

# Experience and Implications of Foreign Countries Public Transportation under the Age-friendly Concept

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## ABSTRACT

Development of public transport facilities is an important aspect of city development to adapt to the trend of population aging and build an age-friendly city. Based on the experience of Japan, Singapore, Britain, Germany in the construction of urban public transport facilities suitable for aging, this paper analyzes the strategies, means and implementation practices in the construction and development of foreign public transport facilities suitable for aging from multiple angles. Combined with the social form and travel characteristics of the elderly groups in Guangzhou, this paper obtains the countermeasures and enlightenment of the construction system of aging suitable transportation facilities in Guangzhou.

**Keywords:** *Public transport facilities, Construction experience, Age-friendly*

## 1. INTRODUCTION

### 1.1. Development trend of aging problem

The development trend of aging problem shows a global gradual aggravation trend with the aging trend in many countries. The aging problem has become an important social problem that the world must face to. According to the prediction of the United Nations Population Fund, by 2050, the proportion of the world's population over 60 years old will reach 22%. By the end of 2020, China's elderly population over 60 years old was 264 million, accounting for 18.7% of the total population. Aging has become an important social trend that can not be ignored, and it has also brought new research topics to the planning and development of urban public transport.

With the increasingly significant problem of aging in China, the academic circles pay more and more attention to the related problems of aging, such as the elderly care environment, life services, elderly product development and other aspects of the elderly welfare culture. The development level of urban public transport reflects the overall development level of the city and the degree of social civilization. In the context of an aging society, the aging adaptability of public transport facilities also reflects the city's attention and care for the elderly and its active adaptation to the development trend of an aging society.

### 1.2. Construction concept of international Age-friendly city

For the research on the travel of urban elderly, relevant organizations and scholars at home and abroad explore from the aspects of travel characteristics, public transport facilities construction, public transport system services, travel product development and design, etc. In 2005, the World Health Organization first mentioned the concept of "Age-friendly Cities". In 2007, the World Health Organization mentioned "improving the quality of life of the elderly through the provision of health care, social participation and safety services" in the global age friendly cities: a guide, Transportation is listed as one of the eight themes of sister cities for the elderly.

## 2. CURRENT SITUATION AND DEVELOPMENT EXPERIENCE OF AGING PUBLIC TRANSPORT FACILITIES IN FOREIGN COUNTRIES

### 2.1. The current situation of aging society and the construction experience of age friendly public transport facilities in Japan

Japan is one of the first countries to enter the aging society. At present, the degree of aging has been at a relatively high level. In terms of public transport travel,

Japan has relatively complete infrastructure construction, high coverage of subway and bus lines and great price advantage. Therefore, people are generally willing to choose public transport travel.

Japan entered the aging society as early as the 1970s. As a country that entered the aging society earlier, Japan has built a relatively complete pension system, and more attention has been paid to the construction of barrier free environment. In terms of aging transportation, the Japanese government has established relatively sound laws and regulations, which provide an important guiding basis and development foundation for the barrier free design and construction of transportation in Japan. In order to ensure the barrier free travel of the elderly, Japan has successively formulated policies and regulations such as the law on promoting the barrier free movement of the elderly and the disabled, the law on public transport facilities convenient for the elderly and the disabled, and so on.

In addition to the formulation of relevant policies, regulations and standard systems, Japan also attaches great importance to the publicity and education of barrier free environment construction. Carry out traffic safety education for the elderly; Train public transport departments, drivers and other service personnel to improve the service level for the elderly.

In terms of the design and construction of public transport facilities, in order to ensure the safety and convenience of the elderly, Japan has promoted the aging construction of public transport facilities. Many efforts have been made to adapt the aging transportation facilities, such as popularizing the construction of elevators and escalators; Gradient construction shall be carried out for roads and sidewalks of stations; Voice indication equipment shall be installed at the intersection; Japan has embodied many humanized designs in the detailed design of transportation facilities. For example, when the bus stops, the body will tilt towards the booth to reduce the distance between the door and the road, so as to facilitate the elderly to get on and off. The hand-held rings used by subway passengers have a variety of heights to adapt to people of different heights and postures. More seats, soft cushions, more comfortable to ride. In terms of software services, Japan has specially developed driving assistance systems for elderly drivers to provide software support more suitable for the characteristics of the population. Japanese stations also have a clear barrier free service mechanism to ensure that passengers in wheelchairs have special service at the boarding and alighting stations.

## ***2.2. The current situation of Singapore's aging society and the construction experience of age friendly public transport facilities***

Singapore is one of the fastest aging countries in Asia,

accounting for 65.2% of the population aged 15 and over in 2018. In order to deal with the social problems of aging as soon as possible, the Singapore government has continuously launched various policies and measures since the 1950s.

