ACCEPTANCE OF PROPERTY TECHNOLOGY IN THAILAND IN THE 4.0 ERA

Nutchaon Thiankhao
Rangsit University, Bangkok, Thailand
*Email: nutchaornth@gmail.com

Tanpat Kraiwanit
Rangsit University, Bangkok, Thailand
Email: tanpat.k@rsu.ac.th

Abstract: *This survey research study aimed to investigate the acceptance of property technology in Thailand in the 4.0 era. Primary data were gathered from 476 participants via online questionnaires and analyzed through inferential statistics and a binary logistic pattern to test the hypotheses. The findings indicate that all independent factors can forecast the acceptance of property technology with 78.5 percent accuracy, while the accuracy predicted by the significant independent variables is only 74.2 percent. Demographic factors, including marital status, income, and residence, can predict the acceptance of property technology significantly, and social factors including purpose and number of people living together can predict the acceptance of innovations significantly as well. The study recommends that the government set rules and policies to improve the convenience and safety of elderly individuals, who will become the majority of the country's population, and that information and knowledge regarding a particular new innovation should be promoted among the general public for the purpose of achieving greater recognition.*

Keywords: *Property Technology, Technology Acceptance*

1. INTRODUCTION

Recently, the Thailand economy entered the so-called "4.0 era", in which a traditional economy changes into an economy driven by innovation, technology, and creativity. This change enables business entrepreneurs to consider and implement modern innovations in all sections of their businesses such as management, marketing, sales, and production. Real estate businesses also cannot avoid these changes, and they need to adapt to the 4.0 era because buyers are looking for convenience and value in their living arrangements.

1.1 Research Objectives

The objective of the research is to examine the acceptance of property technology 4.0 in the Bangkok metropolitan area and analyses factors affecting the acceptance of property technology 4.0 in the Bangkok metropolitan area.

1.2 Conceptual Framework

To achieve the research objectives, the independent variables include factors of demography (gender, age, marital status, education level, occupation, monthly income) and residential life (current housing pattern, people living together, number of residents, plans to buy new housing, and purpose of buying housing). Dependent variables involve the acceptance of property technology 4.0 with regard to convenience, energy saving, design and materials, innovations for the elderly, and health innovations.

1.3 Scope of the Study

Property technology is defined as modern technology and innovation to develop residential projects to meet the needs of consumers; to allow service facilities within houses, condominiums, and offices; and to raise the quality of the real estate industry. In this research, there are five types of property technology innovation:

i. Comfort and Safety

- Mechanical parking helps to solve residential parking problems, creates comfort, and saves time.
- Home care provides services like repair notifications, on a 24-hour basis, for people living in condos.
- Digital door access and locking can be performed with applications on a smartphone.
- Intelligent switching can control lights automatically or through mobile applications.
- Intelligent anti-theft systems, connected to smartphones, can alert owners to tampering with doors, windows, or drawers. In conjunction with CCTV, images can be captured and viewed on the phone. (Sornchai, 2018)

ii. Energy Savings

- Solar smart village transforms solar energy into electricity.
- Energy-saving thermal film on windows achieves better heat resistance and results in less air conditioning.

iii. Materials and Design

- Changes to structural infrastructure can ensure lifestyle and comfort levels yet reduce heat and ventilation.

iv. Elderly Care

- Care for elderly individuals can include areas such as bathroom repair to improve safety, comfort, and good health.

v. Health

- Automated external defibrillator (AED) is basic life support equipment. When an unexpected event occurs, there should be an AED available. An area of only 0.1 square meters can become a life-saving area. An AED could save the lives of those who suffer from acute cardiac arrest before they can reach the hospital.

2. LITERATURE REVIEW

Property technology is a tool of business which increases competitiveness in areas including services, growth of sales, administration, and cost reduction. The key aspect of property technology is to meet customer needs in terms of conveniences for life; these include the use of 3D printing, artificial intelligence, and virtual reality systems in the design process to reduce errors; online house trading or e-booking systems; and automatic home and building systems (lighting controls, security systems, entry control systems). These innovations create comfort and increase safety for residents, and they are becoming the standard that entrepreneurs must provide and facilitate for customers. Therefore, property technology becomes an important factor that customers use in making a decision to buy a residence.

