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Purchase Intention towards IoT Smart Homes in Malaysia:A Value-Based Adoption Model

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Abstract: Internet of Things (IoT) has been the attention in the field of study of innovation. However, there is still lack of study in marketing, especially in the Southeast Asia context. This study strives to examine Internet of Things, specifically focused on Smart Homes in Malaysia context. Hence, this study tested the impact of antecedents and consequences of perceived value, supported by Value-Based Adoption Model (VAM). This study examines the conceptual framework using an online self-administered survey using 163 respondents and employed Smart PLS in analysing the data. The results of analysis showed that perceived fee is an important determinant for perceived value, and perceived value showed a significant positive impact on purchase intention towards Smart Homes. This study found perceived usefulness has been a significant predictor of perceived value; while perceived value showed significant positive impact on adoption intention.

Keywords: Internet of Thing, Smart Homes, Purchase Intention, Value-Based Adoption Model, Malaysia.

1. INTRODUCTION

1.1. The Internet of Things

Innovations in technology mostly emerge from the needs of human society, and the 21st century is deemed as the era of prompt advancement in digital technology (Ghayvat et al., 2015). To date, the main communication form is human-to-human, in which the vast majority of Internet connections worldwide are such devices as computers and mobile phones used directly by humans, but every object can be connected in the future (Tan and Wang, 2010). The industrial value creation in the early industrialised countries is currently shaped by the development towards the fourth stage of industrialization, which is also widely known as the Industry 4.0 that provides immense opportunities for realising sustainable manufacturing using the ubiquitous information and communication technology infrastructure (Stock and Seligar, 2016).

Stock and Seligar (2016) highlighted that the current globalisation is faced by the challenge to meet the continuously growing worldwide demand for capital and consumer goods by simultaneously ensuring a sustainable evolvement of human existence in its social, environmental and economic dimensions. The major technology companies are vastly investing into currently due to the great potential market demand and rapid technological growth as humans aspire to live in a seamless connected world (Teo et al., 2019). The recent development of technology is now focusing more on proficiently monitoring and controlling different activities that can be performed in various forms ranging from a small Smart Homes, big industrial assembly machineries to a kid's toy, a college research laboratory to an international space research centre, and even a health care service at desk through wireless sensors and networks, wireless sensor networks (WSN) have become fundamental and crucial devices (Ghayvat et al., 2012).

Internet of Things (IoT) is one of the emerging topics in the recent decade and what the major technology companies are vastly investing into currently. This is partly due to the significant improvement offered by introducing wireless technology that has reduced the complexity to harness wired transmission and facilitates the installation of sensors, controllers, and actuators, which subsequently reduced the cost and installation efforts for a large numbers of sensors in an urban environment (Ghayvat et al., 2015). One of the main breakthroughs of the IoT is making the physical world and information worlds together, in which sensors play a very critical role to bridge the gap between both the worlds (Tan & Wang, 2010).

In recent years, the concept of IoT has become particular popular via some representative applications such as smart electric meter reading, greenhouse monitoring, telemedicine monitoring, and intelligent transportation (Suoet et al., 2012). The term "Internet of Things", was first introduced by Kevin Ashton in 2009, in which he

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defined it as a network or interaction of multiple devices, which are equipped with the essential sensors or software. These devices collect data from the physical world and exchange such information to create better combined user experience and other innovative service or functions out of its original function (Ashton 2009). Tan and Wang (2010) further expanded the definition of IoT as 'things have identities and virtual personalities operating in smart spaces using social, environment, and user contexts'.

Researchers commonly view IoT has four primary components, namely sensing, heterogeneous access, information processing, applications and services, as well as additional components on security and privacy (Suo et al., 2012). Amongst, they regarded the IoT will face more severe challenges on the security component due to the following reasons:

i. The IoT extends the 'Internet' through traditional internet, mobile network and sensor network,
ii. Every 'thing' will connected to this 'Internet', and
iii. These 'things' will communicate with each other.

