



User perspective of age-friendly transportation: A case study of Taipei City



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ABSTRACT

User perspective of age-friendly transportation provides a solid base for initiating and evaluating improvement strategies. This study surveyed a sample of 610 older people in Taipei City. The respondents rated the degree of importance of 18 indicators, and their degree of satisfaction with 35 items, which were derived from these 18 indicators relating to age-friendly transportation. Rough Sets Theory (RST) and Importance-Performance Analysis (IPA) were used as qualitative and quantitative data mining approaches. Useful and simple decision rules regarding the perspective of age-friendly transportation can be obtained using RST. These decision rules involve policy implications. The application of IPA further facilitated the focuses of improvement strategies. Subsequently, the Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS) was used to evaluate improvement strategies. The results showed that the focuses and the priority ranking of the strategy scenarios were (1) training for bus drivers; (2) enhancing the universal design of transport stops and stations; (3) enhancing the quality of transit information and providing more pedestrian scrambles; (4) education for drivers and enforcement of driving rules; and (5) providing more age-friendly vehicles. Two out of five strategy scenarios are related to driver behavior. We strongly recommend that the future policy focus be on requiring people to be competent and courteous drivers.

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1. Introduction

Age-friendly transportation is becoming a global issue attracting academic and practical attention. Metz (2000) noted that quality of life in old age is related to mobility and outlined an approach to assess the impact of measures aimed at enhancing the mobility of older people. Hjorthol (2013) surveyed Norwegian older people and revealed that due to low mobility and uncovered transport needs, their quality of life is reduced. Williams and Carsten (1989) indicated that younger and older drivers are more frequently involved in crashes. McGwin and Brown (1999) asserted that older drivers exhibit perceptual, judgment, and response problems in traffic flow. McCoy et al. (1989) observed that older people sustain more severe traffic injuries because they are more vulnerable to trauma than younger people. Similarly, Stamatiadis and Deacon (1995) concluded that older drivers are exposed to high risk on the road. Therefore, special considerations for older drivers are required, including driver education, licensing, and highway design and management. Golob and Hensher (2007) investigated the trip chaining activity of Sydney

residents and found that after age 64, residents shifted modes from car driver to car passenger and then to public transport passenger. The authors found that this was true especially for single persons and for all women surveyed. Davey (2007) conducted a survey in New Zealand among older people without private transport. The author concluded that although respondents used alternative modes of transport for obligatory or “serious” transport needs (e.g., trips for medical appointments), they were hesitant to use alternative modes of transport for unnecessary or “discretionary” trips (e.g., trips only for pleasure) that directly relate to the quality of life of older persons. Musselwhite and Haddad (2010) determined that driving a car enables older people to fulfill many affective and esthetic needs. Therefore, ceasing to drive might reduce the older people’s perceived quality of life. Broome et al. (2009) found that older people may have difficulty accessing public transport during the initial stage of mode shifting. Therefore, the authors applied the Person–Environment–Occupation model to explore the relationships between access to buses and the health of older people.

Age-friendliness of transportation is multifactorial, for example, Broome et al. (2011a) further claimed that information is a key factor in developing and implementing bus systems for older people. The authors concluded that multiple media available through different locations would be effective in providing information for older

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people. Chaudhury et al. (2012) compared different neighborhoods in the metropolitan regions, and found that older people in the higher density neighborhoods exposed to more traffic hazards than in the lower density neighborhoods.

A comprehensive guide was proposed by the World Health Organization (2007) to direct global age-friendly cities. An age-friendly city is one in which “policies, services, settings and structures support and enable people to age actively.”

A total of 35 cities participated in the WHO project leading to the guide, and 33 of these cities participated in focus group research. Transportation is one of the eight topic areas contained in the publication, and 15 indicators were comprehensively summarized as a checklist. The present study used the WHO checklist as a basis for a survey questionnaire.

Taiwan is a modern society experiencing the trends of declining birth rate and ageing population. Taiwan became what the United Nations defines as an ageing society in 1993, when the proportion of older persons (age 65 and over) reached 7 per cent of the population. In Taipei City, the capital of Taiwan, the proportion of those aged 65 and over reached 13.7 per cent in 2014. In response to this trend, age-friendly transportation is becoming an increasingly important issue in Taipei City. A specific example of an effort to address the issue is the Taipei City Government's provision of a quota for older citizens (age 65 and over) to ride mass rapid transit (MRT) and buses for free. The experiences in London show that free bus travel for older people contributes their social networking and wellbeing (Green et al., 2014). This study attempts to identify the transport needs of older citizens in Taipei City, and provides a basis for strategic planning to develop age-friendly transportation. The analytical process is arranged to be generalized and reproducible in other cities.

