Opportunities and Challenges for Smart City Development in China

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Abstract: Based on case study of the practice of smart city development around the world, which has achieved a lot to make our life more convenient, through analysis of advantages and disadvantages, conclusion of some principles could be reached in a qualitative way. After studying the policy and economy environment of China, this paper concludes some features, identifies opportunities and challenges for smart city under the background of “The Belt and Road Initiative”, and provides suggestions on the development of China.

Key words: Smart city, The Belt and Road Initiative, policy, financing.

1. Introduction

A smart city is an urban area that uses different types of electronic data collection sensors to supply information which is used to manage assets and resources efficiently [1]. This includes data collected from citizens, devices, and assets that are processed and analyzed to monitor and manage traffic and transportation systems, power plants, water supply networks, waste management, law enforcement, information systems, schools, libraries, hospitals, and other community services [2]. The smart city concept integrates ICT (information and communication technology), and various physical devices connected to the network to optimize the efficiency of city operations and services and connect to citizens [3]. Smart city technology allows city officials to interact directly with both community and city infrastructure and to monitor what is happening in the city and how the city is evolving [4].

2. Methodology

This paper will review smart city development around the world from its origin and influences on our life and identify the different features between different regions. The resource data are mainly from internet and literature paper, almost cover all milestones of smart city development around the world. Through analysis of advantages and disadvantages, conclusion of some principles could be reached in qualitative way, which could guide the process of future smart city development in China. Furthermore, we could identify the opportunities and challenges in “The Belt and Road Initiative” with deep study of relevant policy.

3. Smart City Development in Foreign Countries

As a social, economic and cultural highly developed region, western region is the pioneer of smart city, where the development of the smart city started earlier as to R&D (research and development) and industry practice.
3.1 Smart City Development in North America

The United States is the first country proposing the “smart city”. There are two iconic events: Vice President Gore introduced the “Digital Earth” in January 1998 for the first time; President Obama put forward “Smart Earth” in November 2008. Dubuque—the first smart city, was built with collaboration of IBM by the Internet of Things, advanced smart devices to build an information network for integrating and displaying various public resources information within the area, which can either be used by the city manager or opened to the public, thus contribute to city operation. As the most important commercial and financial center of the world, New York developed smart city to solve problems arising from the process of urbanization, such as traffic congestion, environment damage and over-consumption of resources, to make New York the least carbon emission per capita in the United States. California San Jose launched intelligent road lighting project, which can realize remote monitoring, efficient line inspection and output balance to reduce the cost and improve the service, make the city streets safer and more beautiful. In the field of smart grid, Boulder city has transformed the existing traditional substation into an intelligent substation with advanced technology such as real-time monitoring and remote tracking.

Canada is one of the world’s most successful smart city construction countries with many smart cities, such as Toronto, West Lattuff, Calgary and Waterloo city. Toronto, for example, which cooperated with Google Corporation, raise the concept of “future city”, has launched “Sidewalk Toronto” test area, focusing on environmental sustainability, affordability, mobility and economic opportunities. The city is designed to share traffic tools (including unmanned vehicles), underground freight channels and cargo diversion, to serve related public facilities, such as hospitals, cafes, and communities.

In summary, North American smart city development, which started early and developed rapidly, covering dozens of cities, leads the innovation and practical experience of technology, also provides reference for the following fellows: (1) Smart city is a wide-range system with complex function, which needs long and arduous process; (2) Smart city should be built regionally not locally; (3) New high technology in various fields can be applied; (4) People should put in the first place, which is the original intention, motivation and ultimate purpose of smart city. At the same time, giant science and technology company plays a major role in the United States and Canada’s smart city construction, which can actively mobilize social forces and improve the efficiency of financing, but sometimes too much emphasis on the importance of high-tech and lack of top-level design. On the other hand, due to the competition between the commercial interests of the companies, the smart city construction companies will use leading technology and engineer of their own, this “exclusive” construction
mode is also not conducive to the connection and fusion of smart city system.

3.2 Smart City Development in Europe

Smart city development in Europe also started early. The “European 2020 strategy”, which was released by the European Union in 2010, was established for a vibrant digital market and realization of high speed and large-scale deployment of low-carbon technologies.

