ELDERLY'S ACCEPTANCE TO ADOPT INFORMATION SYSTEM: MOBILE WEBSITES AND APPLICATIONS FOR HOTEL AND ACCOMMODATION RESERVATION

Kultida MALISON[1]

1 Faculty of Business Administration and Information Technology, Rajamangala University of Technology Tawan-Ok, Thailand; kultida_ma@rmutto.ac.th

Abstract

Presently, the older people tend to be a considerably important consumers, especially in tourism and leisure industry because of their afford of purchasing goods and services. The increasing availability of Information System (IS) has affected tourism and travel industries, that is, the way tourists explore, plan, and purchase tourism products. Instead of visiting a travel agent, tourists may visit tourism websites and applications to obtain travel information, do their travel plan, and purchase travel products by themselves. Since the elders are less accustomed with the internet and experience computer anxiety and uncertainty during internet usage, so this study needs to fulfill the gap by investigating factors affecting the acceptance of websites and mobile applications for hotel and accommodation among elderly. The data were collected from 400 elders living in Bangkok Metropolitan Region. The results showed that the elders frequently reserved hotel and accommodation via mobile applications more than websites. The factors affecting the acceptance of information system for tourism among elderly were: 1) The social influence and 2) The ease of system usability. The social influence was the most influencing factor. The results also showed that the factors affecting the intention of using system were: 1) The social influence; 2) The ease of system usability and 3) The perception of system advantages. The most influencing factor is the social influence. The contribution of this study is to shed light on how the elders should be prepared for the information system or technology acceptance.

Keywords: Elderly, Mobile Websites and Applications, Information System, Hotel and Accommodation Reservation

Introduction

According to the world population, there were 703 million elders aged 65 or over in 2019 (United Nations, 2019). Over the next three decades, the global number of the elders is projected to more than double, reaching over 1.5 billion persons in 2050. The lower birth rates and longer life expectancy lead to rising numbers of the elders. The percentage of the elders is often used as the main indicator to analyze population ageing. In understanding the socioeconomic implications of population ageing, several measures have been developed to account for the diversity of capacities and dependencies across ages. Ageing will have a significant impact on social policies, and the elders seem to be the policy-making priorities in the next few decades (Thatsanai, 2019; Banke-Thomas et al., 2020; Chuachoonu, Chatchawanchanchan & Arpornpisanj, 2021).

The number of the elders in Thailand has increased rapidly during a few decades. According to the updated information from the Thai Health Promotion Foundation, the number of older people in the Thai population in 2022 is 20-30% of the total population (Foundation of Thai Gerontology Research and Development Institute, 2021). Moreover, within the next few years, persons aging 60 and older will probably outnumber children under age 15 for the first time in Thai history. (Knodel et al., 2015). Thailand is expected to become a "complete aged society" by the year 2022 (Foundation of Thai Gerontology Research and Development Institute, 2021). In accordance the activity theory, when people retire, they frequently tend to find other activities to replace their works (Socci et al., 2021). One of the most popular activities among and leisure activities (Patterson, 2018). Since elderly tourists are the group of tourists with high purchasing power, they spend longer to travel than other groups of tourists. They seem to focus on tourism and prefer good quality services that are worth but not necessarily be the lowest price (Yonwikai, 2019). The behavior of tourist elders was also giving an emphasis on self-satisfaction and times when deciding on the attractions and services. Because tourism activities become popular among retired people or elderly, Information System for Tourism which referring to mobile websites and applications for hotel and accommodation reservation has involved them. It is assumed that websites and applications can help people for searching information and make their plans independently instead of visiting a travel agent. Since the numbers of elders increase, the preparation of tourism technology among population in this age group seems to be important. Helping elders on the acceptance of information system for tourism does not only benefit them, but also benefit for our society. Provided that the older people can help themselves doing all activities, they will be proud of themselves, and tourism industry will be growth. Moreover, the government has to prepare to take care of the elderly people to make our society become a "super-aged" society. Because of the difficulties in learning and using technology, and the belief that technology is not necessary, older people have low acceptance and use (Bong et al., 2019). As previous research on technology acceptance has highlighted, many technological interventions could be perceived as a waste of time and money because people do not fully accept and use the technology (Chen & Chan, 2011). It is undenied that hotel and accommodation reservation system is crucial for enhancing tourism activities among the elders, yet they seemed to perceive that the systems were probably difficult to learn. Therefore, in order to fulfill the research gap, this study attempts to apply the technology acceptance model (TAM) to:

1) investigate the factors affecting the acceptance of Information System for hotel and accommodation reservation among elderly and

2) investigate the factors affecting the intention of Information System for hotel and accommodation reservation among elderly.

