OBSTACLE FACTORS THAT HINDER THE ADOPTION OF MOBILE PAYMENTS AMONG THE THAI ELDERLY

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ABSTRACT

The objectives of this research were to study 1) the adoption of mobile payments among the elderly when classified by personal factors; and 2) factors that hinder the adoption of mobile payments among the Thai elderly. The researcher used a convenient sample selection method. Data was collected from 570 Thai elderly people. Questionnaires were used as the research instruments and passed the content validity test and the reliability test. The statistics used in the data analysis consisted of percentage, mean, standard deviation, t-test, one-way analysis of variance, model analysis, and multiple indicators through the analysis of structural equations model (SEM). The research results showed that 1) the adoption of mobile payments among the elderly. The findings show that: 1) different genders of the elderly have statistically significant effects on mobile payment adoption at the .05 level; and 2) barriers to using mobile payments are related to the payment system via mobile.

Because the elderly has two primary impediments to embracing mobile payments: usage barriers and value barriers; therefore, research implications indicate that entrepreneurs should build trust in using mobile payment systems as well as simplify functions to manipulate more usage.

Keywords: Adoption, Mobile Payment, Thai Elderly

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Introduction

Today, e-payment research is expanding. As wireless communication technology advances in leaps and bounds, it is noted that the trend toward mobile payments is accelerating. Mobile phones have become a vital tool for everyday transactions. The primary evidence is the increase in the number of mobile phone users, as well as the rapid development of mobile devices and network technology, which has resulted in the proliferation of services through a network of service providers in order to increase efficiency and create a competitive advantage.

Businesses with a policy to provide mobile phone-related services, such as mobile internet and mobile payments, are also growing in popularity. This exponential rise is driving researchers to examine how mobile phone transactions have influenced changes in lifestyle and behavior (Rahayu, 2022; Chaveesuk, Khalid, & Chaiyasoonthorn, 2022; Kumari & Lodha, 2021). These services assist users, so they do not have to spend time going to pay, transfer funds, or browse for goods and services.

The statistics from the study of mobile payments in Thailand indicate that, despite the rising use of e-Payments by Thais, mobile payments continue to grow in popularity. However, cash remains the predominant mode of payment. This is shown by the ratio of currency in circulation (CIC) to unadjusted currency. GDP remained steady at around 9.0 percent, however the percentage of e-Payments use to GDP grew exponentially (Bank of Thailand, 2020). The average annual growth rate for mobile payment service customers in Thailand is 22%, and it is anticipated that this trend will continue. Other significant causes include the Thai population's growing access to smartphones and tablets (Wilasri & Thongmak, 2015).

In lieu of cash, more than 73 percent of payments and financial transactions were done using the E-Payment system. The poll also revealed crucial facts, such as an increase in Mobile Payments confidence. People with a strong buying capacity are more likely to utilize E-Payment services than cash. Over sixty percent of respondents believe cash transactions are no longer secure and avoid carrying cash. In addition, 67 percent of respondents picked automated payments because they are more convenient and quicker (Getinvoice, 2019).

The COVID-19 scenario throughout the globe has sparked an online system that allows people to do financial transactions with just a cell phone. With the government's "Half Per Person" scheme, which needs a comprehensive mobile E-Payment system to be implemented (Srilert, 2020), and successive projects such as selling government lottery tickets through the application "Bao Tung" reflects that in the modern society after this, citizens can no longer avoid making payments through their mobile devices.

The interest of the research team in studying the variables that impede the adoption of mobile payments among Thai seniors led to the conduct of this study. The reason for this is because the elderly is the group with the largest buying power, but they also have the slowest learning of mobile payments owing to physical restrictions and unfamiliarity with technology due to the passage of time. This makes the elderly more prone than other age groups to "reject" or embrace the usage of such technologies.

Research objectives

1. To investigate the use of mobile payments among the elderly based on personal factors.
2. To study the factors that hinder the adoption of mobile payments among the elderly.

