



Predictors of gerontechnology acceptance by older Hong Kong Chinese



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ABSTRACT

The aim of this study was to examine the factors which influence the acceptance of gerontechnology by older Hong Kong Chinese. A research model based on the technology acceptance model (TAM) and Unified Theory of Acceptance and Use of Technology (UTAUT) was proposed. It was empirically tested by using survey data collected from 1012 seniors aged 55 and over in Hong Kong. A face to face interview technique with a preset questionnaire was employed to collect data and Structural Equation Modeling (SEM) was used for data analysis. The proposed model could explain 55.4% of the variance in actual usage of gerontechnology. However, in contrast to TAM and UTAUT, significant effects for perceived usefulness, perceived ease of use, and attitude towards using on usage behavior were not found in this study. Personal attributes like technology self-efficacy and anxiety, and facilitating conditions were more decisive than perceived benefits for predicting gerontechnology usage behavior of Hong Kong older Chinese. The managerial implications generated from the results are discussed.

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1. Introduction

In many countries the proportion of the older population relative to the total population has greatly increased and is still increasing. Since 2000, the speed of ageing of the Chinese population has surpassed the rate of population ageing of the world. The number of Chinese people aged over 60 exceeded 172 million in 2011, accounting for about one half of Asia's over-60s and one fifth of the world's total (United Nations, 2011). Such rapid demographic change will lead to extensive change with attendant consequences for society, businesses and other stakeholders. One clear implication of this demographic shift is the emergence and growth of the "silver-hair market", that is, the market segment for seniors. Innovation strategies for competing in the silver-hair market must include developing and marketing products and technologies for elderly people and adapting products and technologies especially for the elderly (Kohlbacher et al., 2011).

Technological innovation is currently occurring at an unprecedented rate. Gerontechnology combines gerontology and technology, and involves the research and development of techniques, technological products, services, and environments based on knowledge of ageing processes (Lesnoff-Caravaglia, 2007). Past studies have shown that technology adopted by older users can help them increase safety, maintain independence, and provide social networks. For instance, decline of physical and cognitive functions due to ageing and sickness can be partially compensated

for by assistive and adaptive medical technologies (Liang et al., 2013; Yang and Hsiao, 2009). Communication technologies like mobile phones, computers and the Internet enable older people to remotely connect with family members and friends and meet the need for social interaction (Braun, 2013; Gao et al., 2012). Modern technology has also enabled the delivery of what traditionally local services were to distant locations (e.g., distance learning and telecare), as well as providing useful services, like online banking and automatic teller machines (ATMs) (Schumann et al., 2012). By using a transport smart card, such as the Octopus card in Hong Kong, senior citizens can enjoy concessionary fares on public transport. Also, the card can be used for transactions at convenience stores, supermarkets, parking facilities, self-service kiosks, leisure facilities, fast food chain stores, etc.

China accounts for a large percentage of world's older population, so it is obvious that there will be a huge potential market in the future for the development of gerontechnology which will greatly benefit the ageing population and industries dealing with the relevant technologies. Population ageing will influence all aspects of life, including the labour market, pensions, social security programs, health care, family composition, and living arrangements. Meeting ageing-related demands such as social security systems, health care, and community services will be a tough challenge for governments. Moreover, older adults prefer to "age in place", that is to remain in their own homes confidently and comfortably for as long as possible; consequently, the necessary assistance and care are often provided by informal caregivers (usually women in the family) who frequently experience significant stress while playing multiple roles in addition to their caregiving duties (You et al., 2008; Barbosa et al., 2011). Therefore, if older people are able to use technologies which can give them

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the chance to lead lives that are healthier and more independent, the pressures on caregivers would be greatly alleviated: less time would have to be devoted to caregiving for seniors and more women would have an opportunity to participate in the labour force. In addition, the serious ageing related problems like economic, social, and health care burdens on families, communities, and the country may be lowered significantly.

However, it has also been shown that older people do not fully accept modern technology and the usage rates of technological innovations like mobile phones and computers are lower for older people than for younger groups (Hong Kong Census and Statistics Department, 2013). In the study of Olson et al. (2011), compared with younger people, older adults were inclined to use old-fashioned technology rather than more recent technologies in the domains of communication, customer service, health care activities, and home-based systems. It was indicated by Verdegem and De Marez (2011) that technology innovations often fail to be fully utilized because of less attention is given to user acceptance. Therefore, if businesses or practitioners want to better supply and employ technological products and services for older people and predict their usage, it is important to understand the factors that influence the acceptance of technology by the elderly.

