THE FACTORS IMPACT ATTITUDE TOWARD USING AND CUSTOMER SATISFACTION WITH ELDERLY HEALTH CARE MOBILE APPLICATION SERVICES: A CASE STUDY OF PEOPLE IN BANGKOK METROPOLITAN, THAILAND.

Hathairat Didyasarin[1], Rawin Vongurai[2], Sutthhisak Inthawadee[3]

Abstract: Nowadays, Thailand is turning to aging society with the older population increasing than past. Mostly, older people have mental and physical health problems. Consequently, elderly health care is more important and necessary in the society. Currently, technology has continuously grown especially mobile applications that allow people to get involved with more activities. Applying elderly health care as mobile application service instead of traditional service is a new type of product and new trend in Thailand. This research analyzes the factors have impact attitude toward using and customer satisfaction with health mobile application service. The target population are people who lives in Bangkok Metropolitan, Thailand. The data were collected by applying non-probability sampling as convenience and snowball sampling methods with 406 respondents both online and paper based questionnaire survey. Multiple Linear Regression methodology was used in the research. As a result, perceived usefulness, perceived ease of use, perceived playfulness, and cognition of compatibility have significant impact on attitude toward using. Moreover, customer satisfaction with health mobile application services were significantly impacted by perceived usefulness, perceived ease of use and attitude toward using.

Keywords: elderly, health care, mobile application, perceived usefulness, perceived ease of use, perceived playfulness, cognition of compatibility, attitude toward, customer satisfaction

Introduction

The world population of older people have rapidly been increasing and birth rate has been declining every year. According to The United Nations, older people are classified under age above 60 years old (United Nations, 2013). Nowadays, Thailand has become an aging society with proportion's population of older people lead to 10 percent or over. However, The Ministry of Public Health preparation for Thailand become an aged society for next 23 years or in year 2040, the proportion of older people as one-third of the total country's population. Approximately 20 percent would stay at home and need elderly health care (The Government Public Relations Department, 2016).

The government's policy is developing Thailand as an international medical hub. Therefore, the objective of Ministry of Public Health is to encourage health establishment in Thailand and the plan involves four types; medical treatment, health promotion, traditional and alternative medicine, and herb and health product.

In recent decades, technology has been continuously growing and become an essential part of our life which has an influence on people lifestyle as well as mobile applications that provide functions

[1]Hathairat Didyasarin, Graduate School of Business, Assumption University, Thailand.

[2]Rawin Vongurai, Ph.D., Graduate School of Business, Assumption University, Thailand.

[3]Sutthhisak Inthawadee, Ph.D., Managing Director, Merlin's Solutions International Co., Ltd.

to use easily. Thailand Government's policy needs to promote "Thailand 4.0" is referred to build economic accomplishment through innovation, knowledge, technology for competitive advantage and sustainability.

Mobile healthcare service is unique a kind of service refer to the software program design to provide healthcare service over mobile communication devices that could help patients or people who need attention to gain benefit in social health aspect. It is to provide a service platform to connect patient to meet service providers such as physician, nurse and caretakers. This new service will help customer to views service provider instantly and connect them which could obtain services immediately instead of going to the clinic or hospital and waste more time in line. This platform solution will be the best answer to all healthcare service trend in coming years (Global Industry Analysts, 2015).

Therefore, researcher is interested in this research and the objective of this study is to understand factors that impact on attitude toward using and customer satisfaction with elderly health care application services.

Literature Review
Perceived Usefulness (PUF)

Perceives usefulness is the one factor of Technology Acceptance Model (TAM) that examines the level of personals believe, intend to use or not to use an application (Davis, Bagozzi, and Warshaw, 1989) which it will help them to achieve technology information in a better way. According to TAM model adoption into this research to indicate usage technology his/her engaging elderly health care's application service to enhance or improve their conditions.