Literature review

Theory of innovation resistance

Ram and Sheth (1989: 5-14) presented the innovation resistance theory by pointing out the cause and barriers to the user's refusal to adopt the innovation are caused by change and the contradiction of the use of innovation. These obstacles can be divided into 2 types: functional barriers and psychological barriers. Functional barriers include usage barriers arising from innovation that inconsistent with the user, such as working procedures, methods of use, and user habits. The value barrier is that this innovation has economics value that are not suited to the potential given when compared to other innovations, and the risk barrier is the level of risk arising from the implementation of that innovation. The psychological barriers include traditional barriers that generally involve with the change in innovations used in everyday life and image barriers regarding the identity of the innovation, such as product type, brand or origin.

According to study conducted by Chin et al. (2013) and Elbadrawy and Azizz (2011), resistance to innovation is a hindrance to innovation. It is the preference of customers preferring current or established items over fresh developments. Including a predisposition for maintaining the same behavior as opposed to adapting it to innovation. Utilization barrier, value barrier, risk barrier, tradition barrier, and image barrier are barriers to the adoption of innovations. The usage barrier is the level of effort users of mobile payment services or an image that looks difficult to use. If a lot of effort is required, it will hinder its use. The value barrier compares the effectiveness of innovation to something else that can replace innovation. For example, if a mobile payment service is not offering a competitive price for its performance when compared to traditional payment methods such as cash, credit card, etc., users may not feel motivated to use the service.

Risk barriers are such as the risk of copyright infringement, theft, confidentiality, and transaction errors, etc. If the risk is greater, the acceptance will be less and the spread of innovation will take longer too. Traditional barriers are those where consumers are more satisfied with using traditional methods than switching to innovative risk-awareness. Image barrier refers to the perception that consumers think innovation has an image that is difficult to use (Chin et al. 2013; Teo et al., 2013)

Concepts and theories on technology adoption

Technological Acceptance Model (TAM) developed from the concept of Davis, Bagozzi and Warshaw (1989) is a theory that is popular today to describe the accepting behavior of individuals. In the meantime, RJOAS (2018) states that TAM used to describe and predict adoption and the use of information systems is to develop the theory of rational action by adding two core structures: perceived usefulness and perceived ease of use. Therefore, technology adoption includes: Perceived usefulness is

the degree to which people believe that using technology will improve efficiency; 2) perceived ease of use is the degree to which some people believe that using technology requires no effort; 3) attitude towards behavior is a person's positive or negative feelings when using technology; 4) behavior intention is a person's desire to act; and 5) actual use is the action of a person who uses technology. Accordingly, this research was based on three key factors: 1) perceived usefulness, 2) perceived ease of use, and 3) attitudes towards behavior.

1. Perceived Usefulness

Davis, Bagozzi and Warshaw (1989) defined perceived usefulness as the level of belief of potential users of a technology system that the technology is beneficial to them and is likely to increase efficiency in their work. Meanwhile, Udornchainit (2019) has defined perceived usefulness as the people perceive that the information systems, they use are beneficial and that if they use newly developed information systems they will improve their efficiency. The perception of benefits directly influenced the intention to use the information system. In addition, Manoi and Cholpaisal (2019) have defined perceived usefulness as the perception of an attitude, entertainment incentives, price perception of service, and familiarity with the use of electronic payment systems as well as Han et al. (2015) conducted a study on the impact of consumer trust and perceived benefits on mobile payment and online shopping site loyalty. The research has shown that when consumers recognize the benefits and trust in mobile payment systems, it will have a positive effect on consumer loyalty to mobile payments and shopping mall websites. The most encouraging factors are E-commerce user interface design, especially the transaction system. It can be concluded that the perceived usefulness refers to the belief level of the elderly that mobile payment technology is appropriate for their lifestyle. Whether buying goods and services online, paying bills instead of cash, can be used at any time-anywhere, and can access services conveniently and quickly.

