

# Smart City Development in China: One City One Policy

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## Abstract

China is in a process of urbanization and is aiming at a type of people-centered urbanization. The main purpose of developing a “smart city” is to help this type urbanization and to serve the people of the city. From 2012 to 2015, China has chosen more than 300 cities or towns to be national pilot “smart cities.” These pilot smart cities are located in more than 30 provinces around China, which differ greatly in thousands ways. So we advocated “One City One Policy”. In 2012, MOHURD announced 90 cities as first batch of pilot smart cities. After three years, some pilot cities achieved great progress. This paper introduces five example cities (including town, district) as five different models of China’s smart city development. They are: Guilin city; Yunlong demonstration zone; Panyu District; Yangling Agricultural Hi-tech Industries Demonstration Zone; Lecong town. This paper also introduces our standardization work on smart city field at present.

## Keywords

urbanization; MOHURD; pilot smart city; smart tourism; smart city indicator system

## 1 Introduction

China’s smart city development officially started in 2012, when the Ministry of Housing and Urban-Rural Development (MOHURD) announced 90 cities or towns to be the first batch of pilot smart cities. In April 2015, MOHURD announced the third batch. Now, MOHURD and the Ministry of Science and Technology are promoting the smart city pilots to work together, and in total, the number of three batch of national “pilot smart city” reaches 300. [1]

The overall idea of the national smart city pilot project is to start with solving the actual problems of a city or town through the comprehensive application of modern science and technology in order to add smartness to a city. The purpose of smart city development includes: urban planning and management of cities/towns/districts, the allocation of urban resources, creating liveable environment, and using cultural heritage and innovation. In other words, the development of smart cities aims to promote the happiness of citizens and focus on urban sustainable development.

Therefore, in the process of development of smart city, MOHURD asks all pilot cities and towns to insist on an issue-oriented, demand-oriented and goal-oriented approach. This means one city has to work out a comprehensive plan and follow five guide points from MOHURD. The guides are focusing on: “one city one policy, people-centered strategy, city-industry integration, urban-management system innovation; market-

leading and optimizing resource allocation.

## 2 Five Pilot Smart Cities in China

After three years of development on smart city practice, some good results have been presented. Here, cases of five cities (towns) are introduced as models of China’s smart city development. They are Guilin City, Yunlong Demonstration Zone, Panyu District, Yangling Agricultural Hi-Tech Industries Demonstration Zone, and Lecong Town.

### 2.1 Smart Tourism in Guilin

Guilin is a prefecture-level city in the northeast of the Guangxi Zhuang Autonomous Region, China. It is situated on the west bank of the Li River, bordering Hunan to the north. The name Guilin means “Forest of Sweet Osmanthus,” owing to the large number of fragrant Sweet Osmanthus trees located in the city. The city has long been renowned for its karst mountains and is one of China’s most popular tourist destinations. At the end of 2014, Guilin city’s permanent resident population was 4.91 million—2.24 million urban population and 2.67 million rural population. Guilin’s urbanization rate is 45.6%. The natural population growth rate is 6.34%. [2]

Guilin as an international famous tourist city is chosen by the State Council of China as one state-level tourism reform pilot area. In November 2012, the National Development and Reform Commission (NDRC) agreed “Guilin international tourism destination construction development plan”, so the devel-

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opment of Guilin tourism is also a national strategy. Therefore, the Guilin municipal government attaches great importance to the “smart tourism” as a new breakthrough in transformation and upgrading of tourism, also as a new area to promote other industries of Guilin. **Fig. 1** shows demonstration spots of the smart tourism in Guilin.

Smart tourism involves using advanced technologies such as cloud computing, Internet of things, mobile communications, intelligent application, high performance information processing, data mining, and other ICT technology, to build a smarter application system for visitors, travel agencies, departments of Tourism Administration.

Guilin is building its smart tourism framework as “one platform, four systems, two demonstration projects, and eight series of tourism products”. In details, one platform is the Guilin public travel information service platform; four systems of smart tourism include service system, management system, marketing system, and tourism enterprises system; two demonstration projects are “one characteristic small town” and “one characteristic low carbon small town”; eight series of tourism products are water sightseeing, leisure vacation tourism, historical and cultural tourism, national culture tourism, red tourism, ecological village tourism, outdoor sports tourism and romantic wedding tour.