Perceived Ease of Use (PEU)

Perceived ease of use is an important factor of TAM model (Davis et al., 1989). Perceived ease of use shows the angel to

which personal believes that using the new technology system, it would be easy to access the information. Nevertheless, user perceive side, the application could be suitable, effectiveness and beneficial for users while learning a new innovation system is relative to current knowledge of users but sometimes using a new innovation system is difficult to adopt which is an obstacle. So, the good characteristics of innovation should fit with consumers and the key factors could be simply and easy to understand (Rogers, 1962).

Perceived Playfulness (PPF)

According to Moon and Kim (2001) study to evaluate a further step to examine the variable of perceived playfulness in the basic background information. It's also about the attraction of appeal for users and players to defined playfulness. As playfulness refers to the level of enjoyment perceived during encounter and interactive, it will influence the attitude of users and will increase the user acceptance (Lin, Wu, and Tasi, 2005).

Cognition of Compatibility (CC)

Referring to the Innovation Diffusion Theory (IDT) which is related to the consistency of innovation adoption of new technology which is helpful to communicate with applicants in a social system (Rogers, 1962). Compatibility reflects among providers, task to perform, situation and technology (Karahanna, Straub, and Chervany, 1999). Moreover, compatibility helps measuring technology's consistency with customer's needs and values.

Attitude toward Using (ATU)

The Ajzen and Fishbein (1980) study could be illustrated as user assessment of satisfaction while using a technology information system. It is believed that

attitude toward using is a spontaneous reaction to new technology by consumers. Also believed that customer satisfaction is a previous experience review to the past by comparison of the product or service and then purchase goods (Kotler, 2000).

Customer Satisfaction (CS)

Assessment by customer will determine the service or product whether to meet the needs of the customer and expectation (Zeithaml, Bitner, and Gremler, 2006). It could verify that customer often use emotional judgment in response to product and services by following last consumption. Moreover, the level of customer satisfaction can create number of customers to repeat use or purchase goods in the future.

Research Framework and Methodology

Referring to the theoretical framework that studied the relationship between attitude toward using and customer satisfaction with mobile application services: an empirical study from the life insurance industry (Lee, Tsao, Chang, 2015), seven variables were used for the framework: Perceived Usefulness, Perceived Ease of Use, Perceived Playfulness, Cognition of Compatibility, Attitude toward Using, Customer Satisfaction and Control Variables (age, education, disposable, income, occupation) . Therefore, this research is to study regarding the factors impact Attitude toward Using and Customer Satisfaction with elderly health care mobile application services. Below figure 1 displays the conceptual framework of this research.

Figure 1: Conceptual Framework developed by researcher for this study
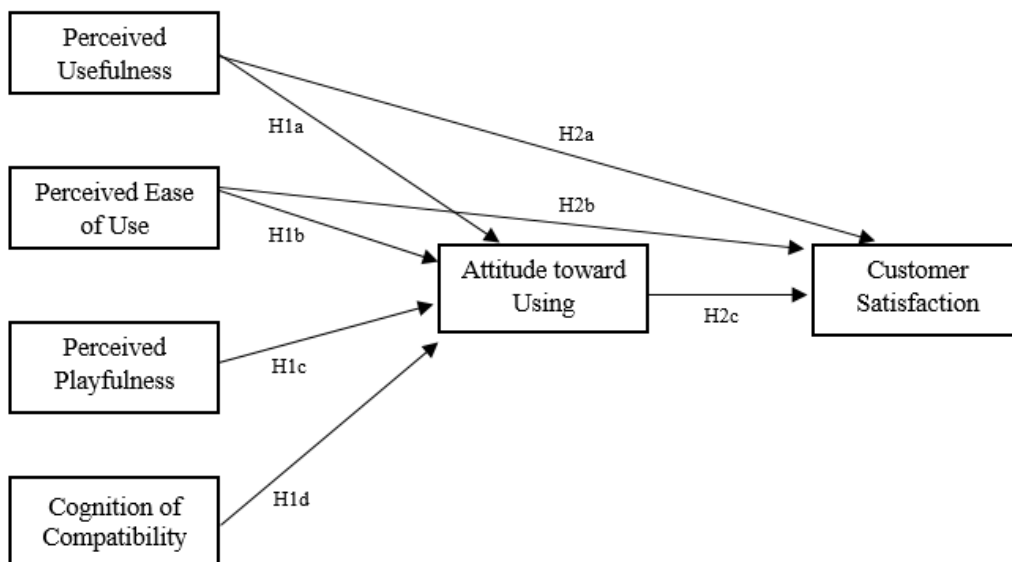
This study examined the hypotheses to achieve the research objectives. They are:

H1a: Perceived Usefulness has significant impact on Attitude toward using elderly health care's application service.

H1b: Perceived Ease of Use has significant impact on Attitude toward using elderly health care's application service.

H1c: Perceived Playfulness has significant impact on Attitude toward using elderly health care's application service.

H1d: Cognition of Compatibility has significant impact on Attitude toward using elderly health care's application service.

H2a: Perceived Usefulness has significant impact on Customer Satisfaction with elderly health care's application service.

H2b: Perceived Ease of Use has significant impact on Customer Satisfaction with elderly health care's application service.

H2c: Attitude toward Using has significant impact on Customer Satisfaction with elderly health care's application service.

Research Methodology

Quantitative approach is employed to examine the hypothesis of this research. The data were collected both online and paper based questionnaire survey by applying non-probability sampling as convenience and snowball sampling methods. The questionnaire is divided in to 2 parts; the first part is for screening purposes and general questions of respondents. The second part has 27 questions with 6 variables by using 5-point Likert scale to test the factors under each variable by using ranking (1) for the respondents who accepted the "strongly disagree" to (5) for the respondents accepted "strongly agree".

Measurement of variable

The target populations are people who lives in Bangkok Metropolitan, Thailand and use smartphone.

Population and Samples

The questionnaires were distributed to 406 respondents by using screening question for selecting these who are living in Bangkok metropolitan and use a smartphone. The data were collected by non-probability convenience and snowball sampling methods.

Reliability Test

A pretest was conducted to find validity and reliability of the questionnaire survey in a small group before distribution to the target population. The reliability was conducted on 30 respondents, which was represented by Cronbach's Alpha Coefficient. The reliability of statistics shows all variables were greater than 0.7 (Cronbach, 1951) as shows below in table 1

Table 1: Consistency of the scales test

Variable	Number of items	Cronbach's Alpha
Perceived Usefulness (**PUF**)	5	0.824
Perceived Ease of Use (**PEU**)	5	0.855
Perceived Playfulness (**PPF**)	4	0.714
Cognition of Compatibility (**CC**)	3	0.869
Attitude toward Using (**ATU**)	5	0.826
Customer Satisfaction (**CS**)	5	0.920

Results and Discussion Data Analysis

The process of evaluating data by using statistical software to analyze the data in order to identify the relationship between independent and dependent variables.

Demographic Factors of Respondents Explanation

This part explained the basic characteristics of respondents. The demographic data were collected from 406 respondents which represent 100 percent. The demographic factors included sex, education, age, status, and income which are shown below in table 2.

Table 2: Demographic factors of respondents (N = 406)

	Frequency	Percent
Gender		
Male	119	29.3
Female	287	70.7
Education		
Secondary	5	1.2
High school	17	4.2
Diploma	18	4.4
Bachelor degree	263	64.8
Master degree or higher	103	25.4
Age		
20-29	130	32
30-39	182	44.8
40-49	60	14.8
50-59	31	7.6
Above 60	3	0.8
Status		
Single	288	70.9
Married	110	27.1
Divorce	8	2
Income		
Less than 15,000	43	10.6
15,000-30,000	178	43.9
30,001-45,000	111	27.3
45,001-60,000	29	7.1

