A Study of the Construction of Smart Healthy Elderly Care City: An Aspect of Foshan City, Guangdong Province

Abstract

The smart healthy elderly care city takes the integration of healthy elderly care resources with information technology as its basic feature, and innovates the healthy elderly care service model to accurately serve the elderly. In recent years, all parts of the country have gradually promoted the construction of smart, healthy and elderly care cities, which have achieved good results, but also face many problems. In order to evaluate the current situation of the construction of smart healthy elderly care cities, the author has built a smart healthy elderly care city evaluation index system based on the research results and standards of smart city and healthy elderly care city evaluation index system. The evaluation index system of smart health care city involves five fields, including smart health care infrastructure, smart health care environment, smart health care economy and smart health care services, which can comprehensively and systematically reflect the construction of smart health care city. Taking Foshan City, Guangdong Province as an example, this paper empirically analyzes the current situation and problems of the construction of a smart healthy elderly care city using the data from 2020-2021, and then puts forward high-quality development strategies for the construction of a smart healthy elderly care city in Foshan.

Key words: Foshan City, Guangdong Province; Smart health care city; Elderly services; Health services; Evaluating indicator

1.Introduction

In 2022, China's birth population dropped to 9.56 million (excluding Hong Kong, Macao and Taiwan, the whole language is the same), and the birth rate was as low as 6.77 per thousand. Taking into account the data of the Seventh National Population Census and the fertility program of the United Nations' World Population Prospects (2022), the population aged 15-59 in China will decrease from 894 million in 2020 to 653 million in 2050. The number of people aged 60 or above will increase from 264 million in 2020 to 509 million in 2050, and the old-age dependency ratio (60 years old is the standard for elderly people) will rise to 78.02%. It is a strategic measure to solve the aging problem to develop the smart and healthy elderly care business, integrate service resources and innovate service mode with information technology.

The "14th Five-Year Plan" for the Development of National Aging Cause and

Elderly Care Service System emphasizes "building a smart society that takes into account the needs of the elderly". The "Smart Health Elderly Care Industry Development Action Plan (2021-2025)" (Ministry of Industry and Information Technology joint electronic Letter (2021) No. 154) and other proposed the development goals, key tasks and paths of smart health care services. In recent years, the construction of smart health care for the elderly (referred to as "smart health care") has been gradually promoted, and a series of smart health care projects have been launched around the country. By 2021, the state has announced five batches of "smart health care application pilot demonstration list (pilot enterprises, streets, districts, etc.)".

The development of wisdom and health care has achieved good results, but it also faces some thorny problems. Foshan, located in the Pearl River Delta, has a high level of economic and social development, with an average life expectancy ratio of 82.35 years in 2020, 4.42 years higher than the national average. Foshan Municipal government has issued a series of policies to promote the smart health care cause, and the health care service system is relatively sound. This paper takes Foshan City as an example to study the construction strategy of smart and healthy elderly care city. The evaluation index system will be constructed with reference to relevant research results and standards, and empirical analysis will be carried out on most of the indicators by using the data from 2020 to 2021, so as to understand the current situation of Foshan smart and healthy city construction and put forward high-quality development countermeasures for Foshan smart and healthy city construction.

2.Literature review

2.1 The concept of smart and healthy city

Smart healthy city is a new trend of healthy city construction under the support of information technology. The new generation of information technology such as big data enables the innovation of health care services, efficiently integrates health care resources to solve the urgent problems faced by health care services, and helps the construction and upgrading of health care cities, so as to effectively respond to the challenges brought by aging [1-4].

Two concepts closely related to smart wellness cities are smart cities and smart wellness. Smart city is a new mode of urban development based on the Internet of Things, wireless broadband network and other network combinations, and mainly characterized by the high integration of smart technology, high-end development of smart industry, and efficient and convenient smart services. It involves smart hospitals, home care and public transportation and other fields. Smart city comprehensively improves the efficiency of resource utilization. Help solve the transportation, medical

and other problems facing the city [5-8]. Kang Yang can be understood as "health plus activities" and "health plus pension". Due to the increasingly severe aging problem, this paper discusses the problem of "health plus pension". Urban health care services are faced with the problems of insufficient resources and low level of resource integration, and it is urgent to seize the opportunity of popularization and application of new generation information technologies such as the Internet of Things, promote the innovation of health care services through the popularization of smart technologies and smart facilities, improve the matching efficiency of supply and demand of health care services, and help solve the dilemma of "unmanned elderly care" [9-13].