Based on these two research purposes, this study seeks to provide contributions from two perspectives. Firstly, this study reveals factors affecting the acceptance of Information System for tourism to fulfill the actual information of what factors motivated Thai elders on technology

acceptance. This means that revealing factors affecting the use of hotel and accommodation reservation system probably promote tourism economic, that is the major industry in Thailand. Likewise, understanding the factors causing the acceptance of technology among the elders will be beneficial and the influential factors should be increased. Secondly, the factors affecting the intention of Information System for hotel and accommodation reservation were explored in order to shed light on what factors motivating the elders to intend to use technology. Provided that these factors revealed, the government and related sectors may launch the campaign, policy, or guideline to promote the use of hotel and accommodation system and make our country's economic growth. Additionally, application developers may obtain a benefit because they can develop the application which more friendly among the elders. This study also provides the government and tourism industry recommendations to enhance tourism services in the future.

Literature Review
Technology Adoption in Diffusion of Innovations Theory
The Diffusion of Innovations Theory was developed by E.M. Rogers in 1962 which used to explain how an idea or product spreads through a specific population or social system (Dearing & Cox, 2018). Diffusion is a social process that occurs among people in response to learning about an innovation. The technological innovation is the main engine of economic development (Arthur, 2011 cited in Miranda et al., 2016). When people learn about an innovation that they think it may have important consequences for them, they can better adopt the innovation (Dearing & Cox, 2018). The result of diffusion is that people adopt a new idea, behavior, or product. Adoption means that a person does something differently than what they had previously such as purchasing or using a new product, acquiring and performing a new behavior, employing policies or rules. The key to adoption is possible that the person must perceive the idea, behavior, or product as new or innovative (Khonglarp & Sansook, 2022).

Technology Acceptance Model of the Elderly
It is seen that elderly people are often more reluctant to accept a specific technology (Morris & Venkatesh, 2000; Yao & Murphy, 2007). Acceptance research is also criticized for the reliability on Technology Acceptance Model (TAM) and The Unified Theory of Acceptance and Use of Technology (UTAUT) as the essential determinants. In a recent literature review, Chen & Chan (2011) discussed several studies that used TAM or related models and constructs to explain technology acceptance by older adults. They found that specific biophysical factors such as cognitive and physical decline together with psychosocial factors such as social isolation and fear of illness related to aging. The elders probably accept technology if it increases their quality of life (Czaja & Lee, 2007 cited in Niehaves & Plattfaut, 2013). In addition, various examples showed that the use of internet reduced social isolation together with supporting communication with friends and family. However, the elders have difficulties of mobile phones adopting (Chen & Chan, 2011). Earlier studies demonstrate a negative relationship between age and the argue that a negative relationship between age and internet self-efficacy exists. In addition, it is recommended that the investigation on how the specific factors will contribute to the adoption such as the specific dimension which influence the elderly to perceive a specific technology need to be conducted (Yap et al., 2022). Chen & Chan (2011) also noted that cost or price of technology was neglected in many studies, although it seems to be a critical factor in determining an older adult's acceptance of technology. While many studies concern a better understanding of acceptance of various types of technology by older adults, this study fulfils the gap of investigating factors affecting technology acceptance and intention among the elders.

Research Methodology

The quantitative data were collected from 400 elders living in Bangkok Metropolitan Region. Accidental sampling was used to collect data from systematically random area in Bangkok and vicinity. The data were collected at the places where the elders frequently visit such as hospital, department store and park. The elders read and signed informed consent before collecting data. The instrument of this study was questionnaires consisted of three parts: 1) Background information; 2) Factors influencing the acceptance of Information System and 3) The evaluation of the acceptance of Information System for tourism among elderly. The background information data were analyzed by descriptive statistics with Frequency, Mean and Standard Deviation. In order to explore factors affecting the acceptance of Information System of the elders, the data were analyzed by Pearson Correlation and a multiple linear regression. The questionnaire items were piloted among 30 elders to find the reliability by using Cronbach's alpha and the 30 elders were excluded in the study. The reliability of the questionnaire was 0.889 which was acceptable since 0.7 is an acceptable reliability coefficient (Nunnally, 1978).

