Factors Influencing The Intention to Purchase Smart Home Devices in Generation Y

Moragot Camta* and Sutep Tongngam**

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Abstract

The objective of this quantitative research is to study the factors influencing the intention to purchase smart home devices in generation Y by collecting the online survey of 400 samples in Thailand. In order to prove the hypothesis, path analysis has been used to process the data. According to the statistics results, it is obvious that the perceived value directly influences the intention to purchase. The results also reveal that the most positive influencing factor for the people in generation Y is the perceived enjoyment, followed by the perceived compatibility and the perceived usefulness, respectively. On the other hand, the most negative one is the perceived fee, followed the perceived technicality. Compared to the literatures, the outputs are consistent with most of them. In term of benefit, businesses could arrange their smart home device campaigns based on the influencing factors to achieve the intention to purchase of their target customers in generation Y.

Keywords: Smart Home Devices, Intention to Purchase, Perception, Generation Y

* Graduate School of Applied Statistics, National Institute of Development Administration
148 Serithai Road, Khlong-Chan, Bangkapi, Bangkok 10240, THAILAND.
E-mail: Morgotcamta@gmail.com

** Assistant Professor, Graduate School of Applied Statistics,
National Institute of Development Administration
148 Serithai Road, Khlong-Chan, Bangkapi, Bangkok 10240, THAILAND.
E-mail: Sutep.t@nida.ac.th

ปัจจัยที่มีอิทธิพลต่อความตั้งใจซื้ออุปกรณ์บ้านอัจฉริยะสำหรับผู้บริโภคกลุ่มเจนเนอเรชันวาย

มรกต คำตา* และ สุเทพ ทองงาม**

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บทคัดย่อ

งานวิจัยเชิงปริมาณนี้มีวัตถุประสงค์เพื่อศึกษาปัจจัยที่มีอิทธิพลต่อความตั้งใจซื้ออุปกรณ์บ้านอัจฉริยะสำหรับผู้บริโภคกลุ่มเจเนอเรชันวาย กลุ่มตัวอย่าง คือ ผู้ที่ใช้งานอินเทอร์เน็ตในประเทศไทย จำนวน 400 คน ผู้วิจัยใช้แบบสอบถามออนไลน์เป็นเครื่องมือในการเก็บรวบรวมข้อมูล สถิติที่ใช้ในการวิเคราะห์ข้อมูล คือ สถิติเชิงพรรณนา ในส่วนของสถิติที่ทดสอบสมมติฐานนั้น ได้แก่ การวิเคราะห์แบบเส้นทาง (Path Analysis) เพื่อหาความสัมพันธ์ที่เกิดจากอิทธิพลส่งผ่านจากตัวแปรคั่นกลางรวมทั้งวิเคราะห์อิทธิพลทางตรงและทางอ้อมของตัวแปรที่มีต่อความตั้งใจซื้ออุปกรณ์บ้านอัจฉริยะจากการศึกษา พบว่า ปัจจัยที่มีอิทธิพลต่อการรับรู้คุณค่าในเชิงบวกมากที่สุด คือ การรับรู้ถึงความสนุกสนานในการใช้งาน รองลงมาเป็นการรับรู้ถึงความเข้ากันได้ และการรับรู้ถึงประโยชน์ในการใช้งานตามลำดับ ส่วนปัจจัยที่มีอิทธิพลต่อการรับรู้คุณค่าในเชิงลบมากที่สุด คือ การรับรู้ถึงต้นทุน และการรับรู้ถึงลักษณะของการใช้งานทางเทคนิคเป็นอันดับรองลงมา เมื่อเปรียบเทียบกับงานวิจัยอื่น ๆ ในเรื่องที่ใกล้เคียงกัน พบว่า มีความสอดคล้องกัน ในส่วนของประโยชน์ในภาคธุรกิจก็สามารถนำปัจจัยที่มีอิทธิพลไปปรับแผนการรณรงค์ทางการตลาดเพื่อให้บรรลุวัตถุประสงค์ในด้านการทำให้ลูกค้าเกิดความตั้งใจซื้อสินค้าของตนได้