2. Perceived Ease of use

Perceived ease of use is a level of belief and expectations of people who use information systems that such information systems are easy to learn. It doesn't take much effort to learn how to use the system or to understand it. Under the definition of easy and without difficulty or effort (Davis, Bagozzi & Warshaw, 1989). Additionally, Lobphai (2016) has given the meaning of perceived ease of use as the level of user belief expected of a system being developed and that it is intended to be easy to learn to use and does not require much effort. Perceived ease of use directly influenced the use of the system and indirectly influenced the use of the system through perceived benefit. The perception of ease of use is divided into 2 aspects, namely knowledge and the intention to use. Furthermore, Setiawan and Setyawati (2020) are conducting research on the influence of perceived ease of use on the intention to use mobile payments. The study found that perceived ease of use helps traders be wary and re-examine existing transactions. This ensures that the transaction is successful and that there is a notification on the merchant's mobile phone. In conclusion, the perceived ease of use means that elderly people perceive mobile payments as easy to learn, simple and convenient to use.

3. Attitude towards behavior

User attitude is influenced by perceived usefulness and perceived ease of use of the system. This will result in the adoption of practical applications (Davis, Bagozzi & Warshaw, 1989). Kitisitthichai (2018) has given the meaning of attitude as feelings, thoughts, beliefs, and the tendency to express a person's behavior. It is a reaction by estimating likes or dislikes to affect a person's positive or negative response to the person, thing, or situation in that person's environment. It can be learned or managed using experience, and that attitude can be known or interpreted from what people say informally, from an official survey, or from that action. In the meantime, Manoi (2019) gave the definition of attitude towards behavior as the opinions of users towards technology, which has a direct relationship with the behavior of service users. Furthermore, Aslam, Ham, and Arif (2017) researched on Consumer Behavior Intentions towards Mobile Payment Services: An Empirical Analysis in Pakistan. The results found that awareness of compatibility, perceived usefulness, and personal norms are strong predictors of consumer attitudes towards mobile payment services. While the impact of safety awareness and simplified perception will be influenced by attitude, it is insignificant. Accordingly, it can be concluded that attitude towards behavior refers to feelings, thoughts, or beliefs of the elderly towards the acceptance of mobile payments that are good in a modern way and agree to use them.

From the review of all literature can be used to create a conceptual framework as follows.