Research Findings

Based on survey results of 400 elders, the majority of respondents were female; the most degree respondents obtained was high-school degree or equals; the most status was being married and the most income was in the range of 10,001-20,000 baht. Additionally, it was found that 146 elders have ever used hotel and accommodation reservation websites which accounted for 36.50%, while 186 elders have ever used hotel and accommodation reservation applications which accounted for 46.50%. The ranking was shown in Table 1.

Table 1 The frequency of reservation system usage

No.	Reservation System	Yes	No
1	Website	146 (36.50%)	254 (63.5%)
2	Application	186 (46.50%)	214 (53.50%)

Factors Affecting the Acceptance of Information System for Tourism among Elderly

According to the analysis of factors affecting Information System acceptance, the highest rank factor was given to "The perception of system advantages" with a mean of 3.94 (high level), followed by "The ease of system usability" with a mean of 3.44 (moderate level) and "The social influence" with a mean of 3.43 (moderate level) respectively. The results were shown in Table 2.

In order to investigate the factors affecting the intention of Information System for tourism among elderly, a multiple regression analysis was employed. Before conducting a multiple regression, it was necessary to check the assumption of correlation of between independent and dependent variables. An important step in a multiple regression analysis is to ensure that the assumption of no multicollinearity has been met. Multicollinearity is a statistical phenomenon in which two or more predictor variables in a multiple regression model are highly correlated (Plotts, 2011). In this step, mean scores of these two variables were used to test Pearson Correlation in order to prove multicollinearity of variables. The results were shown in Table 3.

Table 2 Factors affecting the acceptance of information system for tourism among elderly

Factors	$\bar{\text{X}}$	S.D.	Interpretation
The perception of system advantages	**3.94**	**0.74**	**High**
1) The reservation system helps you do not waste time to check room availability.	3.95	0.84	High
2) There is promotion and discount from system using.	3.95	0.84	High
The ease of system usability	**3.44**	**0.88**	**Moderate**
1) You can use the system conveniently and quickly.	3.82	0.07	High
2) The using steps are not complicated.	3.29	0.95	Moderate
3) You can learn and use the system quickly.	3.21	0.02	Moderate
The social influence	**3.43**	**0.80**	**Moderate**
1) Fellows and relatives support the use of system.	3.35	0.91	Moderate
2) Fellows and relatives support are using the system.	3.19	1.19	Moderate
3) The using of system makes you get social acceptance.	3.32	1.03	Moderate
4) The using of system makes you up to date.	3.86	0.83	High
The acceptance of system using	**3.55**	**0.94**	**High**
1) You are pleased to recommend the system to fellows and acquaintance.	3.65	0.92	High
2) You intend to use the system in the future.	3.45	1.11	Moderate
The intention of system using	**3.47**	**0.98**	**Moderate**
1) You intend to book hotel/accommodation online if you have an opportunity to do.	3.83	1.06	High
2) You highly tend to book hotel/accommodation online.	3.19	1.05	Moderate
3) You highly intend to use hotel/accommodation reservation online system.	3.41	1.12	Moderate

Table 3 The relationship among variables

The acceptance of system using/The intention of system using	The perception of system advantages		The ease of system usability		The social influence	
	Pearson Correlation (r)	Sig. (2-tailed)	Pearson Correlation (r)	Sig. (2-tailed)	Pearson Correlation (r)	Sig. (2-tailed)
The perception of system advantages	1	.000	.599	.000	.595	.000
The ease of system usability	.599	.000	1	.000	.522	.000
The social influence	.595	.000	.522	.000	1	.000

As shown in Table 3, Pearson Correlations were calculated among three variables. The output showed that there was no correlation exists among "The acceptance of system using" and "The intention of system using" factors (r = .00). This means that the multicollinearity was not found.

The Effect of Factors on the Acceptance of System Using

A multiple regression analysis was conducted, and the results were shown in Table 4. As shown in this Table, the factors influencing the acceptance of system using were: 1) The social influence (P < 0.001, beta = 0.495, t-value = 13.396) and 2) The ease of system usability (P < 0.001, beta = 0.396, t-value = 10.732). The most influencing factor was "The social influence". In addition, the acceptance of system using was correlated the two factors in moderate level (R = 0.779). These two factors described the acceptance of system using among elderly with percentage 60.70 (R^2 = 0.607). The algebraic equation was

$Z_{\text{The acceptance of system using}} = 0.495 (Z_{\text{Factor1}}) + 0.396 (Z_{\text{Factor2}})$

