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### Comparison of transportation accessibility policy among elderly in Hong Kong and Singapore

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**Master of Social Science in Comparative Social Policy  
(International)**

**Academic Year 2022-23**

**SOC 605 Comparative Social Policy Research Project**

**Comparison of transportation accessibility policy among  
elderly in Hong Kong and Singapore**

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## Introduction

Population aging is a significant global concern. Declining fertility rates and increasing longevity are causing accelerated population aging. The report on aging released by the Economic and Social Commission for Asia and the Pacific shows that the population of individuals aged 60 and older in the Asia-Pacific region approach 670 million in 2022, representing approximately one-seventh of the resident population. The report predicts that the population aged 60 and older in the Asia-Pacific region will reach 1.3 billion by 2050 (ESCAP, 2022). According to the United Nations, a country or region has entered an aging society when the proportion of people aged 65 and older exceeds 7% of the total population (UN, 1965). In 2022, according to the Singapore Department of Statistics, the percentage of residents aged 65 and older reached 16.6%, an increase of 0.6% from the previous year. From 2010 to 2020, the number of the elderly in Singapore increased from 338,000 to 614,000, making Singapore the country in Asia with the highest rate of aging (DOS, 2022). Like Singapore, Hong Kong is aging faster, with 19.6% of the overall population aged sixty-five and over in 2021, an increase of 6.3% from 2011. The life expectancy of older people in Hong Kong is high, with 25% of the elderly aged 75 to 84 and the number of people aged 85 and over accounting for 15.6% of the population, as shown in the 2021 Elderly Population Data Report (C&SD, 2021). In the face of aging, it has become an urgent need to promote accessibility vigorously.

Older people are likely to suffer from disabilities due to a decline in physical function brought on by aging (Xiang et al., 2020). Due to physical and mental deterioration, older individuals inevitably become less mobile, with common conditions including visual impairment and physical impairment. Most individuals with disabilities in the Asia-Pacific region are elderly (ESCAP, 2022). These individuals are more vulnerable than younger and encounter numerous barriers to full social participation. An aging population of people with disabilities accompanies the aging of Hong Kong's overall population (Xiang et al., 2020). According to Document 63 issued by the Census and Statistics Department of the Hong Kong Government, 14.4% of all persons with disabilities in Hong Kong are between the ages of sixty and sixty-nine, while 44.5% are aged seventy and older (C&SD, 2021). This demonstrates that disability is prevalent among the elderly in Hong Kong, with the disability rate among inhabitants aged 70 and older reaching as high as

25.9%. Creating a barrier-free environment can effectively aid senior citizens in enhancing their quality of life and preventing accidents. Barrier-free environment construction embodies physical and spiritual civilization, a significant symbol of social progress, and will undoubtedly become the direction and trend of future architectural design (Cheng, 2005).

With the economic development of countries comes a growing emphasis on humanistic care in urban construction (Wan, 2017). With the spread of modern cultural ideas such as equality and sharing, humanized and universal urban transportation accessibility design for older people has become the dominant paradigm of urban planning (Zhang & Yu, 2021). In addition, accessibility facilities are becoming increasingly important livelihood projects, integrated into all areas and facets of economic and social life. They are becoming an important vehicle to support and guarantee public transportation and participation in social activities for senior citizens (Li et al., 2022).

Transportation and outdoor space are essential features of the physical space environment. On a positive level, a good community environment can improve elderly's outdoor experience (Sun & Ling, 2020), directly influencing behaviors such as travel and recreation (Li, 2019). The modes of urban transportation influence the outdoor activity patterns of elderly, who depend on public transportation for their daily travels more than other age groups due to the declining physical functions associated with aging (Wan, 2017). Many urban transportation systems have insufficient public transportation systems, such as poor route accessibility, lengthy distances to stops, and a lack of accessibility to buses, all of which cause significant inconvenience to senior citizens' travel. Most older people must limit their activities to a limited region near their homes to avoid the lengthy and inefficient public transportation system (Dou et al., 2015). Due to the rapid combination of urbanization and aging, it is crucial and imperative to construct a barrier-free environment for seniors. Consequently, the aging population must promote the construction of a transportation accessibility environment with the elderly's travel requirements at its core. The scale of demand for barrier-free facilities in the planning, design, and management of urban transportation space is increasing daily, as is the quality of barrier-free facilities, and transportation accessibility has become a hot topic and focus of public attention (Zhang et al., 2012).

The purpose of this study is to compare the policies for accessibility of transportation for senior citizens in Singapore and Hong Kong. This study proposes policy implications for pertinent government departments to expedite the construction of a convenient transportation environment for seniors and support their integration into society.

## **Literature review**

The literature review is divided into two sections. The first subsection elaborates on the concepts related to accessibility and summarizes the empirical studies of previous research on accessibility policies for the elderly in Hong Kong and Singapore. The second section provides a preliminary understanding of the accessibility of transportation for senior citizens in Hong Kong and Singapore by listing the existing policies and programs on the accessibility of transportation for the elderly in both regions.

### **1. Related concepts and empirical studies**

#### **1.1 Related concepts**

##### **Barrier-free**

Barrier-free is a fundamental condition to guarantee the equal participation of members of society, including persons with disabilities, in social life (Li, 2019). Because barrier-free is originally intended for people with disabilities, this study first investigates the concept's origins to analyze accessibility for the elderly better. The United Nations Convention on the Rights of Persons with Disabilities identifies the construction of barrier-free environments as a fundamental principle and an essential element, recognizing that accessible physical, social, economic, and cultural environments, health care and education, as well as information and communication, are essential for persons with disabilities to be able to fully enjoy all human rights and fundamental freedoms (UN, 2006). Barrier-free design mainly includes two aspects: barrier-free physical and barrier-free information and communication, respectively (Jia et al., 2012). Barrier-free physical environment mainly refers to the planning, designing, and constructing of urban roads, public buildings, and residential areas for the passage and use of people with disabilities. The barrier-free of information and communication mainly refers to: the support of public media for information communication for people with hearing speech and visual impairment (Wu et al., 2009).

In 1961, the American National Standards Institute formulated the first barrier-free design standard, emphasizing that all countries' governments should build a barrier-free environment (ANSI, 1961). Governments and designers began to promote a barrier-free environment and provide a convenient living space for people with impairments (Zhang, 2013). In 1974, the United Nations Expert Meeting on Living Environment for Persons with Disabilities formally proposed the concept of "Barrier-free design" (Li, 2019). During the legislative process of the Americans with Disabilities Act of 1990, based on guaranteeing equal opportunities for people with impairments to participate and benefit, it was stipulated that all aspects of employment, transportation, public facilities, government services, and telecommunications must be accessible for people with impairments, thus introducing a new terminological expression for the concept of "Accessibility" (Li, 2019).

#### Universal Design

Foreign transportation accessibility policies have gradually expanded the scope of applicable objects and defined them according to people's ability to use space. For example, the United States has advanced the idea of people with disabilities in a broad sense, and the Rehabilitation Act, as amended in 1973, expressly included older people in the scope of security (USEEOC, 1973). Hong Kong Equal Opportunities Commission (EOC) recommends that the government adopt the "Universal Design" principle to build an inclusive society (EOC, 2018). One of the principles of universal design is fair use, which means that different people can use it without causing harm or embarrassment to any user. The difference between barrier-free and universal design is that the former is only adapted to the needs of people with disabilities. The latter considers the needs of the elderly. To cope with the future accessibility of autonomous mobility for the elderly in Singapore, the Land Transport Authority (LTA) has released the Land Transport Master Plan 2040 (LTMP 2040), which sets out the universal design goals for mass transit. The LTMP 2040 is designed to be very wheelchair friendly for the elderly (LTA, 2019).