คำสำคัญ: อุปกรณ์บ้านอัจฉริยะ เจนเนอเรชันวาย สมาร์ทโฮม ความตั้งใจซื้อ

* คณะสถิติประยุกต์ สถาบันบัณฑิตพัฒนบริหารศาสตร์
เลขที่ 148 ถนนเสรีไทย แขวงคลองจั่น เขตบางกะปิ กรุงเทพฯ 10240
อีเมล: moragorcamta@gmail.com

** ผู้ช่วยศาสตราจารย์ คณะสถิติประยุกต์ สถาบันบัณฑิตพัฒนบริหารศาสตร์
เลขที่ 148 ถนนเสรีไทย แขวงคลองจั่น เขตบางกะปิ กรุงเทพฯ 10240
อีเมล: Sutep.t@nida.ac.th

Introduction and Objectives

Background and Significance of the Study

At present, technology greatly assumes an important role in the lives of the people around the globe. Their livelihood is affected as it changes following the global trend. Smart home is to connect the convenient electrical home devices with the internet or network system. The sensor is embedded in various devices to allow users to give order through smart home devices such as control of indoor lights, turning on/off lights and air condition, turning on television and music, indoor security system (Shin et al., 2017).

It is found that the reason for the consumers' concern is the costs. The development of smart home devices at the beginning costs a lot (Mani & Chouk, 2017). However, the functioning of the smart home devices requires the entrepreneur's awareness of the concern of consumers' privacy. The explanation must be made of the methods of data storage, and data analysis, as well as the increased ability of the devices to be able to delete the data not required by the customers for self-storage (Manager Online, 2019).

According to the information of smart home in Thailand from the statistic website Statista, it was found that the revenue in the smart home market in Thailand was expected to be as high as US$ 151 million in 2020 and the household growth rate was 1.1% in 2020 and is expected to increase 8.8% by 2024. At present, the average income of installation of smart home per house values US$ 18.35 (570.69 Baht).

Table 1*:* Comparison of Average Income per Current Installation of Smart Home

Countries	Average Income per Installation of Smart Home
Singapore	US$41.01 (1,275.41 Baht)
Lao PDR	US$41.22 (1,281.94 Baht)
Cambodia	US$37.19 (1,156.61 Baht)
Malaysia	US$21.30 (662.43 Baht))
Thailand	US$18.35 (570.69 Baht)

Source: Search on June 27, 2020 from https://www.statista.com/outlook/126/283/smart-home/thailand

Although the installation rate per household increased 1.1% but the average data of the installation per household revealed that compared to Thailand and her neighboring countries, the average cost rate for installation in Thailand was lower than in many neighboring countries. Based on the statistics, the two groups of consumers with the age ranges of 34-25 years and 44-35 years were the consumer groups with the highest market share of smart home market in Thailand.

Research Question

What are the factors that influence the intention to purchase smart home devices in Generation Y?

Objective

To study the factors influencing the intention to purchase smart home devices in Generation Y.

Scope of Study

This study was the quantitative research. It studied the factors influencing the intention to purchase smart home devices with the following scope. The sample used in this study included Generation Y who had already used or bought smart home devices. The sample in this study included Generation Y born between 1980-2000.

Expected Benefits

1) To plan the entrepreneurs' adjustment to accommodate the growth of smart home that will happen in Thailand in the future.

2) To understand the demands of customers who constitute an important group to accommodate the increased purchases and utilize the factors impacting the intention to buy smart home devices for the formulation of marketing strategy.

Literature review

Concept of Smart Home

Smart home means the setting of convenience and comfort in a home where the automatic tools and equipment can be controlled from a long distance from

everywhere with the connection to the internet using the smart phone or other network tools. The tools in smart home connected to the internet will enable the users to control various functions such as access to home safety, temperature, light, and home theatre from long distance.