The UK regards “smart city” as the “digital city” to solve the problems of urbanization with information technology. To this end, the British issued “energy efficiency and low-carbon technologies deployment” plan in June 2009, which clearly proposed to build the UK to the world’s “digital capital” and committed to providing the public with efficient and convenient public services. Glasgow established an open data platform and smart lighting management system; London developed sustainable ecological community, utilized comprehensive renewable sources to achieve low carbon emission.

Germany’s smart city focuses on energy saving, environmental protection, transportation. The Berlin intelligent transportation system provides convenient and efficient public transportation services for the public; Berlin also launched passive residential projects with renewable resources, new materials, new design methods to maintain a suitable living environment with low energy and low carbon life without air conditioning or heating system [5].

Sweden is one of the countries with the high popularity of home network and mobile communication in the world. Relying on convenient communication infrastructure, Sweden’s smart city construction focuses on the traffic system. Through establishing “intelligent transportation system”, Stockholm improves the overall traffic, which utilizes a variety of sensors to collect and analysis transport routes, weather information and other data, to solve the traffic congestion and achieve low carbon emissions.

The theme of Amsterdam is sustainable development, supported by NOKIA, Ericsson, IBM and other international companies mainly focus on the establishment of sustainable development with the goal to reduce greenhouse gas emissions by 40% till 2025 comparing to 1990. Traffic data are opened to the public, enterprises are encouraged to innovate new products and mobile services to improve public travel efficiency.

Smart city in France regards the people’s livelihood and ecological benefits as the most important thing, pays attention to potential climate and geological risk through new technology, reduction of carbon dioxide emissions and improvement of residents’ life quality by using data collection and analysis techniques. The system assists managers to make decisions and achieve the goal of reducing the cost of urban management. In the same time, France Telecom has set up a comprehensive operation department, and realized remote meter reading and other services to provide convenient public services to residents.

Barcelona proposed the “smart city” in 2009 to improve the quality of life of residents and ensure the city efficiency and sustainability, which is committed to building a green energy saving smart city. Barcelona built garbage intelligent processing and recycling system to improve the residents’ garbage classification consciousness. In terms of energy saving, Barcelona installed intelligent LED street lamp to adjust the street lights automatically through sensors and timers, thus energy saving effect is remarkable.

Besides above-mentioned countries, Italy, Austria, Denmark, Estonia and other European countries have also developed smart city according to their own characteristics and achieved considerable results. The primary feature is focusing on the environment protection, energy conservation and emission reduction, recycling of resources, renewable resources utilization, ecological sustainable development strategy to build pleasant natural conditions and living environment. Second, European smart city is generally initiated by the government, with enterprise participation. Third,
smart city satisfied public needs, which is supported by sensors and modern information technology to provide intelligent services to improve the economic benefit and efficiency, thus promoting economic, social and cultural city and common development. Finally, the biggest enlightenment of smart city is information technology which is the basic of smart city with core content of people-oriented, public participation, social coordination and public value and unique value creation [6].

3.3 Smart City Development in Southeast Asia

Although the Southeast Asian countries started later comparing to Europe and the US, most of them made up-down smart city development strategy, which have made extraordinary achievements, such as Japan, South Korea, Singapore, Hongkong etc.

Japan is the earliest country to build smart city in Asian. Japan launched the “I-Japan smart Japan strategy 2015” in 2009, which is committed to integrating information technology into daily life, to achieving people-oriented and vibrant digital society. The strategy focuses on e-government governance, medical health services and education. Electronic medical record system has been established in Tokyo, which integrates medical record information of the patient, hospital and nursing and convenient for the doctor to diagnose and treat the disease timely. In Matsushima, “smart” is everywhere, as long as you have a smart card, you can enjoy convenient public services, experience intelligent everywhere. The Internet is like a big net, which closely connects the city’s main facilities to ensure a comprehensive public service.

The South Korean government launched the “U-Korea” development strategy first, and then started “U-City”, using the sensor to connect the city together. Managers can readily grasp the information of road, parking lot, underground pipelines and other facilities. At the same time, people from every corner of the city can be convenient to use or handle various social services.