#### Transportation Accessibility

Transportation accessibility aims to guarantee that travelers achieve spatial location mobility alone, with less help from others (Tansy, 2019). The macro-level of transportation accessibility includes

public transportation systems, slow-walking accessibility systems, and accessible signage. The meso-level includes various transportation accessibility facilities and equipment, such as helicopter elevators, ramps and handrails, and the micro-level involves specific transportation accessibility design details. The accessibility of transportation is to realize the effective connection of urban space from different levels and to provide convenient and safe travel conditions for travelers (Zhang & Yu, 2021).

## **1. 2 Empirical studies**

Wu et al. (2020) conducted a comparative study of rail hubs in Japan, Hong Kong, and Singapore. They discovered that these three high-density areas had established a relatively mature and stable balance between rail hubs and urban space. Hong Kong is one of the areas where urban accessible facility building began earlier in China. Hong Kong has created a running mechanism of government investment, social organizations undertaking, and social contributions (Wan, 2017). Hong Kong society started to pay attention to the needs of people with seniors in the 1970s. It has progressively updated design concepts and improved policies and regulations over the last half-century. The effectiveness and characteristics of accessible environment construction have progressively emerged from architecture to urban space, from physical environment to information (Xiang et al., 2020). The Hong Kong Government and public transportation operators have improved and expanded the number of public transportation amenities to help older people integrate into society. For example, the Rehabus service is a public transportation concept that provides unique transportation services for people with mobility impairment who have trouble using public transportation to get to jobs and school or receive training or treatment (Wan, 2017). Since 2002, the Hong Kong government has promoted the concept of "Transport for All" (TFA) and collaborated with public transportation operators to continuously improve public transportation facilities and implement accessible transportation systems to meet the requirements of the elderly (LegCo Transport Panel, 2016).

Liu et al. (2021) cited the transportation policies of Taiwan, Singapore, and Japan from the perspective of age-friendly travel to summarize the targeted and feasible urban transportation improvement measures. In addition, they proposed strengthening the age-friendly public transportation system in continuous travel. Singapore's most travel models of public transportation



are the Mass Rapid Transit (MRT), Light Rail Transit (LRT), and buses. Because of the installation of safe and continuous accessibility for residential, commercial, and workplace structures, public transportation accounts for 60% of daily trips (Zhu, 2016). Singapore's urban planning has always given priority to "People-Oriented," with a strong focus on "Universality," considering the travel needs and psychological expectations of the elderly (Zhang & Yu, 2021). By the end of 2015, Singapore had attained barrier-free design in all MRT stations and bus interchanges, allowing seniors to have priority waiting areas and rides (Yu & Xia, 2018). Zou et al. (2017) investigated the design of pedestrian crossing accessibility facilities in Singapore and discovered that articulation facilities are an essential component of urban pedestrian crossing accessibility facilities. They also found that the safety and systematization of urban roads are the basic conditions for senior citizens to travel.

## **2. Existing policies**

Older people's psychological characteristics and travel behavior patterns necessitate special requirements for urban transportation systems, such as identification and accessibility (Mao & Ren, 2005). In 2007, the World Health Organization (WHO) issued the "Global Age-Friendly Cities: A Guide," which explicitly mentions the concept of outdoor space and transportation in "Age-friendly City" (AFC) (WHO, 2007). According to the guidelines, governments can provide transportation services and establish accessible neighborhood environments for senior citizens. "Age-friendly" emphasizes accessibility and inclusiveness for the elderly and eliminates physical and non-physical barriers (Liu et al., 2021). The WHO promotes urban development that supports the elderly by developing age-friendly cities in urban settings that allow the elderly to maintain active and healthy participation in society. Convenient transportation, buildings, and outdoor spaces are components of an age-friendly city. They enable senior citizens to engage in outdoor activities independently (Srichuae et al., 2016).

Each participating AFC project city has introduced its urban development plan based on an extensive preliminary study by WHO guidelines (Fan et al., 2017). Hong Kong actively responded to WHO's appeal. In 2008, the Hong Kong Council of Social Service (HKCSS) began planning the Hong Kong Elderly Friendly Community Project to encourage older people's active involvement in building a caring community (Kang, 2014). Hong Kong's aging policy is based on

a robust "bottom-up" approach, actively encouraging older people to participate in community-building discussions, encouraging all parties to pay attention to the community environment, and working together to promote the development of age-friendly communities (Sun & Ling, 2020). The "Design Manual 2008" of the Equal Opportunities Commission offers policy directions and strategies for the Hong Kong government to handle accessibility issues at the policy, operational, and technical levels (Xiang et al., 2020). The Hong Kong government declared the implementation of the "Universally Accessible" in 2012, intending to provide lifts or ramps for current public walkways, flyovers, and underpasses in the city (Wan, 2017).

In 2015, the Hong Kong Jockey Club and four universities in Hong Kong launched the Jockey Club Age-friendly City Project (HKJC, 2015). According to Elsawahli et al. (2017), social and physical pursuits in age-friendly cities are characterized by safety, accessibility, and convenience. According to Alley et al. (2007), an age-friendly community effectively meets senior citizens' diverse needs through well-developed infrastructure and services that allow them to participate in social activities and realize their self-worth actively. The government first mentioned the goal of creating an "Age-Friendly City" in the Hong Kong 2016 Policy Address (Hong Kong Government, 2016). The government promotes district elderly centers to provide services to older people through financial support (Sun & Ling, 2020). To promote the development of an age-friendly city in Hong Kong, various stakeholders in society are actively encouraged to fully comprehend the phenomenon of population aging and the needs of older people, as well as to clarify that improving the quality of life of the elderly requires the coordination and cooperation of all sectors of society (Kang, 2014).

Despite Singapore not participating in the WHO Age-Friendly Cities program, the Ministerial Committee on Ageing (MCA) introduced the "City for All Ages" (CFAA) program in 2011 to create a caring and secure environment for all senior citizens (MCA, 2011). In 2015, the Singapore government launched the "Action Plan for Successful Ageing," which proposed a more targeted healthcare service, urban design standards, and urban public transportation facility system for the aging population, as well as four construction of habitat, transport facilities, public spaces, and elderly welfare facilities areas to prepare Singapore for the rapid aging of the population in the coming decade (Hou, 2021). The government decided to increase senior participation in the design

of age-friendly communities. This inclusive program meets the needs of people of all ages (Cheng, 2021). The "Silver Zone" for seniors' program, which addresses the problem of seniors crossing the street safely, was announced in 2014 (Hou, 2021). The Ministerial Committee on Ageing has updated the "2023 Action Plan for Successful Ageing," which aims to meet current and future seniors' changing needs and aspirations. Regarding transportation connectivity, the plan suggests that by 2027, the 100 footbridges in Singapore that older individuals frequently use will have additional elevators and more traffic lights to allow seniors more time to cross the road (MCA, 2023).

In summary, current research on accessibility policies for elderly has concentrated on the design of roads, transportation, community environment building, and travel for elderly. Few studies have linked elderly's social participation to transportation accessibility regulations. As a result, this study aims to investigate the impact of transportation accessibility policies on the social participation of elderly, as well as to discuss the differences and similarities in accessibility policies between Hong Kong and Singapore and the influencing factors that lead to these differences, from a comparative standpoint.

***Research questions:***

1. Are there differences and similarities between the transport accessibility policies for older people in Hong Kong and Singapore?