Smart health city is the result of comprehensive integration of smart city construction and high-quality development of health care services. Strengthening the construction of smart and healthy cities is the key to dealing with the challenges of aging. China is faced with the triple dilemma of a sharp rise in the proportion of the elderly population, an obvious trend of aging and a decline in the proportion of the labor force. The increasing demand for medical and health services of the elderly population has brought huge pressure to the existing health care service system [14-18].

The key to solving the problem of shortage of health care services and structural imbalance lies in building smart health care cities, improving health care infrastructure such as transportation and information technology, increasing investment in health care services such as medical care and elderly care services in home-based institutions, innovating health care service projects and service models, and coordinating efforts to solve the problem of insufficient resources and imbalance between supply and demand for medical care, sports and fitness services, and elderly care services. To create a good and healthy environment for the elderly. For example, with the support of big data, 5G and other technologies, elderly care and medical facilities are linked to solve the problem of uneven distribution of service resources and demand. For another example, smart sensors are installed in parks, squares and other places with dense elderly population, and are connected with medical institutions in real time to facilitate emergency rescue of sudden diseases and accidents [19-22].

2.2 Research on evaluation index system of smart and healthy city

The research on the index system of smart healthy city is mainly reflected in the related research of healthy city and smart city.

There are researches on the evaluation index system of smart city. Chen Ming et al. built an evaluation index scheme for the level of urban informatization in China,

and its evaluation indexes involved four major fields, namely "smart city" infrastructure, urban smart industry, urban smart service and urban smart humanity. Among them, the infrastructure field includes 5 indicators such as optical fiber access coverage; the industrial field includes 7 indicators such as the proportion of smart industry in GDP and the number of industrial employees; the service field includes 4 indicators such as the penetration rate of smart public service application; and the humanities field includes 7 indicators such as per capita GDP [5].

He Qin constructed a smart city construction evaluation index system consisting of 4 first-level indicators, 11 second-level indicators and 24 third-level indicators, among which the first-level indicators are smart infrastructure, public management application, public service application and public support system [23]. Zhao Jianhai and Qu Xiaoshuang proposed a smart city evaluation index system composed of three layers of base layer, application layer and target layer, among which the application layer has three first-level indicators of smart economy, smart ecology and smart governance [24]. Wang Wei et al. proposed a new integrated method system for the evaluation of smart cities, and built an evaluation system based on analytic Hierarchy Process (AHP), including eight first-level indicators such as Huimin services, ecological livability, intelligent facilities and information resources [25].

The research on healthy city index system mainly focuses on healthy town, healthy city and so on. Zhang Jie and Zhu Jun proposed to build a smart health city from the aspects of basic information infrastructure construction, smart house and health care smart product promotion, health care data management and service system strengthening, and characteristic health care industry cultivation [26]. Wang Wei and Pei Chuan-wang constructed an index system from four aspects: ecological construction, humanistic construction, people's livelihood construction and medical construction. Under ecological construction, there are 6 indicators such as environmental air quality index; humanistic construction involves 7 indicators such as per capita public library and per capita museum; people's livelihood construction includes 7 indicators such as per capita disposable income. Medical construction includes five indicators, including the number of hospital beds per 10,000 people [27].

Wang Xia et al. built a healthy city evaluation index system in Shaanxi Province, which consists of 6 criteria levels, including healthy environment, healthy society, healthy economy, healthy culture, healthy technology and healthy transportation, and 36 evaluation indicators. Wu Zhanyun et al. designed five first-level indicators, including healthy economy, healthy culture, healthy society, healthy environment and health management, and 16 second-level indicators, including production efficiency, public service and social security [28]. Some scholars discussed related indicators of health and wellness at the community and township levels. For example, Tang Jie et al.

studied indicators such as medical care, living services and housing facilities in comprehensive elderly care communities [29].