## 2.2 Yunlong Demonstration Zone: The Road Map for Low-Carbon Society and Eco-City

The Yunlong Demonstration Zone, established in 2009, is a new district of Zhuzhou City, Hunan Province. **Fig. 2** shows one image map of Yunlong Demonstration Zone. It is located in the northern part of Zhuzhou City, is the Fifth District of Zhuzhou, with a total area of 105.8 km<sup>2</sup> with a total population of

66,400 people, leading two towns, 22 villages and three community committees. [3] From the beginning, Yunlong summarized the road map for low-carbon society and eco-city, its urban design and planning aim to the two goals. And the Demonstration Zone is divided into three areas: tourist area, cultural park area and new industrial area as shown in **Fig. 3**.

Yunlong made six detailed plans for its development: 1) green traffic, 2) low carbon energy, 3) ecological and environmental protection, 4) comprehensive utilization of water resources, 5) low carbon industrial, 6) urban management. Using the concept of smart city and technical tools, it will enhance the capability of urban infrastructure, command operations, ability to respond emergency events, better public service, etc.

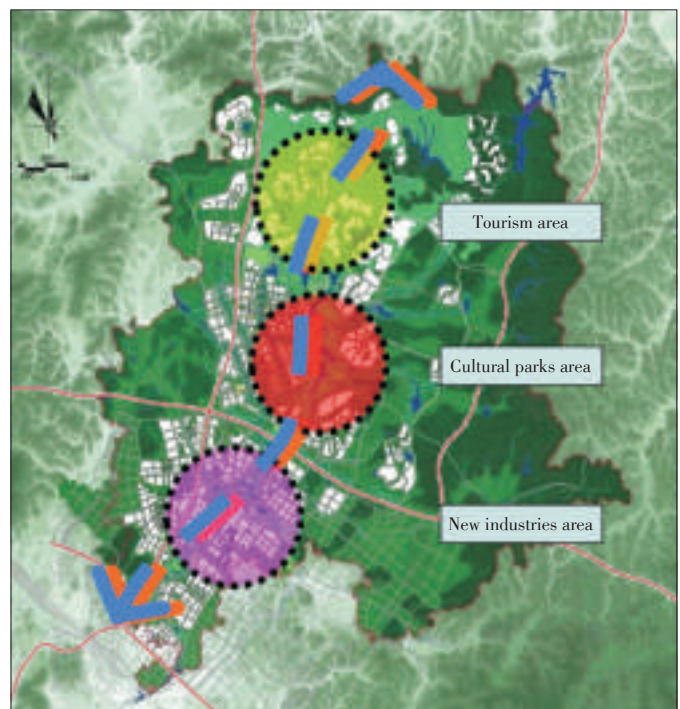
In detail, the green traffic plan will develop public transport first, manage road usage, build public transport system and green road system. In water resources comprehensive utiliza-



▲ Figure 2. One image map of Yunlong Demonstration Zone.



▲ Figure 1. Demonstration spots of the smart tourism in Guilin.



▲ Figure 3. Land planning map of Yunlong Demonstration Zone.

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tion, water conservation is as the core; the plan will promote the optimization of water resources allocation and recycling, strengthen the water ecological restoration and reconstruction, rationalize the use of rainwater, strengthen the surface water conservation, to build a safe, efficient, sustainable water environment. In land use, Yunlong will pay attention to developing towns and villages, reserving agricultural land at rural areas, and maintaining high-density development at urban areas so that the relative proportion of urban construction land, ecological land, and agricultural land use will be 1:1:1.

Finally, Yunlong new area is trying to use of build-operate-transfer (BOT), public-private partnership (PPP), transfer-operate-transfer (TOT), building-transfer (BT) and other new financing model, to attract foreign capital and private capital, promote the construction of infrastructure.

### 2.3 Smart Public Service at Panyu District

Panyu is a district of Guangzhou in southern China. It was formerly a county-level city before it became a district of Guangzhou. The name of Panyu dates back to the conquest of Guangdong by Qin Shi Huang. It was the old name of present-day Guangzhou. The district covers an area of about 661.88 km<sup>2</sup>. It is consisted of six towns, 10 streets, total of 177 administrative villages, and 84 community committees. [4]

Panyu District has maintained a rapid economic development and the size of the population is also growing rapidly. Now the actual resident population is 3 million, far more than the population that has household registration. At present, one unresolved problem is that the effective supply of public service is not good enough to satisfy the public, and this problem is becoming increasingly prominent.