A: If yes, what are the differences in transport accessibility policies for senior citizens? a) Hong Kong b) Singapore

B: If yes, what are the similarities in transport accessibility policies for senior citizens? a) Hong Kong b) Singapore

2. Are there any impact of transport accessibility policies on the social participation of the elderly in Hong Kong and Singapore?

A: If yes, how do transportation accessibility policies for the seniors enacted in Hong Kong have impact on elderly social involvement and integration?

B: If yes, how do transportation accessibility policies for the seniors enacted in Singapore have impact on elderly social involvement and integration?

## **Conceptual Framework**

This study chooses the "Age-Friendly City" framework as the conceptual framework (WHO, 2007). This study provides valuable insights into how to construct more age-friendly, accessible transportation systems that meet the needs of older people and encourage their social participation by employing the conceptual framework presented. The framework defines friendly cities in eight domains divided into three categories.

The first category is the physical environment, which comprises architecture, transportation, and housing. The housing domain impacts the elderly's quality of life and attempts to provide adequate housing options for older individuals. The transportation area allows seniors to travel freely, safely, and efficiently across the city. The safety and accessibility of outdoor places and buildings influence older individuals' social and economic participation. The following domains of the social environment are social involvement, respect and social inclusion, and civic employment. Older persons' social function influences the respect and acknowledgment they receive. Older people can still contribute to society and realize their self-worth after retirement. Supporting older persons' social participation allows them to use their strengths, gain respect and regard, and form relationships that benefit one another and contribute to social cohesiveness. Finally, communication and information, community support, and health services are all included in the field of health services. The field of information communication guarantees that older persons have simple access to information and that they remain engaged in their communities. Health and support services are critical to preserving older people's health and freedom. The field of community support and health services guarantees that older individuals have easy access to health care services. The Age-Friendly Cities Framework can be used to assess the accessibility of transportation for older people, focusing on creating inclusive, accessible, and supportive environments for the elderly. Understanding the significance of accessible transportation in fostering the social participation of older people in urban contexts is the focus of this framework.

The geriatric population presents the social governance system with an unprecedented challenge. Ensuring accessible travel for older people is a fundamental requirement and guarantee of "active aging" (Zhao, 2022). According to Yu and Xia (2018), mobility and accessibility are the most

influential factors in the mobility of the elderly population and, consequently, their social participation. Liang and Du (2018) discovered that adopting a health-promoting lifestyle is closely correlated with an individual's health status and that excellent health status in older age groups is a crucial pillar of active aging. Yu and Xia (2018) demonstrated that the travel mobility of older people in Hong Kong does not decline sharply with age and that some older people encounter potential spatial barriers to their travel needs. Inadequate transport infrastructure and services limit older people's mobility and access to public spaces. Mobility is necessary for older people to maintain physical health, attain social participation, and preserve their vitality and independence (Srichuae et al., 2016). Accessibility has a more significant impact on older people with lower incomes. Liu et al. (2021) discovered that elderly with lower incomes travel more on foot, even though they are more likely to experience functional impairments that reduce their mobility.

As a result, the framework of this study chooses transportation as a significant subject in the physical environment (Figure 1). The accessibility of the environment's locations and amenities must meet a minimum standard regarding their suitability for older people. Accessibility is a crucial aspect of the urban physical environment and refers to how it is objectively simple for older people to travel from one location to another. This study assesses the accessibility of the transportation system, including the elderly station entrance/exit accessibility, station ramp step accessibility, bus vehicle, bus stop accessibility, and station waiting area accessibility. This framework seeks to improve the accessibility and mobility of older people, increase their independence, and make engaging in social activities easier. The other seven WHO-proposed essential areas can be linked to accessible transportation systems, which connections can facilitate social participation (Ravensbergen et al., 2022)

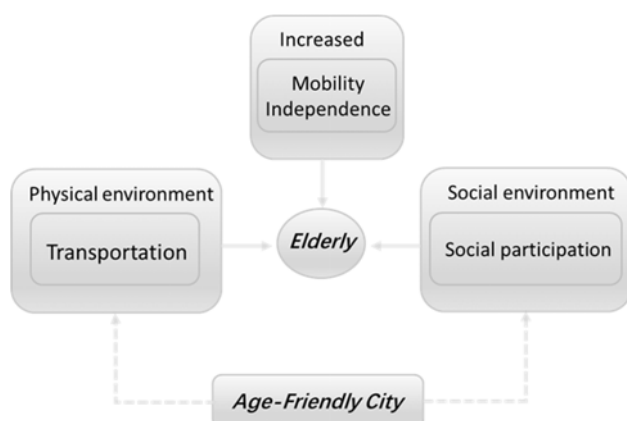


Figure 1

This framework chooses social participation as the social milieu to be investigated. WHO (2007) reports that the social environment has the most significant impact on the mental health of older individuals. Social participation refers to older individuals' active participation in social life and community development, including social activities, volunteer services, and cultural recreation. Perfect community service facilities and harmonious community culture are conducive to increasing the enthusiasm of older people for social participation and decreasing the incidence of psychological problems. In addition to helping older individuals maintain their independence and social connections, improvements to accessible transportation systems can reduce social isolation and exclusion caused by transportation barriers (HKJK, 2015).

The conceptual framework accurately reflects the study's research question, which examines the influence of accessible transportation on the social participation of older individuals. This conceptual framework offers a comprehensive method for analyzing the effect of transportation accessibility policies on the social participation of seniors. The framework considers both the physical and social aspects of the environment in which older people reside, as well as how policy interventions can improve the accessibility and social participation of older people.

### **Methodology**

This study uses a document analysis method of qualitative research to investigate the policies of Hong Kong and Singapore regarding transportation accessibility for older people. Through analyzing government documents and reports, this study investigates the impact of accessible transportation for older people on social participation.

#### **•Inclusion Criteria**

The focus of this investigation is the elderly accessibility policies of Hong Kong and Singapore. This study's specific inclusion criteria are required for the selected materials' content to prevent the scope of the collected data from being excessively broad. First, the used reports, policy documents, and literature should be associated with the following keywords: Hong Kong, Singapore, older people, transportation, accessibility, social participation, and age-friendly cities.

The second form of data may include policy documents, research reports, academic literature, and pertinent guidelines. To ensure the accuracy and veracity of the data, they must all be sourced from government agencies, relevant organizations, and reputable academic websites. To assure relevance, this study selects the policies published between 2000 and 2023.

The policy year chosen ensures that it is pertinent to the thesis. Hong Kong and Singapore have published many policies on accessible design over the past few decades. However, this thesis aims to focus on transportation accessibility policies for older people, so a screening of the published policies is conducted. The Hong Kong Government issued the "Design Manual: Access 1984" to direct the construction of access and facilities for individuals with mobility impairment in private buildings. The Hong Kong Government marked the completion of the revision of the "Design Manual: Access 1997", which outlined the design requirements for adequate access to buildings. "Transport for All" was implemented in 2002 to promote public transportation services in Hong Kong, including services for older people. The "Universal Accessibility Program" was officially launched by the Hong Kong government in August 2012 to expand the government's plan to install barrier-free access facilities on footbridges, elevated walkways, and pedestrian underpasses to facilitate public access (Wan, 2017). In the 2016 Policy Address, the Hong Kong Chief Executive called for "a safe and comfortable home environment for the elderly" and "issues related to the construction of a barrier-free environment" (Xiang et al., 2019). It is evident that since 2000, older people have been included in the Hong Kong government's transport accessibility policy.