The smart home devices connected to one central point can have access with smart phone, tablet, laptop, or game console. Home devices such as door locks, televisions, temperature controller, camera, lighting, or even refrigerator can be controlled through the only automatic system in the house. The system can be installed on the smart phone or other network devices and the users can create programs or rectify or change various setups by themselves.

The smart home devices come with the ability to learn by oneself in order to learn the timetable of the homeowner and modify as needed. The smart home with the light control system will help the owner to reduce the electricity consumption and benefit from the energy savings. Some automatic home systems will warn the owner of any movement in the house while he or she is away. Other systems can phone officials such as the police or the fire brigade when there are situations. The smart doorbell, smart safety system, and smart devices are all part of the technology of Internet of Things (IoT) which is a network system that can compile and share electronic data.

The smart home has wire or wireless systems or both. The wireless system is easier installed. The wireless automatic home system with qualities such as smart lighting system, weather control, and safety may not be expensive. On the contrary, the wire system is more reliable and not easily hacked. The wire system can increase value in reselling the house but the disadvantage is that it is more expensive than the wireless system (Chen, 2020).

Concepts and Theories of the Generation (Classification of People According to Time Period)

The definition of Gen Y according to economists is the group of people born at the beginning of 1980s to 1990s. They form a big group of population that the world gives importance to and studies their behavior for understanding and communication. So, there are a lot of definitions given to this group of people. The definition of Gen Y started in 1993.

At the beginning, no condition of age was determined but the definition was given at the age of the Millennials. Some gave the definition of the group as the border line between Gen Y and Gen Z, tend to move back to their families due to economic problems, and tend to get married late.

In terms of the behavior of Gen Y according to the concept of economists, Gen Y are mostly the children of Gen X. Gen X is born at the period of economic growth which makes the parents of Gen Y succeed and can afford their Gen Y children to have higher education. At present, most of Gen Y are university-educated or at the beginning of their career. Gen Y constitutes the group with the highest rate among the four groups of consumers. This group of population has high income and purchasing power. Gen Y can do many things at the same time by connecting two types of devices to the internet at the same time (Ministry of Public Health, 2020).

Value based Adoption Model (VAM)

It is presented by Kim et al., 2007 as Technology Acceptance Model (TAM) has constraints to explain the recognition of new ICT at the individual level. Most workers and users of traditional technology work as employees in organizations. Their objective is to use technology for work only. The recognition and the use will become the burden of the organization instead. On the contrary, the users of new ICT who are ordinary people have the double role of users of technology and consumers. Most recognize the use of technology for personal objective. The costs are voluntary and personally paid. The use depends on the individual. One main problem in recognizing the use of ICT technology is financial costs such as usage fees. Therefore, consumers will recognize the use of new technology more than general technology users. The objective is to inspect the recognition of the use of the new ICT technology from the perspective of the consumers and not that of the technology users (Kim et al., 2007). Therefore, the VAM model looks at the additional factor in some loss to compensate for something (Sacrifice). It consists of recognition of Perceived technicality, and Perceived fee. As for the Benefit, it consists of Perceived usefulness and Perceived enjoyment (Kim et al., 2017).

Perceived Value means the overall assessment of the net benefit of consumers of goods or services according to the assessment of the customers which will offset between recognition of the received benefit and the lost benefit. If one feels that one

receives benefit more than loses the benefit, one will perceive value. Perceived Usefulness means the level that an individual believes that the use of the system will make his or her work more efficient. Perceived Enjoyment means the level that an individual participates in an activity and perceives enjoyment that he or she experiences apart from the expected efficiency due to usage. Perceived Fee means payment according to the goods' real prices. Generally, it is measured by the perception of the consumers' real paid prices. The perception of lost benefit will have negative impact on the perception of value. Perceived Technicality means the level of perception of new technology of technical service. Because money is not the only factor that the consumer feels the loss. The consumer also takes into account the perceived fee that is not only money but also the time spent in the efforts to seek or costs that need to be spent for convenience. Purchase Intention means the intention to purchase depends on each individual's intention in the efforts and the plan to purchase goods.