2. Methods

2.1. Analytical framework

This study employed a questionnaire survey to analyze user perspective of age-friendly transportation. The questionnaire was designed mainly based on “Age-friendly transportation checklist” proposed by the World Health Organization (2007). We examined the related projects promoted by Taipei City Government and moderately revised the questionnaire. Older people were selected to conduct face-to-face interviews. Reliability of the questionnaire was tested by Cronbach's α after survey results were obtained. Subsequently, both qualitative and quantitative approaches were applied to explore the implications exist in survey results.

Rough Sets Theory (RST) is a qualitative tool to induce decision rules. These decision rules form a cause–effect relationship and involve policy implications. Quantitative analysis methods include the Importance-Performance Analysis (IPA) to locate the improvement strategies and the Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS) to evaluate improvement strategies.

Qualitative and quantitative approaches play complementary roles in data mining. The analytical results provide a solid basis for discussing and concluding. Fig. 1 shows the analytical framework.

2.2. Survey

World Health Organization (2007) proposed 15 indicators of “Age-friendly transportation checklist” as follows:

- **Affordability:** (1) public transportation is affordable to all older people. (2) Consistent and well-displayed transportation rates are charged.

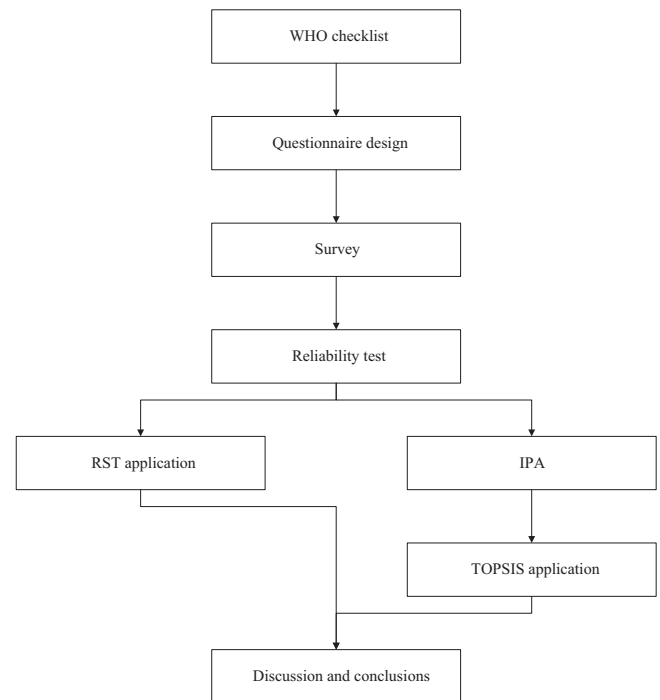


Fig. 1. The analytical framework.

- **Reliability and frequency:** public transport is reliable and frequent (including services at night and at weekends).
- **Travel destinations:** (1) public transport is available for older people to reach key destinations such as hospitals, health centers, public parks, shopping centers, banks and seniors' centers. (2) All areas are well-served with adequate, well-connected transport routes within the city (including the outer areas) and between neighboring cities. (3) Transport routes are well-connected between the various transport options.
- **Age-friendly vehicles:** (1) vehicles are accessible, with floors that lower, low steps, and wide and high seats. (2) Vehicles are clean and well-maintained. (3) Vehicles have clear signage indicating the vehicle number and destination.
- **Specialized services:** sufficient specialized transport services are available for people with disabilities.
- **Priority seating:** priority seating for older people is provided, and is respected by other passengers.
- **Transport drivers:** drivers are courteous, obey traffic rules, stop at designated transport stops, wait for passengers to be seated before driving off, and park alongside the curb so that it is easier for older people to step off the vehicle.
- **Safety and comfort:** public transport is safe from crime and is not overcrowded.
- **Transport stops and stations:** (1) designated transport stops are located in close proximity to where older people live, are provided with seating and with shelter from the weather, are clean and safe, and are adequately lit. (2) Stations are accessible, with ramps, escalators, elevators, appropriate platforms, public toilets, and legible and well-placed signage. (3) Transport stops and stations are easy to access and are located conveniently. (4) Station staff are courteous and helpful.
- **Information:** (1) information is provided to older people on how to use public transport and about the range of transport options available. (2) Timetables are legible and easy to access. (3) Timetables clearly indicate the routes of buses accessible to disabled people.

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