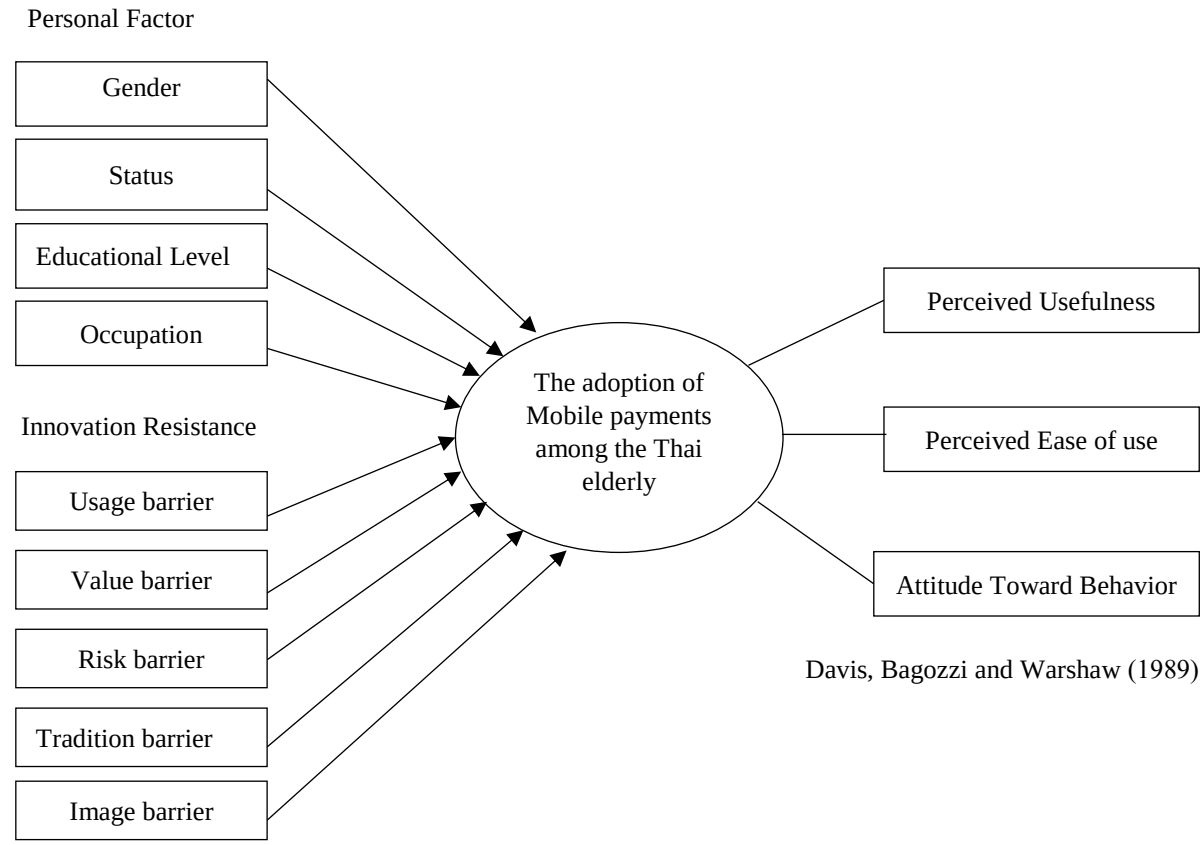

Figure 1 Conceptual framework

Research methodology

The population is the elderly of Thai nationality aged 60-69 years and whose names are listed in the household registration for 6,843,300 people (Department of Provincial Administration, 2022) The researcher used the number of variables criteria of Hair et al. (2010), which proposed that the ratio of samples to the number of parameters or observable variables for a suitable measurement should be at least 30 samples per 1 observed variable. In this study, 19 variables were obtained, so a total of 570 samples were obtained from the sample, and collecting data uses simple random sampling.

The quality test of the questionnaire that passed the content validity test from 3 experts received a content validity value of 0.67–1.00, determined by the Cronbach alpha value. The sample group of 30 lecturers at Nakhon Pathom Rajabhat University, aged between 55 and 59 years. The anti-innovation questionnaire had a Cronbach alpha value of 0.86-0.90. The acceptance of mobile payments by elderly people had a Cronbach alpha value of between 0.78 and 0.81. The questionnaire was divided into three parts:

1. The personal characteristics of the respondents were multiple choice and closed-ended questions. Inquire about gender, status, education level, and occupation.

2. The anti-innovation contains questions about usage barriers (5 items), value barriers (5 items), risk barriers (5 items), traditional barriers (5 items), and image barriers (4 items) for a total of 24 questions. They were rated as 5-level estimation scale questionnaires. The questionnaire was revised in the opposite direction, with those assessing anti-innovation at the highest level.

3. The acceptance of mobile payments for the elderly includes questions about perceived usefulness (5 items), perceived ease of use (4 items), and attitude toward behavior (5 items), totaling 14 questions. They were characterized as a 5-level estimation scale questionnaire.

The statistics used in the data analysis consisted of percentage, mean, standard deviation, t-test, and one-way analysis of variance. The analysis model for multiple indicators multiple causes (MIMIC) using structural equation model (SEM).

The criteria for considering the mean, use the criteria of Best and Kahn (1998: 247) as the estimation criterion as follows:

Score 4.21-5.00 means the assessment results are at the highest level.