Singapore launched the "elderly friendly city action plan" in 2015, which comprehensively covers urban planning and construction schemes in many aspects, such as living environment, health care and so on. Singapore has put forward the idea of developing aging science. Urban design and planning are related to the life of the elderly. It involves transportation, focusing on providing a friendly public transport system for the elderly. In 2016, the Singapore Public Transport Council and the land transport authority (LAT) launched a series of aging appropriate public transport measures. For example, install handrails in places where the elderly are more active; Install elevators on footbridges for pedestrians, especially near hospital clinics; Replace ordinary buses with new buses that can use wheelchairs; The seats in the waiting station are replaced with seats with armrests, which makes it easier for the elderly to stand up; In the font design of public transport related information, choose a font more suitable for the elderly.

Singapore has also provided various preferential measures for the elderly to travel by public transport, implemented preferential fare measures for the elderly, and encouraged the elderly to travel by public transport. And train bus drivers to cultivate the culture of respecting the elderly in public transport.

## ***2.3. The current situation of aging society and the construction experience of age friendly public transport facilities in Britain***

In 2015, the population over 65 years in UK accounted for 17.93% of the total population. The British government pays more attention to public transport for the elderly.

In 2010, the World Health Organization established the Global Network of Age-friendly Cities and Communities, GNAFCC. Manchester and London in the UK became early members of the league. Inclusive design is an important strategy in London planning, which is also reflected in the process of building a sister city for the elderly in London. In 2019, the London Olympic heritage development company (LLDC) formulated the inclusive design specification. The details of inclusive design include detailed design guidance for road signs, seats, ramps, elevators, lighting, etc. in the traffic flow line. The elderly over 60 years old in London can take public transport free of charge, and a stepless station is built at the station to facilitate the access of the elderly.

#### ***2.4. The current situation of aging society and the construction experience of age friendly public transport facilities in Germany***

In 2009, the population over 65 years old in Germany reached 20.27%, and in 2016, the population over 65 years old in Germany reached 21.24%. The population aging is serious. In such a social context, Germany is also a country that pays more attention to elderly issues and elderly services. Germany has successively promulgated the federal act on the equality of persons with disabilities and the federal act on equal opportunities to protect the equal travel rights of the elderly, the disabled and other special groups, and improved the barrier free construction of public transport.

In terms of aging transport facilities in Berlin, low floor buses have achieved a penetration rate of more than 95%. The subway station is equipped with barrier free direct elevators to adapt to the characteristics of subway multi-story buildings and facilitate the travel of the elderly. The station platform is equipped with ramps and handrails for wheelchair access. Seats and handrails at bus stops to ensure the safety of the elderly when waiting for the bus. The route planning ensures smooth transfer. There is a strict timetable for the departure and arrival of vehicles to ensure the accurate arrival time of vehicles and avoid the inconvenience of special people. Set the arrival reminder board and query machine to timely understand the driving conditions of vehicles and query the required information. German bus drivers will also receive special training to learn how to provide services for people with difficulties, especially those using wheelchairs.

### **3. ENLIGHTENMENT OF INTERNATIONAL EXPERIENCE ON THE CONSTRUCTION OF AGING TRANSPORTATION FACILITIES IN GUANGZHOU**

Guangzhou is in the stage of mild aging society as a whole, and the degree of aging is gradually increasing. In 2016, the registered residence population aged 60 and above was 1 million 546 thousand and 100 in Guangzhou. In 2020, the figure increased to 1 million 799 thousand and 500, the average growth rate was 3.87%. The aging population in Guangzhou showed a continuous growth trend. Compared with the rapidly growing aging population, there is still room for improvement in Guangzhou's current preparations for the construction of urban aging infrastructure. It is of great theoretical and practical significance to carry out research on the development countermeasures of public transport aging facilities in Guangzhou. Properly learn from the construction experience and Enlightenment of foreign aging public transport facilities, and combine the regional characteristics and aging social characteristics of

Guangzhou to explore the Countermeasures of Guangzhou, which is helpful for the city to comply with the trend of social development in the process of development, It is of great significance to build a friendly society for the elderly.

#### ***3.1. Improve policies, regulations and mechanisms related to the development of age friendly transportation facilities***

By formulating relevant laws and regulations on barrier free public transport facilities, ensure that infrastructure meets relevant regulations, meets the travel needs of the elderly, and ensures the equal right of the elderly to travel. To meet the differences in the needs of different groups, the elderly have more inconvenience when traveling by public transport than ordinary people due to the decline of physical function. Through the formulation and implementation of relevant policies, regulations and mechanisms, ensure the safety and sense of experience of public transport travel for the elderly. For example, in terms of preferential policies, give priority to protecting the interests of special groups such as the elderly, set up exclusive carriages and exclusive waiting areas, and use preferential rides to facilitate the use of public transport for the elderly.

