TOD Implementation of Nanchang, CHINA

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Background

Nanchang, the thriving capital city of Jiangxi Province with a population of 2.3 million, is being transformed by the construction of a 70 kilometers metro system to be completed by 2020.

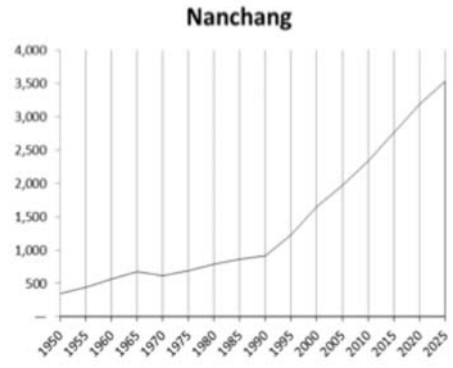
Located in southeastern China, Nanchang's central location relative to the Pearl River and Yangtze Delta regions as well as to the junctions of major highways makes it a major transportation hub (see Figure 5.1). In addition to being the capital city and a major transportation hub, Nanchang is also a regional center for agricultural production in Jiangxi province. The city hosts many manufacturing firms including cotton textiles and yarn, paper products, food processing, agricultural chemicals and insecticides, and Chinese medicine and other pharmaceuticals.

Figure 5.1. Location of Nanchang and Its Connectivity to Other Major Chinese Cities

Source: Urban Planning and Design Research Institute of Nanchang (2013)

The GDP is 366.7 billion in 2014. Growth rate is 9.8 percent compared with last year, indicating Nanchang's rapid economic growth. Nanchang's strong economic growth has also triggered a rapid rate of urbanization. According to the United Nations Department of Economic and Social Affairs, Population Division (2011), the population in Nanchang's core city areas (330 square kilometers) increased from 1.6 to 2.3 million people from 2000 to 2010, or by 44 percent. It also projects that population in the core urban area will continue to grow, reaching 2.8 million by 2015, and then 3.5 million by 2025 (see Figure 5.3). Due to rapid population growth at the city center, proper land use and transportation planning becomes crucial.

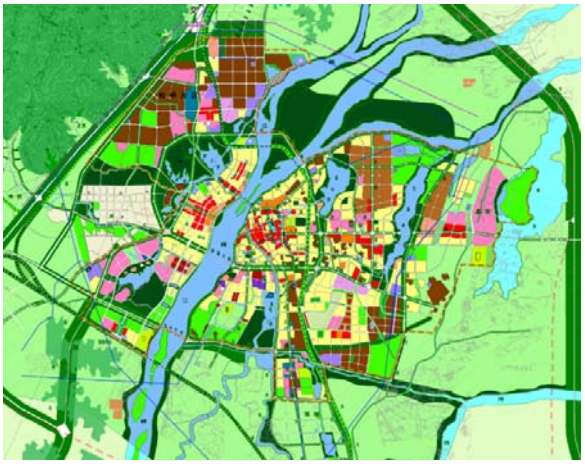
Figure 5.3. Projected Population of Nanchang: 2015-2025



Source: United Nations, Department of Economic and Social Affairs, Population Division (2011)

Urban Planning In 1995, a new strategic plan was established to extend city development across the river to its left bend. Industrial and residential development started to occur on the northern part of Nanchang's city center. The goal at that time was to balance urban development on both sides of the Gan River and to extend residential areas to the surrounding seven districts.

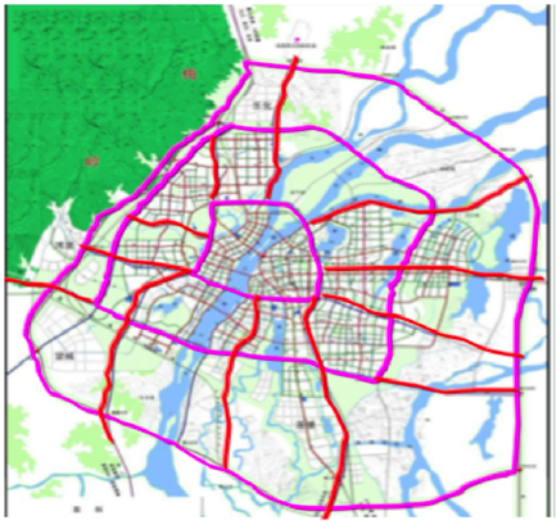
This 1995 strategy has remained unchanged till present day. According to the 2005 Urban Comprehensive Development Plan, Northern and Southern Nanchang will form the future city's urban core, with new developments radiating out to surrounding districts and towns. In Southern Nanchang, NMG plans to decrease the population of the historic core, lower its development densities, lessen traffic congestion, and preserve historic buildings.