International organizations and relevant Chinese departments have issued standards or guidelines related to the construction of smart and healthy cities. On May 1, 2023, the "New Smart City Evaluation Index (GB/T 33356-2022)" was implemented to build a smart city evaluation index system from both subjective and objective dimensions. The objective indicators include eight first-level indicators: benefit-people service, accurate governance, ecological livable, information infrastructure, information resources, industrial development, information security, and innovative development [30]. The "Global Guidelines for the Construction of Age-friendly Cities" formulated by WHO puts forward construction guidelines from eight aspects: outdoor space and architecture, transportation, shelter, social participation, respect and social inclusion, community participation and employment, information exchange, and community support and health services [31-32].

The National Healthy City Evaluation Index System (2018 edition) issued by the National Health Care Office sets 5 first-level indicators, 20 second-level indicators and 42 third-level indicators to evaluate the status of healthy cities, involving air quality, water quality, food safety, culture and education, health resources, health level, social security and other aspects [33]. The "Healthy China Action (2019-2030)" issued by the Healthy China Action Committee puts forward major action plans for building a healthy China from 15 aspects, including the national fitness action and the health knowledge popularization action. In addition to general health protection and health service indicators. In addition, 9 indicators such as the rate of disability in old age and the rate of population health examination have been proposed specifically for the elderly population [34].

3. The construction of evaluation index system of smart and healthy city

3.1 Key objectives to be achieved in the construction of smart and healthy cities

The construction of smart health city is characterized by the integration of information technology enabling resources and service innovation, and focuses on efficiently meeting the needs of health care services. To this end, the construction of smart and healthy cities needs to achieve the following goals:

First, the smart health care infrastructure is good, supporting the efficient operation of smart health care services. Perfect infrastructure is a prerequisite for the construction and operation of a smart and healthy city, such as sufficient and reasonable distribution of transportation, communication, telecommunications and other resources, to meet the needs of the elderly people to travel, medical treatment and other needs, to provide material guarantee for the elderly, medical, parks and

other service institutions and facilities intelligent operation. Therefore, it is necessary to consider the traffic road, postal service capacity and information level when designing the index system.

The second is a good environment for wisdom and health. Excellent ecological environment and tourism and leisure environment to meet the elderly population's increasingly high health needs. Air pollution, water pollution and other problems in some areas are still relatively serious, and have become important factors affecting the quality of life of elderly people. With the improvement of income and the enrichment of the connotation of a better life, basic health care services have been unable to meet the needs of the elderly, and the upgrading demand for tourism and leisure has increased. Therefore, the evaluation index system needs to reflect the ecological environment and tourism and leisure resources of the city.

Third, the economic security of wisdom and health care is in place. The construction and operation cost of smart health city is high, in addition to the traditional medical, care and other services investment, but also need to telecommunications, public facilities to age and wisdom, service institutions to operate digital investment. Health economic security from the government, individuals (families) and society, donations and other social resources are limited, so mainly from the government and individuals (families). To this end, the indicator system needs to reflect the economic situation and investment intensity of the government and individuals (households).

Fourth, service institutions, places and facilities such as elderly care, medical care and libraries provide high-quality health care services accurately. According to national standards and policies such as "Statistical Classification of the Elderly Care Industry (2020)", "Guofa [2021] 35" and "Ministry of Industry and Information Technology Joint Electronic Letter [2021] 154", health services mainly include daily care, medical care, health, culture and entertainment services. To this end, the index system should reflect the scale, quality and intelligence level of health care services.

Fifth, the smart health care industry has developed well, and the development of the silver economy and the wisdom of health care services are carried out simultaneously. Smart health care services rely on a wide variety of smart health care facilities, equipment and parts, and also require the integration of services such as information technology and software services with the health care service industry. To this end, the indicator system should reflect the development level of smart health related manufacturing, service industries and science and technology.

