

Taking Shenzhen and Shanghai as Examples to Analyze the Construction and Development of Smart Port Cities

Qiyuan Cai^{1,a,*}

¹*Henan Province Experimental School, Zhengzhou, China*

a. wd@hwec.edu.cn

**corresponding author*

Abstract: In recent years, the enthusiasm for discussing building smart cities has been boosted greatly worldwide, and the residents of major super cities seem to be eager to understand what a smart city is. Unfortunately, due to the International Business Machines Corporation's (IBM) recent introduction of the concept of smart cities, many people have misunderstood the concept of smart cities, and even mistakenly classify urban "digitization" as the scope of smart cities. The core element of a smart city is to use various Smart City Facilities (geographic information systems, urban security systems, intelligent traffic control systems, environmental monitoring systems, residents feedback systems) to bring the city onto an intelligent, automated, efficient, and livable road. This article aims to compare two significant Chinese port cities, Shenzhen and Shanghai, in their efforts to establish smart cities. It delves into the challenges they encountered during this process, analyzes the benefits accrued, and offers valuable reminding for cities aspiring to embark on their own smart city journey in the future.

Keywords: Port city, smart city, collective, migration

1. Introduction

With the development of big data and the Internet, more and more advanced technologies such as geographic information system (GIS) become important in the urban planning field. That is a new concept proposed by International Business Machines Corporation (IBM), the world's largest provider of information technology and business solutions, which was founded in 1911. IBM posits that Smart Earth, a technological paradigm that underpins the development of smart cities, can enable a more comprehensive and dynamic management of citizens' production and daily lives through the Internet and the Internet of Things (IoT). This is because the Internet and IoT can provide an information or urban data platform which solve address issues and challenges such as rapid urban population growth and inefficient urban resource allocation effectively.

Meanwhile, the Internet and IoT can also promote a healthy and sustainable development environment of the urban economy [1]. With information technology, more citizens can participate in urban construction and promote healthy development and more reasonable management advice of the city. IBM proposed the concept of smart cities around 10 years ago, believing that the purpose of smart cities is to create a more livable urban environment for citizens to live in, and providing technological support for smart cities is the application of cutting-edge technologies such as big data

and the Internet of Things. For example, the retrieval and use of core information, as well as the construction and maintenance of databases, cannot be separated from these two factors [2].

Nowadays, there are many successful smart city examples in the world. For instance, Hengshui City in China has achieved satisfactory results in the construction of urban informatization at present. In 2011, Hengshui's e-government development plan for the period from 2011 to 2015 was formulated and issued, on July 19, 2013, Hengshui city government and Unicom (one of the famous communicate companies in China) signed a cooperation agreement based on the construction of "smart city ". The point is worth noting that a series of urban departments in Hengshui also set up a wider activity of building a smart city in 2014, which brought lots of positive impacts to this city [3]. However, the analysis of smart port cities is still not as common as the land cities. Dating to the past 40 years, some towns near the coast developed rapidly, such as Shenzhen or Dubai. At the same time, some old-brand port cities like Shanghai, and Los Angeles also maintained a stable economic growth trend. It is worth comparing their ways of building a smart city, which can let them keep on developing in the future.

The purpose of this article is to analyze and compare China's two major economic centers - Shenzhen and Shanghai's smart city building process, to analyze where to start building a zero-foundation smart city under the model of port city. This research will be based on the data of local and Chinese government posted to the public and the conclusion made by other researchers. With these data, this article is going to explore how cities can make better future development on this foundation, such as more efficient community governance, urban greening, and sustainable economic development. This article further compares the processes of smart city construction in these two cities, highlighting both the similarities and differences in their approaches. It identifies the key factors that have primarily influenced their development and explores the advantages that other cities can learn from. Additionally, it forecasts the future direction of development in these two cities and the benefits that elements such as the Internet of Things (IoT), big data, information and communication technologies (ICT), and digital city management can bring to a smart city. Providing useful suggestions for the construction of other smart cities in the future.