Singapore launched the “iN2015” program in 2006, which has set up a citizens-oriented “e-government” system, with collaboration of citizens, enterprises and government, so that citizens and enterprises can participate in the government affairs whenever and wherever they want. Intelligent transportation was built to significantly improve the traffic efficiency of peak period vehicles by accurately predicting the traffic flow and traffic flow. As part of the “iN2015” strategy, Singapore proposed “wireless Singapore” program to explore its information potential to enhance the economic competitiveness and make Singapore an information-driven, global country. In order to strengthen the smart city further, Singapore proposed the “wisdom 2025” in 2014. As an upgraded version of “iN2015”, “smart 2025” depicts a grand smart blueprint, to make Singapore the world’s first smart country, which can be summarized as “3C”—Connect, Collect and Comprehend. “Connect” refers to a safe and expansible communications infrastructure, “Collect” refers to the real-time data acquisition throughout the country, “Comprehend” means to analysis collected data to predict the needs of the people and establish effective sharing mechanism for the public [7].

The “wisdom” of Hongkong is a concentrated manifestation of the “octopus card”, which was originally launched to pay for the transportation fee, while has become the public facilities service fee payment tools and gradually developed into a powerful intelligent payment system, “octopus card” has become an omnipotent “smart card”, which brings Hongkong efficient and convenient life.

The most notable feature of smart city in Southeast Asia is national strategic height, government-lead, unified management and deployment, involving strong leadership to connect the government and the public, relating transportation, medical, communications, education and other fields. With the development of science and technology progress, the previous
technology will be gradually updated, also direction and strategy can be adjusted with the deepen understanding of smart city [8].

In the above mentioned smart city cases, the United States chose the Internet of things, cloud computing and other high-tech model as the core, which focus on broadband connectivity, digitization and marketing methods. Europe focuses on environmental protection, low carbon way of construction, hopes to achieve energy-saving emission reduction targets through low carbon strategy and sustainable development. Although the western experience is worth learning, problems still arise: first is lack of active participation of citizens, second is sluggish development caused by limited financial resources, third is generally lack of effective and practical monitoring system on the construction stage in the process of target monitoring, lack of effective indicator system to measure intelligence development efficiency and input-output efficiency.

From Table 1, representative smart cities in different time are analyzed with several characteristics, the evolution of smart could be concluded that, smart city grows from simple collection of data to intently use the information to govern, and then achieves sustainability goal. Nowadays smart city becomes more vital since it combines with market, much closer to the need of citizen with practical tools (card maybe).

Comparing the Gartner curve, we could identify that 1998-2008 is the first generation of smart city, 2008-2012 is the peak of inflated expectations, many countries followed to develop smart city, after several years’ silence, now smart city enters the slope of enlightenment, just like China, over 200 cities applied pilot smart city after 2012, now those cities gradually know what should be done in the frame of smart city after several years’ implementation, and a new era has begun.

![Fig. 2  Time table and concept of smart city.](image)

<table>
<thead>
<tr>
<th>Year</th>
<th>City</th>
<th>Display</th>
<th>Solve</th>
<th>E-government</th>
<th>Sustainability</th>
<th>Economic</th>
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<td>2017</td>
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<td>Toronto</td>
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**Table 1  Analysis of the characteristics of smart city in time axis.**

Display: collect information and open to public and city managers;  
Solve: to solve specific problems that arise from urbanization;  
E-government: application in government/hospital/public facilities;  
Sustainability: focus on eco-environment/energy efficiency/low carbon emission;  
Economic: concerns the combination of market.
4. Smart City Development in China

4.1 “One City, One Policy” Leads Smart Development

China has a vast territory, and there are huge differences between regions in terms of economy, geography and customs. Therefore, it is reasonable to make arrangements and strategy according to their own features in the framework of overall deployment. “One city, one policy” considering local conditions makes reasonable promotion of smart city.

4.1.1 People Oriented, Focusing on People’s Livelihood

China’s smart city leads a “people-oriented” sustainable scientific development road, basing on the people, paying attention to people’s livelihood, solving the needs of the people, which is the fundamental purpose of building smart city.