In Northern Nanchang, NMG has promoted new property development with higher construction standards, environmentally friendly features, and fully serviced by public infrastructure. As the 2020 populations of Northern and Southern Nanchang are projected to be 1.1 and 2 million, respectively, the objective is to incentivize and redirect industrial and housing investment from the old center to the newly planned areas.
To achieve this urban development plan, NMG has designed an extensive public transportation system with fully integrated bus service and MTR networks to facilitate travel between the newly planned areas and between the left and right bends of the Gan River.

Transportation Planning The existing road system in Nanchang follows the traditional approach of relying on ring roads connected by major highways to form a network. As shown in Figure 4.5, a spider web-like network that comprises three rings roads and eleven highways serves the urban area, covering a total area of 350 square kilometers.

Figure 5.5. Artery Road Network in Nanchang



Source: Urban Planning and Design Research Institute of Nanchang (2013).

Like many rapidly urbanized Chinese cities, traffic congestion in Nanchang is one of the major challenges of urbanization. While car ownership in Nanchang (at 120 per 1,000 people in 2012, according ChinaAutoweb June 25, 2013) is lower than most provincial capitals in China, and 67 percent of trips are still by bicycle or walking, the share of motorized road trips (including public transport) grew from 22 percent in 2002 to 30.5 percent in 2010, according to traffic surveys (2013 World Bank report). The average distance travelled per motorized trip was 9.4 kilometers. Public transport accounted for only 13.5 percent of total daily trips--relatively low compared to cities

with similar sizes and GDP such as Changsha (24.5 percent) or Wuhan (23.4 percent), where the share of walking and biking is lower" (World Bank 2013, 12).
Roads in Southern Nanchang as well as the four bridges across the river routinely experience congestion with average driving speed down to 11 kilometers/hour during rush hour. Roads built in the newly developed part of Northern Nanchang are wide, which favor car usage.

Metro Project In response to the growing congestion, NMG plans to encourage alternative means of transportation by building an integrated public transportation system, using MTR as the backbone. The plan is to build five subway lines, two of which are currently under construction. Once complete, the MTR network will have a total length of about 160-170 kilometers with 128 stations.

With a targeted completion date of 2020, lines 1, 2 and 3 – totaling 60-70 kilometers – will form the basic structure of the MTR system. This network will connect major business centers, the financial district, recreational areas, sport facilities, two industrial parks, and three universities.

The construction of Line 1 began in 2012 and will be completed in December 2015 (represented by the red line in right picture). This will connect the old city center to the new development areas in the left bend of the Gan River, helping to redirect economic and residential investments from Southern to Northern Nanchang. Upon the completion, Line 1 will be 28.7 kilometers with 24 stations, one depot, and one parking yard. The average distance between stations will be about 1,200 meters.

The construction of Line 2 started in July 2013, and is partially financed by the World Bank (represented by the blue line). This line goes from the Zhan Qian Nan Da Dao Station to Xin Jia An Station, and will be 23.8 kilometers with 21 stations and one depot. NMG expects construction of Line 2 to be completed by 2016. Plans to build Line 3, 4, and 5, and Phase II of Line 1 and 2, are pending further approval by the National Development and Reform Commission.