Their concern is further confirmed by Tan and Wang (2010), in which they clearly stated out that in a not distant future, every object can be connected. They explained that the future is not going to be neither people talking to people nor people assessing information; however, it is going to be about using machines to talk to other machines on behalf of people as we are now entering to a new era of ubiquity, we are now entering the IoT era that new forms of communication between human and things, and between things themselves will be realised. Therefore, Suo et al. (2012) highlighted the importance to pay more attention to the research issues on confidentiality, authenticity, and integrity of data in the IoT, as the new security and privacy problems will arise. The IoT is important evolutionary steps and is increasingly relevant when defining new information architecture projects, and organisations that have approached the IoT as unique technology initiatives, experiments, or resume building exercises (Stackowiak et al., 2015). There is increasing attention on IoT due to its great potential market demand and rapid technological growth as humans aspire to live in a seamless connected world. For example, a consumer could interact with the Smart television to receive information on current weather or traffic condition, instead of just watching a television broadcast. Smart Homes are equipped with sensors, actuators, and /or biomedical monitors, and operates in a network connected to a remote centre for data collection and processing, in which the remote centre diagnoses the ongoing situation and initiates assistance procedures as required (Chan et al., 2009).

1.2. IoT Smart Homes

The Smart Homes concept was originally developed with the main focus in providing convenience, improving security, and saving of energy (Ding et al., 2011).

Smart Homes, or homes where various domestic appliances are mutually connected and converged using information and communication technology (ICT), were showcased as handling domestic chores with greater efficiency and being able to protect both property and human lives from dander, including burglary, fire and flood (Kim et al., 2017). Besides, Silva et al. (2012) defined IoT Smart Homes as a home-like environment that possesses ambient intelligence and automatic control, which allow it to respond to the behaviour of residents and provide them with various facilities.

Ding et al. (2011) referred Smart Homes to a residence augmented with sensors to observe the environment and devices/actuators to provide proactive services with the goal to improve the occupant's experience of staying in a house equipped with the technology.

In their study in examining the technologies used to help people to overcome dependence and health problems, Chan et al. (2009) see Smart Homes is sued for a residence equipped with technology that allows monitoring of its inhabitants and/or encourages independence and the maintenance of good health. They have further categorised the users who can benefit from of Smart Homes new technologies, as the following:

i. People living alone who are unable to seek help in emergencies (unconsciousness, falls, strokes and myocardial infarction),
ii. Elderly or disabled people who suffer from cognitive (Alzheimer disease, and dementia) and/or physical (visual, hearing, mobility, and speech) impairment,
iii. People who need help in daily life to perform personal care activities (eating, toileting getting dressed, and bathing) and instrumental activities (cooking healthy meals, dealing with medication, and doing laundry),
iv. Informal (family, friends, neighbours) or formal (care provider) caregivers for the elderly or the handicapped,
v. People living in rural and remote communities or in urban communities with inadequate health service provision,
vi. People who suffer from chronic disease, and who need continuous monitoring (diabetes, cancer, cardiovascular disease, asthma, and COPD), and
vii. People involved in telehealth care undertaking health care at a distance or telemedicine, with physicians practising 'virtual visits'.

This study adopted the definition provided by Kim et al. (2017) that Smart Homes is defined as a residence equipped with IoT technology based system which seamlessly harness data and transmit information to its surrounding people and objects, and therefore fulfil the needs or enhances the quality of residential life. This is explained by Ding et al. (2011) that one of the primary supporting features of a Smart Homes is its ability to monitor the activities of daily living and safety of its residents, with the availability of inexpensive low-power sensors, radio frequency chips, and embedded processors, existing Smart Homes are typically equipped with a large amount of networked sensors in the collaboratively process, which subsequently make deductions from the acquired data on the state of the home and the activities and behaviours of its residents. Interestingly, the technology can be further extended to wearable and in vivo implantable devices to monitor people 24 hours a day, from both inside and outside of a Smart Homes (Chan et al., 2009).

