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ARTICLE

DEVELOPMENT AND CONCEPTIONS OF SMART CITY

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ARTICLE DETAILS

ABSTRACT

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This paper mainly discusses the construction process of global smart city and development of related concept. Through consulting relevant domestic information, this paper is dedicated to find out the shortcomings of smart cities in China, researching on the directions and approaches of smart cities construction. By means of putting forward our own ideas on medical treatment, education, ecology and culture, this paper hopes to provide some guidance for the development of smart cities in the future.

KEY WORDS

Smart City, Urbanization, Construction, City Planning

1. INTRODUCTION

With the rapid development of economy and society, a number of super cities have emerged, which can accommodate more people and create more prosperous economy. For these cities, the limitations of traditional urban management mode on traffic, ecology and city development are increasingly evident. In order to create a better environment and accelerate the economic development of cities, countries around the world take the construction of "smart city" as a new urban development concept and practice path.

The 18th National Congress of the Communist Party of China (CPC) set the goal of building a moderately prosperous society in all respects by 2020. China will take the path of a new type of industrialization, urbanization and agricultural modernization with Chinese characteristics to promote sustained and sound development of economy and society. In 2011, the number of urban population in China surpassed rural population for the first time, and residents are paying increasing attention to cities. Environmental pollution, litter emission, traffic congestion and other problems which were once only faced by a few cities have gradually become problems that most cities need to solve, which leaves huge potential for the development of smart cities [1][2].

2 DOMESTIC AND FOREIGN RESEARCH STATUS AND CONCEPT OF SMART CITY

2.1 Understanding of Smart City

Smart city is derived from the concept of "smart Planet" which was first proposed by IBM in 2008. Under the framework of this concept, smart city integrates information technology with urban construction. It contains integrated services covering software, hardware, management, computing and other businesses in the urban field, which will push urban informatization to a higher stage [3]. The rise of smart city conception mainly benefits from technical applications of Internet, cloud computing and Internet of Things. The realization of big data analysis

and other technologies makes the imagination of urban infrastructure, urban services, traffic management and other aspects possible

In terms of content, smart city includes smart buildings, traffic management, smart medical care, smart shopping and so on [4]. Covering all aspects of life, it can reduce the probability of robbery, theft and other crimes in the city, and reduce the greenhouse effect and pollution emissions of the city. From production to life, from energy saving to environmental protection, smart city will bring great changes.

2.2 Development Process of Global Smart City

The first smart city of foreign countries is the smart Island plan proposed by Singapore in 1999, which aims to build the national infrastructure and realize the electronization of office and housework [5], so as to turn the whole Singapore into a "smart island". The continuous improvement and implementation of the plan has made Singapore become an electronic, informational city, and has become one of the first batch of countries that have advanced national information infrastructure. In the following ten years, South Korea, France, Portugal and other countries have put forward relevant urban plans to solve the traffic, ecological and other problems of cities to promote urban development and build new types of cities. In this period, large technology companies focused on the vertical field of urban operation as leaders with problem-oriented solutions. However, the whole process lacked overall analysis of urban development and ignored the real needs of urban development. Later, this stage was called as Smart City 1.0 (1999-2012).

After 2014, the development of smart city has gradually shifted from large technology companies, such as IBM and Cisco, to government leading. The establishment of smart city based on the need of urban development. Through the overall planning, science and technology applications were deployed to improve the quality of urban operation. For example, the Ministry of Industry and Information Technology of China led the establishment of China Smart City Industry Alliance in 2013 and planned to invest 500 billion RMB in smart cities during the

12th Five-Year Plan period. In 2015, the US government put forward a new initiative of smart City, with a total investment of 1.6 trillion dollars in power grids, smart transportation and broadband. In 2016, India planned to use APP model to build 100 smart cities and announced to invest 7.5 billion dollars in 5 years, etc. This stage is mainly dominated by government on smart city development with the goal of improving the operation and management quality of auto market. This stage is called as Smart City 2.0 (2014-2016).

2.3 Research Status of Smart City in China

In recent years, China has paid more and more attention to the construction of smart cities and increased investment in capital and talent training, resulting in the rapid development of smart cities in China and remarkable results [7]. The development of smart cities in China is generally divided into four stages: The first stage is the exploration and practice period, mainly from 2008 to 2014. In this stage, there is no complete overall planning, and most departments and localities promote the development of smart cities according to their own understanding, which is relatively limited, scattered and disordered. The second stage is the standard adjustment stage. From 2014 to 2015, China established the "Inter-ministerial Coordination Working Group on Promoting the Healthy Development of Smart Cities" and issued relevant work suggestions. Various departments began to coordinate and guide local construction of smart cities. The third stage is the strategic breakthrough period. From 2015 to 2017, the state promoted the concept of smart city as the national strategy, making smart city as the core of promoting new urbanization, and promoting information integration and government cooperation. The fourth stage is the comprehensive development stage. In the 19th National Congress of the Communist Party of China, it was proposed to build smart society, accelerate urban-rural integration, and point out the development direction for further promoting the construction of new smart cities.

3. DEFICIENCIES IN THE DEVELOPMENT OF SMART CITIES

3.1 New Technologies Are Not Well Applied, and Residents Do Not Feel the Charm of Smart City

In recent years, China gained vital breakthrough on information platform and technology, such as artificial intelligence, new Internet terminals, Internet of things, etc., but not combined the application on digital city construction. We should work on the backend application of output around improving daily life of residents. For example, on June 6, 2019, 5G commercial license of China was officially issued, and the commercial operation began on October 31. As the infrastructure of the new generation of network, 5G is the cornerstone of intelligent connection of everything. The high-speed transmission will further improve the coverage of intelligent connection, together with efficient collection and calculation of various data and information in a short time. The presence of 5G enables driverless driving, remote surgery, and immersive learning, accelerating the application of new technologies to daily life. More people would participate in the process of building smart cities.

