aim is to coordinate the allocation and optimization of the resources of urban transportation systems, that is, to specify the level and type of each division of transportation planning and the inheritance relationship among them.

Based on the urban planning and development management mechanism and their stage divisions, the urban transportation planning system consists of three aspects: First, the urban comprehensive transportation system planning, as a sectoral plan for the overall urban planning, supporting the compilation of the overall urban planning. Second, the sectoral plan of urban transportation as a medium- and near-term sectoral planning under the guidance of urban comprehensive transportation

system planning, it supports the compilation of the regulatory detailed planning and the government work plan. The third is the traffic impact assessment of the urban development project^①, supporting urban planning and development management.

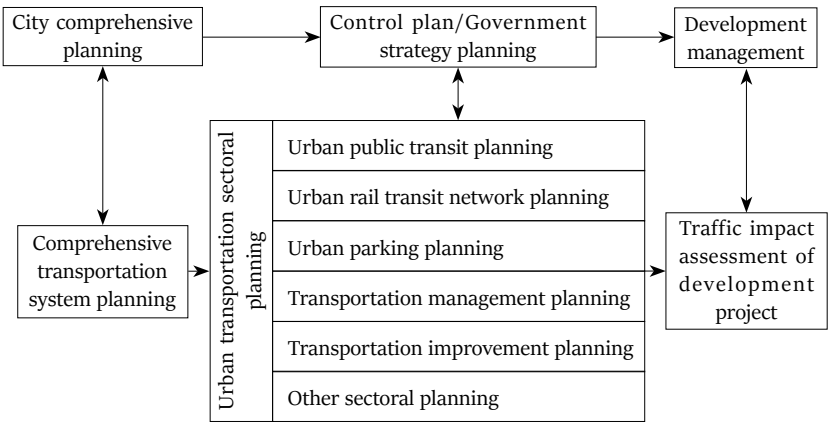


Figure 1. The compiling system of urban transportation planning

4 Urban comprehensive transportation planning

In the urban transportation planning system, the urban comprehensive transportation planning is the superior planning with a macroscopic view and strategic attribute. The Measures for the Planning of Urban Comprehensive Transportation Planning and The Guidelines for the Planning of Urban Comprehensive Transportation Planning issued by the Ministry of Housing and Urban-Rural Development establishes that the urban comprehensive transportation planning is an important part of the urban comprehensive planning and the basis for the compilation of the sectoral planning for the urban transportation facilities plan, the passenger and freight transportation system organization plan, the recent transportation plan and local regional traffic improvement plan. Its planning period and planning scope are consistent with the urban comprehensive planning. It is compiled in parallel with urban comprehensive planning, mutual feedback, and coordination^[7-8].

The urban comprehensive transportation planning aims to scientifically allocate transportation resources, to develop green transportation, to arrange reasonably the relationship among various

① Strictly speaking, it is not in the scope of urban transportation planning, but it is closely related to the implementation and management of urban transportation planning.

subsystems of urban transportation, to coordinate the development of urban internal and external, passenger and cargo and near and long-term transportation development, to form an integrated transportation system that supports the sustainable development of the city. The compilation of urban comprehensive transportation planning highlights regional coordination, transportation development model, transportation organization and other contents related to policy orientation and development strategy. The urban comprehensive transportation planning focuses on solving the problem of scientific allocation of resources, optimizing land use and transportation mode, guiding and supporting urban space expansion and functional layout. The urban comprehensive transportation planning determines the overall goals of urban comprehensive transportation development, the development orientation and development indicators of each transportation subsystem as well. The urban comprehensive transportation planning underlines the layout of major transportation infrastructure that affects the overall goals of urban development and the basic transportation network that supports the urban spatial structure.

The urban comprehensive transportation planning includes three parts: overall plan, sub-system plans and the implementation of the plan.

