

## Real Estate Intensive Development Management under TOD

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**Abstract:** Energy, resources and environment are the difficult problems of sustainable development of urbanization. In order to promote the healthy and sustainable development of the real estate, the real estate intensive development under TOD mode is advocated; This paper introduces the present situation and problems of real estate development. The real estate intensive development under TOD mode is analyzed, existing the difficulties and blind spots in the TOD implementation, and on the basis of which, radial spatial structure model of real estate intensive development management under TOD is advocated; In order to promote the healthy and sustainable development of real estate, this paper puts forward some strategies for the implementation of the intensive development mode of real estate under TOD from the perspective of government and market.

### 1. Manuscript Preparation

As a developing country with a large urban population and high intensity of land development, China, in a sense, has the advantages of TOD based intensive real estate development, such as mixed commercial, residential and office development, more than the European and American countries, the intensive development of the Old City Center, etc. .

In recent years, many cities are facing the crisis of center decline and suburban sprawl, and traffic congestion has become a hindrance to urban development.<sup>[1][2]</sup> Japan, Singapore, the Republic of Korea, Hang Kong, London, Paris and New York have taken vigorous measures in recent years and achieved typical results in the area of TOD. However, there is a lack of research on how to find out the solution of social sustainable development from the perspective of Real Estate Development from the perspective of cooperation between government and developers.

The advantages of large population and high intensity of land development put forward that cities should transfer to the track of healthy development of intensive real estate development under TOD. The project of real estate intensive development under TOD proposed in this paper is not simply along the ground line, rail line, bus station development. The intensive development mode of real estate under TOD emphasizes compact and economy, especially the proper mix and richness of real estate functions, and avoids a lot of pendulum traffic.

### 2. Mode of real estate intensive development under TOD

#### 2.1 Uniqueness and advantages of real estate intensive development under TOD

Real estate intensive development under TOD is not a simple development along the ground, rail lines, bus stations. It emphasizes on savings, especially the real estate function moderately mixed and enriched. Under this kind of development philosophy, residence, office, commercial district, school, hospital and so on don't cause a lot of pendulum transportation of pure function concept. Real estate intensive development under TOD has advantages: ①Provide more transportation choice; ②Provide bus transportation on quantity; ③Reduce car use; ④Reduce environmental pollution, reduce energy consumption; ⑤Increase household disposable income.

#### 2.2 Problems existing in the development

Neglecting to establish the mode of real estate intensive development under TOD, expansion of city and real estate developers chasing profits make booth pie type, low density, disorder development. Spread disorderly undoubtedly give users the heavy cost. Later in the project life cycle cost rise sharply; At the same time, it also will lead to traffic jams, energy waste of resources, environmental pollution and so on. At present, our country is in a period of rapid development, especially in real estate. How to effectively use the limited land resources, avoid the waste of land in the urban construction and traffic congestion, and how to integrate all kinds of public transport resources, making the organic combination of city of each unit are important research topics.<sup>[3]</sup>

### 2.3 Current situation and corresponding measures

Shortage of resources and energy, and environmental pollution are serious bottlenecks. Strengthening the intensive development and compacting urban development is becoming the industry consensus. Especially along with our country urbanization level improved steadily, the demand for land and other resources will continue to rise sharply. Real estate intensive development under TOD will be Chinese urban health way of energy conservation and the sustainable development. Mode of real estate intensive development under TOD avoids the pure function and low density concept, setting work place, residence, shopping area and so on together. It makes traffic very convenient, fast. Meanwhile, it prevents a large number of pendulum clock type traffic and is conducive to the healthy development of the city.

## 3. Space structure mode real estate intensive development under TOD

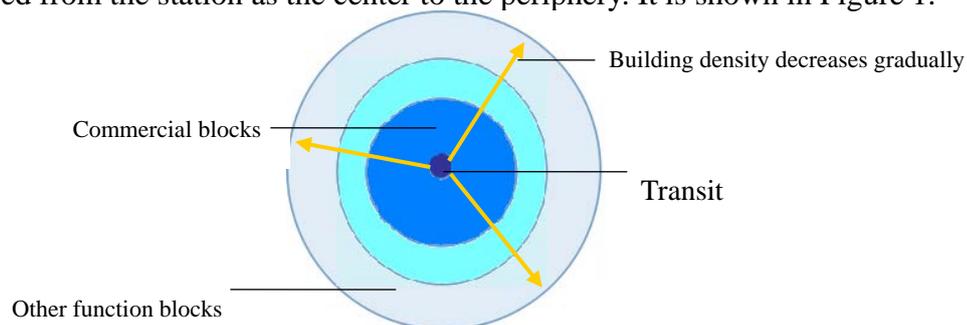
### 3.1 Analysis difficulties and blind spot of implementing TOD