Technology acceptance pattern (TAM) is a theory developed from the theory of reasoned action, and it is a highly accepted theory in explaining and predicting consumer behavior in technology acceptance and technology use)Davis, Boqozzi, & Warshaw, 1989; Schepers & Wetzels, 2007; Wakefield & Whitten, 2006;(. TAM changed the attitude measurement of the theory of reasoned action into two elements which support and drive the adoption and use of

new technologies: perceived usefulness (PU) and perceived ease of use (PEOU). PU is defined as the degree to which an individual believes that using a particular technology would enhance job performance, while PEOU is defined as the ease in learning and understanding a particular technology as well as the ease in using it skillfully. At the level of confidence of consumers who are using innovation confidently and tend to use it more, the innovations make consumers feel the benefits of use. For example, if a mobile banking service provides simple processes, consumers will feel comfortable in using it; it will take less time to execute mobile, online financial transactions than to locate a physical bank branch and conduct a transaction there (Paripunyapat & Kraiwanit, 2018). Such factors affect the behavioral intention for direct use. TAM includes four main factors: external variables, PEOU, PU, and attitude toward use. These affect the acceptance of that technology, as shown in Figure1.

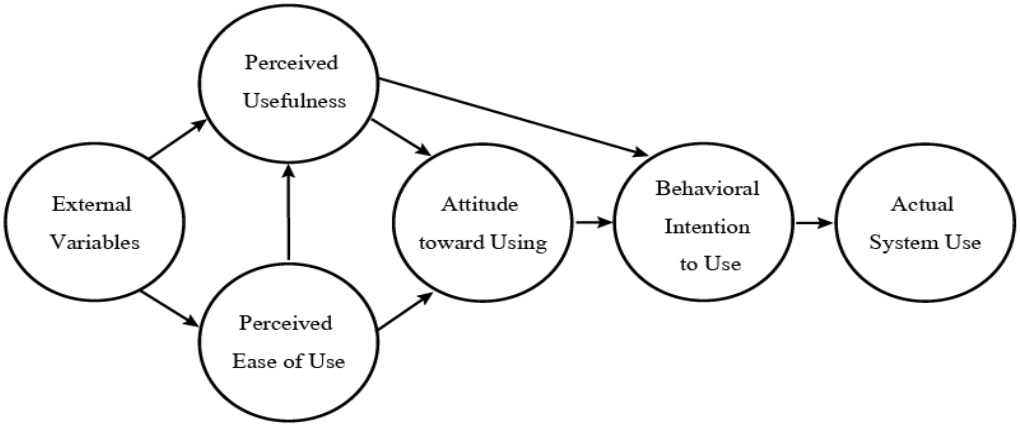

Figure 1: Technology Acceptance Pattern (TAM)
Source: Paripunyapat & Kraiwanit, 2018

The results of recent research demonstrate the need to add variables in TAM in order to create understanding for individuals' acceptance of new technology uses. This accords with Muansrichai (2012), who states that the acceptance of technology is a key factor in living with and using technology because using technology creates experiences, knowledge, skills, and demands for its use. In addition, Hart, Nwibere, and Inyang (2015) explain that accepting technology also includes personal attitudes and belief in using technology or a particular system, and these are factors affecting the individual behavior of technology use (Zhou, 2008). Injaieuar (2016) studying the attitudes of Bangkok population toward the marketing mix of single-detached dwelling projects found that all age groups had similar opinions on price factor and place factor, so-called distribution channels. House price should be associated with income. Contact channels should be varied. As well as the product factor, all groups paid attention to project atmosphere and location. While Phachongwiriyathorn (2016) studied factors influencing the decision to buy condominiums in Bangkok, it was found that only the average income factor per month affecting the decision to buy condominiums in Bangkok. Crowley and Coutaz (2015) studied the ecological of Smart Home technology found that continuous progress in information and communication technology had the result is a technology that supports the potential for revolutionary housing to automation home focused on general automation and control (Hargreaves)2017). To sum up, when individuals accept technology they create benefits for themselves and change their related attitudes, beliefs, and behaviors. Therefore, the researcher is interested in studying property technology influencing current

buyers, with the aim of benefiting those who are interested in property technology and developing housing innovations.

This study is based on a literature review as well as concepts, patterns, theories, and marketing components according to customer perspectives. Theories include a theory of financial technology acceptance, the Delon and Mclean (2003) pattern. The research objective is to focus on factors affecting PU, ease of use, and PEOU, which lead to an acceptance of transactions using financial technology.

3. METHODOLOGY

For this survey research, data were gathered from 476 participants via online questionnaires and analyzed through inferential statistics and a binary logistic pattern to test the hypotheses. The dependent variable, a dummy variable (1 = accept; 0 = do not accept), is acceptance of property technology in Thailand in the 4.0 era.