Table 4 The effect of factors on the acceptance of system using

Model		Unstandardized Coefficients		Standardized Coefficients	t	P
		B	Std. Error	Beta		
1	(Constant)	.103	.142			.470
	The social influence	.582	.043	.495	13.396	.000*
	The ease of system usability	.421	.039	.396	10.732	.000*

The Effect of Factors on the Intention of System Using

A multiple regression analysis was conducted, and the results were shown in Table 5. According to the results, the factors influencing the intention of Information System using for tourism among elderly were: 1) The social influence ($P < 0.001$, beta = 0.347); 2) The ease of system usability ($P < 0.001$, beta = 0.343) and 3) The perception of system advantages ($P < 0.05$, beta = 0.163). The most influencing factor was "The social influence".

In addition, the intention of system using among elderly was correlated the three factors in moderate level (R = 0.724). These three factors described the intention of system using with percentage 52.40 ($R^2 = 0.524$). The algebraic equation was

Z The intention of system using = 0.347 ($Z_{Factor1}$) + 0.343 ($Z_{Factor2}$) + 0.163 ($Z_{Factor3}$)

Table 5 The effect of factors on the intention of system using

Model		Unstandardized Coefficients		Standardized Coefficients	t	P
		B	Std. Error	Beta		
1	(Constant)	-.144	.191		-.756	.450
	The social influence	.426	.055	.347	7.764	.000*
	The ease of system usability	.380	.050	.343	7.655	.000*
	The perception of system advantages	.216	.063	.163	3.430	.001*

Conclusion & Discussion

The results revealed that the majority of participants, the elders, have experienced using hotel and accommodation reservation websites and applications. This is consistent with activity theory which stated that people tend to find other activities to replace their works when they retire (Socci et al., 2021). In addition, Yonwikai (2019) mentioned that tourist elders have high tendency to travel because they tended to be stronger and are able to afford for travelling expenses. Moreover, the pervasive of technology may assist older adults to maintain an active their lifestyles (Juárez et al., 2018)

The most influencing factors for the acceptance of Information System for tourism among elderly was "The social influence". It can be assumed that sons, daughters, nephews, nieces, relatives including their fellows seems to be motivation to use the system for the elders. This is consistent with the concept of Success Ageing and model of Active Aging which reveals that social participation plays a pivotal role in the acceptance (Urtamo et al., 2019). As stated in Patterson (2018), the most important sources of information for older people are primarily through personal sources such as family and friends. This means that word-of-mouth communication through satisfied customers seems to be the key component affecting elderly people's decisions. Another factor influencing the system using among elders was "The ease of system usability". The elders tended to have different cognitive, and their use of innovative services such as websites varies depending on their cognitive age. Website and application atmosphere is a main part of tourism and hospitality marketing since it determines electronic

service quality, and more importantly, it leads to consumers' online purchases (Kim et al., 2021). Presently, the system designers for both websites and applications tended to design system or user interface which easily to access and use among various age group. So, the elders probably are open-minded to use. Likewise, because social influence was the most influencing factor, family members or friends may suggest the elders to learn the system. Then, they may perceive that the systems were not complicated, and they felt comfortable and were able to use. The factors affected the intention of system using were "The social influence", followed by "The ease of system usability" and "The perception of system advantages". This seems that the older people intend to use the system because of the influence and suggestions made by their family and fellows. Additionally, the elders may feel comfortable to use tourism system such as checking occupancy, promotion, campaigns when they perceived that the system is easy and provide advantages.

Since Thailand becomes the aged society, the elder consumers seem to be majority of consumers in Thailand. It can be implied that the extension of elder's expenses is important. The elders may pay for their health, their lives, and their happiness more than other generations because they do not have other duties, or responsibilities. Their sons and daughters are probably mature which can take care of themselves. In addition, the elders are in retirement, so they attended in social activities. Because technology help connecting the world of activities, the development of information system such as websites, application need to be focused. The websites and applications should be easy, not complicated, and user friendly-designed. For instance, the monitor should be reflected less light in order to reduce eyestrain and the colors selection should be obviously seen. Besides, the way to motivate the elders to accept and change themselves using hotel and accommodation websites and applications is to launch campaigns, promotions or give the benefits to their family, relatives, and friends because social influence considerably affects their decisions and encourages the acceptance and intention to use Information System among elderly. Moreover, in terms of pedagogy, short courses or non-degree courses should be designed in order to prepare the elders to understand the Information System which useful for their lives.