	Frequency	Percent
60,001-75,000	25	6.2
More than 75,001	20	4.9

The major population of respondent of this research were females represented as 70.7 percent and males constituted 29.3 percent. Majority education level at 64.8 percent have "bachelor's degree" followed by 25.4 percent with "master's degree" or higher level, 4.4 percent had "diploma", 4.2 percent did "high school", and 1.2 percent passed "secondary level". For the age of respondents, the most group were in the age 30-39 years old represented by 44.8 percent, followed by age 20-29 years old represented by 32 percent, age 40-49 years old at 14.8 percent, age 50-59 years old at 7.6 percent and 0.8 percent were age 60 years old or over. For the marital status of respondent's majority were single at 70.9 percent, followed by married status at 27.1 percent, and divorce status at 2 percent. The highest number with income level per month were respondents representing 43.9 percent earning 15,000-30,000 baht followed by 27.3 percent earning 30,001-45,000 baht, 10.6 percent earn less than 15,000 baht, 7.1 percent earning 45,001-60,000 baht, 6.2 percent earning 60,001-75,000 baht and 4.9 percent earning income per month more than 75,001 baht respectively.

Descriptive Analysis and Correlation Matrix

The 5-point Likert scale for used for factors under each variable with ranking (1) for the respondents who accepted the "strongly disagree" to ranking (5) for respondents who accepted "strongly agree".

Table 3: Correlation Matrix (Dependent variables: Attitude toward Using)

Variables	Mean	SD	ATU	PUF	PEU	PPF	CC
Attitude toward using (ATU)	3.9227	.62683	1				
Perceived Usefulness (PUF)	4.0596	.60393	.715*	1			
Perceived Ease of use (PEU)	3.8433	.64612	.746*	.681*	1		
Perceived Playfulness (PPF)	3.8787	.63165	.808*	.656*	.704*	1	
Cognition of compatibility (CC)	3.8558	.77656	.858*	.666*	.678*	.804*	1

Correlation is significant at 0.05 level (1-tailed)

The correlation matrix from above revealed that there are four independent variables which have positive correlation with dependent variable. According to Evans (1996), Perceived Usefulness *(PUF)* has strong relationship with Attitude toward Using *(ATU)* elderly health care application service *(ATU)* at 0.715 and Perceived Ease of Use *(PEU)* has strong relationship with Attitude toward Using *(ATU)* elderly health care application service *(ATU)* at .74 while Perceived Playfulness *(PPF)* has very strong relationship with Attitude toward Using *(ATU)* elderly health care application service *(ATU)* at .808 and Cognition of compatibility *(CC)* has very strong relationship with Attitude toward Using *(ATU)* elderly health care application service *(ATU)* at .858.

Table 4: Descriptive Analysis and Correlation Matrix (Dependent variables: Customer Satisfaction)

Variables	Mean	SD	CS	UF	EU	ATU
Customer Satisfaction (CS)	3.9015	.70185	1			
Perceived Usefulness (PUF)	4.0596	.60393	.698*	1		
Perceived Ease of use (PEU)	3.8433	.64612	.711*	.681*	1	
Attitude toward Using (ATU)	3.9227	.62683	.864*	.715*	.746*	1

Correlation is significant at 0.05 level (1-tailed)

According to Evans (1996), the correlation matrix from above shows that there are three independent variables have positive correlation with dependent variable. Firstly, Perceive Usefulness *(PUF)* has strong relationship with Customer Satisfaction *(CS)* at .698. Secondly, Perceive Ease of Use *(PEU)* has strong relationship with Customer Satisfaction *(CS)* at .711. Lastly, Attitude toward Using *(ATU)* has very strong impact with Customer Satisfaction *(CS)* with elderly health care application service at .864.

Inferential Analysis

For inferential analysis, this study applied Multiple Linear Regression (MLR) technique to test H1a, H1b, H1c, and H1d are Perceived Usefulness *(PUF)*, Perceived Ease of Use *(PEU)*, Perceived Playfulness *(PPF)*, and Cognition of Compatibility *(CC)* have significantly impact on Attitude toward Using elderly health care application service *(ATU)*. Similarly, H2a, H2b, and H2c are Perceived Usefulness *(PUF)*, Perceived Ease of Use *(PEU)*, and Attitude toward Using *(ATU)* have significantly impact to Customer Satisfaction *(CS)* with elderly health care application service.