Score 3.41-4.20 means the assessment results are at a high level.

Score 2.61-3.40 means the assessment results are at a moderate level.

Score 1.81-2.60 means the assessment results are at a low level.

Score 1.00-1.80 means the assessment results are at the lowest level.

The results of the concordance analysis of the empirical data by using chi-square values (x^2), Relative chi-square values (x^2/df), Root Mean Square error of Approximation (RMSEA), Normed Fit Index (NFI, Comparative Fit Index (CFI), Goodness of Fit Index (GFI), and Standard Root of Mean Square Residual (SRMR) (Jöreskog, & Sörbom, 2012).

Research results

The results showed that most of the respondents were female (52.63%), graduated from primary school (21.40%), and engaged in wage work (32.98%).

Table 1 Shows the average resistance to innovation

	Mean	**SD.**	**Assessment**
Usage barrier :UB	3.46	1.05	High
Value barrier :VB	3.25	0.93	Moderate
Risk barrier :RB	3.09	1.02	Moderate
Tradition barrier :TB	2.97	0.96	Moderate
Image barrier :IB	3.71	0.85	High
Total average	**3.30**	**0.96**	**Moderate**

The overall anti-innovation factor was assessed moderately. When the first three priorities are arranged, they include: image barriers, usage barrier, and value barrier, respectively.

Table 2 Shows the average elderly mobile payment acceptance rate

	Mean	**SD.**	**Assessment**
Mobile payments allow you to purchase a wide variety of products.	3.74	0.93	High
Mobile Payment Technology is suitable for your lifestyle.	3.68	0.85	High
Mobile payments allow you to efficiency buy goods and services online.	3.19	1.12	Moderate
Mobile payments make it possible for you to use it anytime, anywhere.	3.78	1.17	High
Mobile payments give you quick and easy access to our services.	3.57	0.99	High
Perceived Usefulness	**3.59**	**1.01**	**High**
You recognize that mobile payments are easy to learn.	3.54	1.07	High
You acknowledge that mobile payments are simple.	3.06	1.04	Moderate
You acknowledge that mobile payments are easy to use.	2.80	1.17	Moderate
You acknowledge that mobile payments are available 24 hours a day.	2.77	1.10	Moderate
Perceived Ease of use	**3.04**	**1.09**	**Moderate**
You feel good and accept mobile payments.	2.77	1.09	Moderate
You feel that mobile payments are a modern and you can follow.	3.07	1.24	Moderate
You are convinced that age is no barrier to mobile payments.	3.06	1.06	Moderate
You agree that older people need to be open to accepting mobile payments.	3.04	1.10	Moderate
You see that mobile payments can be trusted.	3.47	1.31	High
Attitude Toward Behavior	**3.08**	**1.16**	**Moderate**

The overall adoption of mobile payments among elderly people is range from moderate to high. When prioritized in the first three will consist of perceived usefulness, attitude towards behavior, and perceive ease of use accordingly.

Research results for answering research objective number 1, the researcher tested with t-test and one-way analysis of variance. The results are as follows:

Table 3 Elderly acceptance for mobile payment when classified by personal factors

Latent Variable	Gender	Status	Education	Occupation
	t-test	One Way ANOVA		
Perceive usefulness	-2.11*	1.26	1.63	0.49
Perceive ease of use	-0.33	0.69	0.89	0.25
Attitude toward behavior	1.47	0.66	0.16	0.18
Mobile Payment Acceptance	**-2.05***	**0.83**	**0.52**	**0.16**

Accepting mobile payments by elderly was found that there was a statistically significant difference by gender at the .05 level.

The results of the study factors that hinder the adoption of mobile payments among the elderly by the analysis model for multiple indicators multiple causes (MIMIC) using structural equation model (SEM) can be presented as follows.