Table 2: Summary of Relevant Theories and Research Works

Theories/Research References	**Names of Inventor/ Researcher (Years A.D.)**	**Variables**							
		Perceived Usefulness (PU)	Perceived Enjoyment (PE)	Perceived Technicality (PT)	Perceived Fee (PF)	Perceived Privacy Risk (PR)	Perceived Compatibility (PC)	Perceived Value (PV)	Purchase Intention (PI)
Value based Adoption Model (VAM)	(Kim, Chan & Gupta, 2007)	X	X	X	X			X	X
Predicting e-services adoption: a perceived risk facets perspective	(Featherman a & Pavlou, 2003)	X				X			
Perceived Risk and Product Involvement on Taobao.com	(Han, Chung, Kim & Youjeong, 2017)					X			
Understanding consumer intention to participate in online travel community and effects on consumer intention to purchase travel online and WOM	(Agag & El-Masry, 2016)	X					X		

Research Conceptual Framework and Hypotheses

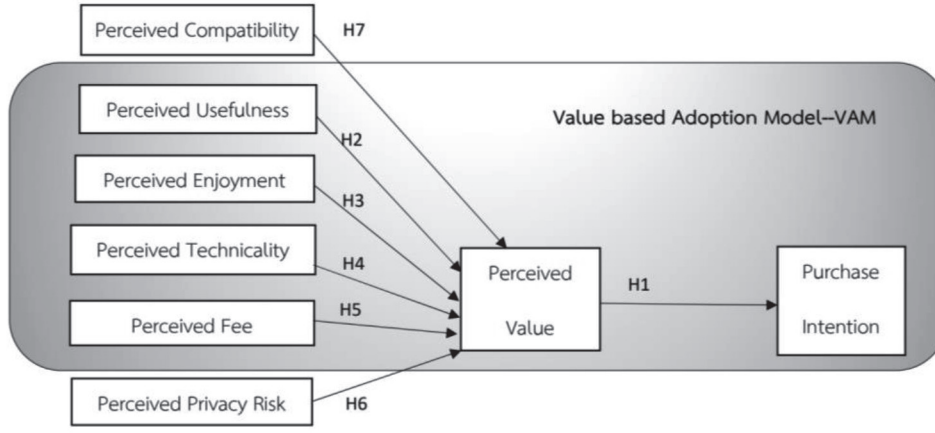

Figure 1: Research Conceptual Framework

H1: Positive perceived value influenced the intention to purchase smart home devices in Generation Y.

H2: Positive perceived usefulness influenced the intention to purchase smart home devices in Generation Y through the perceived value.

H3: Positive perceived enjoyment influenced the intention to purchase smart home devices in Generation Y through the perceived value.

H4: Negative perceived technicality influenced the intention to purchase smart home devices in Generation Y through the perceived value.

H5: Negative perceived fee influenced the intention to purchase smart home devices in Generation Y through the perceived value.

H6: Negative perceived privacy risk influenced the intention to purchase smart home devices in Generation Y through the perceived value.

H7: Positive perceived compatibility influenced the intention to purchase smart home devices in Generation Y through the perceived value.

