

Urban Public Traffic Management in the Aging Society

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Abstract. The problem of aging population is a social problem that the world faces together. Traffic travel is a real problem that the aged society needs to pay attention to and improve. The construction of the elderly-friendly city is a useful exploration to actively address the problem of population aging. By reviewing the urban transport improvement measures implemented by Japan and Singapore in response to the aging problem, we further explore the planning concept and measures of diversifying and inclusive for urban construction and urban public transport management improvement.

Introduction

The aging of population is a common social problem faced by many countries in the world today. According to the United Nations Population Fund (UNFPA) projections, by 2050, the world's population over the age of 60 will reach 22%, the elderly population will triple the number of 2010. In general, a country with a population over 65 years old accounting for more than 7% of the total population or more, or 10% or more of the population over the age of 60, marks the country's entry into an aging society. In China, the rapid and steady economic and social development in recent years have led to the continuous improvement of living standards and medical conditions, the gradual extension of the average life expectancy of mankind, and the increasing proportion of the aged population in the total population and the aging of the population in urban development. City should be inclusive with a temperature of living space. Urban planning under the background of aging needs to pay more attention to the aging population from planning concepts and planning methods and actively respond to the problem of population aging.

With the continuous improvement of living standards and the gradual improvement of medical and health conditions, as well as the development of urban transport infrastructure and modern information technology, there are some new features in the elderly population with respect to their physical functions, lifestyles and travel. From the planning options and practical experience of international cities on the issue of aging, the urban transportation system should proceed with the planning concept, technical means and decision-making mechanism so as to effectively improve the travel convenience for the aging population and improve the travel environment for the elderly in order to construct the elderly-friendly city.

The second part of the dissertation starts from the characteristics of the development trend of population aging and summarizes the impact of population aging on urban public transport management. The third part reviews the policy exploration of Japan and Singapore in building the elderly-friendly city, especially in cities Traffic management. The fourth part, based on the reality of our country, discusses the feasible and targeted countermeasures and suggestions from the perspective of planning concept and policy support.

Impact of Population Aging on Urban Public Transport Management

The aging of population has many impacts on economy and society. Through investigation and literature review, the characteristics of aging society in traffic and transportation are mainly reflected in the increase of total demand, the diversification of travel structure, the diversification of influencing factors and the significant regional differentiation.

The Proportion of the Elderly in Traffic Demand Increased. At present, China has gradually entered an aging society and has become the country with the largest population of the elderly in the world and one of the countries with the fastest population aging. According to statistics of the National Commission on Health and Family Planning, in 2017, the population aged 60 and over accounted for 17.4% of China's population, an increase of 0.7% over 2016. In fact, part of the elderly population living in Beijing, Shanghai and other cities are those who originally lived and worked in the cities. The other part consisted in following the migration of their children into the cities. These elderly people are an important part of urban life. Compared with the fast-growing elderly population, China's current infrastructure preparation is not sufficient. There is still a big gap in infrastructure and travel environment improvement.

Since 2000, China has stepped into an aging society and China's aging has shown the characteristics of rapid growth, large scale and unprecedented prosperity^[1]. The increase of the aging population will inevitably increase the total amount of traffic and travel, thereby increasing the requirements for the level of traffic and transportation service facilities. At the same time, with the improvement of living standards and the improvement of medical and health conditions, the physical quality of the aged population gradually increases. The pursuit of quality of life of the aged population is also different, which further improves the quality of traffic and travel services. On the one hand, the pursuit of higher standard of living and quality of life leads to the diversification of the purpose of traveling among the aging population. For example, the demand for social travel and leisure travel of urban middle-aged population will gradually increase. On the other hand, At the same time, but also on the travel environment, the level of facilities requirements.

The Purpose of Travel for the Elderly is more Diversified with Different Spatial-temporal Distribution in the City. Although the elderly population no longer directly participate in social productive activities, as the leisure time increases and the current social life style is more diversified and richer, the aging population in the urban areas gradually form specific leisure activities and preferences of places, which also makes aging The population has more diversified and differentiated characteristics in terms of the purpose of travel, travel time and modes of travel^{[2][3]}.