The research study focused on mobile websites and applications for hotel and accommodation reservation, the further studies are recommended to conduct with other types of tourism system in order shed light on angle of recreation industry.

Acknowledgment

References

Banke-Thomas, A., Olorunsaiye, C., & Yaya, S. (2020). "Leaving no one behind" also includes taking the elderly along concerning their sexual and reproductive health and rights: a new focus for Reproductive Health. *Reproductive Health, 17*(101), 1-3.

Bong, W., Bergland, A., & Chen, W. (2019). Technology Acceptance and Quality of Life among Older People Using a TUI Application. *International Journal of Environmental Research and Public Health, 16*, 4706.

Chuachoonu, S., Chatchawanchanchan, P., & Arpornpisanj, P. (2021). Components and Factors Affecting of the Elderly Quality of Life in Chumphon Province. *Journal of Interdisciplinary Research: Graduate Studies, 10*(1), 1-9.

Chen, K., & Chan, A. (2011). A review of technology acceptance by older adults. *Gerontechnology, 10*(1), 1-12.

Dearing, J., & Cox, J. (2018). Diffusion of Innovations Theory, Principles, and Practice. *Health Affairs, 37*(2), 183-190.

Foundation of Thai Gerontology Research and Development Institute. (2021). *Situation of the Thai Older Persons 2020*. Bangkok: Amarin Printing & Publishing Public Co., Ltd.

Juárez, M., Gonzalez, V., & Favela, J. (2018). Effect of technology on aging perception. *Health Informatics Journal, 24*(2), 171-181.

Khonglarp, P., & Sansook, J. (2022). The Affecting of Service Innovations Capability on the Efficiency of the Provincial Electricity Authority Employees in Phra Nakhon Si Ayutthaya, Thailand. *PSAKU International Journal of Interdisciplinary Research, 11*(1), 38-47.

Kim, S., Bi, Y., & Kim, I. (2021). Travel Website Atmospheres Inducing Older Travelers' Familiarity: The Moderating Role of Cognitive Age. *International Journal of Environmental Research and Public Health, 18*, 4812.

Knodel, J., Teerawichitchainan, B., Prachuabmoh, V., & Pothisiri, W. (2015). *The Situation of Thailand's Older Population*. Michigan: University of Michigan.

Miranda, M., Farias, J., Schwartz, C., & Almeida, J. (2016). Technology adoption in diffusion of innovations perspective: introduction of an ERP system in a non-profit organization. *Revista de Administração e Inovação, 13*(1), 103-123.

Morris, M., & Venkatesh, V. (2000). Age Differences in Technology Adoption Decisions: Implications for a Changing Work Force. *Personnel Psychology, 53*(2), 375-403.

Niehaves, B., & Plattfaut, R. (2013). Internet adoption by the elderly: Employing IS technology acceptance theories for understanding the age-related digital divide. *European Journal of Information Systems, 23*(6), 708-726.

Nunnally, J. (1978). *Psychometric Theory*. 2nd ed. New York: McGraw-Hill.

Patterson, I. (2018). *Tourism and leisure behaviour in an ageing world*. London: CAB International.

Plotts, T. (2011). *A Multiple Regression Analysis of Factors Concerning Superintendent Longevity and Continuity Relative to Student Achievement*. Doctor of Education Thesis, Seton Hall University.

Socci, M., Santini, S., Dury, S., Perek-Białas, J., D'Amen, B., & Principi, A. (2021). Physical Activity during the Retirement Transition of Men and Women: A Qualitative Longitudinal Study. *BioMed Research International*, 2720885.

Thatsanai, R. (2019). The Public Private Partnerships in Elderly Welfare Provided in Thailand. *International Journal of Crime, Law and Social Issues, 6*(2), 57-63.

United Nations. (2019). *World Population Ageing 2019: Highlights*. New York: United Nations.

Urtamo, A., Jyväkorpi, S., & Strandberg, T. (2019). Definitions of successful ageing: A brief review of a multidimensional concept. *Acta Biomed, 90*(2), 359-363.

Yao, Y., & Murphy, L. (2007). Remote electronic voting systems: an exploration of voters' perceptions and intention to use. *European Journal of Information Systems, 16*, 106-120.

Yap, Y., Tan, S., & Choon, S. (2022). Elderly's intention to use technologies: A systematic literature review. *Heliyon, 8*, e08765.

Yonwikai, W. (2019). Business Development Guidelines to Support Tourism Behaviours of Elders Travelling in Thailand. *Dusit Thani College Journal, 13*(2), 428-438.