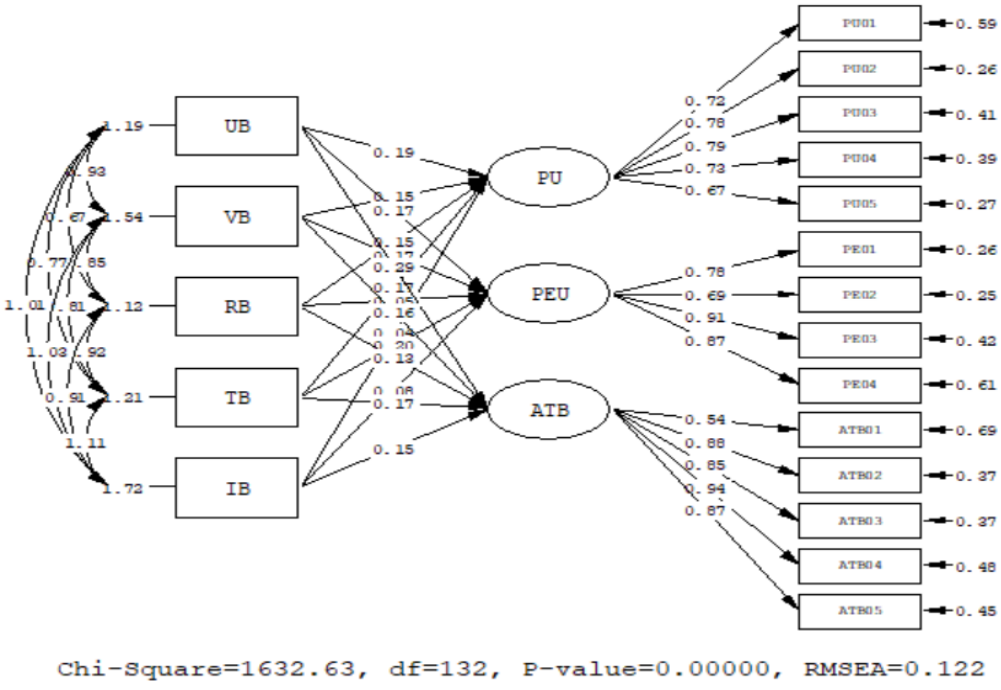

Figure 2 A model of barriers to the adoption of mobile payments for the elderly (model before adjustment)

