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ANALYSIS OF IOT USE IN THE SMART HOME CONTEXT USING THE TAM MODEL: EDUCATION AND INCOME AS MODERATING VARIABLES

Bonefasia Salvatore Stelamaris*1), Rio Guntur Utomo2), Rahmat Yasirandi3)

1. Department of Information Technology, School of Computing, Telkom University Bandung, Indonesia
2. Department of Information Technology, School of Computing, Telkom University Bandung, Indonesia
3. Department of Information Technology, School of Computing, Telkom University Bandung, Indonesia

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* Corresponding author.
Bonefasia Salvatore Stelamaris
E-mail address:
stelamaris@student.telkomuniversity.ac.id

ABSTRACT

This study aims to develop effective policies and strategies to promote the adoption of IoT technologies, particularly smart home usage in Indonesia, in light of the rapid increase in internet usage and to address the digital divide due to varying education and income levels. Utilizing the Technology Acceptance Model (TAM) and a quantitative methodology, the survey was conducted with 427 smart home users via a digital form distributed on social media. Data was analyzed using TAM variables and additional variables like privacy, compatibility, perceived ease of use, perceived usefulness, attitude towards using, behavioral intention to use, and actual system use, with demographics (income and education) as moderating variables. The results show that privacy, perceived ease of use, and perceived usefulness significantly influence attitudes towards using smart homes, which in turn positively affects users' intention to use them, while compatibility does not. Education and income levels weaken the relationship between external factors and intention to use smart homes. This research highlights the impact of demographic factors on IoT adoption and provides insights for technology providers and policymakers to enhance smart home device adoption in Indonesia.

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I. INTRODUCTION

THE exponential expansion of Internet of Things (IoT) technology is revolutionizing the entire technological panorama and generating novel prospects for the integration of electronic gadgets into everyday life. The IoT sector in Indonesia is projected to achieve a value of US$ 31 billion (IDR 444 trillion) by 2022, and is anticipated to grow to US$ 142 billion (IDR 1,620 trillion) by 2025, which shows the huge economic opportunities that come from the development of IoT and supports the government's program to digitize Indonesia[1] . Of the various IoT services offered, smart home is one of the most popular services and has become a trend among the wider community because the convenience and marketability provided are quite promising [2].

Smart homes incorporate sophisticated technology that allow for automation and remote management, making them a crucial tool for enhancing Conserving energy and minimizing resource waste. These technologies enhance both comfort and quality of life while also serving a crucial role in sustainable consumption, by reducing negative environmental effects and addressing the requirements of future generations [3]. The smart home concept connects electronic devices and systems through the internet to monitor, control and control electronic devices in the home which then offers great comfort, efficiency, security and energy in the household so that it has great potential benefits [4].

The objective of this research is to employ the Technology Acceptance Model (TAM) method to examine the factors that influence the acceptance of Internet of Things (IoT) technology in the context of smart residences. The TAM method is employed to investigate the factors that contribute to the acceptability of an information system or system [5]. Using demographic factors, this study aims to determine how income and education levels can influence the relationship between perceived convenience and usefulness as well as other factors such as privacy and compatibility with users' intention to use a smart home. In addition, this research aims to contribute to a deeper insight into the factors that influence the adoption of IoT technology in the context of smart home in Indonesia which may differ from other countries due to differences in culture, economy, and technological infrastructure. With this research, it is hoped that it can help in designing a more effective technology implementation strategy and can increase people's technological literacy.

According to [6], the measurement variables included in TAM are expected to help estimate individual mindsets and levels of acceptance of technology. In addition, they can provide important underlying data regarding the elements that drive a person's attitudes. From previous research that has been conducted [7], the results show that compatibility, privacy, perceived usefulness and perceived ease of use provide positive results on buyer intentions. Due to the study's shortcomings, which include its limited data coverage, a more recent investigation was conducted with a larger sample size and respondent population in Indonesia. Another previous study [8] Investigated the influence of adoption and acceptance variables on the utilization of smart homes. The study found that the main factor preventing people from using anything is their perception of the potential risks involved. This perception is influenced by their perception of the potential advantages. The findings indicated that the primary factors influencing the intention to use were the compatibility and usability of the application. This latest research differs from earlier studies in that it adds other elements, including moderation variables, to the extended model. Based on the statistical analysis conducted in the study [9] The results confirmed that Malaysian householders are more inclined to adopt smart home technology when they see a clear interface, consistency, attractiveness, veracity of information, perceived security, and perceived privacy. Due to some constraints in earlier research, including those related to sample size, sampling was done in a larger number of samples—that is, across all regions of Indonesia—in the most recent study.