The purpose of aged population, such as shopping, socializing, medical treatment, leisure, has transit from commuting to the life-style travel^{[4][5]}, and most of the travel will gradually around the place of residence living. In China, according to the questionnaire survey in Wuhan, Shanghai and other cities, the elderly population mainly make daily travel for purchases of food and pick up their children mainly from nearby schools and go to the parks for fun and cultural activities. The proportion of body-building and communication trips is obvious Increase, travel frequency also gradually increased.

Walking and taking Public bus is the most Popular Travel Mode. The existing research shows that in the process of shopping and traveling, the middle-aged and elderly population in western cities still use cars as the main mode of transportation. With the change of the elderly population in their physical functions and basic needs, the travel type of the aged population is gradually changed and the mode of travel has also gradually shifted to a variety of modes of transport for the pedestrian-based mode of transport, while the bus travel mode is based on ordinary buses and subways, but significantly reduced the travel time of public transport^[6]. For this reason, walking distance and walking environment are the most important influencing factors for the elderly population. The impact of daily shopping trip is the most prominent.

Influencing Factors are Diversified with Obviously Regional Differences. In general, there are great differences in the living conditions and travel characteristics among the elderly in different cities, and there are also many influential factors in elderly people's traffic travel. From the existing research results, it is generally believed that mobility and accessibility are the key factors that affect the travel of the elderly and thus the quality of life of the elderly population^[6]. As the distance from the place of residence increases, the proportion of elderly population will gradually decrease, and the perfection and accessibility of residential commercial facilities can directly affect the degree of convergence of shopping space for the elderly population^[7]. At the same time, factors such as

gender, age and other factors, whether living alone or having an independent source of income, such as retirement salary, also have a significant impact on the travel needs of the elderly population ^[8].

The characteristics of the elderly population in the same city in shopping and traveling are affected by many factors. In some economically developed cities, the aging population in large communities is more convenient in terms of information communication and other aspects, more sensitive to changes in sales information and commodity prices in shopping malls, Transportation needs of shopping trips will be with the impact of shopping malls sales. Large-scale trade fairs and hypermarkets in these cities often provide the necessary shuttle service, which increases the accessibility of shopping trips to the aged and is also an important factor influencing the travel destinations, travel modes and frequency of travel of the elderly population.

Regional disparities also show differences in travel characteristics and travel needs, even in the same city, where older people live in urban centers and suburbs. For the communities with good commercial or living supporting facilities around the community, the proportion of elderly population who choose to walk as the mode of travel is more obvious, while the safety, comfort and convenience of travel become the important influential factors of travel destination selection ^[9].

International Experience of Urban Public Traffic Management Practices

Since the 1960s, countries such as the Netherlands, Germany and Japan have started to pay attention to the issue of population aging and have adopted some targeted measures. Japan is the country with the most serious problem of population aging in the world. According to the statistics of 2014, Japan's elderly population accounted for 26.7% of the total population in that year, ranking the first in the world; in Singapore, the current age of the world One of the fastest growing countries. Combing the typical countermeasures taken by typical countries around transportation and other infrastructures in the context of aging and summarizing the international experiences of all countries in coping with population aging can provide more pertinent and more effective reference for the formulation and planning of China's relevant policies Inspiration.

Older-friendly City in Japan. Since the 1970s, Japan has carried out detailed studies on many problems facing aging societies, attached great importance to traffic problems in the aging society and responded positively to urban planning and urban management. Firstly, we investigate the physical function of the elderly population under different modes of travel to construct a walking environment, a riding environment and a driving environment suitable for the elderly population. Secondly, we study the traffic characteristics such as the purpose and frequency of the elderly population and the intention of choosing the mode of transportation, adjust traffic policy to ensure traffic mobility of the elderly population. In general, Japan's response measures in the transport sector mainly focus on perfecting related laws and regulations, improving more practical and targeted facilities, and encouraging social participation.

