TOD Planning in China: Problems and Solutions
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Contents

1. Concept and Origin of TOD
2. Comparison of TOD Development between China and U.S.
3. Practice and Problems
4. Routes and Strategies
5. Case Studies
6. Conclusion
1. Concept and Origin of TOD

The concept of TOD (Transit-oriented Development) was firstly introduced in 1990s, but a great number of successful cases about the application of TOD have already arisen in many cities before, such as Copenhagen.
Initially, TOD theory was brought into Chinese mainland about in 2000, then it attracted a lot attention. Some practical TOD planning projects have been carried out.

In china, TOD is served as an approach to guide urban space expansion, rather than focusing on the construction of stations in an intensive way. It is not only limited in station area, but the whole city or bigger areas.
TOD mainly focused on the low-density expansion issues in America.

When the TOD theory appeared, urbanization and motorization had almost ceased in America, and its spatial structure in urban areas had already stabilized too. People had been used to the private motorized trip.

It was difficult to apply TOD in a large range, as it could only been implemented in the real estate projects.
<table>
<thead>
<tr>
<th>U.S.</th>
<th>China</th>
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<tbody>
<tr>
<td>The urbanization rate has reached 80% and its process has basically ceased.</td>
<td>The urbanization rate has reached 50% and its process is far from over.</td>
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<tr>
<td>The ownership rate of motor presents high and stable.</td>
<td>The ownership rate of motor is still rising rapidly.</td>
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<tr>
<td>Urban space expansion is in the mode of low-density, a large amount of land is occupied by the private and the government’s power in urban planning shows weak.</td>
<td>Urban space expansion is in the mode of high-density, the land belongs to the public and the government owns strong control over urban planning.</td>
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<tr>
<td>The growth of public transport is difficult and also its financing support is hard to obtain. Its main problem is poor accessibility and coverage rate of station.</td>
<td>The investment of public transport is enrich, and many cities are carrying out large-scale rail construction. Its main problem is traffic congestion and poor comfort.</td>
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## TOD Objectives in China (Comparing to U.S.)

<table>
<thead>
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<th>U.S.</th>
<th>China</th>
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<tbody>
<tr>
<td>Prevent low-density expansion in urban space.</td>
<td>Guide the development of new city, and coordinate land use and transport infrastructure.</td>
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<tr>
<td>Take single area around the station as major planning object.</td>
<td>Take the city as major planning object while the government serve as the dominant.</td>
</tr>
<tr>
<td>Improve the development intensity around the station and the share of bus trips.</td>
<td>Coordinate land use and transport infrastructure so as to avoid excessively passenger traffic in the station and realize traffic sustainable development of the city.</td>
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3. Practice and Problems

（1）Shenzhen’s practice

Shenzhen is a mega-city in south of China. Its build-up area is 700 square kilometer with 20 million population.

Shenzhen has devoted in a large-scale construction of urban rail transit.

In 2008, the local planning department organized the TOD plan research for Shenzhen.
- Coordinated land use with railway transit system
- Address TOD implementation around some railway transit stations.
- Due to the land use condition limitation, cannot be applied yet.
（2）Changsha’s planning practice

Changsha is a large city in the central part of China. Its build-up area has 300 square kilometer lands with 4 million population.

In recent years, Changsha has been carrying some large construction projects to develop the new city.

In 2010, the local planning department released the TOD plan research for the new city.
- **TOD planning scheme**

In accordance with the layout of the rail stations, perform the high-density development areas around the stations, adjust the land use around the stations, and provide the planning and designing principles and key points of the station areas.

Perform high-density development areas around the rail station. Adjust the land use in TOD area.
(3) problems

- The TOD theory is not an official method been certificated by China local government, so the effect is limited.

- Constrained by existing laws and regulations, the core areas around stations are not so developed comparing to the case in Hong Kong, Singapore and other cities etc.

- Land resource is limited, the development intensity of the land away from the rail stations has not been effectively controlled, and it is even higher than the station areas.
4. Routes and Strategies

(1) Urban Planning System in China

The official Chinese planning system mainly includes master planning and detailed planning, detailed planning can be divided into regulatory detailed planning and construction detailed planning.

The urban master planning and regulatory detailed planning are the most important legal planning. The guidance and control that they have on urban development are the most significant.

The implementation of TOD planning must be integrated with these two plans.
(2) Combining TOD and the Urban Master Planning

- **Coordinate** Urban Development Objectives and Transportation System Objectives, like urban population and traffic infrastructure scale.

- **Coordinate** layout of land use and transport facilities.

- **Coordinate** land use scale and transport capacity.

- **Coordinate** time sequence of the land developing and transport facilities construction.
(3) Combining TOD and the Regulatory Detailed Planning

- Dividing the urban land into a number of regulatory detailed planning units and identify the TOD Units.

- Adjust land use planning of each unit according to TOD principles.

- Adjust transport planning of each unit according to TOD principles.
（4）Routes and strategies for implementing the TOD plan in China.

- The urban built-up area do not have the conditions for the implementation of TOD development. Thus, new city with plenty of undeveloped lands would be the key locations for TOD development.
- TOD plan should be brought into the Urban Master Planning and the Regulatory Detailed Planning.
- The route is to start with the research on TOD planning for the whole city, and then adjust the urban master planning and regulatory detailed planning according to the research output.
5. Case Studies

（1）City Overview
Nanning is a big city in southwest China. Its build-up area has 370 square kilometer with 3 million population. In recent years, Nanning has been carrying some large construction projects to develop the new citys and the rail transit system.

According to the urban master planning, Nanning will construct two large new citys in the east and southwest regions. The addition area of the new cities will be more than 400 square kilometers.
(2) Objectives

- Achieve the sustainable development of transportation. In recent years, the annual average growth rate of cars has exceeded 15%. The market share of car trips has been increasing year by year, and as a result, traffic congestion has become worse.

- Support the development of the new city. The new city's limited functions making living and working separated. In particular, centripetal traffic pressure has become increasingly severe.
(4) Planning scheme

- Combining TOD and the Urban Master Planning:
  
  - According to the urban spatial structure and the development needs of the new city, adjust and optimize the layout plans for mass transit system and transportation hubs.
  
  - According to the plan of transport infrastructure, adjust land use plan, reduce the development scale and population in the areas with poor bus service, and enhance the development intensity in the station areas.
Combining TOD and the Regulatory Detailed Planning

Dividing the urban land into about 300 regulatory detailed planning units
About one hundred units are identified as TOD units according to the conditions of public transport infrastructure and land use.
Combining TOD and the Regulatory Detailed Planning

Classify TOD units into 3 types:
- HUB
- Urban
- Community
(4) Implementation Status

- Adjusting the urban master planning, urban rail transit network planning and transportation hub layout plan based on the TOD plan at present.
- Adjusting the urban regulatory plan, especially the regulatory plan for the new city.

An example for regulatory detailed planning adjustment around a single station.
6. Conclusion

There are significant differences between Chinese cities and American cities. Thus, the objectives and pathways to deliver a good TOD planning in China would also be different. The patterns and methods in the U.S. cannot directly guide the practice in China.

A successful implementation of TOD planning in China needs to address the following issues: understanding its approaches and concepts, integrating into Chinese official planning system, coordinating mass transit systems and land uses.