Pudong New Area of Shanghai, as one of the first batch of pilot smart cities in China, started from the livelihood of the people with a series of management and service mode to benefit and facilitate people. In the management concept, promoting smart government services, from “government centered” in the past to “people centered” now, concerned about the people in the first place. In order to improve the service efficiency, Pudong New Area launched the political integrated business information management system, to integrate civil relief, special care, welfare, aging, community business chain information resources. And it develops smart cards, APP and other convenience tools to facilitate people’s lives. Smart city card includes identification, life service, payment and other functions through intelligent management, to solve the carry trouble of a large number of notes and coins, which are organically integrated from the people, businesses, banks, community and other. Lujiazui and other towns have enabled intelligent parking APP applications, self-service courier boxes, the elderly service system, providing intelligent parking for the community residents, disabled elderly supervision, accessing control security management, expressing logistics services, etc., have achieved good social effects.

Dongguan has the reputation of “manufacturing capital”, but security problem caused by a large number of migrant workers has plagued the government and the public, it can be said that security is the biggest livelihood of Dongguan. To this end,
Dongguan launched the “smart Dongguan” project, focusing on the use of high-tech means to create a city security environment. “Smart Dongguan” pursues the concept of synchronization of safety, by increasing the investment of wireless security equipment, Dongguan has realized a wireless, real-time, full coverage monitoring network in key areas. Dongguan also cooperates with 360 companies with rich security big data resources, a large number of network security staff and core technology, to provide more powerful security protection to Dongguan [9].

4.1.2 Green Development and Ecological Environment Protection

Since the reform and opening, China’s economic construction has made remarkable achievements, but environment has been seriously damaged. The development of smart ecological city is an important direction.

Zhuzhou Yunlong area has great potential for development of high-quality landscape resources. In order to protect the superior natural environment, Yunlong area sets priority for the green concept in the resources utilization, green transportation, ecological environment, utilization of renewable energy etc. In terms of ecological projects, wetland, forest land, farmland and green land are emphasized. As to renewable energy, which has been based on the efficient use of traditional energy, supplemented by solar energy, geothermal and biomass energy, carbon emissions have been greatly reduced. In the aspect of green transportation, the priority of public transport in the integrated transportation system is defined. Through the multi-level combination of public transport system, the natural landscape is well protected.

4.1.3 Build Intelligent System to Improve Management Level

Intelligent system is an important supporting tool for the construction of smart city. Many pilot cities have made great achievements in the construction of intelligent systems in many fields of industry. Beijing has been in the forefront of domestic development of city intelligent transportation system, which mainly includes five major application systems: (1) the integrated transportation information platform, which supports intelligent transportation system layer of Beijing; (2) the passenger information service system, which has realized the real-time optimal dispatch operation of the vehicle; (3) the automobile dispatch system, through the analysis of regional bus scheduling to improve the allocation of bus routes and service capabilities, to achieve regional centralized scheduling, parking, optimizing the allocation of resources, reduce the bus operating cost; (4) the taxi dispatching system. Passengers can call the car by telephone or network through the smart platform reservation service; (5) the toll highway system (ETC), transceiver installed in car with function of fast reading, data exchange can solve the queuing problem. Those five intelligent systems have effectively improved the traffic situation in Beijing, and laid the foundation for solving the urban traffic congestion and improving the traffic efficiency.

In the field of smart water, through the Internet of things, wireless broadband, big data, cloud computing and other new generation of information technology, automatic acquisition and integration of hydrology, water quality, water supply, drainage, flood control and drought relief and shipping and other aspects of the information have been built to achieve a full range of water information sharing and intelligent management [10].

4.1.4 Giving Full Play to Market Function and Realizing Multiple Financing

In order to ensure the construction of smart city, China mainly adopts the government investment as the main financing way. While smart city construction is a long-term process, which needs a lot of financial support, in addition to the government financing, some cities made a useful exploration and innovates a “hematopoietic” way. The first is to create favorable conditions to fully absorb private capital to participate
in the construction process, such as Foshan and Shenzhen; another way is to invest by enterprises, government procurement services, such as Qinhuangdao [11].

Shenzhen gives full play to market and financing channels. With the help of market, we can not only gather funds more widely, but also break the boundaries of regional, industrial and capital nature. Shenzhen established credit financing system, including commercial bank, stock market, policy bank loan, project financing, private equity financing, trust financing and other recruitment channels, which make the investment more reasonable and diversified, forming a virtuous circle in the capital supply chain.