Methodology

Research Sample

There were 35,954,165 internet users in Thailand (The Information and Communication Technology Survey on Household, National Statistical Office, 2018). In selecting the sample in this study, the size of the sample was determined in case the population size was known using the Krejcie & Morgan formula as follows:

$$n = \frac{\chi^2 Np(1-p)}{e^2 (N-1) + \chi^2 p(1-p)}$$

n = Size of sample

N = Size of population

e = Tolerance level of sample

χ^2 = Chi-Square at df equals 1 and level of confidence %95 (χ^2 = 3.841)

p = Proportion of interesting traits in population (If not known, determine p = 5.0) represented as follows:

$$\frac{3.841 \times 35{,}954{,}165 \times 0.5 \times 0.5}{(.05)^2 (35{,}954{,}165\text{-}1) + 3.841\text{x}0.5\text{x}0.5}$$

n = 095.384

Therefore, taking into account the error in data collection that did not meet the set number, the sample size of 400 persons were added for the study.

Data Analysis

After collecting all the data, the researchers conducted data analysis using SPSS and AMOS program in the following processes:

1) In terms of data inspection, the researchers must inspect the correctness and completeness of the data in the questionnaire and separate incomplete questionnaires.

2) Record the questionnaire in the data processing program using the statistical program for the data processing. This research used the statistical significance at the level of 0.05.

3) Data analysis in the questionnaire, statistical analysis with Descriptive Statistics to describe the demographic data in the analysis of the general, basic data.

4) Inference Statistics through Path Analysis (using AMOS) to analyze the direct and indirect influences of the variables of the factors and directions of relationship.

Empirical Results

Data Processing Outputs

In Table 3, the descriptive statistics outputs consisting of genders, status, education levels, occupation and monthly income are shown. In addition, the perception levels of each factor can be seen in Table 4. In Table 5, the congruence analysis, which was proceeded after model arrangement, shows that the model was fit enough to process further.

Table 3: Number and Percentage of the Questionnaire Respondents

Gender	Number (persons)	Percentage
Male	170	42.50
Female	193	48.25
LGBT+	37	9.25
Total	**400**	**100**
Status	**Number (persons)**	**Percentage**
Single	262	65.5
Married	129	32.25
Divorced	9	2.25
Total	**400**	**100**
Education	**Number (persons)**	**Percentage**
Lower than B.A. degree	16	4.0
B.A. degree	227	56.75
M.A. degree	146	36.50
Doctoral degree	11	2.75
Total	**400**	**100**

Table 3: Number and Percentage of the Questionnaire Respondents (cont.)

Occupation	Number (persons)	Percentage
Private company employees	161	40.25
Government officials	29	7.25
State enterprise employees	62	15.50
Business owners	63	15.75
Students	76	19.0
Others	9	2.25
Total	**400**	**100**
Monthly income	**Number (persons)**	**Percentage**
Lower than 10,000 baht	29	7.25
10,001-20,000 baht	63	15.75
20,001-30,000 baht	95	23.75
30,001-40,000 baht	89	22.25
40,001-50,000 baht	62	15.5
Over 50,000 baht	62	15.5
Total	**400**	**100**

Table 4: Analytical Results of the Perception Levels of the Questions for Each Factor

Factors	Mean	Standard Deviation (SD)	Perception Levels
Perceived usefulness (PU)	4.33	0.53	Highest
Perceived enjoyment (PE)	4.08	0.67	High
Perceived compatibility (PC)	4.28	0.53	Highest
Perceived technicality (PT)	2.59	1.19	Low
Perceived fee (PF)	2.70	1.08	Moderate
Perceived privacy risk (PR)	2.89	1.14	Moderate
Perceived value (PV)	3.99	0.64	High
Purchase intention (PI)	4.18	0.55	High
Overall factors	**3.63**	**0.79**	**High**

Table 5: Results of Congruence Analysis

Statistical Criteria	Tolerance Level	Analytical Results (After Model Improvement)
CMIN/DF	≤ 3.00	2.714
GFI	[0, 1]	0.979
RMR	≤ 0.08	0.058
RMSEA	<0.5	0.066
AGFI	≥ 0.70	0.941
NFI	[0, 1]	0.980
CFI	[0, 1]	0.987
PNFI	[0, 1]	0.455
PCFI	[0, 1]	0.458

Afterwards, the model was analyzed with the Structural Equation Modeling to find if a variable influenced another variable. The results of the data analysis show in Figure 2 and Table 6.