Modern sensor-embedded houses not only assist people with reduced physical functions but also helping them resolving the social isolation they face, and Smart Homes are not only capable of providing assistance without limiting or disturbing the resident's daily routine, giving him or her greater comfort, pleasure and well-being (Chan et al., 2008). Many Smart Homes today adopt the concept of ubiquitous sensing, whereby a network of sensors integrated with a network of processing devices that yield a rich multi-modal stream of data, and the data will be subsequently be analysed to recognise and monitor basic and instrumental activities of daily living performed by the residents such as bathing, preparing a meal, taking medication, as well as dressing (Ding et al., 2011). Chan et al. (2009) have clearly pointed out that the continued progress and cost reduction in electronics, information technology and communication technology have made Smart Homes project feasible and cost-effective. The global IoT Smart Homes market is projected to reach a value of $58.68 billion by 2020 with an annual growth rate of 17% (Salimon et al., 2018).

Mckinsey's research arm reported a compound annual growth rate in the U.S. IoT Smart Homes penetration of 31% in year 2017; while Boston Consulting Group (BCG) predicted a compound annual growth rate of 42% from year 2017 to 2022 (Ahuja and Patel, 2017; Ali and Yusuf, 2018). BCG also reported a total $916.7 million in IoT Smart Homes' investment value in 2017 (Ali and Yusuf, 2018). This is partly contributed by the increasing population of people with disabilities and the burgeoning older adult population seeks to age in place, Smart Homes technologies can potentially provide an answer to relieve demanding workload of care from family caregivers and healthcare providers as well as support independent living (Ding et al., 2011).

IoT Smart Homes is widely considered as a revolutionary product that distinct itself from the traditional homes, even though it is still very new in the Malaysian market. However, despite a significant number of investments having been invested in its development, IoT Smart Homes is still not an influential threat to traditional conventional houses. Chua (2017) reported that developing economy like Malaysia is often slower in adapting into the IoT technology, despite the government tremendous effort in boosting the adaption of IoT services and IoT-led industry by introducing the National IoT Strategic Roadmap in 2014 (Zaidi, 2017). The Chief Strategy Officer of Malaysia Digital Economy Corporation (MDEC), Siva Ramanathan believes that the development of IoT is crucial in moving Malaysia into a high income nation (InvestKL, 2018).

Due to the increasing attention in IoT Smart Homes but lack of empirical research in this field, this study aims to contribute to the body of knowledge by examining the purchase intention of IoT Smart Homes among Malaysians, by extending the Value-Adoption Based Model (VAM). This is also respond to the call by Chan et al. (2008), in which user intentions should be studied in more detail and respected whenever possible. This would potentially improve the understanding of consumer purchase decision making process, particularly focus on such new innovative products. This study strives to answer the following research question, which is "What are the determinants contributing to perceived value and purchase intention of IoT Smart Homes among Malaysians?" Apart of that, two research objectives will be achieved in this study, which are:

RO1: To examine the factors that affecting Malaysians' perceived value of IoT Smart Homes.

RO2: To test the relationship between perceived value and purchase intention towards IoT Smart Homes.

2. LITERATURE REVIEW

2.1. Value-Based Adoption Model

Past studies on behavioural intention have led to the development of the Value-based Adoption Model (VAM) by Kim et al. in 2007. According the assumptions of VAM, both perceived benefits and perceived sacrifice are seen as the main contributing factors of perceived value, which subsequently affect the intention to use (Kim et al., 2017). Indeed, VAM is a theory based on a cost-benefit paradigm that reflects the decision making of individual, whereby the decision for adoption is made by comparing the cost of risk and uncertainty to benefits of use in choosing a new technology or product (Lin et al., 2012).

A bundle of research has been done on consumer's purchase intention and decisions, including the antecedents and consequences. Theory of Reasoned Action and Theory of Planned Behaviour are deemed as popular theories that applied in this field of study. Indeed, for studies related to relatively new ideas and innovative products, researchers tend to employ Technology Acceptance Model (TAM). In recent years, TAM has been extended, and has led to the development of a newer model, namely Value-based Adoption Model (VAM) that introduced Kim et al. (2017) . The comparison of TAM and VAM is as presented in Table 1.