Qinhuangdao introduces a new model of enterprise investment and government services procurement, introduces high-end enterprise cooperation, avoids project risk and achieves win-win cooperation. The smart city construction of Qinhuangdao integrates funds, technology, management and other resources within a platform to promote the smart city construction effectively. At the same time, we should also notice that the key to carry out the construction of smart city with this innovative mode is to establish the working mechanism of division of labor, responsibility, coordination and coordination among departments. Clear responsibilities of departments, which restrict each other with organic coordination, promote the construction of smart city.

4.2 Integration of Urban and Rural Characteristics

The new route of urbanization in our country is not the development of city, but urban and rural coordinated sustainable development, reflecting the China characteristics, carrying forward cultural traditions. Urban smart city construction cannot be separated from the support of the surrounding villages and towns, which is a positive feedback process of mutual promotion. Combined with the development needs of smart city, as well as the particularity and diversity of urban and rural development, many cities in China have carried out the construction of smart city according to their own characteristics, mainly reflected in green agriculture, characteristic culture and tourism.
As a famous tourist city, Guilin attaches great importance to the construction of smart tourism projects. As the “Guilin international tourist resort construction and development plan” mentioned, the smart tourism construction for the comprehensive integration of Guilin enhances the development of Guilin tourism industry, and further enhances the core competitiveness of the tourism industry. Guilin municipal government will work hard on smart tourism transformation and upgrading of the tourism industry, to improve the tourism administrative departments of tourism administrative service level needs. Through effective use of cloud computing, networking, mobile communications, intelligent terminals and other modern information technology, Guilin builds “one platform, four systems, two demonstration projects, eight smart tourism products framework”, with rational design of smart tourism and develops tourism resources in depth, for the benefit of urban and rural people [12].

5. Conclusion of Smart City Development

Through case studies of smart city development on foreign countries and different city in China, some clues which present the core value of the smart city can be concluded.

5.1 People Is the Core Content

What is the city? We can define it from different perspectives such as economics, sociology, geography and urbanism. While considering differently, the core is always people. Either society, politics, economy or culture is based on “people”, the establishment of the existence and development of the city all should serve people.

On the road of economic development, China has already realized the importance of “people”. At the beginning of this century, China had proposed a sustainable development with “people-oriented, promoting the overall development of economic society and human”. In recent years, the Central Committee of the Communist Party of China proposed a new urbanization road with Chinese characteristics, which is people-oriented, four modernization synchronized, optimized layout, ecological civilization and cultural heritage to find ways to solve the problem of urban sustainable development. “People” is the core concept which must be adhered to in the construction of smart city. First of all, from the top design, China focuses on “people” in the process of smart city construction. Secondly, the purpose of building a smart city is to serve the city, therefore, if there is no widespread participation, smart city is only an empty shell. Adhering to the “human centered” is to listen to the voices of the masses, to absorb the opinions of the masses, to improve public participation. Through the media, Internet and other means, mobilize the enthusiasm of public participation and let the public understand the smart city and carry out targeted construction, to achieve a variety of intelligent systems.

“Quality” is the basic principle that must be adhered to in the construction of smart city, to realize the organic combination of various “intelligence” from the simple accumulation of “intelligence”, and to improve the management and operation efficiency of smart city. The quality assurance should start with the following aspects:

First, the quality of infrastructure. Infrastructure is the main part of the hardware environment of the city, is also the material basis of the smart city, which can be simply divided into traditional infrastructure and information infrastructure, the former mainly includes transportation, hydropower, energy, health care, public service, which guarantee the people’s basic living facilities, while the latter mainly includes sensor, fiber optic cable, microwave, satellite, mobile communication network communication facilities, which enable people to live more comfortable. At present, China has established a relatively perfect traditional infrastructure. In the eastern provinces and cities with better economic conditions, smart city
develops rapidly, while in the western region it is relatively backward [13].

Second, the quality of personnel and technical methods. At present, there are various types of colleges and universities, there are also a number of “BAT” as the representative of high-tech companies at the same time, which have made remarkable achievements in computer, communication, Internet, big data processing. It can be said that, China’s education resources and talent reserves can not only support and ensure the successful implementation of smart city construction, but also lead the forefront technology, research and innovation of the world in the smart city.