Formulate supporting laws and regulations to legalize response measures and mechanisms. Through years of intensive research, Japan has formulated the Essentials of Social Policies for Longevity and proposed a series of transport modes and transport policies that are appropriate to the aging society to achieve the objective of "accessibility." To ensure the travel of the elderly and people with disabilities, and to improve the mobility and accessibility of the elderly and handicapped people to public transport facilities, Japan has promulgated the "Barrier-free Regulations (Blue Book)" and the "Barrier-free Traffic Law." A combination of multiple ways to provide safe, reliable and practical transport facilities to improve the public transport environment. In accordance with the relevant orbit, the subway and public transport must provide the practical implementation of escalators, lifts, ramps and other convenient elderly population and special needs groups. At the same time, it is also required to reduce the mixture of people and vehicles, to adjust the height and slope of pedestrian steps and to improve pedestrian safety; to adjust public transport vehicle configurations such as vehicle door width and height, interior seats, etc. to improve public transport environment; The characteristics of the elderly population, research and senior citizens hand brain coordination and responsiveness to adapt and ensure safety of the vehicle configuration, in order to improve the driving environment of the elderly population ^[10]. Japan's elderly population

occupies a certain proportion of drivers, so the Japanese government also requires road alignment design, improvement of intersections and other means to reduce the driving risk of elderly drivers, and actively encourage the development of ancillary drivers to form ancillary systems to simplify operations and improve Driving safety for seniors.

Mobilize social forces to pay attention to the aging population and jointly tackle the problem of population aging. To strengthen and encourage social forces to participate in tackling the problem of aging, the Japanese government has also taken such measures as tax incentives and subsidies. To encourage developers to provide better barrier-free design, the Japanese government provides that different types of financing interest bonuses can be obtained from the Japanese Policy Investment Bank and the Small and Medium-sized Enterprise Financial Treasury through the design of buildings with barrier-free design evaluation. Remission of some income tax. Some art galleries, cultural centers and other public welfare facilities and buildings within the channel, steps, elevators and other walking system, will also be part of the government compensation and maintenance costs part of the support.



Figure 1. Finite Accessibility of Japanese public transport stations

Assisting Facilities in Urban Design in Singapore. In order to respond more positively to the issue of the elderly, Singapore effectively improved public transport facilities and further optimized the traffic environment for the elderly through timely replenishment of accessible facilities. By the end of 2015, all subway stations, bus interchanges and integrated transport hubs in Singapore have adopted barrier-free design to provide priority waiting places for the elderly, pregnant women and people with limited mobility, and give priority to traveling. In the meantime, elevators are installed at pedestrian crossing bridges to facilitate the elderly to take the MTR. It is estimated that by 2023, 50 Sliver zones will be set up to create a safer and more convenient travel environment for the elderly.

To refine the urban planning, reflecting the concept of human design. For example, the "silver hair zone" which is specially designed to cross the road for the aged will be provided with effective measures such as adjusting signal lights, reducing the width of roads and laying speed reduction gear to reduce the speed of driving to facilitate the aging population and also to use low-floor vehicles to facilitate the aging population and take trips People in wheelchairs and buses also have elderly population seats and wheelchair fixtures, which also improve travel safety. At the same time, in the slow traffic system, adding small slope access, additional barrier handrails and other barrier-free facilities to improve the underground passage lighting, the addition of elevators and canopies in the overpass to optimize the walking environment.

At the same time, vigorously promote safety awareness education and service concept. Improve the ideological awareness of the elderly living and travel safety, but also train the public transport sector, taxi drivers and other necessary training to improve their service awareness and service capabilities for special groups such as the elderly population and people with disabilities.