3.2 Smart and healthy city index system design

Considering the availability of data, feasibility of implementation and cost of

evaluation, the evaluation index system as shown in Table 1 is designed for the above key objectives to be achieved in the construction of a smart and healthy city. The index system has 5 first-level indicators, 13 second-level indicators and 52 third-level indicators. Under the smart health infrastructure (A), there are two secondary indicators: transportation and postal service (A1) and informatization level (A2). Under the smart and healthy environment (B), there are two secondary indexes: ecological environment (B1) and tourism and leisure (B2). The index of ecological environment status is calculated according to the national environmental standard (standard No. HJ 192-2015). B2 is used to evaluate the tourism status of a region, park green area, etc. There are 5 indicators such as per capita urban park green area. Under the smart health economy (C), there are two secondary indicators, namely fiscal expenditure, social security (C1) and per capita income (C2), which examine the level of economic support from the perspective of the government and individuals (families) respectively. C1 includes indicators such as the participation rate of basic medical insurance, and C2 includes indicators such as per capita disposable income. Smart health service (D) consists of four secondary indexes: public cultural and sports service (D1), medical and health service (D2), elderly care service (D3) and smart health service (D4). D1 reflects the development level of regional public cultural and sports service, and D2 mainly examines the relative scale of medical and health service. D3 measures the size and quality of residential, community and institutional care services, while Smart Care Services (D4) measures smart care services. The smart health industry (E) consists of three secondary indicators: manufacturing industry (E1), service industry (E2) and smart technology development potential (E3), which reflect the scale and quality of the smart health industry.

Table 1 Index system of smart and healthy city

Primary indicators	Secondary indicators	Tertiary indicators
Smart Health Infrastructure (A)	Transportation and Postal Services (A1)	1. Highway density 2. Per capita urban road area (Municipal district) 3. Standard operating number of urban public transport vehicles 4. Public transport aging index 5. The coverage rate of intelligent elderly assistance equipment in public transport 6. Per capita postal business income
	Information Level (A2)	1. Per capita telecom business income 2. Number of mobile phones per capita 3. Broadband access per capita
Smart and Healthy Environment (B)	Ecological Environment (B1)	Ecological environment status index
	Travel & Leisure (B2)	1. Per capita tourism income 2. Tourism beds 3. Urban per capita green park area 4. Green coverage rate of built-up area 5, the coverage rate of smart elderly assistance equipment in tourist attractions
Smart Health Economy (C)	Fiscal Expenditure and Social Security	1. Per capita expenditure on health, social security and employment (2) The ratio of expenditure on health, social security and

	(C1)	employment to fiscal expenditure 3. Participation rate of basic endowment insurance 4. Participation rate of basic medical insurance
	Per capita income (C2)	1. Per capita GDP 2, the average annual salary of employees 3. Per capita disposable income
Intelligent Health Services (D)	Public Cultural and Sports Services (D1)	1. Number of public library collections per capita (2) Per capita expenditure on cultural relics 3, public library public housing area 4. Public housing area of Group Art Museum (Cultural Museum) 5. Museum public housing area 6. Public housing area of cultural station 7. Number of radio and television employees 8. Number of personnel of cultural and cultural relics institutions
	Health Services (D2)	1. the hospital more than 10,000 units of equipment 2. Number of beds in medical institutions 3. Number of health personnel 4, the national physical fitness monitoring rate
	Elderly Care Services (D3)	1. Number of beds for elderly care service 2. Number of certified workers per 10,000 people 3. Number of community elderly care service institutions and facilities

		5. The proportion of nursing beds in elderly care institutions 6. Number of home care services per capita 7. Monthly visit rate of elderly people with special difficulties 8. College (school) enrollment rate for the elderly 9. 15 minutes life circle development index of the elderly
	Smart Nursing Services (D4)	1. Intelligence index of medical and health institutions 2. Intelligence index of elderly care institutions 3, home elderly intelligent monitoring service index 4, village (community) roads, public places of wisdom to help the elderly index 5. Intelligence Index of government services
Smart Health Industry (E)	Manufacturing Industry (E1)	1. Manufacturing (Industrial added value above designated size) 2. Output value of intelligent and smart products (wearable devices, intelligent monitoring devices, etc.)
	Services (E2)	1. Number of employees 2, the proportion of employees 3. Industry added value
	Smart Technology Development Potential (E3)	1, per capita years of education 2. Science and Technology Innovation Index (number of patents per 10,000 people, science and technology Innovation Index)

4.Results& discussion

The author will use the index system designed above to evaluate the current situation of Foshan smart health city construction. Limited by data availability and other factors, only some indicators were analyzed. The data mainly come from the statistical yearbooks of Qipu, Guangdong Statistical Yearbook (2021), Guangdong Social Statistical Yearbook (2021), China Urban Statistical Yearbook (2020, 2021), Foshan Statistical Yearbook (2021) and other relevant public information, and the data obtained by the author.