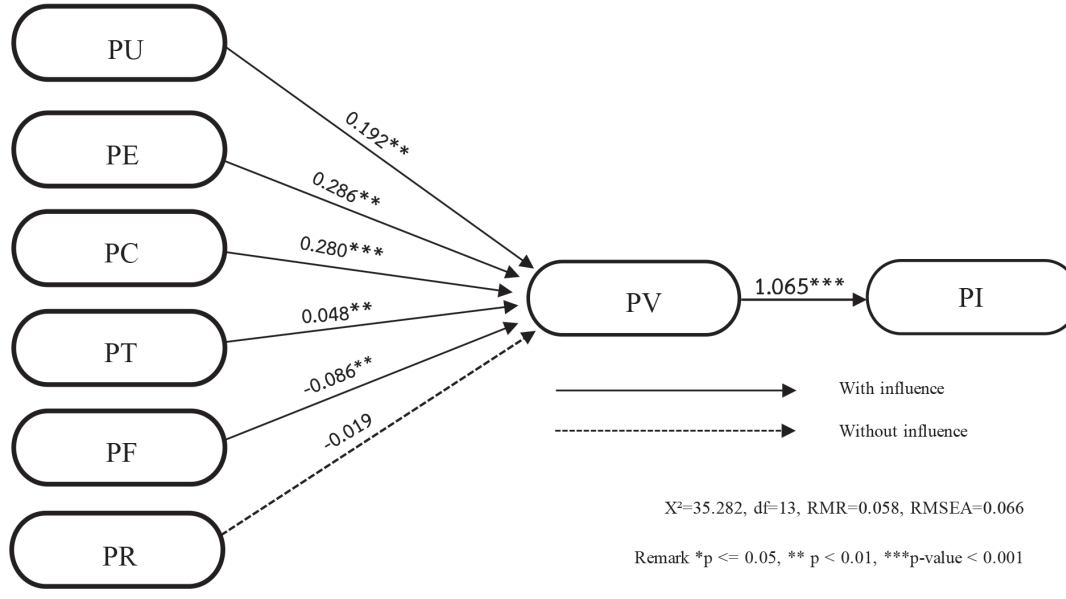

Figure 2: Standard Path Coefficient of the Model According to the Research Hypothesis

Table 6: Analytical Results of the Causal Influences within the Model

		Independent Variables						
Dependent Variables	**Influences**	**PC**	**PE**	**PU**	**PR**	**PF**	**PT**	**PV**
PV	Direct	0.280***	0.286***	0.192***	-0.019	-0.086**	0.048**	
	Indirect	-	-	-	-	-	-	-
PI	Direct	-	-	-	-	-	-	1.065***
	Indirect	0.299***	0.304***	0.204***	-0.020	-0.092**	0.051**	

Remark *p < 0.05, ** p < 0.01, *** p-value < 0.001

Results of Hypothesis Tests

Each hypothesis was tested and analyzed as follows and summarized in Table 7.

Hypothesis 1 (H1): Positive perceived value influencing the intention to purchase smart home devices in Generation Y revealed that the influence had the weight of 1.065 with the relationship in the same direction at the statistical significance at 0.001 in accordance with the research hypothesis.

Hypothesis 2 (H2): Positive perceived usefulness influencing the intention to purchase smart home devices in Generation Y through perceived value revealed that the influence had the weight of 0.204 with the relationship in the same direction at the statistical significance at 0.001 in accordance with the research hypothesis.

Hypothesis 3 (H3): Positive perceived enjoyment influencing the intention to purchase smart home devices in Generation Y through perceived value revealed that the influence had the weight of 0.304 with the relationship in the same direction at the statistical significance at 0.001 in accordance with the research hypothesis.