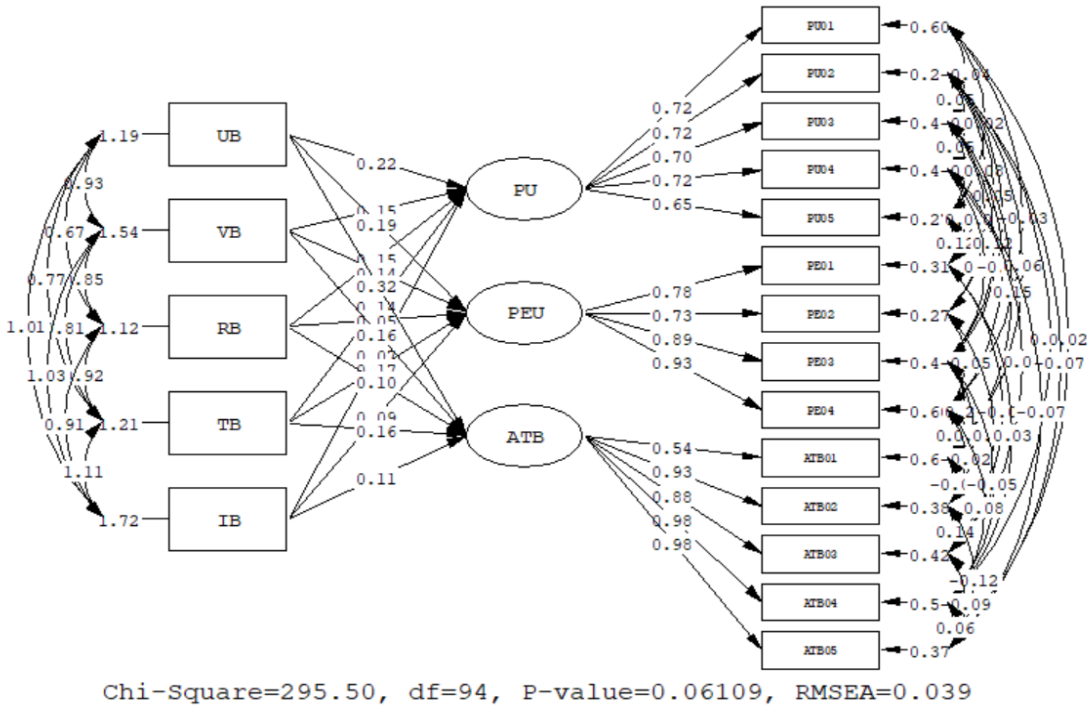

Figure 3 A model of barriers to the adoption of mobile payments for the elderly (model after adjustment)

Table 4 Proving congruence with the empirical data of Confirmatory factor analysis (CFA)

Value	Criterion	Value before adjustment	Result of consideration	Value after adjustment	Result of consideration
P-Value	More than 0.05	0.00	×	0.06	√
x^2/df	Less than 5	12.37	×	3.14	√
RMSEA	0.03-0.08	0.122	×	0.039	√
NFI	0.9 or more	0.95	√	0.98	√
CFI	0.9 or more	0.95	√	0.98	√
GFI	0.9 or more	0.82	×	0.95	√
SRMR	Less than .05	0.13	×	0.03	√

Note: √ means passing the index test result criteria used to verify the consistency and harmony of the model with the empirical data.

The results of the index analysis used to verify the coherence and harmony of the model with the empirical data using confirmatory factor analysis (CFA). The results of the assessment of the harmony of the model revealed that x^2 = 295.50, df = 94, x^2/df = 3.14, RMSEA = 0.039, NFI = 0.98, CFI = 0.98, GFI =0.95, SRMR = 0.03. The index shows that the adjusted model has better empirical consistency because it is consistent with sufficient empirical data.

Table 5 Factor models that hinder the adoption of mobile payments among elderly.

	Perceive usefulness			**Ease of use**			**Att. toward**		
	β	**SE.**	**t**	β	**SE.**	**t**	β	**SE.**	**t**
Usage barrier :UB	0.22	0.04	5.19	0.19	0.04	5.09	0.32	0.03	9.93
Value barrier :VB	0.15	0.04	4.36	0.14	0.03	4.34	0.16	0.02	6.65
Risk barrier :RB	0.15	0.05	3.27	*0.05*	*0.04*	*1.16*	0.10	0.03	3.25
Tradition barrier :TB	0.14	0.05	2.71	0.17	0.05	3.77	0.16	0.03	4.88
Image barrier :IB	*0.07*	*0.04*	*1.74*	0.09	0.04	2.54	0.11	0.03	4.18
	$R^2 = 0.51$			**$R^2 = 0.51$**			**$R^2 = 0.82$**		

Factors that hinder the adoption of mobile payments among the elderly in each aspect, are portrayed as follow: 1) Perceived benefits: consisted of usage barrier, value barrier, risk barrier, and traditional barrier; 2) Perceived ease of use: include usage barrier, traditional barrier, value barrier, and image barrier; 3) Attitudes towards behavior: include usage barrier, value barrier, traditional barrier, image barrier, and risk barrier respectively. The research results concluded that usage barrier is one of the main barriers to the adoption of mobile payments among the elderly.

The results of the analysis of the confirmation elements contained in the barriers to the adoption of mobile payments among the elderly found that:

1. Perceive benefit: gain weight factor in allow to purchase a wide variety of products, suitable for lifestyle, and can use it anytime anywhere.