4. RESULTS

For the proper use of a binary logistic pattern, the independent variable must be an interval scale and other demographic variables determined by a weight value. This can be investigated through chi-squared analysis of each variable to determine the score.

Table 1: Determination of Score Values for Independent Variables

	Chi-square	Weight
Age	25.229	11.37
Under 30		5.46
31–40		0.74
41–50		1.13
51 or over		0.76
Status	23.049	10.39
Single		4.99
Married		0.67
Widowed/divorced/separated		1.03
Education	15.75	7.10
Lower than bachelor’s degree		3.41
Bachelor’s degree		2.99
Higher than bachelor’s degree		0.70
Occupation	24.946	11.24
Private employees		5.40
Government officials / state enterprises		0.73
Private business / trading		1.11
Freelance / general contractor		0.75
Student		3.25
Income	30.545	13.76
10000–20000 baht		6.62
20001–30000 baht		0.89
30001–40000 baht		1.36
40001–50000 baht		0.92
More than 50000 baht		3.98

Monthly savings	9.375	4.22
Below 3000 baht		2.03
3001–6000 baht		0.27
6001–9000 baht		0.42
9001–12000 baht		0.28

Table 1 Continue

	Chi-square	**Weight**
Current residence	40.9	18.43
Single detached house		8.86
Townhouse/semi-detached house		1.19
Condominium		1.83
Commercial building/tenement house		1.23
Dormitory/apartment		5.32
People who live together	23.56	10.62
Alone		5.10
Parents		0.69
Husband/wife		1.05
Brethren		0.71
Child		3.07
Relative		10.62
Friend		0.25
Purpose of buying	28.55	12.87
Living on their own		6.18
Giving to children and relatives		1.69
Second house		1.28
Investment, speculate, or rent		3.72
Total	221.904	100.00

Table 1 shows that current housing pattern and income have the highest scores, accounting for 18.43 and 13.76, respectively, while monthly savings has the lowest score, accounting for 4.22.

Table 2: Percentages of Acceptance of Property Technology

Acceptance	Number of people	Percentages
Do not accept	211	45.5
Accept	253	54.5
Total	464	100.0

As seen in Table 2, 45.5 percent of participants do not accept property technology, whereas 54.5 percent of participants accept property technology.

A variable(s) entered on step 1a includes age, status, education, occupation, income, savings, residence pattern, people living together, purpose of buying, gender, number of family members, planning to buy a new house, and necessity of innovation

4.1 Binary Logistic Pattern Analysis

From Table 3, the independent variables can explain that the dependent variables are significant, resulting in the eligible pattern for using predictive independent variables.

Table 3: Omnibus Tests of Pattern Coefficients

		Chi-square	df	Sig.
Step 1	Step	83.641	13	.000
	Block	83.641	13	.000
	Pattern	83.641	13	.000

Table 4: Pattern Consistency Test

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	293.124	.262	.352

Table 4 shows that the -2 log likelihood equals 293.124; therefore, there is a small deviance. The pseudo R square coefficient or Cox & Snell R square equals 0.262 and the Nagelkerke R square equals 0.352. This pattern indicates that all independent variables can predict the acceptance of property technology.

Table 5 shows that income, status, purpose of buying, number of family members, and the necessity of innovation have statistical significance with Exp (B), accounting for 1.258, 1.226, 1.251, 0.552, and 0.093, respectively. This means that if a change of status increases the acceptance of property technology more than 1.258 times, an increase of income will increase the adoption 1.226 times; on the other hand, if the negative coefficient of the number of family members increases, acceptance of property technology will decrease by 44.8 percent, calculated from (1- 0.552) x 100.

Table 5: Multivariate Analysis with Enter Method (Variables in the equation)

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1(a)	Age	-.068	.139	.240	1	.624	.934
	Status	.229	.095	5.830	1	.016	1.258
	Education	-.017	.152	.012	1	.911	.983
	Occupation	-.092	.092	1.000	1	.317	.912
	Income	.204	.086	5.592	1	.018	1.226
	Savings	.322	.274	1.380	1	.240	1.380
	Residence pattern	.076	.045	2.860	1	.091	1.079
	People living together	-.107	.082	1.705	1	.192	.898
	Purpose of buying	.224	.084	7.129	1	.008	1.251
	Gender	-.131	.305	.183	1	.669	.878
	Number of family members	-.595	.125	22.474	1	.000	.552
	Planning to buy a new house	-.155	.318	.239	1	.625	.856
	Constant	2.883	1.222	5.572	1	.018	17.874

Table 6: Predicting Acceptance of the Property Technology Classification Table (a)

Observed			Predicted		
			Total		Percentage Correct
			.00	1.00	
Step 1	Total	.00	79	41	65.8
		1.00	18	137	88.4
	Overall Percentage				78.5

The cut value is .500

Table 6 shows that the overall accuracy is 78.5 percent at the set acceptance value of .05 (cut value = 0.500).