Therefore, Panyu District's goal in terms of smart city development is to promote people's livelihoods and provide better information services. Panyu plans to implement four projects related to people's livelihood: 1) file management plan, 2) livelihood service cards, 3) service points, 4) livelihood services. In particular, is to promote the "cloud services + smart service card + smart App" plan to push construction of a comprehensive and highly integrated intelligent ICT, providing the public with a number of smart services, such as emergency services, community services. **Fig. 4** shows the public service hall of Panyu government. For example, in 2013, the "Rental Housing Safety Management" worked well and is in charge of 643,000 rental housing sets. The coverage rate of 94.4%; and the "Citizen Hotline of the Panyu District" got 140,036 complaints or comments, 138,880 cases received satisfied reply, wind-up-case rate was 99.17%.

### 2.4 Smart Agriculture at Yangling Agricultural Hi-Tech Industries Demonstration Zone

Yangling Agricultural Hi-Tech Industries Demonstration Zone is located in Yangling District, Xianyang, Shaanxi. It is under the direct governance of Shaanxi Province, and is the only

such zone within the People's Republic of China. It was created on 29 July 1997. This district has the planning area of 22.12 km<sup>2</sup>, and its population is 80,000 people. [5]

Yangling Demonstration Zone believes that it is very important for modern agriculture to control whole agricultural industry chain of quality and safety and to improve food safety production. One vegetable factory at Yangling is shown in **Fig. 5**.

Yangling Demonstration Zone affixed to two dimension code as identification to its all agricultural products. Consumers can scan the code only using a smart mobile phone, can easily query the time of sowing, picking time, fertilization time and fertilizer name, the pesticide name used, time and production manufacturers, etc. In this way, all these agricultural products have an "identity card". **Fig. 6** shows one customer checks his food's identity. And, four local standards have been worked out for safety of Yangling agricultural products. These are standard for the management of traceability, technical specification for products-examination, examination criteria, and certification inspection standard.

### 2.5 Smart City in Lecong Town: Focusing on Industries

Lecong Town is situated in the hinterland of the Pearl River



▲ **Figure 4.** Public service hall of Panyu government.



▲ **Figure 5.** One vegetable factory at Yangling.



**Figure 6.** ▶  
One customer checks  
his food's identity.



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Delta, the northwestward of Shunde and the south of the central urban area of Foshan. It is less than 30 km from Lecong to Guangzhou and more than 100 km to Hong Kong and Macau. The National Highway 325 runs through from the south to the north. Lecong town covers 78 km<sup>2</sup>, owns five community committees, 19 villages, household registration population of 100,000 people, and resident population of 260,000 people. [6]

As a small town of only 78 km<sup>2</sup>, Lecong gains its achievements being the world's largest furniture market, the country's largest iron and steel market, South China's largest trading market of plastic. With the acceleration of urbanization and serious market competition, Lecong is facing many difficulties, such as wrong land planning, low end market, environmental degradation, and public service challenges.

From 2012, Lecong local government started the development of Internet of things (IOT) industry as a new starting point, to increase investment, to start building "smart town" and to promote upgrade of Lecong's other traditional industries. Until now, IOT Industrial Park has been successfully opened, attracted more than 30 famous research institutions and enterprises into this Park, such as South Korea's Samsung data.

Lecong is one typical small town of China's first batch of smart pilot cities. "Smart Lecong" development is an important example in the eastern coastal areas different with other big cities. Through the IOT industry and other new ICT innovation with other industries, Lecong promotes the upgrading and transformation of traditional industries and the development of urban area. It has become a model of smart development in China's small cities and towns. **Fig. 7** shows a Lecong night scene.

### 3 Smart City Standardization and "One City One Policy"

Now, smart city development is in full swing, the demands of the standard system are also increasingly strong. At the end of 2012, MOHURD published "national smart city (town, district) pilot standards system (for trial)", a guide book for 90 pilot smart cities that year.