Third, the quality of operation and management. Science and technology has changed our daily life and smart city has changed the traditional urban management mode. Nowadays, electronic, information and intelligent are emphasized, operation management innovation should keep pace with the times to adapt to the progress of science and technology. China’s management mode innovation has gradually formed a “people centered” management model with Chinese characteristics [14].

In short, smart city construction is inseparable from the public participation, smart city must take into account the feelings of the public. Only the utilization of human wisdom, awareness of the actual needs of the people and modern information technology can support smart city construction efficiently, realize the intelligent operation of the city and create a better platform of living environment, bring the benefits of smart city construction achievements for of all citizens. The future of smart cities is not just to use as many advanced technologies as possible, but shall be more committed to cooperation and interaction between the city and the public [15].

5.2 Overall Progress of Pilot Projects in China

In order to solve the problems in the process of urbanization and implement the national strategy of “new urbanization”, China has led a distinctive, effective way of smart city development after several years of practice.

5.2.1 Overall Planning as a Whole

Development principle and direction for the construction of smart city from top planning should be determined to seek long-term and overall achievement. Ministry of housing and urban development implements a “top-down” style management and working system to ensure the construction of smart city sustainable and healthy development.

As the administrative department, the ministry of housing co-planed the pilot work of smart city nationwide and issued the “Interim Measures for the administration of the national pilot smart city” in November 2012, which elaborates the leading group, the reporting methods, contents and acceptance, the relevant requirements and index system. According to the interim measures, the ministry of housing, has set up a leading group for the establishment of smart city, which is responsible for the overall organization and implementation of the work [16].

According to the “Interim Measures”, provincial urban construction departments are mainly responsible for the organization of the provincial reporting, assessment, material review, field investigation, expert appraisal and other forms of reporting. At the same time, the urban and rural construction departments of each province have made beneficial exploration in the aspects of organizational management, policy support, project promotion, funds and technical support, etc. [16].

5.2.2 Multi Participation and Comprehensive Support

The construction of smart city is a long-term and complex systematic project, involving a large number of fields and participation. In order to carry out the development smoothly, it is necessary to cooperate with many parties and establish a perfect support system. First of all, coordinating the promotion, and optimizing top-level design. The Ministry of Housing established co-ordination mechanism, fully responsible for the organization and coordination and promoted the
construction of smart city to create work leading group. Chinese city scientific research center will be responsible for the formation of the digital city engineering technology research center, responsible for full-time institutions establishment and provincial housing department. Secondly, establishing professional team to achieve talent support. The creativity of talents is the direct driving force of productivity. Only a business excellent professional large scale talent team can support the complex smart city pilot work. To this end, the Ministry of Housing and Urban-Rural Development form the national committee of experts into the smart city, containing more than 100 experts, with strategy, policy, planning, information technology, architecture, energy, and other seven theme expert group, which has played an important role in the smart city assessment. At the same time, the provinces have also established the expert talent pool accordingly and participated in the consultation, guidance and supervision of the pilot smart city construction. Thirdly, colleges and universities develop simultaneously in the process of construction, in order to serve the smart city better, more than 200 universities, enterprises and research institutions build a smart city industrial technology innovation strategic alliance [17].

5.2.3 Optimize the Selection, Strict Entry and Exit

In order to ensure the successful implementation of smart city, the ministry of housing and the provincial sectors perform their duties in the screening of the pilot cities and regions, and strictly declare customs declaration and acceptance. According to the provisions of the “Interim Measures”, application will be audited by the provincial housing and urban construction department and then submitted to the ministry of housing. Subsequently, the ministry of housing and people’s government of the pilot city (district, town) sign an initial task book of smart city which clearly defines goals, creation cycle and construction tasks and so on. At the same time, the “Interim Measures” also explicitly declare the conditions and acceptance materials and standards for the application of the pilot cities.

