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Public transport policy measures for improving elderly mobility

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ABSTRACT

Population aging is happening in most of the world's metropolitan cities, and the proportion of elderly adults is predicted to increase significantly in the coming decades. This rapid growth of elderly populations may lead to serious transport issues when their mobility is compromised by the unavailability of public transport services. Public transport concession fare schemes are commonly implemented in many cities to encourage the elderly's participation in social activities. However, these policies emphasize the role of money (i.e., travel fares) in determining willingness to travel. Other possible factors, such as walking distance to and from stops and stations, wait times for public transport services, and seat availability, have not been considered by transport operators and policy makers. In this study, we interviewed 613 elderly Hong Kong residents aged 60 or above regarding their travel decisions using designated modes of public transport to attend social activities in four hypothetical games. A total of 2452 observations were collected for model development. Binary logistic regression models were calibrated to determine which factors significantly influenced the elderly's travel decisions. Based on the model results, this paper suggests policy measures to strengthen public transport planning in Hong Kong with the goal of improving elderly mobility. The findings provide policy insights that can also be applied to other metropolitan cities with similar traffic conditions.

1. Introduction

1.1. Ageing population

Population aging has become a notable, pervasive, and enduring demographic phenomenon in most countries. The proportion of populations aged 60 and over is growing steadily and vigorously, faster than any other age group. According to the forecast issued by the World Health Organization (2002), there will be two billion elderly adults by 2050, constituting an even larger share of society. This anticipated rapid growth in the elderly population poses a great challenge for transport operators, managers, and urban planners tasked with offering travel options that consider the unique and complex travel patterns of the elderly (Alsnih and Hensher, 2003; Hess, 2009). The challenges aging poses for the economy, health care, and retirement systems have been long recognized. However, the impact of aging on the transport system has been discovered much more recently and has not been extensively addressed (Buehler and Nobis, 2010).

Predominantly due to sustained low fertility and mortality rates, the population in Hong Kong is aging at an unprecedented rate. In 2015, the proportion of people aged 60 and above was the second highest in Asia, exceeded only by that in Japan (United Nations, 2015). According to population projection data for 2015–2064, the proportion of elderly people aged 60 and above in the Hong Kong population is expected to reach 38.0% in 2064 (Census and Statistics Department, 2015). Indeed, Hong Kong's ageing population has already created numerous social and economic challenges, such as health care, the old age allowance, and senior residence provisions (Financial Services and the Treasury Bureau, 2015). Unfortunately, the effects of ageing populations on transport systems have been largely ignored by government officials and policy makers, such that the existing transport system is inadequate to support the striking increase in the elderly population in the near future. There is no doubt that improvements in elderly mobility facilitate the promotion of overall societal development, especially in the transport sector (Olawole and Aloba, 2014). Therefore, such improvements should be a top priority for transport policy makers.

1.2. Elderly mobility issues

Mobility refers to a person's ability to move from one place to another in an independent and safe way, and it typically declines gradually as people age (Rantakokko et al., 2013). For the elderly, mobility is not only

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a crucial element of overall life satisfaction but also a prerequisite for active aging. It is essential for independence and ensuring good health and quality of life (Whelan et al., 2006; Tacken, 1998; Metz, 2000; Banister and Bowling, 2004; Spinney et al., 2009). A lack of mobility can deter older people from participating in social activities, resulting in low morale, depression, and loneliness (Atkins, 2001). With the deficits in their sensory function and musculoskeletal strength, the elderly are a disadvantaged group that requires special attention (Ipingbemi, 2010). Therefore, it is vital to maintain the mobility of elderly people to ensure that they can continue to engage in civic and social life, take part in community activities, and pursue human interactions that enrich their health, well-being, and quality of life from a social integration perspective (Dickerson et al., 2007). Thus, future transport policies should prioritize the mobility of elderly populations to support their independence and thereby improve their quality of life.

Improving elderly mobility should be regarded as an important part of promoting overall societal development, especially in the transport sector (Olawole and Aloba, 2014). Maintaining the quality of elderly people's daily lives by improving their mobility should be a top priority for transport policy makers. In most Western countries, for example the United States, driving is the most common mode of transport among elderly, and only a small portion of them use public transport (Ritter et al., 2002). The key reasons contributing to the infrequent use of public transport by older Americans, include (1) unreliable public transport services; (2) difficulties in accessing bus stops/stations and transfers; (3) an unavailability of some destinations; and (4) fear of crime (Burkhardt et al., 2002). From the statistics of bus crime in Los Angeles, it is found that the elderly are more likely to be victimized than other subpopulations and their fear of personal security significantly affects their frequency of bus use (Levine and Wachs, 1986). Some other potential factors may also adversely affect ridership for the old adults, including fears for safety (falling or being hit), and concerns about becoming disoriented or lost. Accordingly, numerous studies have been conducted on the driving behavior and safety of elderly drivers (Stamatiadis et al., 1991; Robertson and Aultman-Hall, 2001; Yannis et al., 2010; Broberg and Willstrand, 2014; Nakagawa et al., 2013; Gelau et al., 2011). Some other studies have also been conducted on the travel patterns of the elderly (Wachs, 1979; Carp, 1988; Hildebrand, 2003; Newbold et al., 2005; Schmöcker et al., 2008; Buehler and Nobis, 2010; Broome et al., 2012; Siren and Haustein, 2013) in an effort to improve their mobility. However, the majority of pertinent studies have been focused on car-dominant cities that are vastly different from transit-oriented cities.