Table 1: Comparison of TAM and VAM

	TAM	VAM
Subject	Individuals (Employees in an organizational setting)	Individuals (Technology user and service consumer)
Environment	Traditional technologies (e.g. spreadsheet, word processor)	New Information and Communication Technology (ICT) (e.g. M-Internet, Internet banking)
Features	Use of technology for work purposes The cost of mandatory adoption Usage is borne by the organisation	Adopt and use new ICT for personal purposes The cost of voluntary adoption Usage is borne by the individuals

Source: Adopted and adapted from (Kim et al., 2017).

VAM would be able to capture the monetary sacrifice elements and show adoption as a comparison of benefits and cost (Kim et al., 2007). This is because it is based on a cost-benefit paradigm that reflecting the decision making process whereby the decision to use is made by comparing the cost of uncertainty in deciding to adopt a new technology or product (Lin et al., 2012).

2.2 Perceived Value

The term 'values' was originally used in the field of social sciences to characterise societies (Peterson and Barreto, 2018). Kroeber and Kluckhon (1952) highlighted that values describe ends that the implicit in a society's patterns of behaviour. In the literature of consumer behaviour, Kim et al. (2007) stated that value represents an overall estimation of the choice of object, and consumers decide their choice behaviour based on this overall estimation. In other word, perceived value is derived based on consumers perceived preference and evaluation of the selected product or services in facilitating or blocking them to achieve their desired goals (Woodruff, 1997).

According to Zeithaml (1988), perceived value is refers to consumer's overall assessment of the utility of a product based on the perception of what is received and what is given. The primary assumption in the consumers' decisions making process is the desire for value maximisation, in which value is reflected by both benefit and loss (Kahneman and Tversky, 1979). This decision making process is based on a cost-benefit paradigm where consumers balance the benefit received and sacrifice made to evaluate the value of the product or services to them (Kim et al., 2007). Zeithaml (1988) categorised perceived sacrifice in two categories, non-monetary sacrifice and monetary sacrifice. Monetary sacrifice is measured by consumer's perception of actual price paid to purchase the product; whereas non-monetary sacrifice is represented by time, effort or other dissatisfactory spending associated with the purchase of the product (Kim et al., 2005).

Kim et al. (2005) have also further highlighted the importance of examining the sub-dimensions of both perceived sacrifice and perceived benefit, which will provide a more comprehensive understanding on the construct. Indeed, they found technicality and perceived fee to be the significant contributors to perceived sacrifice; whilst, perceived benefit was significantly affected by usefulness and enjoyment. Hence, this study is also strive to examine the impacts of the sub-dimensions of perceived sacrifice and perceived benefit.

Teas and Agarwal (2000) and Lin et al. (2012) identified that perceived benefit had a positive effect on perceived value. It is believed that the higher the benefit received from purchasing a product or service, the more likely the consumer perceives the value of it. Enjoyment refers to the level of pleasure felt by the user after using new product or services (Reychav and Wu, 2015). Consumers are deemed to have favourable or likable emotions or attitude towards products that provide enjoyment to them. Besides from enjoyment, perceived usefulness is also one of the perceived benefits. Usefulness is defined as the level of enhanced performance of the users after adopting new products or services (Cheung and Vogel, 2013). It is posit that the higher the perceived usefulness, the greater the perceived value for the consumers. Based on the discussion above, the following hypotheses are proposed:

H1: Enjoyment has a positive impact on Perceived Value.

H2: Usefulness poses a positive effect on Perceived Value.

2.3 Perceived Risk

Innovative products or services, especially technological products and service is always bound to hidden and unexpected risk, thus causing consumers to postpone or avoid adoption to these items (Dhebar 1996). Chen and Dubinsky (2003) also reaffirmed that consumers' perceived value are usually influenced by the perceived sacrifice made, such as product performance and price. It is assumed that the higher the sacrifice made for a product or services, the lower the perceived value. Perceived fee is refers to the perception of consumers in regards of the fees required to purchase IoT smart home (Voss et al., 1998;, Wang and Wang, 2010). It is believed that if the perceived price to purchase is too high, then the consumer's perceived value will be significantly affected. It is posit that:

Technicality is referring to the level of difficulty to learn or use the new product and service (Davis, 1989; DeLone and McLean, 1992). The higher technicality involved in the learning process to adopt a new product or services, the less likely consumers are willing to pay for it because consumers will always prefer products with smaller learning curve and hassle free. Thus, the following hypotheses is concluded:

H3: Perceived Fee has is negative related to Perceived Value.