2. Factors Affecting the Build of Smart Cities

To better achieve the above goal of analyzing and comparing the process of building smart cities in the two major port cities, Shenzhen and Shanghai, this article will first research when these two port cities come up with the plan to build smart cities. Based on public information provided by the Chinese government, Shenzhen and Shanghai planned to build smart cities in 2018 and 2010 respectively. Based on the above data, Shanghai proposed the construction of a smart city earlier than Shenzhen. This may be because Shanghai, as an old brand city, served as a trading port with Europe as early as the Qing Dynasty. During this period, its urban basic facilities such as the Urban Transportation Systems, Urban Capital Sources were relatively well built with the assistance of countries like the United Kingdom. For instance, the first urban facility in Shanghai became modernized were waterworks, which started in the British Concession, followed by the French Concession and Public Concession of other countries. The advanced municipal facilities in the concessions have also attracted the sight of Chinese jurisdictions. After all these factors came together, the municipal facilities of Shanghai had been resulted in a comprehensive development method, such as urban greening, transportation systems, lighting equipment, water supply facilities, and public service equipment. These measures have enabled Shanghai to achieve modernization earlier and ahead of other cities in China. At the beginning of the 20th century, the Shanghai Concession had become a modern metropolis with wide and clean streets, well-developed transportation, prosperous commerce, and complete municipal facilities. In terms of municipal facilities and management, it can be said that it was closely following the pace of major cities in the world and was second to none in

the whole of China [4]. Turning to other urban facilities like city parks, libraries, weather services, sewage systems, cars, buses, etc. that can still play a significant role in today's smart city construction had already emerged in Shanghai at that time. Therefore, these factors (advanced city basic facilities) led Shanghai to come up with plans to build a smart city earlier than other cities like Shenzhen. Meanwhile, Shanghai also attracted many enterprises and merchants to come to this city for commercial activities due to its wide reputation and superior geographical location (at the cross of the Yellow Sea and the East China Sea, the mouth of the Yangtze River, and near the Strait of Malacca). Taking the lead in building a smart city can make Shanghai, as a financial city, more competitive and attractive internationally, making commercial exchanges and goods flow more frequently with the international, and promoting sustainable development of Shanghai's urban economy. On the contrary, before China's reform and opening in 1978, Shenzhen was an underdeveloped small fishing village (Bao'an County) in Guangdong Province at that time. It was an agricultural town, so Shenzhen did not have enough industrial and urban facilities to build a smart city. Therefore, compared with Shanghai, Shenzhen aimed to build a smart city later because Shenzhen first needed to develop and improve the city's basic facilities. The facility of a city plays an important role in the development of various aspects of the city. Taking Shenzhen and Shanghai as examples, the timing of their proposal to build a smart city is also affected by this factor, because the facilities of a city (transportation, communication, energy) can provide the most basic support for the construction of a smart city.

2.1. Fiscal Expenditure

Mentioning the financial expenditures of Shenzhen and Shanghai for smart city construction in the future, this article predicts that Shanghai's expenditures will be larger than Shenzhen's. Perhaps there may be an opposite viewpoint, which reason is why Shenzhen as an emerging city, it was started later than Shanghai in the field of building smart cities, a large amount of funds needs to be invested to support the construction of smart cities. However, as a super city that has achieved modernization earlier than Shenzhen, Shanghai may focus on building an internationally leading smart city and widely applying the Internet of Things (IoT) and big data within the city (especially in the Central Business District and residential communities) to attract more migrations. In addition, Shanghai also has some aging urban facilities that can provide support for the construction of smart cities which need to be recovered. Therefore, in the future, Shanghai's expenses should be larger than those of Shenzhen.

2.2. Difficulties

Both Shenzhen and Shanghai have faced many difficulties in the process of building smart cities, one of the most typical difficulties is the high urban land prices, which will lead to less and less space provided for smart city facilities, and the cost of building smart cities will be higher. The enthusiasm of enterprises to participate in the construction of smart cities will be greatly reduced because their expenses will become larger. This situation also occurs in other supercities around the world, while cities accelerate economic development, they also make competition for limited urban space more intense. Urban economist William Alonso believes that if most talents and businesses gather in one place, the land in that place becomes more expensive. Ultimately, it will inevitably lead to the loss of regional population and enterprises. In his view, the core areas of industry and commerce are occupied by wealthy people, leading to a surge in land prices in the central urban area. However, the land supply in highly developed supercities is very limited, leading to fierce competition in land space and an unreasonable increase in land prices [5]. Unluckily, the best space that a smart city need is the central urban area, because that place can provide several sources for the experiment of the smart city.

These situations may be caused by the following two factors. The first one is that the improvement of urban comprehensive strength leads to a sharp growth of the city migration, and the second one is that the limited development space and construction land of the city. In addition, there are also some other issues during the construction process. For example, existing technology cannot support the construction of some smart facilities (community online management systems or real-time traffic information systems), existing funds cannot support subsequent development, and citizens don't have enough enthusiasm for smart cities.