Similarly, Singapore introduced the "Accessibility Guidelines" in 1990 to assist architects and developers in meeting the requirements of the elderly in building projects. The updated guidelines have played a significant role in creating a more inclusive built environment over the subsequent decades. According to the guidelines, new construction and significant renovation projects must include accessible features for older people and those with mobility impairments (LTA, 2022). The government of Singapore has been concerned with accessible design since 1990, but the emphasis on transportation accessibility began in 2000.

Since 2000, the Land Transport Authority (LTA) has prioritized constructing transport accessibility, renovating existing MRT stations, and making all rail stations accessible for older

people. According to the "2008 Land Transport Master Plan" published by the LTA, the ultimate objective of public transport development is to establish a people-oriented land transportation system that can serve the needs of a society with compatible requirements (Yan et al., 2012). The Singaporean government introduced the "the City for All Ages" in 2011 to provide a more senior-friendly urban public transportation system. Singapore launched the "Action Plan for Successful Ageing" in 2016 to make urban public transportation more accessible (Liu et al., 2021). Therefore, this study ensures the paper's relevance by including pertinent Hong Kong and Singapore policies published between 2000 and 2023.

#### •Procedure

The literature review in this study uses a qualitative methodology. Firstly, using electronic resources such as Lingnan University Library, Google Scholar, and Scopus, as well as government and non-government websites in Hong Kong and Singapore, this study exhaustively searches for policy documents, statistical reports, and academic articles related to the designated keywords. From the reports on the development of the elderly population, it can comprehend the current aging state in Hong Kong and Singapore and recognize the need to investigate the construction of accessibility. This study identified barriers-free construction and universal design concepts by reviewing relevant literature from China and internationally. Secondly, this study searches the websites of relevant authorities in Hong Kong and Singapore for policy documents for preliminary reading. Thirdly, according to the order of policy introduction, this study extracts and collates the contents of policy contents, implementation strategies, and success factors from the selected literature. Finally, the collected data and data extraction forms are analyzed to elaborate and explain the content surrounding the research questions and resolve the research questions by comparing the Hong Kong and Singapore policy documents. This study aims to provide a comprehensive understanding of transport accessibility policies by reviewing and extracting pertinent policy documents and organizing data tables to investigate the relationship between transport accessibility policies and the social participation of the elderly in Hong Kong and Singapore.



**•Data Collection**

Data collection for this study includes gathering pertinent documents about senior transportation accessibility policies and programs designed to enhance senior accessibility. This study gathers data via online searches and policy documents published by government agencies. The issue of aging is a prevalent social problem on a global scale, and the construction of age-friendly communities is a valuable exploration for proactively addressing the issue of an aging population. The implementation and practice of diversity and inclusive urban development are enhancing urban transportation facilities in terms of accessibility and convenience, increasing the safety and convenience of travel for the aging population (Yu & Xia, 2018). Therefore, to better achieve active aging, it is essential to collect aging data. Hong Kong Statistics Department, the Singapore Bureau of Statistics, and the Asia-Pacific Economic Commission provide data on the geriatric population. As a part of the literature review and theoretical foundation, this study searches data using keywords in academic databases. The collection covers various topics, including identification of the accessibility concept, elderly travel requirements, the impact of transportation on elderly travel, elderly travel independence, elderly needs, age-friendly cities, transportation accessibility, and elderly social participation. This study collects policies, reports, and news from the official websites of the WHO, Hong Kong Government, Hong Kong Labor and Welfare Bureau, Singapore Ministerial Committee on Ageing, and Singapore Land Transport Authority. In addition, this study evaluates the consistency of all article-collected data with the study's conceptual framework. Then, it eliminates any content that does not adhere to the structure. The data that satisfied the criteria are extracted and arranged in tables for comparative analysis.

**•Data Analysis**

This study applies the document analysis methodology of qualitative investigation. Document analysis is a low-cost method for collecting empirical data with stability, precision, and longevity benefits. Finding, reading, selecting, comprehending, and synthesizing the data contained in the documents comprise the analysis process (Bowen, 2009). This study aims to analyze the impact of accessible transportation policies on the social participation of older people. Initially, this study skims through the collected documents and policies to choose and extract the material. Secondly, thoroughly read the documents and policies on older people's accessibility in Hong Kong and Singapore, which makes the following discussion about the aging-friendly urban framework and

accessible transportation policies better. Thirdly, this study draws valuable insights by interpreting and comparing the specific accessibility measures, project processes, and project results adopted by the governments and NGOs in Hong Kong and Singapore. WHO plans to promote the functionality of older individuals primarily by assisting them in maintaining their abilities and providing environmental support (WHO, 2015). The accessibility of urban living space is a prerequisite for the construction of accessible urban transportation, which is a prerequisite and foundation for addressing the mobility of the elderly (Zhang et al., 2014). In addition to examining the existing literature surrounding the research questions, this paper searches for evaluation reports published by the government or agencies in Hong Kong and Singapore to determine whether the construction of accessible transportation affects the social participation of older people. Based on existing articles and data reports, this study evaluates the policies' efficacy in achieving an age-friendly city and accessible transportation by analyzing their strengths and weaknesses. Based on these analyses, recommendations are made to enhance older adult accessibility policies and programs.

## **Findings**

This study analyses the significant progress made by Singapore and Hong Kong in designing transportation systems to accommodate an aging population. The findings reveal specific measures both cities took to establish age-friendly environments, such as pedestrian, public, and rail transport. This study has determined that Singapore and Hong Kong have made significant strides in creating transportation systems suitable for the elderly by comparing. By examining these successful policies, valuable insights can be obtained to inform the creation of a suitable transportation system for older individuals.

## **Pedestrian Transportation**

The aging population has various demands for quality of life due to the rise in living standards, which increases their demand for transport services. On the one hand, pursuing a higher standard of living will result in various travel purposes for older people, including a growing demand for social travel. On the other hand, the rise in the geriatric population's travel volume places demands on the travel environment and infrastructure (Dou et al., 2015). With the changes in physical functions and basic needs of the elderly population, their travel mode has gradually shifted from

multiple modes of transportation to walking-based transportation (Yu & Xia, 2018). Singapore and Hong Kong have adopted a variety of action initiatives and programs that, while different, have improved the quality of life of the aging population in practice (Table 1).

Table 1:

	Existing Resources	Key Findings	Data Sources
Singapore	Green Man Plus (2009)	Traffic signals are equipped with special card readers to extend the "green man" signal, extending the time for the elderly to cross the road by up to 13 seconds	Land Transport Authority <a href="https://www.lta.gov.sg/content/ltagov/en/getting_around/driving_in_singapore/intelligent_transport_systems/green_man.html">https://www.lta.gov.sg/content/ltagov/en/getting_around/driving_in_singapore/intelligent_transport_systems/green_man.html</a>
	Walk2Ride (2013)	Covered walkways for schools, medical institutions, and other public facilities within a 200-meter radius of bus interchanges and light rail stations	Land Transport Authority <a href="https://www.lta.gov.sg/content/ltagov/en/newsroom/2018/9/2/factsheet-lta-completes-200km-of-sheltered-walkways-under-walk2ride-programme.html">https://www.lta.gov.sg/content/ltagov/en/newsroom/2018/9/2/factsheet-lta-completes-200km-of-sheltered-walkways-under-walk2ride-programme.html</a>
	Sliver Zone (2014)	Sliver Zone areas are required to reduce the speed to 40 km/h and speed bumps are installed to slow down oncoming traffic. Increase the safety of elderly people crossing the road.	Land Transport Authority <a href="https://www.lta.gov.sg/content/ltagov/en/getting_around/active_mobility/walking_cycling_infrastructure/walking.html">https://www.lta.gov.sg/content/ltagov/en/getting_around/active_mobility/walking_cycling_infrastructure/walking.html</a>
Hong Kong	Universal Accessibility (2012)	Add lifts or ramps to existing public walkways, flyovers, and underpasses in all 18 districts of Hong Kong.	Highways Department <a href="https://www.hyd.gov.hk/en/our_projects/walkability_projects/UA/">https://www.hyd.gov.hk/en/our_projects/walkability_projects/UA/</a>
	Smart Device for the Elderly and People	Enabling elderly passengers to cross the road more	Transport Department <a href="https://www.td.gov.hk">https://www.td.gov.hk</a>