H4: Technicality has a negatively related to Perceived Value.

2.4 Purchase Intention

The central principle of the function of value is that it is defined over perceived gains and losses relative to some natural reference point, people tend to respond to cognitive comparisons (Kim et al., 2005). Turel et al. (2010) identified that perceived value shows a positive relationship with adoption intention. Consumers usually exhibit a much favourable attitude and intention to adopt or purchase a new product or services when they have a higher perceived value about the product and services (Aaker and Joachimsthaler, 2000). Therefore, it is posit that:

H3: Perceived Value has a significant positive relationship with the Purchase Intention of IoT Smart Homes

Based on the discussion in preceding sections, a conceptual framework has been developed. The conceptual model of this study is illustrated in Figure 1.

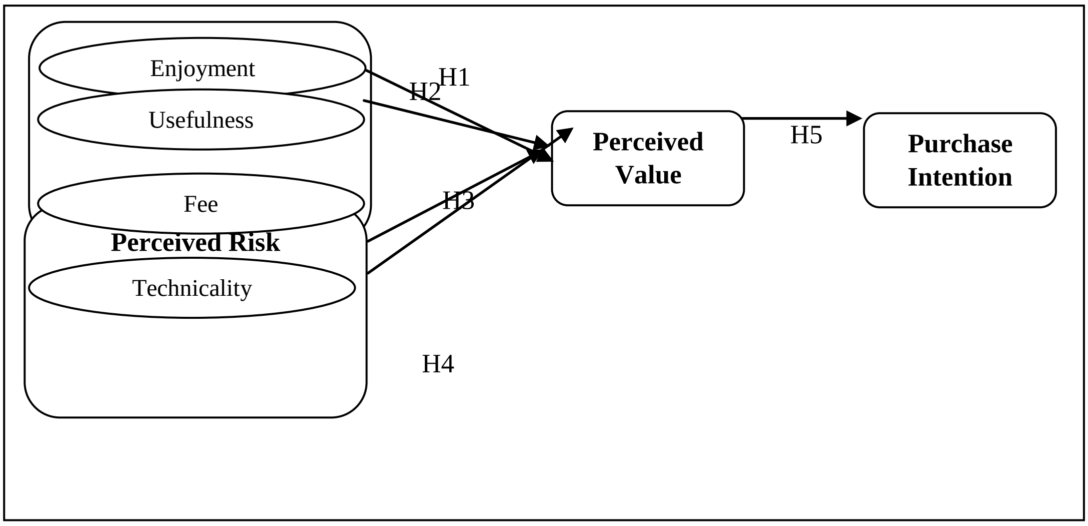

Fig.1: Research Framework

METHODOLOGY

This is a cross-sectional study, and the data collection method is online self-administered survey. The samples of this study were Malaysian citizens aged above 21 years old due to the minimum legal age for house purchase in Malaysia is 21 years old, according to the Malaysian Law, Section 11 of the Contracts Act 1950. The sample size of this study is 163 respondents. This study employed the data collection method that proposed by Kim et al. (2018), in which respondents were be first presented a set of introductory write up and video before every survey was conducted due to the unfamiliarity of the concept of IoT Smart Homes. Also, a consent letter is attached at the beginning of the survey to alert and acknowledge the respondents about the details of the research and uses of data collected.

A questionnaire was developed to captures data needed for this study. The questionnaire consists of a total of six sections, whereby Section A was developed to measure Perceived Risk; Section B to measure Perceived Benefit; Section C to capture Perceived Value: Section D measures Purchase Intention; and lastly, Section E captures respondents' socio-demographic profile such as age, gender, education level and household income. A five-point Likert Scale ranging from 1-strongly disagree to 5=strongly agree was employed to capture data in Section A, B, C and D. The measures of Perceived Sacrifice, Perceived Benefit and Perceived Value were adopted and adapted from Kim et al. (2005), whereas the measures for Purchase Intention was adopted from Taylor et al. (1975). SEM-PLS was employed to serve data analysis purpose.