4.1 Smart health infrastructure

(1) Transportation and postal services. From the perspective of transportation and postal development level, Foshan City has a certain gap with Shenzhen and Guangzhou, and is in the middle and upper reaches of the Pearl River Delta. The standard number of public transport vehicles in Foshan City is 7.54, which is lower than the level of more than 10 vehicles in Guangzhou, Shenzhen and Zhuhai, but higher than Dongguan and Zhongshan. The per capita postal income of Foshan City is 1155.51 yuan, only about one-third of Guangzhou and Shenzhen, about half of Dongguan City, and about the same as Zhuhai and Shantou. The author visited and found that the modernization level of urban roads and other infrastructure construction is relatively high, the road conditions of villages and communities are better, and the public transportation is generally relatively developed; However, it also faces some problems, such as the low frequency of departure in more remote areas, the serious congestion problem in some sections of the road during peak times, the low level of public transport suitable for aging, the inadequate transformation of stations and vehicles, and the weak service awareness of individual personnel, such as complaining that the elderly are slow.

(2) Informatization level. The informatization level of Foshan City is in the middle reaches of the Pearl River Delta. Foshan's per capita telecom business income of 1,478 yuan, lower than Guangzhou Shenzhen, but higher than Zhuhai, and Zhongshan's 1,477 yuan is basically the same. The per capita number of mobile phones in Foshan is 1.35, lower than Guangzhou, Shenzhen, Zhongshan and Zhuhai, but higher than Jiangmen, Huizhou and other cities. In terms of the number of broadband access households per capita, Foshan City has 0.32 households per capita, lower than Jiangmen, Zhuhai, Huizhou and other cities, but higher than Guangzhou and other cities.

4.2 Wisdom health environment

(1) Ecological environment. Foshan City's ecological environment quality ranks low

in the whole province. According to the ecological environment status index of Guangdong Province in 2020 released by the Department of Ecology and Environment of Guangdong Province, the ecological environment index of Chancheng District, Nanhai District and Shunde District is as low as 46.7, 54.7 and 54.4, while that of Sanshui District and Gaoming District are 67.6 and 78.8 respectively. Foshan City's ecological environment index ranks lower in Guangdong Province [35]. From the perspective of the proportion of good days (AQI compliance rate), Foshan ranks 21st in 2021, ranking last in the province. In terms of PM2.5 concentration, Foshan ranks 13th, ranking in the middle of the province.

(2) In tourism and leisure, Foshan is in the middle level. Per capita tourism income: Vertically, per capita tourism income in 2020 is 3,414.82 yuan, which is significantly reduced compared with 2019 due to the impact of the epidemic; Horizontally, it is far lower than Guangzhou, Shenzhen and Zhuhai, but higher than Jiangmen, Zhongshan and other cities. The per capita green park area of Foshan city is 17.78 square meters, lower than Guangzhou, Zhuhai, Dongguan and Jiangmen, but higher than Shenzhen, in the middle and lower reaches of the Pearl River Delta. From the afforestation coverage rate of built-up areas, Foshan city is 45.09%, lower than Guangzhou, Jiangmen and other cities, but higher than Shenzhen, Huizhou and other cities. Regarding the coverage rate of smart elderly assistance equipment in tourist attractions, from the author's field visits, smart elderly assistance equipment is insufficient, and it is difficult to meet the emergency assistance needs of elderly people when they travel and go out. The cooperation between scenic spots and hospitals, elderly care and other institutions is not close enough, and the transformation of tourism facilities to adapt to aging still needs to be strengthened.