	with Disabilities (2018)	safely. Traffic lights are retrofitted with smart devices and elderly people use Octopus cards to tap cards to extend the time to cross the road.	
	2018 Policy Address	Feasibility study launched for proposed lift additions to 128 pedestrian walkways	Hong Kong Government <a href="https://www.policyaddress.gov.hk/2018/eng/policy.html">https://www.policyaddress.gov.hk/2018/eng/policy.html</a>

Singapore's urban planning always prioritizes "people-oriented" design, takes the mobility needs of the elderly into account, accords importance to urban transportation accessibility planning and construction, and integrates and implements transportation accessibility design into urban planning and construction. For instance, the breadth of pedestrian paths has been increased from 1.5 meters to 1.8 meters to accommodate the elderly and wheelchair users. Covered linkways are complemented with rest areas to enhance the experience of the elderly and wheelchair users. These rest areas could include a bench and wheelchair parking space (LTA, 2022).

Even with the assistance of traffic signals, traversing the street has become a daunting task for many older people, where transportation is becoming increasingly congested. Older people are typically slow to move, and the "green man" at the traffic signal frequently turns red before they reach the middle of the road. The Singaporean government introduced the "Green Man Plus" for the first time in 2009 to give older people more time to cross the street safely (LTA, 2022). The government of Singapore has installed a particular card reader for the traffic signal. When seniors cross the street, they can touch their "Senior Citizen Discount Easy Card" to the card reader, and the computer system of the traffic signal will automatically extend the "green man" signal by up to 13 seconds. With the extended crossing time, senior citizens can be able to traverse the street at a more leisurely pace. More than 1,000 Singapore crosswalks are equipped with Green Man Plus (LTA, 2022).

Singapore launched the Walk2Ride program in 2013 to increase walkability between main transportation networks and residential and public facilities. Covered walkways were constructed for schools, medical facilities, and other public facilities within 400m of Mass Rapid Transit (MRT) stations and within 200m of bus interchanges and bus stops with significant commuter traffic (LTA, 2022). In 2018, the original 46km of pedestrian connections increased to 200km, and there were signage, subway route map, and rest areas along the way to enable seniors to walk to stations comfortably. This significantly enhances the experience of senior citizens traveling to and from bus stations and increases the accessibility of transit facilities (Sha et al., 2021).

The Land Transport Authority introduced the Silver Zone program in 2014 to increase the safety of senior citizens by modifying the roads and adjacent environment to make it easier for older pedestrians to navigate daily traffic (LTA, 2022). The silver zones are in specific housing estates with a high elderly population, a relatively high accident rate among older people, and locations close to convenience facilities frequented by older people. In silver zone areas, the speed of cars limit is reduced to 40 km/h, and some three-dimensional markers are also printed on the road to create a roadblock's visual effect, prompting drivers to slow down or stop. In addition to narrower roads and speed bumps to slow oncoming traffic, these areas also put two-stage intersections to enable elderly pedestrians to rest in the middle of their journey. LTA has announced that by the end of 2023, the number of silver zones on the island will increase from 35 to 50. This is consistent with the "Happy Aging Action Plan," which seeks to create safer and more convenient travel environments for older people and encourage them to remain active (LTA, 2022).

Hong Kong has extremely stringent accessibility requirements for prescribed roads, allowing the elderly and wheelchair users to travel freely on accessible roads. The government is devoted to providing public pedestrian walkways with accessible. In 2012, the Hong Kong Government announced implementation of the "Universal Accessibility Program" to equip existing public walkways, footbridges, and underpasses in all 18 districts with standard accessible access (Wan, 2017). Since the launch of the "Universal Accessibility Program" in 2012, the government has expanded the scope of the initiative to include more pedestrian accesses to benefit more senior citizens (HyD, 2012). In the 2018 Policy Address, the government announced the commencement of feasibility studies for the remaining 128 pedestrian accesses in various districts across the

territory, intending to advance the feasible projects to benefit more senior citizens (Hong Kong Government, 2018).

As the elderly population in Hong Kong continues to rise, the Transport Department introduced the "Smart Device for the Elderly and People with Disabilities to Extend Green Light Blinking Time" initiative in 2018 to assist elderly passengers in crossing the road more safely (Transport Department, 2018). With the implementation of intelligent devices on pedestrian traffic light poles, when elderly people are waiting to cross the street at pedestrian crossings, they can activate the smart devices by tapping their Elder Octopus cards to extend the flashing "green man." To avoid causing traffic congestion, these pedestrian crossings are situated near frequented areas frequented by seniors and at less-busy intersections. The devices are implemented in twenty-one locations across the territory as of 2023 (Transportation Department, 2018).

### Public Buses

The construction of city transportation infrastructure determines the scope of urban residents' daily activities and is a significant indicator of the character of urban life and living conditions. Due to their declining physical abilities, older people rely on public conveyance more than other city residents. For building an aging-friendly city, route planning, convenience, and practicability of public transportation have become crucial factors. Many measures have been implemented by Singapore and Hong Kong governments to construct accessible public transportation (Table 2).

Table 2:

	Existing Resources	Key Findings	Data Sources
Singapore	Code on Accessibility in the Built Environment 2019	New bus stops are built according to accessibility standards. Operate low-floor bus vehicles. Provide priority waiting places for the elderly and arrange for their priority rides.	Building and Construction Authority <a href="https://www1.bca.gov.sg/regulatory-info/building-control/universal-design-and-friendly-buildings/code-on-accessibility-in-the-built-environment">https://www1.bca.gov.sg/regulatory-info/building-control/universal-design-and-friendly-buildings/code-on-accessibility-in-the-built-environment</a>
	Land Transport	Different styles and	Land Transport Authority