RESULTS AND DISCUSSION

Table 2 showed that output of the measurement model, which explains how the measured variables represent each construct, by testing their reliability and validity (Malhotra, 2010). It is found that Composite Reliability for all constructs is above 0.8, ranging from 0.877 to 0.953. This implies that the measures are highly reliable. Meanwhile, all the constructs displayed an AVE value of **more than 0.5**, in which Purchase Intention has the highest AVE at 0.803 and Technicality has the lowest AVE at 0.588. The results presented in Table 1 have clearly proved that the listed scales are free from convergent validity issues.

Table 2: Results of Factor and Reliability Analysis

Construct	Items	Loadings	CR	AVE
Enjoyment	ENJ1	0.838	0.931	0.772
	ENJ2	0.904		
	ENJ3	0.875		
	ENJ4	0.897		
Perceived Fee	PF1	0.904	0.931	0.773
	PF2	0.924		
	PF3	0.778		
	PF4	0.904		
Purchase intention	PI1	0.860	0.924	0.803
	PI2	0.926		
	PI3	0.901		
Perceived value	PV1	0.610	0.895	0.686
	PV2	0.878		
	PV3	0.897		
	PV4	0.894		
Technicality	TEC1	0.773	0.877	0.588
	TEC2	0.832		
	TEC3	0.742		
	TEC4	0.758		
	TEC5	0.723		
Usefulness	USE1	0.884	0.953	0.771
	USE2	0.897		
	USE3	0.842		
	USE4	0.861		
	USE5	0.899		
	USE6	0.883		

Note 1: CR= Composite Reliability; AVE= Average Variance Extracted
AVE = 0.5 and more, CR > 0.7, Loadings more than 0.5 (Hair et. al. 2017)

The study then proceeds to assess the discriminant validity of the measurement model. The discriminant validity was tested using HTMT ratio of correlations. HTMT is the ratio of correlations within the constructs to correlations between the constructs (Ramayah et al. 2018). According to (Kline, 2011), if the HTMT value is greater than 0.85, this indicates that there is a discriminant validity issue. Table 3 showed that all the values are lower than 0.85, thus discriminant validity were supported.

Table 3: Output of Discriminant Validity Heterotrait Monotrait (HTMT)

	Enjoyment	Perceived Fee	Perceived Value	Purchase intention	Technicality	Usefulness
Enjoyment						
Perceived Fee	0.138					
Perceived Value	0.551	0.131				
Purchase intention	0.620	0.155	0.680			
Technicality	0.532	0.259	0.591	0.570		
Usefulness	0.810	0.183	0.678	0.653	0.619	

Once the validity and reliability of the measurement were established, this study proceeds to test the proposed hypotheses by assessing the structural model. The significance of direct relationships proposed in this study were evaluated by applying 5,000 bootstrap subsamples as recommended by (Hair et al., 2017). Table 4 showed that only Perceived Usefulness (b= 0.507, p<0.01) has a positive significant impact on perceived value, thus H2 is supported. This study also found that perceived value (b=0.614) is a positive significant impact on respondents' purchase intention (b=0.614, p<0.01), hence H5 is supported. The R2 value or the amount of explains variance in the endogenous variable for perceived value is 0.453 and purchase intention is 0.373. The R2 values are greater than the threshold of 0.02 as suggested by Cohen (1988). Hence, this establishes a good predictive accuracy of the model. In addition to assessing the R2 values, the effect size (f2) were also calculated. The result shows that all the supported hypotheses i.e. H2 (f2 = 0.184) and H3 (f2 = 0.605 possess a medium to large effect based on the threshold suggested by Cohen (1988) where 0.02, 0.15 and 0.35 represent small, medium and large effect respectively.

