Urban Transport systems in major cities in China

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Part 1

Introduction
China Academy of Transportation Sciences (CATS), established in 1960, is a comprehensive research institute of the Ministry of Transport (MOT). CATS is mainly conducting fundamental, forward-looking and public welfare researches and providing technical consulting services for government authorities and the transport sector.
Traffic congestion is spreading:

- East ➔ West
- Large cities ➔ Small cities

At present, China's mega- and large cities are generally facing the problem of traffic congestion.

The City Ranking about Commuting peak congestion in the second quarter of 2018
1. Introduction

1.2 Urbanization

China has experienced a rapid urbanization in 1990 to 2017, nearly doubling from 26 to more than 50.

the increasing trends towards urbanization in major countries around the world
1. Introduction

1.3 Motorization

Motorization growth among developed and developing nations

Trend of the private car growth in Nanjing

Comparison of the number of vehicles in Beijing in 1990 and 2012
Part 2
Urban transport policies
2. Urban transport policies

Chinese Transit Metropolis Demonstration Program

In 2012, Chinese government began the Transit Metropolis Demonstration Program, 15 cities were selected.

In 2013 and 2017, 22 and 50 cities were selected to construct the project respectively.

Each selected city would reward 1.5 million USD.
2. Urban transport policies

The basic information about Nanjing

Nanjing is the Capital of Jiangsu Province
◆ The area: 6,622 km²
◆ Population: 83 million
◆ Per capita GDP: 20,576 USD
◆ Number of buses: 8359
◆ Bus line: 592
◆ Rail transit: 6 bars, 225 km
2. Urban transport policies

2.1 Policy guarantee mechanism

◆ Guidance on urban priority development of public transport, Issued by The State Council in 2012.

◆ The Nanjing government has issued 16 policies related to the priority development of public transportation.

◆ Financial subsidies are about 167 million USD per year.

Objectives: Share of Public Transport in Motorized travel modes: 60%
2. Urban transport policies

2.2 Focus on transportation planning

- Compile and revise transport infrastructure plans
- Strengthening the concept of Transit-Oriented Development (TOD) in the city
- Prepare five-year and ten-year transportation plan
2. Urban transport policies

2.3 Public transportation infrastructure construction

• Highlight the construction of the interchange hub
• Built public transportation hubs for external transportation station, rail transit stations connected to bus hubs
• Built park + railway (P+R) parking and transfer station
• Increase the construction of bus

Nanjing passenger station and bus station

“P+R” parking and transfer station

The color road in Bus Lane
2. Urban transport policies

2.4 Improve the level of intelligence

◆ Promote the construction of intelligent public transport system

◆ Electronic monitoring is installed on bus lanes, and some buses are equipped with mobile monitoring.
2. Urban transport policies

2.5 Improve the quality of services

• Implement the standardization of public transport services
• Further strengthen the safety of employees
• Organized “green travel month” “Bus week” and “No-car day” activities
• Focus on energy conservation
Part 3

Urban transport Effectiveness
3.1 Passenger volume has increased significantly

- At present, Nanjing has a daily average of 5 million passengers, an increase of 880,000 passengers compared with 2012.
- Over the first two years, the passenger volume of rail transit has doubled.
3. Urban transport Effectiveness

3.2 Significant improvement in infrastructure

- Main city buses have updated to air-conditioned cars
- Increase 2269 buses and 638 rail transit operation vehicles
- Every 10,000 citizen has 15.5 buses (calculated according to the resident population)
- Increase the bus station area by 35 hectares
3.3 Strong development of green bus

- Realized new energy buses and charging piles
- The ratio of clean energy public transport vehicles increased from 31% to 67%.
- Public bicycles are developing rapidly, covering the whole city
3.4 Public transport satisfaction rate is improved

- The comprehensive satisfaction rate of public transport reached 61.7%
- The basic satisfaction rate is above 95.2%, and the dissatisfaction rate is only 4.8%
At present, 87 Transit Metropolis creation activity has begun in China, but the level of public transport are far from the international standard bus city such as Tokyo, Seoul and London. We will take the bus city creation work as an opportunity to learn more useful experience from international advanced cities and provide more convenient travel services for people!

- **Research on urban transportation science**  
  (e.g. urban traffic theory research, walking system, fare policy)

- **Research on big data of urban transportation**  
  (e.g. Relying on mobile internet, big data, cloud computing and other emerging information technology)
Part 4

China Urban Transport Indicators
In order to guide the establishment of Chinese Transit Metropolis, Ministry of Transport enacted the indicators system of performance measurement for Transit Metropolis. The index includes 7 Measurement indicators and 4 reference indicators.