2.3. Advantages

As typical port cities, Shenzhen and Shanghai have their unique advantages. With the support of ports, a large amount of goods can be transported quickly, including the facilities required for building smart cities, such as large computers. The external exchanges of port cities are becoming busier, and more experiences in building smart cities will be exchanged and studied. This can not only accelerate the building of smart cities but also avoid making more mistakes. Taking Shanghai as an example, it has advantages such as high economic openness, intensive talent and intelligence, a developed information industry, and a solid foundation for the development of financial and other service industries. It is an international airing and shipping center with a wide range of influence [6]. Although ports can bring convenience to the building of smart cities, port cities also need to pay attention to some risks, including low awareness of port management, overly formalized management, and a serious shortage of high-quality personnel in cities [7,8]. The most serious one is the lack of professional talent. As mentioned in the previous paragraph, smart cities, as an emerging concept, require professional talents to first construct frameworks and plans for building smart cities and testing in some areas of the city to help more residents understand what a smart city is, which can lay the foundation for future popularization. However, due to the diverse employment chances in port cities and the low popularity of the concept of smart cities, these professionals may not choose to serve in smart cities. They may choose to work in intelligent ports or high-tech enterprises, resulting in a severe shortage of such talents in port cities.

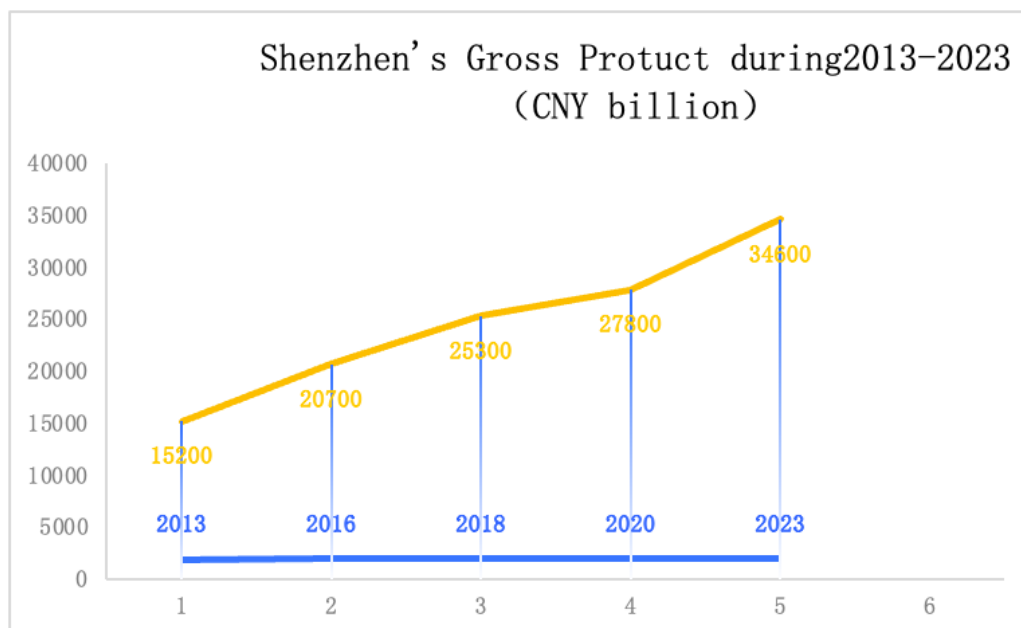


Figure 1: Gross product of Shenzhen during the period of 2013-2023

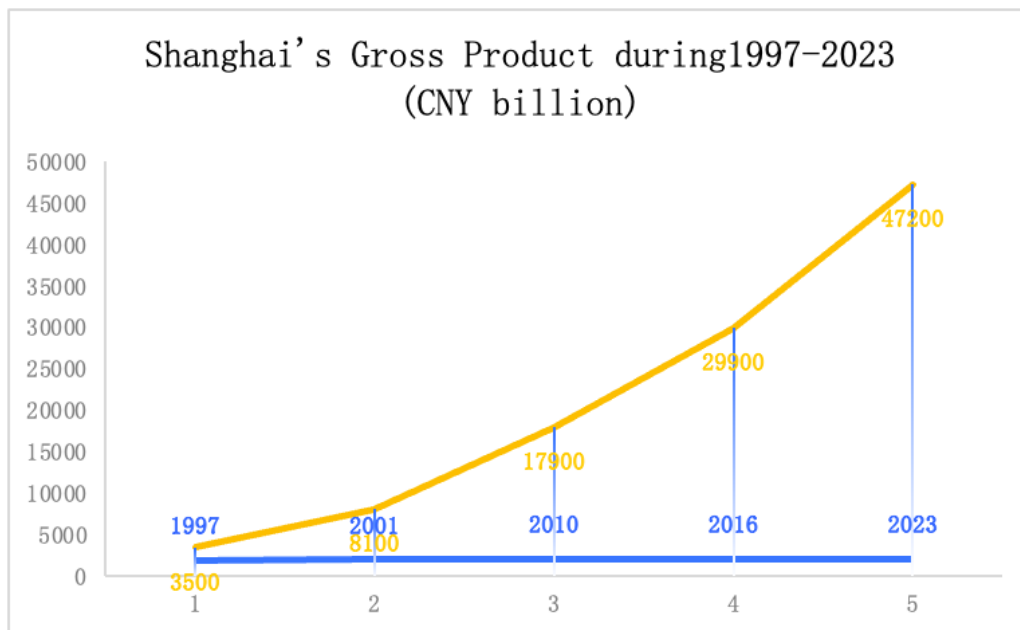


Figure 2: Gross product of Shanghai during the period of 1997-2023

Smart cities bring many advantages to cities and urban residents, including more job opportunities, more migrations, and a more beautiful urban environment. And the most obvious one is the increase in urban gross product. These line charts (Figure 1 and Figure 2) show the gross product of Shenzhen and Shanghai, as known in figure 1, the speed of Shenzhen's gross product increased from 2013-2018 grew slowly (almost 1683 billion yuan per year). However, after 2018, which was the time Shenzhen began to build smart city, the gross product increased rapidly (almost 1860 billion yuan per year) even with the disturb of COVID-19 virus. Turning to the figure 2, which show the gross product of Shanghai, the speed of its gross product increased from 1997-2010 also moved slowly (almost 1028.5 billion yuan per year). After Shanghai began to build smart city in 2010, the speed of it increased almost 2254 billion yuan per year. So, the construction of smart cities has greatly stimulated the urban economic development.

3. Conclusion