	Master Plan 2040	colors of seats are designed to avoid elderly people from missing the stops. Use color to distinguish the dividing line between bus stops and sidewalks. Traffic signs provide visual cues for seniors through patterns.	<a href="https://www.lta.gov.sg/content/ltagov/en/who_we_are/our_work/land_transport_master_plan_2040.html">https://www.lta.gov.sg/content/ltagov/en/who_we_are/our_work/land_transport_master_plan_2040.html</a>
<b>Hong Kong</b>	Transport for All (2002)	Ninety percent of the franchised buses are wheelchair accessible low-floor buses. The number of wheelchair bays inside the bus cars has been increased to 2 for the convenience of passengers who need to use wheelchairs.	Hong Kong Government
	Low-floor Wheelchair Accessible Minibus Trial Scheme (2018)	Introduction of low-floor minibuses for hospital routes: Hong Kong Island GMB Route 54M (Kennedy Town Station - Queen Mary Hospital) and New Territories GMB Route 808 (Kam Ying Court - Prince of Wales Hospital) Public Light Bus, GMB Route 413 (Tsing Yi Ferry Pier - Princess Margaret Hospital)	Transport Department <a href="https://www.info.gov.hk/gia/general/201801/24/P2018012400605.htm">https://www.info.gov.hk/gia/general/201801/24/P2018012400605.htm</a>
	2016 Policy Address	The bus stops are designed to meet the needs of the elderly by installing seats and instant arrival	Hong Kong Government <a href="https://www.policyaddress.gov.hk/2016/eng/index.html">https://www.policyaddress.gov.hk/2016/eng/index.html</a>

		information display boards, universal bench type seats, and simple handrails.	
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Singapore established the Land Transport Authority in 1995 and published a "Land Transport White Paper" outlining a multifaceted land transport policy (LTA, 2022). Enhancing Singapore's municipal transportation infrastructure emphasizes urban planning that reflects the people-oriented design concept. According to the accessibility standards, the anti-slip design of new bus stop platforms considers the travel safety and requirements of the elderly and uses pavers with increased friction. All newly registered buses are wheelchair-accessible, and bus companies have deployed many low-floor buses to make bus travel easier for older people (Yan et al., 2012). All Singapore bus interchanges were accessible in 2015, with priority waiting areas and mobility-impaired transportation for older people (Yu & Xia, 2018). Starting in 2022, the Land Transport Authority renovated 360 bus stops to improve the convenience of elderly passengers. The objective is to modernize all 360 bus locations by the middle of 2025 (Dong et al., 2022).

Singapore takes accessibility into account in the design of bus stops. Each district in Singapore has its unique style of bus stop, replete with seats of various colors and designs. This strategy ensures that nearly every bus stop is distinct, preventing seniors from becoming confused and sitting at the incorrect stops. For instance, Singapore's Jurong Town has introduced a distinctive bus stop. This intelligent bus stop provides passengers with Wi-Fi, electronic information displays, free books, and a swing set for recreation and relaxation, which impresses the elderly (Bai et al., 2016). In addition, the dividing line between the bus stop and the sidewalk employs a distinct sidewalk pattern and contrasting colors to improve accessibility. This design strategy acknowledges that more than signage is needed, particularly for older individuals with slower reaction times. The contrasting colors and different paving patterns serve a dual purpose: to emphasize the distinctive style and character of the different areas and provide the elderly with visual and psychological cues. For instance, the combination of contrasting colors and varied paving patterns aids senior adults in navigating the environment of a bus stop, thereby enhancing their independence and confidence when using public transportation.



Mao and Ren (2005) found that the elderly's dissatisfaction with public transportation was primarily attributable to lengthy waiting times, poor safety, and discomfort. Due to older people's physical condition and health status, they should not wander or stand for extended periods in the open air, particularly during inclement weather. The design of accessible seats (with handrails) in Singapore's station platform waiting areas demonstrates consideration for the elderly. In bus terminals, more seats are installed in the central area for waiting and resting, and the space between each seat is close to accommodate the stopping requirements of older people. The queuing waiting area is separated by a simple seat in a railing, followed by a distinct yellow line as an extension of the queuing waiting area. Furthermore, a separate disabled waiting area is set up at the most convenient location next to the railing (Zhang et al., 2014), where wheelchair users can board the bus independently via a connecting board (Bai et al., 2016). Consequently, Singapore has effectively enhanced public transportation facilities and optimized the transportation environment for an aging population by promptly adding accessibility facilities.

In Hong Kong, since 2002, the government has been promoting the "Transport for All" (TFA) concept. It has been working with public transport operators to continuously improve public transport facilities and implement an accessible transportation system to meet the requirements of the elderly. According to the Transport and Housing Bureau (2017), more than ninety percent of franchised buses are wheelchair-accessible low-floor buses with lowered bodies and wide doors, allowing wheelchair users to board and alight independently through the connecting panels on the bus. Older people who use wheelchairs can access a wheelchair parking space inside the bus (Wan, 2017). Because most buses only offer one wheelchair parking space, wheelchair users sometimes wait for multiple buses to locate a spot. Since 2017, the government and bus companies have examined the possibility of doubling the number of wheelchair spaces from one to two. In 2019, 242 buses offered two disability parking spaces to eliminate the obstacles wheelchair users face when riding a bus (HKSR, 2022).

In Hong Kong 2016 Policy Address, the HKSAR Government allocated \$88.27 million to subsidize franchised bus operators' seating installation and immediate arrival information display panels at covered bus stops (Hong Kong Government, 2016). As of August 2021, 2,200 covered bus stops (25.1% of the total bus stops in 2019) have seats installed. The universalized bench-style

seats can accommodate more individuals, and the design with simple armrests fulfills the needs of senior citizens in full (HKSR, 2022). In 2018, the Hong Kong government launched the "Low-floor Wheelchair Accessible Minibus Trial Scheme" to create two levels of wheelchair accessibility by introducing green minibuses on two hospital routes to better address the travel issues of older people. They are Hong Kong Island GMB Route 54M, New Territories GMB Route 808, and New Territories GMB Route 413, which is implemented in 2021 (Sau Po Centre on Ageing & The University of Hong Kong, 2021).

### Rail Transportation

The accessible environment of rail transit is the most crucial part of public transportation accessibility because of its characteristics, such as a high frequency of use and a wide variety of users. Singapore and Hong Kong have more developed rail transit interchange stations and have implemented systematic accessible designs for the urban construction requirements of the old population (Table 3).

Table 3:

	Existing Resources	Key Findings	Data Sources
Singapore	Code on Accessibility in the Built Environment 2007	Add lifts and escalators and provide continuous ramps at entrances and exits.	Building and Construction Authority <a href="https://www1.bca.gov.sg/regulatory-info/building-control/universal-design-and-friendly-buildings/code-on-accessibility-in-the-built-environment">https://www1.bca.gov.sg/regulatory-info/building-control/universal-design-and-friendly-buildings/code-on-accessibility-in-the-built-environment</a>
	Find Your Way (2016)	Add color identification signs in rail transit stations to help seniors who get lost easily identify their way around interchanges and subway stations.	Singapore MRT and Alzheimer's Disease Organization
Hong Kong	Design	All stations provide	Hong Kong Government

	Manual 2008 (2021 edition)	hand-carried or movable folding boards; interchange stations are equipped with anti-slip strips at the entrances and exits; rail transit interchange stations provide rest areas and reserve special waiting areas for the elderly; accessible shared telephones and special lines for assistance are set up.	
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The Singapore Land Transport Authority has retrofitted rail stations with elevators, escalators, and straight staircases at entrances and exits since 2006. All MRT stations are now equipped with lifts for older people, and in 2021, Singapore MRT introduced the "Find Your Way" project in partnership with Alzheimer's Disease Organization. The project assists elderly persons prone to getting lost in identifying their routes at interchanges and MRT stations by painting colorful murals (Dong et al., 2022). Even those who cannot read or write can reliably identify the routes in the train stations by color.

In Hong Kong, the MTR system has various amenities to accommodate the elderly. For instance, all stations provide portable folding boards so that if a wheelchair user needs to ride the MTR, the personnel provide elderly wheelchair users with portable folding boards. On the platform level, some wheelchair-specific waiting areas exist for older people. In addition, wheelchair-accessible shared telephones and support lines are available throughout the MTR, ensuring that elderly wheelchair users can request assistance from any location within the station (Wan, 2017).