To better feed the MTR system, bus services will also be reorganized. In 2011, the Nanchang Bus Company (a state-owned enterprise operating all bus services in the city) conducted a study on providing seamless transfers from rail to bus services for passengers. The results have helped transit planners better serve transit passengers. For example, several interchange

locations between bus and rail have been designed for Line 2. More importantly, these interchanges are coordinated with better land use planning to allow retail stores and supermarkets to establish at these locations for the convenience of passengers.

These are interesting outcomes because TOD is a strategy that promotes mixed land use. A typical design of a TOD scheme will have offices buildings clustered with residential properties and retail stores around a transit station. This design can, on one hand, increase ridership and on the other, cross-subsidize the transit development costs by capturing the increased land value generated by commercial and residential development. An upward trend of land prices for mixed use can be viewed as a favorable condition for adopting the LVC method in Nanchang.

Land Value Capture Method Value Capture Method NRTG plans to fully utilize land value increments to partially fund MTR investment via three procedures. The first is to build up a land resource by land acquisition. With assistance from the Land Resource Center, NRTG can access land that is needed for MTR development. After the announcement of the City Master Plan and Land Use Plan by the Urban Planning Bureau, the Land Resource Center will use its eminent domain (or compulsory purchasing) power to take land for NRTG from private individuals with just compensation, and NRTG will pay for all acquisition costs.

NMG will increase the density of the acquired sites to allow NRTG to either invest directly in land redevelopment or transfer the development rights to another private investor to raise funds to finance construction. All land parcels located within a 500-meter radius from a subway station will be qualified for up-zoning. Presently, the 500-meter criterion is fixed. However, some flexibility should be incorporated to accommodate varying market conditions, especially because NRTG has priority for accumulating land parcels that are deemed to be strategic for the project. More importantly, the Urban Planning Bureau will also convert the land use of these sites to mixed use, so as to allow NRTG to maximize the value-increment potential of the land due to regulatory changes and public transportation investment.

If other needed land sites are still under NMG’s control, the second procedure is for NRTG to obtain these parcels by participating in public auctions. The Land Resource Center is in charge of leasing public land in Nanchang. In general, it leases development rights of public land to all interested investors through public auction or tenders. Through a bidding process, the developer who offers the highest bid will obtain the development rights. NRTG can also participate in these public land auctions. At present, less than 1 percent of the total land resource (16,426 mu) obtained by NRTG was obtained from public auctions.

With the land resource in hand, the third procedure is to generate land revenue to defray the development costs of the MTR system. NRTG could, through the Land Resource Center, re-auction some of the land sites to private developers at market value that reflects: (i) the increase in the development density and land use change; and (ii) the improvement in the

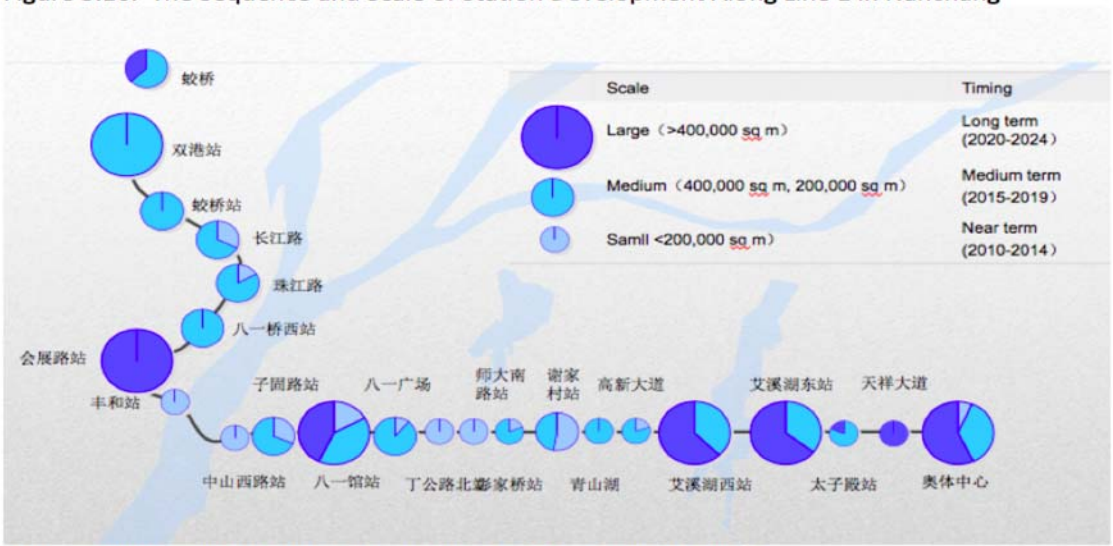
accessibility and amenity of the sites due to the investment undertaken by the company. The successful bidder will pay the bidding price (or the transfer fee) to the Municipal Finance Bureau, which will in turn deduct fees for six development funds related to education, agriculture, and other public services. These charges in aggregate are about 20 percent of the transfer fee. NRTG will receive the remaining balance from the Finance Bureau and use the funds to finance the construction of the subway lines and stations.