5.2.4 Distinctive Features with Various Styles

Since the start of the National Smart City pilot work in 2012, China has announced three batches of smart city pilot list till now, including a total of 290 cities and regions, mainly in the central and eastern regions, and there is a trend towards the western region. Among those smart cities, there are distinctive features: (1) formulating corresponding development strategy according to characteristics of each pilot city; (2) implementing the people-oriented scientific outlook on development, making the town a peace place for people to live and work; (3) “the integration of city and industries”; to solve the city problem and enhance the development power of city; (4) encouraging a variety of financing channels, exploring and perfecting the mode of operation to ensure the sustainable promotion of smart city construction; (5) innovation, integration of mechanism system, making the process of urbanization in China to adapt to the new towns construction road. Smart city has started earlier in of Jiangsu, Shandong, Hunan, Guizhou and Anhui provinces. Project start rate is higher in Shanghai, Sichuan, Guizhou and Jiangsu.

In short, smart city construction is a huge project with rich content, the demands of the parties need to fully consider the various factors in the design process, it is necessary to do the top-level design, overall control, comprehensive coverage, prioritize and highlight key points.

6. Suggestion on Smart City Development

At present, China is urbanizing rapidly, featured with transferring of traditional industries to the inland and the large inter-regional population migration. Rapid urbanization has stimulated economic and social development in China and promoted the process of industrialization and upgrading of industrial structure. However, the drastic urban change has also raised many problems, such as unbalanced regional development, poor public services and urban
management, serious pollution and so on which have seriously hindered the healthy development of urbanization in China. In order to solve the problems of urbanization, China presents the principles of ecological civilization in the Central Economic Work Conference in December 2012, which shall be integrated into the whole process of urbanization, take intensive intelligent green low-carbon new urbanization road. In order to further promote and implement the new urbanization construction, China established and issued “national new urbanization plan (2014-2020)” in 2014 (hereinafter referred to as the “plan”), so as to form the overall guidance of the national documents for the development of urbanization reform. In order to realize the requirements and objectives of the development of the plan, the following aspects should be accomplished.

6.1 Improving Policies to Escort the Development of Smart Cities

Smart city construction needs relevant policies and regulations. (1) The construction of smart city is a long-term project, in order to guarantee long-term stability, the construction of smart city need national or local policy to guide the development constantly; (2) It includes lots of infrastructure construction, which needs to prevent and punish corruption and degeneration; (3) As every coin has two sides, high-tech also has its disturbing side. Relevant laws and regulations should also be adapted to the development of high technology to ensure information security. Finally, intelligent system should be used to improve the management level and efficiency. By using the opportunity of the design and construction of smart city, we could gradually integrate all kinds of scattered information system to realize the integration of city management and service mode.

6.2 Reasonable Arrangement of Funds to Achieve Operation Innovation

Smart city project is a large investment with slow return. First of all, limited capital investment should focus on most urgent needs according to city’s own characteristics, and gradually improve the smart city system. Secondly, financing channels should be expanded to gradually establish a diversified investment and financing system with government investment oriented, enterprise based, social investment funded. Finally, big data and Internet thinking should be used to innovate business model and improve the management level and efficiency, saving management, operation and maintenance cost in the same time.

6.3 Speed up the Smart Infrastructure to Lay a Good Foundation

The “plan” clearly proposed the requirements of “intelligent infrastructure”—intelligent transportation, smart grid, intelligent water supply, intelligent network and intelligent building are important parts of smart city, also basic composition of city operation and development.

The top design of smart city is not only the design of various facilities information, but also coordination of corresponding management departments involving the land planning, ecological design and other aspects, so as to strengthen the public transportation, pollution prevention, hydropower, gas supply and other urban infrastructure construction.

6.4 Encourage Scientific and Technological Innovation to Inspire Talents

The famous “smart city equation” by Academician Li Deren, simply pointed out key of success of smart city is the high-technology, not only Internet of things, but also cloud computing and big data, which demonstrate the strength of scientific and technological innovation. To apply these new technologies, first of all, we should have talent people. In the introduction of talent, we should give full play to the role of incentive both material and honor; On the other hand, we need to pay attention to the training of local talents, accelerate
high education and education reform and development to promote the professional discipline adjustment and cultivation of talent on smart city construction. Secondly, to attract more universities and high-tech enterprises to participate in the construction of smart city to fully mobilize the “senior intellectual intensive” groups involved in the initiative, actively encourage and guide them to apply their own advantages and innovation to the process of building a smart city.