In conclusion, Shenzhen and Shanghai, as port cities, fully apply their advantages in the process of building smart cities, such as developed transportation systems, advanced science and technology facilities, and wide international influence. Cities must serve the people and people also rely on them. In the construction of smart cities, technologies such as the Internet of Things, big data, and cloud computing have stimulated the construction of smart cities, allowing supercities to move from "digital" to "intelligent" fields. A smart city with great development potential can improve the level of urban management and service quality, provide more reasonable services for citizens, and make urban life more convenient and efficient. Although many problems also appeared in the process of building smart cities in Shanghai and Shenzhen, such as high land prices, low public enthusiasm, and overstatement of city goals, these problems can all be solved. Those two cities can develop and build edge cities to release the land pressure. Always exchanging experiences of related fields with successful smart cities can avoid a series problem. In some residential communities, information technology facilities can be applied for experimentation. The government and community can also widely promote smart cities to increase public enthusiasm. The city government also needs to gather professional talents to make rational decisions and build smart cities. With the improvement of

people's understanding of the concept of smart cities, the support of mature information technologies such as the Internet of Things, cloud computing, and big data, and the development of an urban economy, the construction process of smart cities in Shanghai, Shenzhen, and even the world will be greatly accelerated. Moving towards a better future under the trend of globalization and urban cooperation.

References

- [1] Wang, S.F. (2012) *Model Construction and Methodological Considerations for Smart City Research*. *Planners*, 28(004), 19-23.
- [2] Fu, H., Liu, S.N., Yu, J.L. (2021) *Analyze the Application of Iot Technology in the Era of Big Data in Smart Cities*. *Geological and Mineral Surveying*, 4 (3), 5-6
- [3] Han, P. (2020) *Information Interactive Design Method for Smart City Construction*. *Materials Science and Engineering*, 750(1), 012112.
- [4] Li, C.H. (2014) *Leading the Way in Charm - The Establishment and Evolution of Shanghai's Early Water Supply Industry (Part Three) - The Beginning and End of the First Chinese Self run Water Supply*.
- [5] Florida, R. (2019) *The New Urban Crisis : How Our Cities Are Increasing Inequality, Deepening Segregation, and Falling the Middle Class*. Basic Books Publishing, New York
- [6] Jiang, Q.Z. Li, N. (2020) *Research on the Collaborative Development of Port Clusters in Yangtze River Delta Cities under the New Situation*. *China Ancient City*, (2), 5
- [7] Wang, X.X. (2020) *On the Issues and Countermeasures of Port Safety Production Management*. *Hydropower and Water Resources*, 4 (8), 19-20
- [8] Sun, J. (2021) *Research on the Development of Smart Cities*. *Agricultural Science*, 4 (1), 55-56