Alternatively, NRTG could develop the land on the top of the subway stations. It could build offices, recreational facilities, retail spaces, and residential units all within the physical space of a MTR station. Revenue generated from renting or selling residential and commercial properties will be used to partially finance the MTR investment or to cover its operating costs.

To ensure that the projected land benefits will materialize, NRTG has planned its MTR development carefully according to TOD principles. It combines the development of the MRT stations with improvements to the surrounding neighborhoods. It also designs the MRT stations using one-stop-shop ideas, and finances their construction with revenue generated from mixed development on the top of all subway stations. Figure 5.1illustrates the development sequence of Line 1.

NRTG's strategy is to develop areas that are close to the inner city first and then extend the development to more remote areas. Development of the areas surrounding the MRT stations according to the variety of land uses to avoid competition comes next. Finally, NRTG will extend residential developments to two new districts, the Honggutan and Chengdong Districts.

Figure 5.10. The Sequence and Scale of Station Development Along Line 1 in Nanchang



Source: Source: Nanchang Railway Transit Group, Co. Ltd. (2013).

Direct Property Development

Between 2012 and 2015, NRTG plans to undertake the construction of 28 stations along Lines 1 and 2 that can be divided into two types. The first is mixed development on the ground

above the MRT stations; there will be 23 projects of this type. NRTG will invest directly in five of these projects and develop the other 18 stations in partnership with interested private investors.

The second type is underground development at selected MTR stations. There will be five projects of this type. NRTG will be the sole investor for three of these projects, with the remaining two co-financed and developed by other private investors.

These investment projects will cover a total land area of 1,700 mu (1.1 square kilometers), with an estimated total capital investment of 8.3 billion RMB (US$1.4 billion). NRTG is expected to raise 6.8 billion (US$1.1 billion) of the capital requirements between 2013 and 2015, mainly from commercial loans and bonds or the sale of leasehold rights.

Case Studies

This section presents two specific MTR station construction projects that adopt the LVC method.

1、NRTG's Metro Mansion Station

NRTG plans to establish its headquarters (including the control center) at the Metro Mansion Station of Line 1, located at the financial center of Nanchang. The total area of the site is 20.7 mu (13,838 square meters) with an anticipated built-up area of 137,000 square meters. Construction began in 2012 with a target completion date of 2015.

NRTG is constructing a 45-story office tower (193 meters high) on the top of the Metro Mansion Station with a FAR of 7.04. There will also be three levels of underground parking below the tower. NRTG's headquarters and control center will occupy the first five floors, with the remaining office space rented to other tenants.

The total investment in land and construction for this project is 1.3 billion RMB (US$213 million). There are two ways of financing the project. First, the Real Estate Subsidiary will develop the site and pay for the total cost. Out from the payment for the land, NRTG will receive 80 percent of the land sales revenue that is approximately 160 million RM (US$25.8 million) to support metro construction. The Real Estate Subsidiary will rent 70,000 square meters of office space to outside corporations. And about 22,000 square meters of office space is offered to Real Estate Subsidiary and its NRTG's control center. The projected annual rental income is about 70 million RMB. The Real Estate Subsidiary can also sell the

rental units in the future for approximately 1.1 billion RMB, valued at the time of project completion. Both scenarios appear to generate enough income to cover the initial investment cost of the project.