## Discussion

According to the findings, Singapore and Hong Kong have instituted effective policies and programs. To further investigate the impact of accessibility on senior citizens, this study discusses three aspects based on the conceptual framework. First, this study discusses the impact of accessibility on the mobility of older people. Second, this study investigates the effect of accessibility on the social participation of the elderly. Third, this study discusses the significance

of accessibility connectivity and the impact of transportation accessibility connectivity on the social participation of older people.

### **The impact of transportation accessibility on the elderly**

Older people's physiological aging characteristics cause them to adapt less to their environment. Their stress response to external stimuli becomes delayed as their health declines. When the elderly cannot drive a car due to physical limitations, if public transportation options near their homes are insufficient and without safe walking paths, they are vulnerable to external stress that prevents them from performing daily activities easily and independently (Li, 2019). As a result, creating an accessible transportation environment is critical to boosting the mobility independence of older persons.

When older people find it challenging to adapt to their surroundings due to changes in their individual physical and mental functions, it is critical to meet the various needs of the elderly in the community to the greatest extent possible through the support of facilities, services, policies, and other aspects to improve the elderly's ability to live independently. Even if older people cannot drive, they can still go shopping or to leisure activities by taking public transportation or walking (Li, 2019). Walking is also a healthy exercise for older persons, as it keeps them active and independent (Srichuae et al., 2016). Inadequate age-appropriate participation environments can impede certain older persons with the desire and opportunity but limited mobility from participating in economic and social development (Wan, 2017). Xie (2022) discovered that the elderly's overall willingness to contribute to society is high and that more than 70% of older people are willing to participate in community volunteer services. However, the actual participation rate is only 40% due to transportation limitations. Better accessible transportation would improve the mood of travelers (Mao et al., 2021). People's perceptions of the quality and efficacy of daily travel services may improve if public transportation is more accessible (Ettema et al., 2011). Wang et al. (2020) determined that travel safety and neighborhood socialization can be enhanced by increasing facility accessibility and enhancing environmental design.

As a result, it is critical for the government to remove the age restriction in environmental construction and to create an age-appropriate participation environment for older people in public transit and other places. Renovating urban public transportation, roads, and other facilities ensures

that older people can get around securely and conveniently. Implementing the Silver Zones program in Singapore has considerably decreased road traffic accidents involving elderly pedestrians and increased the safety of senior travelers. The number of road traffic incidents involving elderly pedestrians in completed silver zones has decreased by approximately 80% since the introduction of the silver zone concept (LTA, 2022). Singapore provides accessible bus stations and barrier-free waiting areas for older people to encourage greater use of public transportation and promote social activities (LTA, 2022). Hong Kong has similarly promoted the participation of older people in social activities by implementing barrier-free initiatives, providing barrier-free access to walkways, footbridges, and underpasses, and introducing floor minibuses (HKSR, 2022).

### **The impact of social participation on older people**

Older persons' health encompasses physical and psychological health, and social activity can improve their health in various physical and psychological ways. Older people have a similar loss in mental health, such as cognitive ability and memory, which impacts their ability to adjust to their surroundings and diminishes their willingness and quality of participation in various social activities (Yu, 2020). Ravensbergen et al. (2022) discovered that older people's participation in social activities such as dance and strolling boosts their activity level and helps accomplish exercise while enriching their later life, promoting their mental health, and improving their quality of life. Furthermore, participation in social activities can enhance the frequency of engagement with people, provide a sense of identity, and lessen depressive symptoms (Musselwhite et al., 2015); by chatting with peers, they can address their concerns and receive respect (Yu, 2020). Liang and Zhang (2023) used logistic regression models to analyze the effects of social activity participation on the health of older people. They found that social participation had a positive effect on the physical and mental health of older people and that social participation was effective in reducing the risk of depression and enhancing the cognitive function of older people. As a result, it is apparent that social participation not only enhances the health of older people but is also an essential means of social reintegration for them.

### **The impact of transportation accessibility connectivity on the social participation of older people**

The accessible design of urban transportation in Singapore and Hong Kong is based on practicality and realism, and the development direction is universal. The two regions have many similar policies for building accessible pedestrian transportation, public buses, and rail transit and, for example, widening the road surface, designing ramps, extending the length of crossing the road, building bus stop waiting for areas, placing folding boards for boarding and alighting, and adding elevators. However, Hong Kong's connectivity of accessible transportation still needs to improve. For instance, there are numerous elevators that wheelchair users must detour to access. Although some multi-service centers for the elderly are connected to retail malls, the elderly must open smoke-proof doors and climb stairs to reach them or take a detour to nearby public housing estates and use the lifts to reach the center platform. Due to the inconvenience of walking or the hassle (e.g., being questioned by security guards as non-residents), many seniors choose to give up services or participate in centers, indirectly reducing their motivation to participate in society (HKSR, 2022).

The success of Singapore's municipal transportation system stems from its integration into the city's overall design. Using rail as the dominant mode and bus lines as feeders and encouraging commuters to switch between various modes of public transport through facility and management integration measures, Singapore's multi-modal integrated public transport system has greatly facilitated the use of public transportation (Yan et al., 2012). As of 2019, Singapore has ten integrated bus terminals, with more to come as new rail lines are constructed. The hubs provide air-conditioned bus interchange space as well as MRT stations with commercial support, and the hubs are mainly designed vertically, with MRT stations in the upper floors or underground space and bus interchange stations in the ground space, minimizing the walking distance for seniors and eliminating as many traffic barriers as possible (LTA, 2022).

As a result, when examining transportation accessibility policies, it is critical to emphasize and discuss the factor of "Connectivity" (Figure 2). Transportation accessibility facilitates the mobility of seniors by reducing their reliance on others. Feng (2017) investigated the determinants of older people's travel behavior and discovered that a connected transportation system increased the

elderly's access to their destinations. Quality connections encourage senior citizens to choose walking as a mode of transportation and maintain a constant connection to the outside world (Stjernborg et al., 2014). Roorda et al. (2010) discovered that residents of cities with dense and well-connected public transportation are more likely to participate in outdoor activities. However, Hong Kong's accessible rail transit system remains not connected. It disregards the travel requirements of the elderly, such as frequency, schedule, and routes. The Transportation and Housing Bureau (2017) found that older people prefer the ground public transportation system because it meets their diminishing functional capacity and travel requirements better.

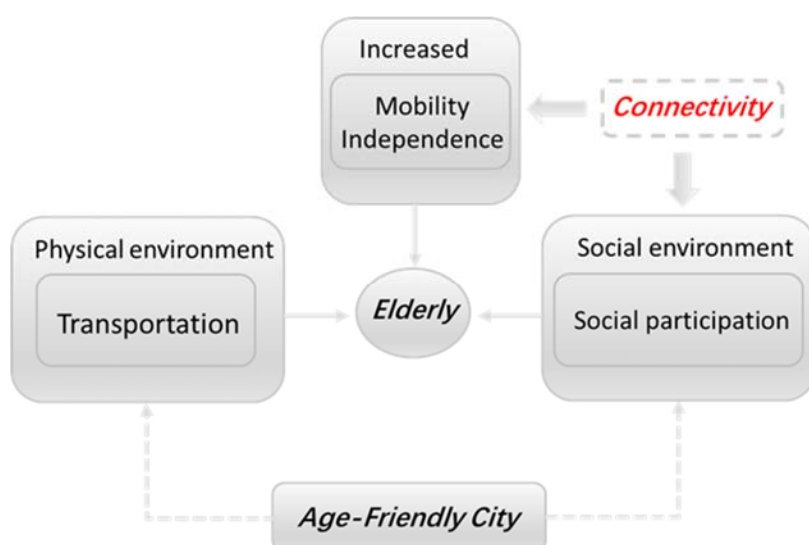


Figure 2

Accessible connectivity also has an essential impact on the social participation of older persons. The outdoor environment has a significant impact on the health and activity levels of older people. From the perspective of the elderly, potential environmental influences include local safety conditions, traffic conditions, and sidewalk facilities (Zhou & Chang, 2020). Older people face obstacles to mobility and social participation. If the transportation system does not offer convenient and dependable travel options, they may feel isolated and excluded, limiting their opportunities to engage in social activities. Richard et al. (2008) studied social participation neighborhood factors for older people in urban areas. They discovered that the ease with which older people believed they had access to specific resources and the five-minute travel time to these resources were positively correlated. Accessibility to resources and the availability of amenities within five minutes of walking distance of a person's residence influence social participation. By

constructing connectively accessible transportation, older individuals will have greater access to resources and services, enhancing their social participation (Zhou & Chang, 2020).