Table 5: The result of significant factors that impact Attitude toward using elderly health care application service *(ATU)*

Variables	Beta	VIF
Perceived Usefulness (**PUF**)	.137 *	2.223
Perceived Ease of use (**PEU**)	.186*	2.441
Perceived Playfulness (**PPF**)	.205*	3.326
Cognition of Compatibility (**CC**)	.477*	3.212
R-square (R^2)	.811	
Adjusted R^2	.809	

*Beta coefficients with standard errors in parenthesis, *p ≤ 0.05*

Table 5 shows the value of R-square is implied that Perceived Usefulness *(PUF)*, Perceived Ease of Use *(PEU)*, Perceived Playfulness *(PPF)*, and Cognition of Compatibility *(CC)* can explain Attitude toward using elderly health care application service *(ATU)* at .811 or 81.1 percent and the value of adjusted R^2 is equal to .809 or 80.9 percent. Moreover, the P-value of these four independent variables are less than .05. As a result, all independent variables have significant impact on Attitude toward using elderly health care application service *(ATU)*. Consequently, it implied that H1a, H1b, H1c, and H1d are supported. On the other hand, the beta coefficient (β) from table 5 also shows that Perceived Usefulness *(PUF)*, Perceived Ease of Use *(PEU)*, Perceived Playfulness *(PPF)*, and Cognition of Compatibility *(CC)* are .137, .186, .205, and .477 respectively. Thus, Cognition of Compatibility *(CC)* shows strong impact on Attitude toward using

elderly health care application service (ATU) due to highest value of beta coefficient. Table 5 demonstrated variance inflation factors (VIF) to test multicollinearity problem, the result of four independent variables revealed the range 2.223 – 3.326 which does not exceed the maximum value of 5 (Ringle, Wende, and Becker, 2015). Thus, the multicollinearity is not critical problem in this research.

Table 6: The result of significant factors that impact on Customer Satisfaction with elderly health care application service (CS)

Variables	Beta	VIF
Perceive Usefulness (**PUF**)	.133*	2.274
Perceive Ease of use (**PEU**)	.104*	2.506
Attitude toward using (**ATU**)	.691*	2.751
R-square (R^2)	**.764**	
Adjusted R^2	**.763**	

*Beta coefficients with standard errors in parenthesis, *p ≤ 0.05*

Table 6 shows the value R^2 is implied that Perceived Usefulness (PUF), Perceived Ease of Use (PEU), and Attitude toward Using (ATU) can explain Customer Satisfaction (CS) with elderly health care application service at .764 or 76.4 percent and the value of adjusted R^2 is equal to .763 or 76.3 percent. Moreover, the P-value of three independent variables are less than .05. As a result, all independent variables have significant impact on Customer Satisfaction (CS) with elderly health care application service. Consequently, it is also implied that H2a, H2b, and H2c are supported. On the other hand, the beta coefficient (β) from table 6 also shows that

Perceived Usefulness (PUF), Perceived Ease of Use (PEU), and Attitude toward Using (ATU) are .133, .104, and .691 respectively. In addition, the table 6 demonstrated variance inflation factors (VIF) to test multicollinearity problem, the result of four independent variables revealed the range between 2.274 – 2.751 which does not exceed the maximum value of 5 (Ringle et al., 2015) Thus, the multicollinearity is not a critical problem in this research.

Conclusion and Recommendations
This research provides an understanding on attitude toward using and customer satisfaction with elderly health care application service on 406 respondents who are living in Bangkok metropolitan, Thailand and use smartphone. The results show that cognition of compatibility has strong impact on attitude toward using and attitude toward using has also strong impact to customer satisfaction with elderly health care application service. Consequently, the customer satisfaction is significantly impact by customer with a good attitude toward using elderly health care application and the functions on application should be fit on customer's lifestyle.