4.3 Wisdom health economy

(1) Fiscal expenditure and social security. In terms of expenditure on health, social security and employment, Foshan's per capita expenditure was 2,046.42 yuan, much lower than the level of more than 3,000 yuan in Zhuhai, Shenzhen and Guangzhou, but higher than Dongguan's 1,254.75 yuan. In terms of the ratio of health, social security and employment to fiscal expenditure, Foshan City is 19.42%, lower than Guangzhou City's 21.96%, but higher than Shenzhen, Zhuhai and Dongguan. Regarding social security, we mainly consider the participation rate of basic medical and pension insurance. Foshan's basic pension insurance participation rate (the number of basic pension insurance participants/permanent population *100) is 48.48%, ranking second to last in the province, far lower than Shenzhen's 72%, more than 15 percentage points lower than Zhuhai, and lower than Dongguan's 56.94%.

The coverage rate of basic medical insurance in Foshan City ((number of urban workers participating in basic medical insurance + number of urban and rural residents participating in basic medical insurance)/permanent resident population *100) is 62.66%, which is only higher than 60.21% in Dongguan, and far lower than 91.22% and 87.08% in Shenzhen and Zhuhai. The two core social security indicators of Foshan City are among the lowest in the province, which the author estimates is related to factors such as the characteristics of the employment structure and the low intensity of social security collection in Foshan City.

(2) Per capita income. The per capita income level of Foshan City is located in the middle and upper reaches of the Pearl River Delta. The per capita GDP of Foshan is 114,157 yuan, which is lower than Guangzhou, Shenzhen and Zhuhai, but higher than Dongguan, Jiangmen and Huizhou in the Pearl River Delta. The per capita disposable income of urban residents in Foshan is 57444.9 yuan, which is lower than Guangzhou, Shenzhen, Dongguan and Zhuhai, but higher than Zhongshan, Jiangmen and Huizhou in the Pearl River Delta. The per capita disposable income of rural residents is 33,440.2 yuan, higher than Guangzhou and Zhuhai, but lower than Dongguan and Zhongshan, ranking third in the province. The average annual salary of employees in Foshan is 94,536 yuan, which is lower than Guangzhou, Shenzhen and Zhuhai, but higher than Huizhou, Dongguan and other Pearl River Delta cities.

4.4 Smart health services

(1) Public cultural and sports services. The per capita public library collection of Foshan City is 0.77 volumes, lower than Guangzhou, Shenzhen, Dongguan and Zhuhai, but higher than Dongguan, Huizhou and other Pearl River Delta cities. The per capita expenditure on cultural relics in Foshan is 83.49 yuan, which is lower than Guangzhou, Shenzhen and other cities, but higher than Huizhou and other cities in the Pearl River Delta. The public housing area of Foshan Public Library (square meters / 100 people), public housing area of Group Art Museum (cultural center) (square meters / 100 people), public housing area of museum (square meters / 100 people) and public housing area of cultural station (square meters / 100 people) are 99.28, 72.70, 136.99 and 333.24 square meters, respectively. In general, it is in the middle reaches of the Pearl River Delta. However, compared with the best index of Pearl River Delta city, there is a big gap, the area of 100 people library is less than half of Shenzhen and Zhuhai; The area of cultural center is much lower than Jiangmen, Shenzhen and other cities; The area of the cultural station is higher than Guangzhou and Shenzhen, but lower than Zhuhai; The museum area is lower than Guangzhou and Shenzhen, but higher than Dongguan and Zhongshan. In general, Foshan's public cultural and sports

services are at the middle level in the Pearl River Delta.

(2) Medical and health services in the middle reaches of the PRD. Foshan's hospital equipment per million yuan or more is 53.65 units, much lower than Guangzhou and Shenzhen, but higher than Dongguan, Jiangmen and other cities. Foshan has 40.47 hospital beds per 10,000 people, which is lower than Guangzhou and Zhuhai, but higher than Shenzhen, Dongguan and Zhongshan. In terms of the number of health workers per 10,000 people, Foshan City is 74.79, far lower than Guangzhou, Zhuhai and other cities, but higher than Shenzhen, Dongguan and Zhongshan.