### **Implications**

This study emphasizes the policy implications of employing universal design principles and involving older people in policymaking. This research implication enables future scholars to examine accessibility construction from a holistic perspective, emphasizing the significance of accessible connectivity to foster the development of an age-friendly urban society. By learning from Singapore's successful experience, the implications of transitioning accessible design to universal design are recognized to broaden the target audience of urban planning and create a harmonious society.

### **Policy implications**

#### **Universal Design**

In Hong Kong, accessible facilities have not been constructed using the concept of universal design. Several countries have utilized Universal Design for over a decade (HKSR, 2022). In Japan, accessible environments have already attained universal design status. The Japanese Ministry of Transportation issued the "Traffic and Building Accessibility Regulations" in 2006, which states that only continuous barrier-free access for whole citizens can be truly established (Gong et al., 2018). Taiwan's accessibility was built early and insists that accessibility is not "exclusive" but "universal," In other words, it is applied to all members of society, including the elderly, children, and pregnant women (Sun & Cui, 2007). For example, due to the large gap between the rail and the carriage, older people and wheelchair users must request assistance from the staff to lower the incline before entering the carriage on the MTR in Hong Kong. However, in Singapore, where the universal design concept has been adopted, the elderly can enter the carriage without requesting the staff to lower the ramp, achieving a genuinely accessible travel experience.

The Building and Construction Authority of Singapore (BCA) formulated the Accessible Design Guidelines for Public Spaces in 2016 to improve accessibility design standards and promote universal design (BCA, 2016). These guidelines expand the population served by accessible environments to include all members of society, including the elderly, children, and pregnant



women, and design them systematically based on the actual needs of different people (BCA, 2016). Singapore's typhoon corridor is among the most remarkable examples of universal design. The corridors are the most frequently used public facilities in Singapore, and the cobweb-like storm corridors and associated accessible facilities that permeate every building not only meet the safe passage needs of the elderly and children but also increase the space for residents to interact. On the way from home to the bus stop, there are not too many lengthy steps that deter people, but relatively safe and comfortable accessible ramps and rain-proof corridors, achieving "full coverage of facilities and accessible ways" from home to community to bus stop.

### **Participation of older people**

Policymakers can discover new essential points only by putting themselves in the shoes of older people and soliciting more feedback from them (JCAFC, 2018). In Hong Kong, for instance, low-floor minibuses have been in operation since 2018, but their implementation has been ineffective. Due to the low frequency and inadequate route coverage of low-floor minibuses, some seniors prefer taxis or buses. The government discovered through a survey of the elderly's willingness that they have difficulty estimating the duration of medical appointments and cannot ride the bus on time, so that they will choose alternative modes of transportation (Sau Po Centre on Ageing & The University of Hong Kong, 2021). Afterward, the Transport Department added routes and refits (Transport Department, 2018). This indicates that the government should encourage senior citizens to participate in decision-making and share their real-life experiences.

According to the AFC guidelines, the World Health Organization suggests that to meet the requirements of the elderly better; policymakers should listen to their voices and adopt their suggestions (WHO, 2007). The Japanese government encourages accessibility users such as older people and related social organizations to participate in the accessibility legislation process, which makes the process of creating accessibility laws and regulations more transparent and provides a top-level guarantee for accessibility construction to truly meet actual needs (Han et al., 2021). Taiwan's Ageing Hub, which prioritizes the participation of older people in collaborative design to coordinate age-friendly spaces, planning, and transportation, is the result of the Taiwan government's emphasis on multi-party cooperation to promote its establishment (Wan, 2017). Hong Kong Transportation Department could conduct regular consultations with senior citizens to

solicit their feedback and promote the concept of "age-friendly transport." Seniors' opinions on age-friendly transportation are gathered, and their attention is drawn to the concept and design of age-friendly transportation using a bottom-up approach. In consultation sessions with transportation providers, seniors can be the first to receive information and provide timely suggestions to enhance accessibility and facilities (Sau Po Centre on Ageing & The University of Hong Kong, 2021).

### **Research implications**

This study encourages more scholars to go beyond the framework of independent accessibility facilities and examine accessibility construction from a holistic perspective to create a friendlier living environment for older people. Future research should focus on the influence of accessibility connectivity on older individuals' travel behavior and social participation. The study of connectivity between pedestrian transportation, conventional public transportation, and rail transit can provide valuable insights for enhancing the mobility independence of senior citizens. Researchers can examine policies about accessibility connectivity, assess the efficacy of policies, evaluate the roles and responsibilities of various government departments, and propose more effective governance models. Connectivity also can apply to other domains, including accessible housing and accessible buildings. In conclusion, this study offers future researchers a new direction for advancing the development of an accessible society.

### **Limitations**

There are some limitations in this study. First, this study employs the document analysis method of qualitative research, with secondary data collected from government websites or databases in Singapore and Hong Kong. Due to the absence of a primary data collection method, such as a qualitative or quantitative research studies, this study could not directly ascertain the accurate opinions of older people regarding the accessibility of transportation construction. Future studies can employ the in-depth interview method and the questionnaire method to directly obtain first-hand data and to collect the genuine opinions of the elderly to gain a more comprehensive understanding of transportation accessibility policies for older people.

Second, this investigation analyzed only documents published between 2000 and 2023. However, essential documents may also exist in Singapore and Hong Kong governments before 2000. Therefore, compiling a comprehensive and exhaustive list of all the policy documents discussed in this study is impossible.

### **Conclusion**

With the advent of an aging society, greater emphasis is placed on the rights of older people to participate in social life, and the construction of a transportation accessibility environment may impact these rights. Considering this, this study compares and analyzes the geriatric transportation accessibility policies in Singapore and Hong Kong. In constructing the conceptual framework, the study refers to the WHO's framework for constructing age-friendly cities and selects "transportation" and "social participation" as central concepts. Through qualitative document analysis, it is determined that the accessible design of urban rail transit interchange stations in Singapore and Hong Kong is based on the rational and practical concept of people-oriented, which creates an excellent, accessible transportation environment and promotes the social participation of older people.

In contrast, Hong Kong's accessibility construction for transportation has connectivity issues. The intermittently accessible transportation environments do not effectively assist the elderly in resolving their travel issues. It is crucial that future urban planning emphasize accessibility and connectivity to safeguard the rights of older individuals to travel and participate in society. In addition, the government should encourage the active participation of senior citizens in policy decisions and solicit their input on urban development. Lastly, contemporary researchers have focused more on the infrastructure level of accessibility and less on the transportation system. Therefore, this study recommends that future researchers give more attention to the connectivity of transportation accessibility construction to foster future research growth in this area.

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