2、Metro Time Square

Another example of MTR station development is the Bayi Bridge West Station of Line 1, also known as Metro Time Square. Metro Time Square has a development area of 125.8 mu (83,867 square meters) with an expected built-up area of 369,233 square meters with a FAR of 3.5 (see Figure 5.14).

Figure 5.14. Architectural Design and Site Plan for Time Square Station

Source: Nanchang Rail Transit Group, Co. (2013).

Station construction began in 2012 with an expected date of completion in December 2016. The total investment cost for the project is 2.8 billion RMB (US$459 million). Project financing is through a joint venture between NRTG and a private developer. The joint company paid 1.1 billion RMB (US$180 million) for the land at cost. Eighty percent of the

land sales revenue (880 million RMB) has already been allocated to NRTG to support construction of the MTR.

The joint company will develop the land with high-end residential apartments, retail stores, recreational facilities, and offices, and then sell some of the properties with an estimated net profit of 240 million RMB (US$39 million). NRTG will receive half of the profit.

In addition, 40,000 square meters of office space – worth 640 million RMB (US$105 million) valued at the time of completion – will be available for lease to private companies. The projected average annual rental income is 23 million RMB (US$3.8 million), and again 50 percent of the annual rental income will go to NRTG.

Conclusions

The city has experienced rapid economic and population growth coupled with fast urbanization. Not only will increases in income and population generate a sufficient ridership for the mass railway system, they can also facilitate the development of a buoyant real estate market. This is essential, because there will be no value to capture if land prices do not increase due to the lack of demand. And revenue generated can be allocated towards developing social housing to ensure that all residents are able to reap the benefits. Put differently, economic fundamentals are paramount when implementing the TOD.

Second, good urban planning helps, and Nanchang has done this well. The land market will behave erratically if land use regulations and planning are unpredictable. Public and private investors need to know with some degree of certainty when and where urban expansion will take place to make their investment. A well-designed master plan that allows for development flexibility will serve this purpose. Nanchang's Urban Planning Bureau reviews its master plan every ten years and makes additions and modifications to the plan according to varying urban conditions. Through this iterative process, NMG has established a clear vision for the future development of Nanchang that guides public and private investments.

Third, well-integrated urban planning and public transportation strategies are a favorable characteristic. NMG has established a clear directive to use the MTR system as the backbone of urban transportation. The design of the MTR system is based on the objective of facilitating the implementation of the master plan. The numbers of subway lines and stations along with their locations and surrounding land uses are clearly specified for both long-term and short-term development.

Fourth, both NMG and private investors understand the importance of mixed land use to make the idea of TOD and LVC work. NRTG's station designs provide strong evidence of this underlying principle. This is also reflected by the continuous increases in prices for land designated for mixed use, showing that the market has also caught on to the idea.

Last, but not least, key government agencies under the leadership of the Mayor and the Vice Mayors are providing their full support to NRTG to achieve its financial goals set forth by the LVC approach. This type of institutional backing is crucial for lowering the transaction costs of land acquisition and regulatory changes. Cooperation from all government agencies can also help engender the necessary synergies between the public and private sectors to undertake the technically and financially complicated MTR investments.

Despite the fact that Nanchang seems to possess the preconditions for applying the TOD strategy, there are potential risks. These include: (i) overreliance on land financing that exposes NMG to excessive real estate market risks; (ii) decreases in housing affordability to the less affluent segments of the population; (iii) displacement of existing communities in the old neighborhoods; and (iv) resistance from residents towards changing their car-dependent travel behaviors due to transport investments favoring car use and public perception of car ownership as a status symbol. However, adopting the various measures discussed in this chapter can help mitigate these risks.

Integrating the metro system with land use and incorporating “Development-based” LVC as a strategic financing tool will play the most important role in ensuring urbanization success by offering an attractive alternative transport mode. If done well, Nanchang’s approach combining TOD and LVC will certainly increase the vibrancy and livability of the city, becoming a model for other Chinese cities to deal with their unprecedented pace of urbanization.