(3) Elderly care services. In terms of the number of beds for elderly care services (the number of beds in social work institutions providing accommodation), Foshan has 18.47 beds per 1,000 elderly aged 60 and above, which is lower than Guangzhou and Jiangmen, but higher than Zhongshan, Dongguan, Shenzhen and Zhuhai, ranking third in the Pearl River Delta. Foshan has 12.6 certified social workers per 10,000 people, which is lower than Guangzhou, Shenzhen, Zhuhai and other cities, but higher than Jiangmen, Huizhou and Dongguan and slightly higher than the Pearl River Delta average (12.38). In terms of the number of community elderly care service institutions and facilities, the number of elderly aged 60 and above in Foshan is 1.09 per thousand, which is lower than Guangzhou, Zhuhai, Dongguan and other cities, but higher than Zhongshan, Jiangmen, Huizhou and other cities, and much lower than the provincial average (1.43). As for home care services, the author found that villages and communities have established home care services for the elderly, and the elderly in extreme poverty visit and help them in accordance with regulations, but they are faced with problems such as home care services to be enriched. The level of development of the life circle in Foshan City is quite different, and the elderly in some villages reflect that high-quality medical and other service facilities are far from home.

(4) The intelligence level of nursing services is low. According to the author's field visits and observations, there are many problems. First, the intelligence level of medical and health institutions is low, the intelligence service project is single, and the service project of village and community level medical and health institutions is few. Second, the degree of intelligence of elderly care institutions is not high, the APP of elderly care institutions or related applications have a single function, many elderly care institutions have not been Internet-enabled, and the coverage rate of automatic monitoring facilities and equipment is not high. Third, the level of intelligent monitoring services for the elderly at home needs to be improved, the variety of intelligent elderly facilities and equipment in village (community) roads and public

places is small and the distribution is uneven, and the level of intelligent government services needs to be improved. Fourth, the level of cross-subject health care service data sharing is low, and the degree of service integration among various subjects is not high. Fifth, the digital divide is plagued by the elderly population, including but not limited to the elderly population's smart health skills need to be improved, the popularity of smart health facilities and equipment in the elderly population is not high, the level of websites and apps suitable for aging is low, and many service institutions and service force arrangements fail to fully consider the elderly population's travel, shopping, medical treatment, and play needs. According to the author's questionnaire survey data, the proportion of elderly service facilities (such as "one-click" networking with hospitals, etc.) is only 25.68%, and the popularity of smart wearable devices (such as smart watches) is 24.05%. The most reason to go online is medical rehabilitation, the proportion is as high as 54.32%, indicating that the demand for smart medical health services is strong. However, the intelligence level of health care services is worrying, and among the 15 health service evaluations, the items most directly related to the intelligence of services scored lowest, including: The use of smart phones and call systems to contact medical institutions, family members, and social workers (3.34 points), the Internet service of medical and rehabilitation institutions (3.36 points), emergency contact, intelligent monitoring, automatic call and other devices used in residential places to contact medical institutions, family members, and social workers (3.4 points), Carry equipment such as emergency contact, intelligent monitoring and automatic calling (3.33 points). In terms of institutional care services, the elderly population has a low evaluation of the Internet service of old-age care institutions (3.44 points).

4.5 Wisdom health industry

According to the corresponding relationship between the Statistical Classification of the Elderly Care Industry (2020) (referred to as Classification (2020)) and the Classification of National Economic Industries (2017) (referred to as Classification (2017)) issued by the National Bureau of Statistics, The "Classification (2017)" industries mainly involved in the elderly care service industry include 23, 24, 35, 37, 38, 39, 41 and other categories. Among them, elderly care services cover 62, 80, 82, 84 and 85 categories in Classification (2017), elderly medical and health services cover 72, 84 and 85 categories, and elderly health promotion and social participation cover 72, 78, 80, 85, 88, 89 and 90 categories. Elderly care technology and smart elderly care services involve 64, 65, 73, 74, 75 categories, and the manufacturing of elderly products and related products involves 14, 18, 19, 20, 23, 24, 27, 35, 37, 38, 39, 41 categories.

(1) Smart health manufacturing industry. From the perspective of industrial structure, Foshan city is a typical industrial city. The added value of manufacturing industry accounts for 14.31% of Guangdong Province, which is much higher than the proportion of Foshan's regional GDP in the total value of the province (9.77%). If a category is higher than 9.77%, it is considered that the category (Classification (2017) category) has a comparative advantage. As shown in Table 2, the industries that account for more than 9.77% include 13, 15, 17, 20, 21, 26, 28, 29, 30, 31, 32, 33, 34, 35, 38, 42 and other categories, among which 35 and 38 are key elderly care manufacturing industries covered by Classification (2020). However, Foshan 39 categories and other categories closely related to the development of smart health services have no comparative advantage.