3.2 Urban Resources Have Not Been Well Integrated, and There Are Problems of Information Island and Fragmentation

An indispensable part of building a smart city is to collect and process all kinds of urban data, so as to realize the timeliness and accuracy of information. However, on the one hand, due to the imperfect mechanism and various acquisition methods, there are repeated and missing data acquisition, resulting in vacuum area of service, along with inaccurate information and inconvenient service. On the other hand, urban data, such as industry data and department data, cannot be well acquired and integrated, which makes it difficult to improve the ability of collaborative governance [2]. For example, in the novel Coronavirus epidemic prevention and control, hospital data in different cities are not closely connected, and nucleic acid certificates cannot be updated to a unified platform in time, so that residents can only obtain nucleic acid certificates through the public account of the testing hospital for travel, which is inconvenient for the authenticity of the certificates and travel of residents [4].

3.3 The Development of Smart City Is Slow, and Sustainable Construction Needs to Be Explored

At present, the construction of smart cities in China is a system project led by government, with the participation of companies and individuals. In the process of smart city construction, a large amount of capital is needed for infrastructure construction, such as full coverage of 5G signal towers, construction of intelligent transmission equipment, laying of optical fiber cables and other equipment, which is a great economic burden for local finance. Therefore, social capital is required to participate in relevant capital investment. According to the survey data in 2019, one-third of cities in China have not yet introduced any third-party organization to carry out smart city management and investment, which is not conducive to the construction of smart city. In addition, the profits of the enterprises involved in the construction are subject to great risks, mainly because the PPP model of smart city is not mature enough and lacks clear income modes and income standards, which makes the profits of the enterprises not very stable. It is necessary to improve the model and make some improvements.

4. FUTURE VISION OF SMART CITY

Based on the development of smart city, this paper hopes to provide some reference for the future development and problem solving of smart city according to the existing technological means and forward direction. We hope that a smart city will be the one where science and technology facilitate livelihood of residents, and humanity and culture coexist.

4.1 Smart Transportation of Smart City

Smart city is expected to have complete transportation network, making an organic interconnection between subway, light rail and bus public transportation. The accessibility and convenience of urban public transportation can be increased, and the last mile cohesion ability of bus can be released. Exerting the advantages of urban traffic to reduce the rigid requirements of the motor vehicle, alleviating the pressure of the urban road traffic, such as the establishment of three-dimensional public transport transfer stations. In addition, unmanned driving and real-time road monitoring should also be developed. Not only can residents learn about the best route and real-time traffic conditions through online platforms, but also road supervision and illegal behaviors can be better controlled, so as to improve satisfaction of residents and improve the efficiency of law enforcement.

4.2 Healthcare in Smart Cities

With an aging population and low fertility rates in the future, urban health care needs a growing concern. In terms of medical care, it is expected that smart city can enable patients to enjoy online diagnosis and treatment at home according to relevant equipment. Through virtual presentation, patients can better understand their own causes and how to cooperate with treatment. For operations that require remote operation by authoritative personnel, the delay of transmission can be reduced and the service radius of remote operation can be increased, so that more urban residents can be served without changing the medical level. Finally, the medical digital platform should be established. By sharing information about patients, patient medical records, hospital pharmaceutical reserve, hospital equipment list, the number of hospital beds and other related data, hospitals could transfer the relevant materials and drug, and the survival probability of patients could be increased with best treatment and equipment.

4.3 Digital Market of Smart City

Through the reconstruction and improvement of the transportation system, the informatization, intelligence and data of market would be met. Through urban planning, through diverse markets within a 15-minute walk or bike ride. Through the online platform, we let urban residents know the characteristics and attributes of the surrounding markets, crowd conditions, commercial formats and other information, and strive to solve the needs of residents together. In the market, residents can use artificial intelligence and virtual models to learn about the usage and value of the items they buy, making transactions more concise and transparent. For some residents who have difficulty in traveling, we improve the online market situation and realize the online and offline browsing of the market at the same time through real-time transmission, GIS and other technologies, so that residents can experience the happiness of shopping with their families.

4.4 Ecology and Emission of Smart City

City is the most important space for our life. With the implementation of "carbon emission reduction" target and the increasing attention to health of residents, they need a healthier and greener ecological environment. In terms of ecological landscape planning, smart city considers people-oriented, increasing the number and types of green trees planted in streets. To increase the flexibility and novelty of public space, green ecology into the surface and interior of the building are introduced, and high-altitude garden and top-floor farm are constructed. It is necessary to reduce the hardened urban coverage area, pay attention to the construction of urban pipeline network, and reserve the construction of small lakes, creating sponge city to increase the capacity of urban drainage and flood resistance. Finally, build a natural ecological urban park to promote biological diversity and reserve habitats for wild animals, so as to make the urban ecology more perfect and healthy. Such ecosystems can efficiently store and consume carbon dioxide, mitigate the heat island effect and reduce urban electricity consumption [6] [8]. Urban pollution emissions will be recycled, classified, treated and discharged based on 5G, AI and big data plus cloud platforms, and urban pollution will be recycled and classified, reasonably processed and decomposed for reprocessing and then discharge. In this way, it can not only increase the raw materials for basic industries and bring income to urban pollution treatment, but also preserve the overall ecological environment and achieve real circular and sustainable development.

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