#### ***3.2. Improve the popularity of age friendly transportation***

Transportation is an important facility for the elderly to use public transportation. The aging design of transportation directly affects the safety, comfort and convenience of the elderly. In the selection and use of means of transport, we should focus on humanized design. The bus route information is clear and easy to identify, the height difference between boarding and alighting is comfortable, the setting of seats and armrests is reasonable, which is in line with the body size of the elderly, and low floor buses should be popularized as far as possible. The design of subway carriage takes into account the characteristics of the elderly. The seat setting is reasonable and comfortable, the volume of arrival information reminder is suitable, and the visual information is easy to read and understand, which is suitable for the physiological characteristics and habits of the elderly.

Improve the service awareness of public transport related employees, standardize operation, strengthen quality, and establish the concept of serving special groups. For example, the design of self-service ticket vending machine and mobile navigation should take into account the needs of the elderly, and provide necessary manual services in ticket sales, transfer and so on. While popularizing information-based payment means and inquiry means, the traditional payment methods and information inquiry methods should be retained.

### ***3.3. Create a barrier free travel environment***

The construction and improvement of transportation facilities conform to the people-oriented design concepts of safety, practicability, convenience and comfort. Create a barrier free travel environment suitable for the elderly. Popularize the aging design of hardware facilities, and set sufficient rest seats in platforms and waiting areas to ensure that the elderly can rest in time when needed. The height, material and shape of seats shall fully consider the needs of the elderly. A sunshade shall be set. The design of the sunshade shall adapt to the local climate characteristics, effectively block the sun, rain and snow, and create a good waiting environment. The visual information guidance system for station signs, signs and other information shall fully take into account the physiological and psychological characteristics of the elderly, avoid complex and unclear visual effects, and select appropriate fonts, font sizes, lighting brightness and graphic layout methods, so as to be as clear and easy to read and understand as possible. In terms of arrival reminder and intersection signal light, make rational use of visual information and voice broadcast to remind at the same time.

### ***3.4. Optimize the safety and comfort of the walking transportation facilities system***

Create a continuous and complete walking environment, optimize the walking environment of roads, internal space of stations and communities, and improve the comfort of relevant supporting facilities. Repair the pavement in time to ensure the anti-skid performance of the pavement. Popularize the ramp design, minimize the vertical height difference and avoid obstacles or steps, so as to prevent the elderly from slipping at night or in rainy weather. In terms of environmental construction, further strictly distinguish the relative space between people and vehicles, appropriately expand the walking area, reasonably set up deceleration pads and isolation belts, and set up safety islands or isolation belts to ensure that the elderly are safer when crossing the road. The setting of signal time at intersections should take into account the characteristics of slow movement of the elderly, and the reserved time for pedestrian green light passage is not easy to be too short. Improve lighting facilities to ensure sufficient illumination. Set elevators, handrails, lighting and other supporting facilities in underpasses and overpasses to ensure the safety and comfort of the elderly when walking.

## **4. CONCLUSION**

The arrival of an aging society brings new challenges to urban development and construction. The aging

problem needs the attention and participation of the whole society, and the construction of aging suitable public transport facilities is an important part to deal with the aging problem. To meet the daily life needs of the elderly and ensure their travel needs from many aspects is an important means to further improve the happiness of the elderly. Realizing the barrier free travel of the elderly is an important subject to realize the people-oriented city concept and build a friendly city for the elderly. In the process of urban development, we should actively respond to the exploration of population aging, develop public transport suitable for the elderly, provide convenience for the elderly in public transport and travel channels, and improve elderly friendly transportation services.

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## **REFERENCES**

- [1] World Health Organization. *Global Age-friendly Cities: A Guide*. World Health Organization, Geneva, 2007
- [2] FAN Shi-shuai, YANG Yi-fan, LIU Yi-cun. The Experiences of Foreign Cities Handling the Aging of Population, in: *Journal of Southwest Jiaotong University*, Vol. 18, Chengdu, 2017, pp.82-90 .
- [3] Takahashi Gihei, *History of Barrier Free in Japan and Prospect for Universal Design Celebrating Tokyo 2020 Olympic and Paralympic Games*, in: *World Architecture*, Beijing, 2019(10), pp.15-19.
- [4] HAN Xaiomi , NIE Tingting, JIANG Cailiang ZHAO Xin. Experience of accessible transport construction in developed countries and its enlightenment to China. in: *Transport Research*, Vol. 7, Beijing, 2021, pp.45-53.
- [5] LIU Meng, LIU Xueli, LI Zexin. Experience and Enlightenment of Transport Planning Suitable for the Elderly: Case Studies of Taiwan in China, Singapore and Japan. in: *Journal of Human Settlements in West China*, Vol.36, Chongqing, 2021, pp57-65.
- [6] JIANG Ying, GUAN Jiayin, DONG Hua. *Towards Age-friendly Cities: UK Practices*. in: *Shanghai Urban Planning Review*, Shanghai, 2020(6), pp42-47.