6.5 Establish a Unified Standard to Achieve “Intelligence” Integration

Smart city standard mainly refers to two aspects, one is data and technical standards; the other is evaluation criteria. Unified data and technical standards are aimed to interchange and share data smoothly so that different sectors can be connected. China has established the National Smart City standardization coordination promotion group to promote the standardization of domestic smart city construction and docking with international standards. At present, China has completed the top-level design of many areas of smart city, formed a set of policies and technical guidance documents and standards, indicating the direction of the development of smart cities in China. There is still long road in the standardization.

7. Opportunities and Challenges of “The Belt and Road Initiative” Smart City Development

In the trend of the information revolution, smart city development has become the common choice of many countries and regions in the world. Although the construction of smart city is self-contained, but it is not isolated, which needs to communicate with the outside world, absorb fresh blood, discharges for self-purification to maintain vitality. Smart city should not be sporadic, but “connect point to line and then surface”, and ultimately realize the beautiful vision of “smart earth”. “The Belt and Road Initiative” as a national strategy points out the direction of road to build smart city.

7.1 Strengthening Infrastructure and Tamping the Foundation

Although “smart city” can be defined from different angles, but it cannot do without such basic elements: Internet, networking, cloud computing, digital technology, sensing technology. As academician Li Deren said: “wisdom city = Digital City + Internet of things + computing”. The material basis is a variety of public service facilities: sufficient energy and electricity, convenient transportation, sensing equipment and broadband network to achieve rapid information transmission.

From a domestic perspective, after decades of rapid urbanization, China has established a relatively perfect infrastructure, but serious uneven spatial distribution has always been a stumbling block to the sustainable development of China. At the same time, some industries have overcapacity problems, which need to be solved urgently. “The Belt and Road Initiative” strategy, not only can make up for the weak western region infrastructure, but also find a new way to solve excess capacity.

From international perspective, “The Belt and Road Initiative” can bring construction experience and excess capacity to countries in Southeast Asia, Central Asia and Africa and develop the infrastructure, then lay a solid foundation for the construction of smart city.

7.2 Expanding Financing Channels to Ensure the Implementation

Smart city projects require lots of investment, and financing is still one of the biggest challenges in the process of smart city promotion. (1) Smart city investment is relatively large, it is very difficult for government to bear alone; (2) It is difficult for smart city to obtain returns in the short term; (3) Some of the smart city projects relate to public welfare but no direct economic benefits. Therefore, smart city construction is a huge investment for any country or city, it is even unbearable for less developed countries and regions. “The Belt and Road Initiative” strategy creates
opportunities and Challenges for Smart City Development in China

7.3 Learn from Each Other and Exchange Experience

As mentioned above, each country and region has its own successful experience in building smart city, which provides latecomer valuable reference objects, and also can export advanced technologies to help the development of other countries. Resources along the “The Belt and Road Initiative” are rich and economic complementary. There is large cooperation potential space. Policy communication, infrastructure connectivity, trade flow, people connection, funds connection are the main content of “The Belt and Road Initiative”. Innovative ways to strengthen cross-border investment and trade, like the development of cross-border e-commerce and other new forms of business to promote the construction of smart city in the “The Belt and Road Initiative” initiative, have an important strategic significance for win-win cooperation and common development.

7.4 Establish Standards and Integrate Intelligence

“The Belt and Road Initiative” strategy is a great strategy focusing on the future, focusing on the world, which break the geographical restrictions and barriers between countries, to achieve mutual benefit and common development. The Internet, Internet of things and other technologies make the world a “global village”, which highlights the important role of smart city standards. Every industry needs the standard. If there is no standard in the smart city and the “The Belt and Road Initiative”, it is difficult to achieve interoperability between cities and countries.

Through the conclusion we made from the deep case study of both foreign and domestic smart city practice, we may find our advantages and disadvantages, we could make further effort to make our smart city better and fulfill the target of the very start to satisfy demand of people by means of information technologies, and also we could export our advanced technologies and management experience by the trend of “The Belt and Road Initiative” to make the world even balanced and developed.

Acknowledgments

This paper is supported by the Science and Technology Commission of Shanghai Municipality (No. 18511101400).

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