Hypothesis 4 (H4): Negative perceived technicality influencing the intention to purchase smart home devices in Generation Y through perceived value revealed that the influence had the weight of 0.051 with the relationship in the same direction at the statistical significance at 0.01 in accordance with the research hypothesis.

Hypothesis 5 (H5): Negative perceived fee influencing the intention to purchase smart home devices in Generation Y through perceived value revealed that the influence had the weight of 0.092 with the relationship in the opposite direction at the statistical significance at 0.01 in accordance with the research hypothesis.

Hypothesis 6 (H6): Negative perceived privacy risk influencing the intention to purchase smart home devices in Generation Y through perceived value revealed that there was no influence because the Sig. (2-tailed) equaled 0.438 which was higher than the statistical significance at 0.05 which was not in accordance with the research hypothesis.

Hypothesis 7 (H7): Positive perceived compatibility influencing the intention to purchase smart home devices in Generation Y through perceived value revealed that the influence had the weight of 0.299 with the relationship in the same direction at the statistical significance at 0.001 which was in accordance with the research hypothesis.

Table 7: Summary of the Test Results of Research Hypotheses

	Hypotheses	Test Results
H1	Positive perceived value influencing the intention to purchase smart home devices in Generation Y.	Hypothesis acceptance
H2	Positive perceived usefulness influencing the intention to purchase smart home devices in Generation Y through perceived value.	Hypothesis acceptance
H3	Positive perceived enjoyment influencing the intention to purchase smart home devices in Generation Y through perceived value.	Hypothesis acceptance
H4	Negative perceived technicality influencing the intention to purchase smart home devices in Generation Y through perceived value.	Hypothesis acceptance
H5	Negative perceived fee influencing the intention to purchase smart home devices in Generation Y through perceived value.	Hypothesis acceptance
H6	Negative perceived privacy risk influencing the intention to purchase smart home devices in Generation Y through perceived value	Hypothesis refusal
H7	Positive perceived compatibility influencing the intention to purchase smart home devices in Generation Y through perceived value.	Hypothesis acceptance

Summary and Discussion

Based on the empirical results shown in the previous section, it was obvious that, for people in generation Y, the perceived value (PV) was directly and significantly influencing the purchase intention (PI). Also, the perceived usefulness (PU), perceived enjoyment (PE), perceived technicality (PT), perceived fee (PF) and perceived compatibility (PC) were influencing the purchase intention through the perceived value. Comparisons with literature are shown in Table 8:

Table 8: Summary of the Factor Comparisons with the Literature

Hypotheses	In accordance with
Positive perceived value influencing the intention to purchase smart home devices.	Kim et al., 2007 Ponte et al., 2005 Kwon et al., 2007
Positive perceived usefulness influencing the intention to purchase smart home devices through perceived value.	Jamal et al., 2015
Positive perceived enjoyment influencing the intention to purchase smart home devices through perceived value.	Nguyen, 2015
Negative perceived technicality influencing the intention to purchase smart home devices through perceived value.	Kim et al., 2019
Negative perceived fee influencing the intention to purchase smart home devices through perceived value.	Liu et al., 2015
Negative perceived privacy risk influencing the intention to purchase smart home devices through perceived value.	-
Positive perceived compatibility influencing the intention to purchase smart home devices through perceived value.	Ifinedo & Princely, 2018 Agag & El-Masry, 2016

According to the results, the perceived value was something that happened before the intention to buy. In the case of perceived usefulness, labeling is an option and could increase an opportunity for customers to perceive the value. Additionally, making the product with enjoyment such as games in smartphones may influence customers to perceive the value. With respect to the result, compatibility should be considered with caution to ensure that it meets with the demand of consumers' value and lifestyle.

In the part of influencing negative factors, businesses should make it clear to their customers that less technical knowledge and affordable cost are required. Although the perceived privacy risk is not an influencing factor, businesses still need to aware of due to responsibility and regulations.

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