(2) Smart health care services. According to Classification (2020), Major service industry categories include accommodation and catering (61, 62 categories), information transmission, software and information technology services (63, 64, 65 categories), scientific research and technology services (73, 74, 75), residential services, repair and other services (80, 81, 82 categories), and education (83 categories). Health and social work (categories 84 and 85), culture, sports and recreation (categories 86-90). According to the survey results, the elderly have lived through the survival stage and have higher spiritual, cultural, health and health needs. However, service industries such as education, tourism and entertainment for the elderly in Foshan can not effectively meet the needs of the elderly population. In addition, information transmission, software and information technology services are one of the most important industries for health and wisdom, but the development of these industries lags behind cities such as Shenzhen and Guangzhou, with 13,198 employees in the city in 2020, ranking fourth in Guangdong Province.

(3) The development potential of smart science and technology is at the middle level in the Pearl River Delta. From the perspective of per capita schooling years, the average schooling years of Foshan's population aged 15 and above is 10.49 years, which is lower than Guangzhou, Shenzhen, Zhuhai and other Pearl River Delta cities, but higher than Dongguan City, Zhongshan City and Jiangmen City. From the perspective of science and technology innovation index, Foshan City has 73,870 patents authorized in 2021 (including 5,652 invention patents), both of which are lower than Shenzhen and Guangzhou, ranking fourth in Guangdong Province, and there is also a large gap between invention patents and Dongguan (8,718).

Table 2 The proportion of industrial added value above designated size in Foshan in the whole province

Industry name	Category code	Foshan proportion
Manufacturing industry	1	14.31
Agricultural and sideline food processing industry	13	16.65
Wine, beverage and refined tea manufacturing	15	21.56
Textile industry	17	35.02
Textile and garment industry	18	13.68
Wood processing and wood, bamboo, rattan, brown, grass products industry	20	16.79
Furniture manufacturing industry	21	25.68
Cultural, educational, industrial, sports and entertainment products manufacturing	24	12.02
Manufacturing of chemical raw materials and chemical products	26	16.10
Chemical fiber manufacturing industry	28	24.79
Rubber and plastic products industry	29	16.88
Non-metallic mineral products industry	30	21.19
Ferrous metal smelting and rolling industry	31	19.10
Nonferrous metal smelting and rolling industry	32	36.34
Metal products industry	33	29.86
General equipment manufacturing	34	18.65
Special equipment manufacturing industry	35	14.36
Automobile manufacturing industry	36	13.58
Electrical machinery and equipment manufacturing	38	38.21
Computer, communications and other electronic equipment manufacturing	39	1.55
Instrumentation manufacturing industry	40	7.13
Waste resources comprehensive utilization industry	42	45.43

5. Conclusion

The construction of smart and healthy city is a strategic measure to deal with the

challenge of aging. Information technology enables resource integration, improves resource utilization efficiency, promotes service model innovation, and builds a borderless health care service network for the elderly. The construction of smart health city involves five fields: smart health infrastructure, smart health environment, smart health economy, smart health service and smart health industry. From the data of 2020-2021, the construction effect of smart health city in Foshan is at the middle level of cities in the Pearl River Delta, and it can provide rich health care services for the elderly population, but it is faced with problems such as the ecological environment needs to be improved, the aging level of public infrastructure needs to be improved, and the intelligent level of health care services is not high.

Considering the future increase in the elderly population, the increase in the elderly dependency ratio and the upgrading of the demand for health care services, it is urgent to guide all sectors of society to increase investment in health care services, improve infrastructure construction with age-appropriate transformation as the core, innovate health care service models and expand the scale of effective service supply. It is expected that the smart health care industry will become one of the most important areas of the national economy. Foshan City should give full play to its comparative advantages and build a smart health care industry highland in the Pearl River Delta and even the whole country with the advantageous manufacturing industry as the leader.

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