To create a good attitude toward using and further customer satisfaction with elderly health care application service. The developer should design the function on the application in term of user friendly, the button on application should be classify on each part for users understanding the function easier. Moreover, the color and icon of the application will design colorful and have meaningful to add value for customers perceive of playfulness. In addition of security term, when customer using this application should be secure and guarantee by service provider. Therefore, the service provider might be cross service from insurance company to decrease their

risk. Moreover, all services should depend on the customers need and value and make it to excess the customer expectation.

For the limitation in this research the elderly health care application service is a new product for people in Thailand, the people are acknowledged by particular group due to the less number of health's care service providers. Mostly, they are providing on regular services. Therefore,

the program might have difficulty to understand operators. Thus, the study summarizes the function overview with a picture to optimize better image to users. This could help the application to be more friendly to users especially to elderly group.

Finally, the future research can expand the questionnaire survey to respondents in other areas in Thailand that give this research to be more meaningful.

References:

Ajzen, I. and Fishbein, M. (1980). Understanding Attitudes and Predicting Social Behavior, Prentice-Hall, Englewood Cliffs, NJ.

Chen-Ying Lee, Chih-Hsuan Tsao, Wan-Chuan Chang, (2015). The relationship between attitude toward using and customer satisfaction with mobile application services, Journal of Enterprise Information Management, Vol. 28 Issue: 5, pp. 680-697.

Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. Psychometrika, 16(3), 297-334.13.

Davis, F.D., Bagozzi, R.P. and Warshaw, P.R. (1989). User acceptance of computer technology: a comparison of two theoretical models, Management Science, Vol. 35, pp. 982□1003.

Evans, J. D. (1996). Straightforward statistics for the behavioral sciences. Pacific Grove, CA: Brooks/Cole Publishing.

Global Industry Analyste, (2015). Market Research Report Collections. Accessed 06 August 2017
Retrieved from http://www.strategyr.com/pressMCP-7960.asp

Karahanna, E., Straub, D.W. and Chervany, N.L. (1999). Information technology adoption across time: a cross-sectional comparison of pre-adoption and post-adoption beliefs, MIS Quarterly, Vol. 23 No. 2, pp. 182-213.

Kotler, P. (2000). Marketing Management: Analysis, Planning, Implementation, and Control, 10th ed., Upper Saddle River, Prentice Hall, NJ.

Lin, C.S., Wu, S. and Tasi, R.J. (2005). Integrating perceive playfulness into expectation: confirmation model for web portal context, Information & Management, Vol. 42 No. 5, p. 683-693.

Moon, J.W. and Kim, Y.G. (2001). Extending the TAM for a world-wide-web context, Information & Management, Vol. 38 No. 4, pp. 217-230.

Public Health Reform to Prepare Thailand for an Aging Society, (2016). Accessed 10 July 2017. http://thailand.prd.go.th/ewt_news.php?nid=2723&filename=index
Retrieved from http://thailand.prd.go.th/ewt_news.php?nid=2723&filename=index

Ringle, Christian M., Wende, Sven, & Becker, Jan-Michael. (2015). SmartPLS 3. Bönningstedt: SmartPLS.
Retrieved from http://www.smartpls.com

Rogers, E.M. (1962). The Diffusion of Innovations, 3rd ed., Free Press, New York, NY.

The Government Public Relations Department, (2011). Public Health Reform to Prepare Thailand for an Aging Society.

The Government Public Relations Department, Office of the Prime Minister December 11, 2012 DITP

United Nations, Department of Economic and Social Affairs, Population Division (2013). World Population Ageing 2013. ST/ESA/SER.A/348.

Zeithaml, V.A.,Bitner, M.J. andGremler,D.D. (2006). Service Marketing,Mc Graw-Hill, New York, NY.