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<th>No.</th>
<th>Indicator Name</th>
<th>Indicator Type</th>
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<td>1</td>
<td>Motorized modal share of public transit(similar to SUTI 2)</td>
<td>Measurement</td>
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<td>2</td>
<td>500-meter coverage ratio of public transit stations(similar to SUTI 3)</td>
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<td>11</td>
<td>Energy consumption intensity(similar to SUTI 9 and 10)</td>
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Only SUIT 1, 6 Not involved
● Transit Metropolis Indictors

(1) Motorized modal share of public transit
• Definition: In the statistical period, the percentage of resident trips using public transit in total motorized trips (unit: %)
• Computing method:

\[
\text{motorized modal share of public transit} = \frac{\text{public transit trips}}{\text{total motorized trips}} \times 100\%
\]

(2) 500-meter coverage ratio of public transit stations
• Definition: In the statistical period, the ratio of the area of 500-meter coverage by public transit stations to the area of built-up area in the city centre. (unit: %)
• Computing method:

\[
\text{500-meter coverage ratio of public transit stations} = \frac{\text{area of 500-meter coverage by public transit stations}}{\text{area of built-up area in the city centre}} \times 100\%
\]
Transit Metropolis indicators

(3) Public transit vehicle ownership 10 thousand per capita
- Definition: In the statistical period, the equivalent number of public transit vehicle ownership per 10 thousand people, calculated by the urban population. (unit: veh/10 thousand people)
- Computing method:

\[
\text{public transit vehicle ownership per 10 thousand people} = \frac{\text{public transit vehicle ownership}}{\text{urban population}} \times 100\% 
\]

(4) Traffic accident death toll
- Definition: The number of traffic accident deaths per mile of public transportation. (Unit: person / million car kilometers)
- Computing method:

\[
\text{Traffic accident death toll} = \frac{\text{The number of deaths from traffic accidents}}{\text{Bus operating mileage}} 
\]
● Transit Metropolis indicitors

(5) Average speed of public transit vehicles in peak hours
- Definition: In the statistical period, the average annual speed of buses carrying passengers. (unit: km/hr)
- Computing method:

\[
\text{average speed of public transit vehicles in peak hours} = \frac{\sum \text{average speed of public transit runs in peak hours}}{\text{total number of runs in peak hours}}
\]

(6) Degree of satisfaction of public transit passengers
- Definition: In the statistical period, the average rates of valid questionnaire on performance investigation for the level of service of public transit. (unit: %)
- Computing method:

\[
\text{degree of satisfaction of public transit passengers} = \frac{\sum \text{score of single valid questionnaire}}{\text{total number of valid questionnaire}} \times 100\%
\]
Transit Metropolis Indictors

(7) Utilization rate of public transit smart card
- Definition: In the statistical period, the percentage of passenger volume using smart card in total public transit passenger volume. (unit: %)
- Computing method:

\[
\text{utilization rate of public transit smart card} = \frac{\text{passenger volume using smart card}}{\text{total public transit passenger volume}} \times 100\%
\]

(8) Number of daily public transit trips per capita
- Definition: In the statistical period, number of daily public transit trips per capita made by residents in urban area. (unit: times)
- Computing method:

\[
\text{number of daily public transit trips per capita} = \frac{\text{annual public transit passenger volume}}{365 \times \text{transfer coefficient} \times \text{urban population}}
\]
Transit Metropolis indictors

(9) Average age of public transit vehicles
• Definition: In the statistical period, average applicable age of public transit vehicles in urban area. (unit: year)
• Computing method:

\[
\text{average age of public transit vehicles} = \frac{\sum \text{total applicable age of single public transit vehicle}}{\text{total number of public transit fleets}}
\]

(10) Income level of public transit employees
• Definition: In the statistical period, the ratio of average salary of public transit employees to all local employees. (unit: %)
• Computing method:

\[
\text{income level of public transit employees} = \frac{\text{average salary of public transit employees}}{\text{average salary of all local employees}} \times 100\%
\]

(11) Energy consumption intensity
• Definition: In the statistical period, tons of standard coal equivalent energy consumed by 10 thousand person-time. (unit: ton/10 thousand person-time)
• Computing method:

\[
\text{energy consumption intensity} = \frac{\text{total tons of standard coal equivalent energy consumed by vehicles}}{\text{total passenger volume}}
\]
China has established a relatively complete index system, but not SUTI.

According to the definition of the indicator, we can assessing the Urban Transportation System, and make a plan that suits China's national conditions.
THE END

THANKS FOR YOUR ATTENTION

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