TOD according to the survey of America's public sector, overcoming difficulties of car oriented development mode is the most difficult problem. The renters and developers are lack of interests in TOD. Limited local enterprises participate in TOD. However, project market demand is uncertain. And traffic insufficient facilities and simple site settings are general problems.<sup>[4]</sup>

TOD is not possible to achieve remarkable success if not carefully planned. Simple execution TOD may cause a lot of pendulum clock type transportation. It not only brings huge inconvenience, but wastes resources and energy. Many times it overemphasizes along the line development, ignoring the bus station for the portal, the public square and commercial and service facilities as the center. And it ignores making commercial district, residence, work, park and municipal configuration around transit public transportation stations and within walking distance. It should preserve natural habitats, riparian area and create a high quality open space; Provide decreasing density outward from center; Create square and public green space for activities as the focus.<sup>[5]</sup>

### 3.2 Radial space structure of real estate intensive development under TOD

Saving and compact, high density, high mixing idea is dominant in the mode of real estate intensive development under TOD. All kinds of different uses of the high density land are on a certain range of station area. They are mixed and close to each other, such as residential land, land for entertainment, commercial and office space, etc. Density for a variety of different types of land development should be high enough. And the whole community building density should be gradually reduced from the station as the center to the periphery. It is shown in Figure 1.



### **Figure 1. Building density diagram**

This compact layout around the center makes the limited public infrastructure projects focus on the relatively narrow territory. Under the condition of constant investment, it has higher distribution density, convenient for the residents. Radial mesh structure of transit provides convenient contact between city center and surrounding regions, reduces various aspects of pressure such as the land, and traffic and so on, makes the city space structure tend to rationalization; And public line around the center has the effect on river closure. At the same time, it can improve the density of the network and transfer station and stimulates downtown high-density mixed development; The outer ring bus lines can greatly improve the accessibility of the partition.<sup>[6]</sup> It can help to guide and accelerate the formation of sub-urban center.

Radial density spatial structure makes each function district concentrated, reduces environmental pollution, slows down traffic jams and reduces energy consumption. The model is suitable for the healthy development of urban.

Mode of intensive development under TOD is not invariable. Effectiveness of the radial density spatial structure on new city is more obvious; In less dense cities, we can be combined with the specific conditions for secondary development, make each function highly mixed and concentrated. Wangjing Beijing development is a typical example: A pure residential development along the line without intensiveness causes a large number of pendulum clock type transportation, wasting resources, energy. No doubt, convenience is greatly discounted. But, on the basis of these, wangjing goes through secondary intensive development. It has 16 square kilometers. Its population is up to 0.5~ 0.6 million. It is high density and high mixed zone.

Under TOD, the intensive development of real estate provides convenient public transportation for people to travel and can walk to the destination in a beautiful environment, which can reduce people's dependence on cars and avoid the car-oriented development mode of TOD biggest and most difficult difficulties. Moreover, TOD intensive development of various functional areas of high density, high mix for developers to provide more business opportunities and real estate appreciation space, greatly mobilize the interest of developers.<sup>[7]</sup>

## **4. Driving strategy in the implementation**

Real estate intensive development development under TOD not only needs public policies but intervention. At the same time gradually market has a far-reaching influence on it for the further development.

### **4.1 Government driving**

Planning and control department should encourage, or plan policies to promote the implementation of intensive development under TOD; Government also should enact corresponding laws and regulations to guide and support them, such as larger discounts for intensive investment, high taxes and fees for the development of remote, propaganda of intensive development under TOD, improving the government functions on promoting intensive development under TOD. And the city planning departments cooperate with property developers to complete this project.

Mode of intensive development under TOD, Real estate developers need to integrate themselves into the development of the city and view problems from the perspective of the future development of the city. And The urban planning department tries to make the road network radiate with the city center as the center, as shown in figure 2.