Predicting only significant variables from Table 5 can show the results of the analysis as follows.

Table 7: The Coefficients of Variable Forecasting, Using Omnibus Tests of Pattern Coefficients

		Chi-square	df	Sig.
Step 1	Step	61.839	6	.000
	Block	61.839	6	.000
	Pattern	61.839	6	.000

The independent variables can explain that the dependent variable is significant; therefore, this pattern is suitable to use as a predictive dependent variable.

Table 8: Pattern Consistency Test

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	390.778	.171	.229

The -2 log likelihood equals 390.778, so it is a small deviance, while the pseudo R square coefficient or Cox & Snell R square is equal to 0.171 and the Nagelkerke R square is equal to 0.229. This pattern indicates that all independent variables can predict the acceptance of property technology.

Table 9: Multivariate Analysis of Significant Variables Enter Method (Variables in the Equation)

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1(a)	Status	.122	.062	3.853	1	.049	1.130
	Income	.087	.055	4.564	1	.019	1.091
	Residence	-.153	.063	5.942	1	.015	.858
	Purpose	.213	.063	11.266	1	.001	1.237
	Number of people living	-.374	.091	16.762	1	.000	.688
	Constant	2.150	.826	6.778	1	.009	8.584

a. Variable(s) entered in step 1: status, income, residence, purpose, number of people

It was found that status, income, residence, purpose, and number of people have a statistical significance with Exp (B) of 1.131, 1.091, 0.858, 1.237, and 0.668, respectively. This means that if a change of status increases the acceptance of property technology more than 1.131, the increase of income will increase the adoption 1.091 times; on the other hand, if the negative coefficient of the number of family members increases, the acceptance of property technology will decrease. This means that an increase in the number of household members affects the adoption of real estate technology, decreasing by 31.2 percent ((1 - 0.6881) x 100), and a residential change causes a decrease of acceptance by 14.2 percent ((1 - 0.858) x 100).

Table 10: Predictions for Acceptance of Property Technology Using Classification Table (a)

Observed			Predicted		
			Acceptance of innovation		Percentage
			Not accept	accept	Correct
Step 1	Acceptance of innovation	Not accept	83	62	57.2
		Accept	23	162	87.6
	Overall Percentage				74.2

The cut value is .500

Table 10 shows that the overall accuracy is 74.2 percent at the set acceptance value of .05 (cut value = 0.500).

5. CONCLUSION AND DISCUSSION

The findings indicate that using all independent variables (age, status, education, occupation, income, savings, residence pattern, people living together, purpose of buying, gender, number of family members, planning to buy a new house, and necessity of innovation) can predict the acceptance of property technology with 78.5 percent accuracy, while the accuracy of prediction is only 74.2 percent when using significant variables. In this study, demographic factors including marital status, income, and residence can predict the acceptance of property technology significantly, and social factors, including purpose and number of people living together, can predict the acceptance of innovations significantly as well.

The theory of the acceptance of innovation and technology shows that in general, people accept a particular innovation and technology after using it and perceiving its benefits. Individual adoption might vary according to the speed of acceptance. People in a community have an important role in the acceptance or rejection of technologies, and this leads to an overall fast or slow speed of change (Kumarnboon, 2009).

Nowadays, the innovation of interactive communication technology between senders or receivers has been developed extremely, and there is a high demand causing a rapid adoption of innovations. According to the diffusion of innovation theory (Roger & Shoemaker, 1978), the acceptance of development relates to many factors depending on the person, social system, communication system of innovation, and the duration of the operation.

6. RECOMMENDATIONS

This study did not investigate communication factors affecting the acceptance of property technology because the collection of information through mixed media, both mass media and digital media, is easily accessible and convenient; therefore, property technology is suitable for

younger generations because of their communications behavior. However, the elderly population constitutes an interesting group which might influence decision making about the acceptance of innovation. This group may suffer from health and mobility problems; therefore, the government should set guidelines as follows.

i. The government should set rules and policies to improve the convenience and safety of older individuals, who will become the country's majority population.

ii. Developments might include more convenient and safer housing, nursing homes, and private and public systems of transportation.

iii. Information and knowledge regarding a particular new innovation should be promoted among the general public to increase recognition. In addition, enterprises should promote a particular innovation to garner greater acceptance, especially among the elderly.

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