Figure 2. Finite Pedestrian walkway and barrier-free access near Singapore Public Transport Station

Prospect of Urban Public Traffic Management in China under the Background of Aging Population

First of all, using elderly, friendly transport to create an unobstructed travel environment. There are many factors that affect the mobility of elderly people. There are many factors that affect not only the improvement of urban transportation system but also the details of the pedestrian environment, the comfort of elderly population in commercial facilities and the convenience of transport facilities. Give attention. In terms of community environment construction, the pedestrian and the car space should be further strictly separated, the pedestrian area should be properly expanded, the pedestrian environment, green space and open space should be connected in tandem, the necessary deceleration pad and isolation belt should be set up at the entrances and exits, the pavement condition of the pedestrian area should be repaired, Lighting can improve the pedestrian traffic environment around the community. Based on the characteristics of elderly population's traffic travel demand, communities and commercial service industries should further consider the needs of the elderly in terms of ancillary facilities, such as adding recreation areas and optimizing the walking environment, taking into account the design of pavement height, slope and width The needs and characteristics of the aging population and providing the necessary barrier-free facilities. At the same time, elderly-friendly transport should also be used as far as possible, such as the selection of low-floor buses, disabled seats in the subway car configuration, the subway station configuration wheelchair lift and other facilities.

Secondly, to improve the safety and comfort of the pedestrian environment and optimize the accessibility and reliability of public transport systems. On the one hand, the use of modern technology to improve the travel environment of the elderly population, walking for the elderly population needs to improve travel safety warning signs, landscaping activities of the elderly population landscape facilities; the other hand, the elderly population and ordinary passengers in the physical function, mental state And travel behavior patterns and other aspects are different, the public transport system needs to provide more detailed services. In Beijing, Shanghai and other big cities, the mass transit traffic volume of large-capacity passenger trains such as metro and light rail at morning and evening shows that the traffic volume is insufficient. In such conditions, it is more difficult to meet the travel needs of the elderly population. In small and medium-sized cities, suburban areas and rural areas Public transport has fewer routes and lower coverage, which is an important factor that limits the ability of elderly population to travel and operate. At the same time, the continuous improvement of living standards has also raised people's demand for travel experience. For the elderly population, the reliability and comfort of public transport are also important factors in their travel. In some cold areas or bad weather, public transport can arrive on time, the temperature inside the car and other factors have a direct impact on the elderly population travel decisions. Therefore, it is necessary to increase the density of bus lines and networks, increase the coverage of stations near stations, especially in residential areas, set up facilities such as sunshades and seats at the stations, set up electronic signage, provide information on vehicle routes and arrival times, Vehicles, additional seats equipped with cushions and armrests in the bus.

Thirdly, to provide short-distance traffic around the community access to transport services, appropriate to expand the scope of travel of the elderly population. From the survey situation,

walking is the main mode of transport for the elderly population. The range of daily travels of the elderly is mostly based on the living community. The walking time and distance are also the main influencing factors of the elderly population. On the one hand, many communities currently offer short-haul buses connected to the MTR to take advantage of these short-haul buses to provide transportation services to hospitals, supermarkets, bus hubs and other locations during non-commuting hours. On the other hand, for supermarkets, the elderly Activity centers, hospitals, parks and other living ancillary services, if we can provide safe and convenient short-distance access to transportation, will also increase the convenience of the elderly population travel, to further meet the needs of the elderly travel needs and improve the quality of life.

Finally, to promote the industrialization of the aging market, and improve the applicability and affordability of public transport services for the elderly population. The concern about the travel problems of the aged population embodies the social importance attached to the quality of life and the embodiment and reality of social progress. In terms of urban infrastructure construction, it is necessary to consider that the elderly population need more preventive and supportive facilities, such as the choice of material for pedestrian roads, the height of stairways, barrier-free facilities such as handrails and handrails, the distinguishability of signs, lighting Facilities and the necessary emergency facilities. At the same time, we must also take into account the elderly's ability to pay for related services and appropriately expand free services in the areas of public transport and public services. Of course, the applicability is also reflected in whether it can provide the harmony between the elderly population and the living environment. For example, the U.S. Environmental Protection Agency puts forward the principle of promoting smart growth in order to promote the common development of community, environment, economy and public health as an elderly friendly community^[11].

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