In contrast with car-dominant cities, transit-oriented cities (e.g., Hong Kong, Singapore, and London) have a well-developed and sophisticated transport network and provide more frequent and relatively reliable public transport services (Land Transport Authority, 2012). In Hong Kong, only 14.4% households own a private car, and about 93.0% of the labor force uses public transit for their daily commutes (Transport Department, 2014). The transit shares of the elderly aged 60–69, 70–79, 80 and above are 93.6%, 95.5%, and 96.5%, respectively (Szeto et al., 2017). The figures indicate that the elderly are regarded as a less privileged population segment with limited transport choices, and their mobility is very dependent on public transport, particularly of those retired and older. It is therefore believed that the results obtained from car-dominated cities cannot be directly applied to transit-oriented cities. There is a need to identify the factors that significantly influence the elderly's travel decisions of using public transport services in a high density and transit-oriented city so as to propose public transport policy measures for improving elderly mobility in that city.

1.3. Public transport policy measures

To improve elderly mobility, the Hong Kong government's transport policies, planning, and regulations have introduced the vision of "Transport for All" and have emphasized creating systems that are accessible to the elderly. Public transport concession fare schemes have been implemented in some public transport modes (including railways, buses, and ferries in the first stage of the implementation and public light buses in the second (and current) stage) to subsidize the elderly by traveling any time for a concession fare of HK$2 per trip. (Buses operating in Hong Kong are usually double-decker buses with a maximum capacity of 146 passengers; public light buses carry a maximum of 16 seated passengers and mainly serve as feeder services). However, the schemes emphasize the role of money (i.e., travel fares) in determining willingness to travel, and does not consider some other potentially influential factors that may adversely affect the elderly's preference of using public transit. Hong Kong is one of the safest cities in the world with a very low crime rate. The number of crimes about thief from vehicle in 2016 is 876, consisting of less than 1.5% of the overall crime (Hong Kong Police Force, 2016). Hence, personal security is not the most pressing mobility problem for the elderly residents. According to the latest research about elderly's satisfaction with the public transport services (Wong et al., 2017), the service aspects demanding immediate improvement, include (1) driver's attitude, (2) the condition of stops and stations, and (3) seat availability. Although, priority seats for people with special needs are recently provided on railways and buses to encourage the elderly to travel by these public transport modes and participate more in social activities, the elderly often have to stand because priority seats are limited and occupied by other passengers (Department of Applied Social Sciences, 2015), which adversely affects their willingness to travel.

1.4. Research objectives, contributions, and paper outline

To establish policy measures effectively enhancing elderly mobility, a comprehensive study is essential and necessary. In this study, we conducted a stated preference survey in which we interviewed 613 elderly residents aged 60 or above and asked them to indicate whether they would rather make a trip by a designated public transport mode or stay home in four hypothetical scenarios. A total of 2452 observations were collected to develop binary logistic regression models for identifying possible factors that significantly influence the elderly's travel decisions of using public transport services in a high density and transit-oriented city. It is worth emphasizing that the proportion of elderly using public transit is already very high (over 90%) in Hong Kong. The key objective of improving the existing services to the elderly is not to get the final 10% into public transit options. The challenges and thus the research questions are *how to enhance the elderly mobility to make more trips* and *what are the factors influencing their travel decision of making or not making a trip to participate in social activities.* This study aims to address these questions.

This study makes several contributions, including the following:

- It fills the research gap and provides an empirical analysis of elderly mobility in Hong Kong, a transit-oriented and high-density city;
- It identifies the factors that significantly influence the elderly's travel decisions of using public transport services in a transit-oriented and high-density city; and
- It suggests policy measures to strengthen public transport planning in Hong Kong, with the goal of improving elderly mobility. The proposed measures can also be applied to other metropolitan cities with similar traffic conditions.

The remainder of this paper proceeds as follows. The next section describes the data collection method; tabulates the interviewed respondents' socio-demographical distribution, travel patterns, satisfaction with the existing public transport services and policy measures; and describes the stated preference survey. The subsequent two sections present model results and discuss potential policy measures. The last section concludes the paper and suggests research directions for future studies.