This indicator system contains six aspects of smart city: standards, infrastructure, construction and liveable, management and services, industry and economy, and security and maintenance. It can be divided into five levels and covers 18 technical areas, including 126 professional standards of industries.



▲ **Figure 7.** Lecong night scene.

The smart city indicator system and 57 indexes for the pilot-project are shown in **Table 1**. Here are 57 indexes of these 6 aspects as third level. And these indexes are flexibly divided into required index, optional index and innovational index.

MOHURD's pilot smart cities are located in more than 30 provinces around China, and are different in many ways. For some small cities or underdeveloped areas, both the urban infrastructure and the ICT service could not take the same standards and criteria with developed areas. So China advocated "One City One Policy", will not judge all pilot cities with same standards and evaluation indicators in future.

National Smart City Joint Lab of Chinese Society for Urban Studies (CSUS) was set up in 2012. The joint lab consists of over 30 enterprises and research institutions, such as National Engineering Research Center for Information Security, Huawei, ZTE, Microsoft, IBM, MIT, HITACHI, Baidu, Xinhua News Agency Modern Express, Economic Daily, etc. The lab focus on the research and construction of all concerning with smart cities, such as ICT, public information platform, city security, and water engineering. Beginning with solving practical issues, the lab is endeavor on putting forward scientific, thorough and executable solutions for smart city construction, assisting pilot smart cities governance and offering consultation

▼ **Table 1.** Smart city indicator system

Smart City Indicator System (Pilot, SCI)		
First Level	Second Level	Third Level
Guarantee system and infrastructure	Guarantee system	Planning outline, implementation scheme, organization guarantee, policy and regulation, funds guarantee, management of operation
	Network infrastructure	Wireless network, broadband network, next-generation broadcasting network
	Common platform and database	City common basic database, city common information platform, information security
Smart construction and livability	Administration of city construction	Urban and rural planning, digital city administration, construction market administration, house property administration, landscaping, historical and cultural preservation, building energy conservation, green building
	Promotion of city function	Water supply system, drainage system, water conservation application, gas system, garbage classification and disposal, heat supply system, lighting system, underground pipeline and spatial integrated administration
Smart Administration and Service	Governmental service	Decision support, information disclosure, online service, governmental service system
	Basic public service	Basic public education, labor employment service, social insurance, social service, medical and health service, public culture and sports, service for disabled, basic housing guarantee
	Special service	Smart transportation, smart energy, smart environmental protection, smart land administration, smart emergency, smart security, smart logistics, smart community, smart house and home, smart payment, smart finance
Smart industry and economy	Industry planning	Industry planning, innovation investment
	Industry upgrade	Industrial factors agglomeration, traditional industry transformation
	Development of emerging industry	High and new technology industry, modern service industry, other emerging industry

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service.

Based on over 200 pilot smart cities practical experiences, the National Smart City Joint Lab is cooperated with its partners to continue standardization work of smart city. Recently, ISO/TC 268's TR37150 Chinese version has been published as one guidebook for city mayors and leaders.

## 4 Conclusion: Smart City and China's Urbanization

China is in a crucial stage of development. There is steady, coordinated progress in advancing the new type of industrialization, IT application, urbanization and agricultural modernization. However, there is a large urban-rural gap in development. Population in the central, western and northeastern regions accounts for over 60% of the national total. And per capita GDP has just exceeded US\$5000. Narrowing the gap between urban and rural areas and between different regions will unleash huge potential for growth. China will implement a new type of people-centered urbanization and address the bifurcation between urban and rural areas. The government will increase support and use market tools to rebuild more rundown areas this year. Government will also promote the development of green industries, new energy, and energy-conserving and environment friendly technologies and products to foster new growth areas, and resolutely eliminate backward production facilities in this process to ease the resources and environmental constraints.

The international experience has proved that when urbanization reaches 50% to 70%, social problems tend to increase. Cities become sick; problem of unemployment, the gap between rich and poor, housing shortage, traffic congestion, energy shortage and environmental pollution, and other issues become serious. China's urbanization rate for the first time reached 50% in 2011. China's urbanization is in a critical period. To achieve people-centered urbanization, "smart city" helps. Smart city development requires to solve various urban diseases existed, and at the same time to prevent new problems or troubles in urban areas. The main purpose of developing a smart city is to serve the people better.

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