**Figure 2.** Radial urban road network

On the basis of the real estate intensive development under TOD, government establishes and improves the public transport facilities and management system. Were it not for intensive development, many citizens are willing to drive oneself; Each function is highly concentrated in intensive development under TOD. The complete public transport facilities and the environment, quality of service will lead to good public transportation way. <sup>[8]</sup>Government should put more money on public transportation and construction, improve the quality of service for people. Overseas cities like Tokyo, Paris, Singapore, Seoul proportion of public transit mode are above 50%; Especially in peak hours, the share rate of public traffic of the core area of big cities in the developed countries is greater than 70%. <sup>[9][10]</sup>

Improve walking and cycling environment. Establish structural system, which is green, low resource consumption and meet the need of travel. It is the key choice to traffic sustainable development strategic. <sup>[11]</sup> The government should spare no effort to make every function area contact conveniently, to provide good walking and cycling trips environment: ①Walking street, business district and the bus stops maintain convenient, clear link; ②Set public bicycle, pedestrian bridge or tunnel in the necessary position; ③Establish a perfect and convenient bicycle lane system.

#### **4.2 Industry driving**

Demand factor is an important factor to drive China's real estate industry high-speed growth. Thus, promoting the mode of real estate intensive development under TOD in China must make full use of the advantages to create the corresponding requirements. In terms of residence, the first thing is to establish perfect living facilities and service system, such as reasonable standard lanes site layout, management, running speed, expanding and cost, improving the competitiveness of public transport. It not only can save household spending, but has great attraction for families who can't afford to buy cars. Cost is the important factor affecting on the supply of real estate. The mode of real estate intensive development under TOD has greatly increased the land use efficiency and volume fraction, and allows developers to gain greater earnings.

According to foreign experience, "joint development" can provide a reference for solve such problems. Setting appropriate "cost - profit" dividing mechanism in advance is more reasonable. Straighten out the construction of transportation infrastructure investment system and encourage social capital into the infrastructure field. Make full use of the resources city. The public capital and private capital joint develop and benefit. Then land values rise. It promotes coordination between real estate development and transportation investment benefit. Public transportation not only can provide transportation services, but provide important opportunities for real estate developers. Using the derivative value to invest traffic construction financing, which make real estate intensive development under TOD and the public transportation together.

## Conclusions

In order to curb the development mode of urban suburbanization, low density, disorder spread, it puts forward the high density, high mixed mode of real estate intensive development under TOD, and it analyzes difficulties thoroughly and puts forward the specific driver implementation strategy.

## References

- [1] Rui Zhong. (2020) Problems and Suggestions of TOD mode in practical operation. *The finance*, 04, 250-251
- [2] Chunhua Wang. (2015) Analysis on the causes of urban traffic congestion in China. *The people of the bus*, 04, 44-45
- [3] Pengchun Li. (2019) Preliminary study on urban rail transit and land resource conservation and intensive utilization. *Building technology development*, 2, 100-101
- [4] Lingqi Kong. (2013) Research on urban traffic oriented development (TOD) and its effect evaluation. *Chang 'an university*, 11-13
- [5] Leslie Dorworth, Robert McCormick. (2010) Sustainable Land Use Impact on Climate Change and Health. *Purdue Agriculture*, 9, 1-6
- [6] Yi Song. (2018) Study on the influencing factors of the functional layout of urban comprehensive passenger transport hub. *Building materials and decoration*, 11, 242-243
- [7] Zhongwei Shen (2020) Determining transit nodes for potential transit-oriented development: Along the LRT corridor in Addis Ababa, Ethiopia. *Frontiers of Architectural Research*, 5, 246-252
- [8] Hongming Liu, Jian Liu (2020) Study on the interaction between rail transit station architecture and city in TOD mode. *Anhui building*, 27(02), 135-136
- [9] Eden Atsbeha Teklemariam, Zhongwei Shen (2020) Determining transit nodes for potential transit-oriented development: Along the LRT corridor in Addis Ababa, Ethiopia. *Frontiers of Architectural Research*, 5, 246-252
- [10] Liyuan Wang, Shaoyao He (2013) Analysis of European compact city practice. *The Chinese and foreign construction*, 05, 27-29
- [11] Pornraht Pongprasert, Hisashi Kubota. (2019) TOD residents' attitudes toward walking to transit station: a case study of transit-oriented developments(TODs) in Bangkok,Thailand. *Journal of Modern Transportation*, 3, 39-51