Several models have been proposed to explain of technology acceptance behavior, such as the technology acceptance model (TAM) proposed by Davis et al. (1989), and the Unified Theory of Acceptance and Use of Technology (UTAUT) developed by Venkatesh et al. (2003). However, the majority of controlled studies in the field of TAM related to older users have been concerned with European (Ramón Jerónimo et al., 2013) and U.S. based populations (Olson et al., 2011; Mitzner et al., 2010), but as yet, China, which has a large percentage of the older population of the world, has not been given much attention. A meta-analysis study by Sun and Zhang (2006) has shown that cultural background may be a constraint that affects the behavioral intention of an individual with regard to technology usage. Schepers and Wetzels (2007) also found that in Western cultures the effect of usefulness is more important, while ease of use is more relevant in non-Western cultures. It is thus not known to what extent the findings for populations in Western countries can be generalized to the older customers in China. Another limitation in current TAM studies relating to the elderly is that the major research targets have been communication and assistive technology in the home domain (Lee et al., 2011; Pressler and Ferraro, 2010), but other domains such as home and daily living, personal mobility, and education and recreation have been neglected. No study so far has investigated the acceptance of a variety of different types of technologies by elderly people. Extending research to cover a larger variety of technologies relevant to a wider range of life domains provides a promising direction of study in order to better understand the needs of the silver-hair market and benefit older members of the population.

Given that there have been no studies to date targeted at exploring acceptance of a variety of gerontechnology by older Chinese, this study aimed at investigating the key factors that contribute to the acceptance of gerontechnology by older Hong Kong Chinese. The objectives of the study were: (1) to determine how older Hong Kong Chinese people actually use different kinds of gerontechnology in daily life and their attitudes to use of gerontechnology, and; (2) to identify the factors affecting the acceptance of technology by older Hong Kong Chinese with the focus on perceived usefulness, perceived ease of use, attitude towards using, facilitating conditions, gerontechnology self-efficacy, gerontechnology anxiety, and relationships amongst these factors. The outcome of the study is expected to provide marketers and businesses with a better understanding of the current situation and problems regarding technology products and services in the silver-hair market in Hong Kong. The results should facilitate the development of better products and services specifically customized for older users. Also, based on the

findings, business managers and marketing executives should be in a better position to take proactive or corrective actions to enhance the adoption of technology in order to increase commercial effectiveness. The government, nonprofit organizations, and related agencies may be assisted in establishing policies or innovation strategies to encourage technology utilization, and foster an environment that is conducive to helping older adults to use gerontechnology.

2. Research background and hypotheses development

2.1. Technology acceptance model (TAM)

Gerontechnology as a concept can be generally defined as electronic or digital products or services that can increase independent living and social participation of older persons in good health, comfort, and safety (Bouma et al., 2007). Technology acceptance has been described as “the approval, favorable reception and ongoing use of newly introduced devices and systems” (Arning and Ziefle, 2007). Level of acceptance contains an attitude towards a certain behavior, that is, the individual’s positive or negative feeling or appraisal about the behavior and the degree to which this affects the behavior, and the usage behavior itself. This study used the technology acceptance model (TAM) as the research framework because numerous empirical studies have confirmed that it is a robust and powerful model for explaining acceptance behavior across subjects and different kinds of technologies (Chen and Chan, 2011; Šumak et al., 2011; Wagner et al., 2010). Although the TAM exists as a reliable acceptance theory, it suffers from inadequate explanatory power since technological and usage-context factors will affect the validity of the constructs in TAM (Sun and Zhang, 2006). A number of studies have shown the effectiveness of extending TAM by incorporating new constructs to increase the explanatory power of TAM (Verdegem and De Marez, 2011; Hernández-Ortega, 2011; Wu et al., 2011). For this reason, using TAM as a starting point, this study incorporates three additional constructs in UTAUT, i.e., self-efficacy, anxiety, and facilitating conditions, to examine the factors affecting acceptance of gerontechnology by elderly Hong Kong Chinese.

According to the TAM, the two most important factors in explaining acceptance and usage of an information system are perceived usefulness (PU) and perceived ease of use (PEOU) (Davis et al., 1989). Perceived usefulness was defined as the degree to which a person believes that using technology would improve his/her quality of life; while perceived ease of use refers to “the extent to which a person believes that using a technology is free of effort” (Davis et al., 1989). Perceived usefulness and perceived ease of use predict usage behavior directly and indirectly through the mediation of attitude towards using technology (AT). Moreover, perceived ease of use is an antecedent of perceived usefulness. The TAM also assumes some “external variables” such as user differences (cognitive style and other personality variables), system characteristics, and task characteristics, the effects of which are fully mediated by perceived usefulness and perceived ease of use.

Studies based on western populations have indicated that the TAM can partly be applied to older adults. The TAM constructs, such as PU and PEOU, are critical for older people as well as for the young (Braun, 2013; Pan and Jordan-Marsh, 2010). With respect to usefulness, it has been found that older adults place a high value on independence and on perceived impact on the quality of life (Steele et al., 2009). The studies of Mitzner et al. (2010) and Steele et al. (2009) reported that older adults did not show interest in innovative technology products and services per se, but rather valued a technology that had the potential to make their daily life easier and provide added safety and security.

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