2. Perceive ease of use: gain weight factor in recognizing that mobile payments are convenience of use.

3. Attitude toward behavior: gain weight factor in agreeing that elderly need to be open to accepting mobile payments and have opinion that mobile payments can be trusted.

Summary and discussion

1. Accepting mobile payments by elderly was found a statistically significant gender difference at the .05 level, consistent with the research by Kumari and Lodha (2021). The research study on the impact of self-efficacy and social influence on the adoption of electronic payments among Indian millennials. The result found that the adoption of electronic payments among the younger generation Millennials have a statistically significant gender difference. Whereas there were no statistically significant differences in the factors of status, education, and occupation. The findings are in conflict with the research of Chanton, Chimmasangkana and Rittiboonchai (2021), which found that different education, occupation, and income affect the accept to use of different technologies.

2. Usage barrier is one of the main barriers to the adoption of mobile payments among the elderly. This is consistent with the research of Wilasri and Thongmak (2015) in a study on the influence of factors that hinder payment acceptance via mobile device. The results indicated that the barriers that affect the characteristics of different anti-innovators are: usage barrier, traditional barrier, and risk barrier, respectively. While Aldammagh, Abdeljawad and Obaid (2021) found that usage barrier will

cause customers to lack confidence in safety. A technology adoption model that combines the theory of a planned behavior with trust and perceived risks will be the game change for financial organizations in terms of remote banking.

3. One of the hurdles in perceived ease of use and attitudes toward behavior is image barriers, which relates to the view that customers believe innovation has a difficult to use image. The findings support Bao and Pan (2021) findings that the user experience of utilizing mobile payment systems is one of the acceptability hurdles for the elderly. The basic usage needs of elderly users in front-end development, actively obtain users' operating experience and satisfaction after the product is launched, evaluate the difference between their operating perception and expectation based on elderly users' feedback on the overall service experience, and improve the payment platform based on the findings, in order to provide elderly people with a comfortable, convenient, and friendly way to use mobile payments (Bao & Pan, 2021).

4. Traditional barriers which is part of psychological barriers is still one of the barriers in all dimensions of technology acceptant model in this study. Differences in individual physiological development can affect the acceptance of mobile payment platforms, according to Bao and Pan (2021). Because of cognitive degradation, certain older adults with neurodegenerative disorders may have demands for existing mobile payment services.

Contributions

1. The results showed that for the elderly, there was no difference in personal attributes in accepting mobile payments. Except for gender differences which elderly female will prioritize mobile payment acceptance higher than males especially the recognition of the benefits of using such devices.

2. Usage barrier is the most effect to TAM in all dimensions (Perceive Benefit, Perceive Ease of use and Attitude Toward Behavior) so banks should improve application to easier to use. Entrepreneurs interested in elderly customers need to avoid innovation inconsistent with elderly users by giving importance to work procedures, methods of use, and user habits.

3. The stakeholder, for example, banks should develop learning channels on the use of appropriate technology because the elderly realized that mobile payments could make them buy a variety of products and are essential to their lifestyle. Moreover, the elderly customers know the impact of the world changing and ready to learn.

4. Usage barriers and value barriers are two major obstacles for the elderly to accepting mobile payments. Therefore, creating trust in elderly is the necessary for entrepreneurs to overcome these obstacles and facilitate the elderly customers to willingness use mobile payments.

Suggestion for Further Research

1. This research collected data from elderly people in the age range of 60-69 years, who were the first elderly group who were able to lead a normal life on their own. Those work does not cover the

elderly in the next period, namely the group 70-79 years and the group 80 years and over. If those who are interested in collecting more comprehensive information may expand the research scope to such groups.

2. This research focuses only on quantitative research. Those who are interested may continue to do qualitative research in order to get more in-depth information by using in-depth interviews. or make a group conversation.

3. The research included only the elderly, if interested researcher will continue to study and develop the model for people of different ages or generation, it should expand the boundaries of knowledge even more.

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