(1) The overall planning consists of two parts: the strategy of transportation development and the organization of a comprehensive transportation system. The strategy of transportation development focuses on the studies of policy and strategy level. It optimizes the choice of a transportation development model based upon the urban social and economic development and urban development goals. It determines the relationships between transportation development and the layout of cities and towns within an urban region and between transportation development and urban land use. It formulates the development goals of a comprehensive transportation system, the development goals of a comprehensive transportation system in each district and the structure transportation mode. It comes up with transportation development policies and strategies. The core of the organization of the comprehensive transportation system is to build a complete functional system. So, it coordinates the overall function of the urban comprehensive transportation system according to the overall development goal of the urban comprehensive transportation system and the transportation resource allocation strategy. Moreover, it proposes planning and layout principles and requirements.

(2) Sub-system planning includes eight parts: external transportation system, urban road system, public transportation system, walking

and bicycle system, passenger transportation hub, urban parking system, freight transportation system, traffic management and traffic informationization. The sub-system planning follows the overall development goals and resource allocation strategies determined by the overall plan. The sub-system planning focuses on the overall layout of various facilities, determines land use control indicators, and specific countermeasures related to the planning and management of each sub-system.

(3) The implementation of the plan consists of the recent plan and the planning safeguards. According to the recent development goals of the city and the financial capacity of the city, the recent plan follows the principles of specificity, necessity, and feasibility. It proposes the recent arrangements of transportation infrastructure and the implementation measures. The planning implementation safeguard measures are formulated with a focus on systemic, effective, and operability. It underlines the management mechanism for planning implementation, and technical and economic policies and countermeasures to ensure the implementation of the plan.

5 Problems and prospects

The urban transportation planning has made remarkable progress in study and implementation in the past 40 years, however, there are still a number of problems such as non-implementation of planning management, the conceptualization of planning and generalization of planning contents without the problem-oriented transportation planning vision. On the whole, the lack of normative management of urban transportation planning, the disorder of the compilation levels, the relatively random compilation of the sectoral plans of urban transportation. Those are more prominent problems. Valuing study and ignoring implementation in general are the consequences of those problems above so that the guiding role of urban transportation planning and its implementation are not strong enough.

Urban transportation planning serves for urban planning and urban transportation development. It is very complicated that the problems urban transportation planning is facing are. Therefore, the planning theories and techniques of urban transportation planning still need to be fully enriched and perfected in practice. Moreover, because of the uncertainty of transportation development in the future and the multi-headed managements of transportation planning, the planning management needs to be further clarified in order to effectively manage the urban comprehensive transportation system with the deepening of the management system reform.

In general, the development of urban transportation planning in the near future may need to focus on the following issues:

(1) The development of the compiling system of urban transportation planning: The cohesive tie between urban comprehensive transportation planning and urban spatial planning will be studied further. The compilation of the sectoral plans for urban public transportation, urban rail transit network and urban parking, which are closely related to urban development management, will be standardized to adapt to the changes in urban planning management system.

(2) The analysis of the transportation demands of residents and social-economic development: It will depend on the exploration for the laws of urban transportation, the studies for the application of big data, Internet, and car networking in the transportation planning based on demand. With the aim of sustainable development, the overall plan for the coordinated development of the city and its transportation will be taken into account. Regarding the public interest and people's livelihood as the core, the relationships between long-term planning and near-term planning, planning goals and actual needs, will be dealt with.

(3) The coordination of the demands, the rights and the allocation of public transportation facilities from different transport attendants: It will be based upon the general aims of the urban transportation development following the principle of sustainable development and inclusive development: to support the national urbanization strategy, to develop the urban comprehensive transportation system that is compatible with urban spatial layout, integrated with land use, and harmonious with resources and environment.

(4) The problem-oriented transportation planning vision: It will be connected with the interdisciplinary integration of urban planning, traffic engineering, transportation economy, ecological environment, social and humanities, the further studies for the theory and technique of urban transportation planning, and the innovative methodology. **UPI**

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