Table 4: Direct Path Modelling

Hypothesis		Std Beta	Std Error	T value	P Values	BCI LL (5%)	BCI UL (95%)	f-square	Decision
H1	Enjoyment -> Perceived Value	0.026	0.098	0.268	0.394	-0.147	0.177	0.001	Not Supported
H2	Usefulness -> Perceived Value	0.507	0.113	4.505	0.001	0.342	0.710	0.184	Supported
H3	Perceived Fee -> Perceived Value	-0.031	0.073	0.418	0.338	-0.216	0.051	0.002	Not Supported
H4	Technicality -> Perceived Value	0.242	0.093	2.607	0.005	0.067	0.372	0.075	Not Supported
H5	Perceived Value -> Purchase intention	0.614	0.058	10.502	0.001	0.342	0.710	0.605	Supported

DISCUSSION AND CONCLUSION

The potential of Smart Homes is vast and there is an increasing attention in this technology, however, little is still known about the determinants that would encourage the acceptance of home buyers. This study endeavours to contribute to the body of knowledge by examining the purchase intention of IoT Smart Homes among Malaysians.

To answer RQ1, H1-H4 were tested. Results shows that only perceived usefulness (H3) has a positive significant impact on perceived value. Enjoyment does not account to the positive relationship with consumer's perceived value. This might be due to the functionality and features of IoT Smart Homes are not directly related to consumers' enjoyment. IoT Smart Homes can be easily understood as a security system or interconnected devices that would dramatically improve user's productivity and performance, but the enjoyment value might not be vastly different from what is offered by current home infotainment system or computers. Furthermore, as IoT Smart Homes is still new concept in Malaysia, consumers might take time to be aware on using IoT Smart Homes.

On the other hand, this study found that perceived usefulness also displayed a significant relationship with perceived value based on the outcomes of the study. The result is similar with Kim et al. (2013). Potential customers will only adopt a new product or service if the investment of monetary and non-monetary costs has reasonable results. The features offered by IoT Smart Homes are compelling and able to convince consumers that IoT Smart Homes can improve their overall effectiveness and efficiency in their daily life and works. Hence IoT Smart Homes are considered useful to consumers as it can enhance consumers' performance.

In relation with relationship between perceived fee and perceived value, owning an IoT Smart Homes also does not display a significant relationship with perceived value based on the outcomes of the research. This might be likely due to the high percentage of respondents coming from a younger age and they are not really aware of the cost of owning a home, thus might not consider perceived fees as a barrier to purchase IoT Smart Homes.

Next, the influence of technicality on perceived value is rejected in the research test. This might be due to the common perception that young people are more technology savvy and find less technical difficulties in adapting to new products, such as IoT Smart Homes. Besides that, Golant (2017) found that while younger generation are still much accepting towards technological products, however the gap between age groups are narrowing. Older generation are displaying improvement in technology adoption in recent years, most probably due to a fast paced information advancement in the society as a whole. Nevertheless, tutorials and guides on new products and services are vastly available to consumers in today's internet era. This might explain the reason why technicality might not create a huge impact in consumers buying decision.

As to answer RQ2, H5 were tested. Results show that there is a perceived value has a significant positive impact on intention to purchase. This result is similar with Chen (2017); Yoo (2015) and Kim et al (2013) on the adoption of new technology. The intention to purchase or not to purchase is based on a cost-benefit paradigm where consumers balance the benefit received and sacrifice made to evaluate the value of the product or services to them. Hence when consumers perceived that that the value gained is more than the risk, will most likely result in higher purchasing intention.

In conclusion, the study findings provided both theoretical and managerial implications to academic researchers and market practitioners. The VAM has been further explored within this study and contributes to better understanding in the body of knowledge. It addressed the research gap and research questions that the study aimed to answer. The result of the study also largely broadened the understanding of how consumers' environmental concerns and environmental innovativeness moderate their buying decisions, especially in the context of IoT Smart Homes. The result would serve as a reference for future studies that attempt to study the similar field. The outcome of the study which are different from previous studies might indicate differences of Malaysian market and intrigue further studies.

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