Previous studies have similarities in the object under study, namely smart home [10], [11], [12] some studies use the same research model, namely the Technology Acceptance Model (TAM) and some of the same variables [4], [13]. Previous research and the research that the author will conduct differ in the variables employed. This study employs variables from the TAM model and several additional variables. In contrast to earlier research, the author of this study chose a topic that encompasses a larger geographic area and respondents of all generations in Indonesia, allowing the study to accurately reflect the preferences of a sizable user base. This research is a follow-up research from [14] where this research is more specifically focused on smart homes, with the aim of exploring in depth how smart home devices can be integrated with IoT technology and identifying unique challenges and prospects in the context of accepting IoT technology in the context of smart homes in Indonesian households.

Understanding these factors is expected to be an initial strategy in encouraging the adoption of smart home technology into the community environment [15]. Regarding the use of smart home technology, it is anticipated that this research will significantly impact industry practice and Indonesian government policy. By focusing on market segmentation based on income and education, the findings can assist producers in developing products that more closely align with regional demands and in developing more focused marketing tactics. The results can also assist politicians in developing rules and rewards, including subsidies for eco-friendly devices, that promote the use of smart home technology. Additionally, this research can help remove adoption barriers and raise people's technical literacy. By focusing on perceived risk, the industry may increase client trust. In order to encourage rising public interest in adopting smart home technology, this research can help create products and policies that are more in line with the IoT devices, designs, and policies of manufacturers and service providers.

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II. Methods

A. Research Method and Model

This research uses a quantitative approach [16] and the method applied in this research is useful to find out the extent of users' willingness to adopt IoT technology in the context of smart home. This research uses surveys as a medium for data collection, the scope of this research is the distribution of questionnaires to users who have the potential to use IoT technology and homeowners who have used IoT technology with no age limit and the distribution of questionnaires in the territory of Indonesia.

The model in this research uses the Technology Acceptance Model developed by Fred Davis in 1986 [17]. The initial TAM version comprises four constructs: perceived utility, attitude, behavioral objective, and perceived simplicity of use. The behavioral intention is determined by the attitude and perceived utility, while the attitude is determined by the perceived usefulness and perceived simplicity of use, according to this paradigm [18]. Additional constructs examined in this study are compatibility and privacy. This study aims to examine the moderating impact, which refers to a variable that has the ability to either enhance or diminish the direct association between the independent and dependent variables [19], [20], the variable is demographics consisting of education and income.

Perceived ease of use, perceived usefulness, attitude, behavioral intention to use, actual system usage, moderating variables, namely demographic characteristics, and external variables, namely compatibility and privacy, were the

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constructs in the TAM model that were measured in this study. How simple it is for consumers to understand and utilize the technology determines how easy it is perceived to be. Because it takes less work to understand, technology that is simple to use is more likely to be accepted. The degree of comfort, effectiveness, and safety in daily life is the basis for measuring perceived utility. The rate at which smart home IoT devices are adopted can rise if homeowners genuinely perceive the advantages of having one. The degree to which smart home technology is appropriate and in line with users' requirements and lifestyles is measured in the compatibility construct. Smart home IoT goods that can be incorporated into all household gadgets, for instance, will be more extensively embraced than other types of technology since they better suit the needs and lifestyle of the users. User concerns around the usage of personal data are measured by privacy. Users' perception of security against data utilized in smart home systems is greatly increased by data security features and transparent privacy policies. In addition, this study employs income and education as moderating demographic variables. The adoption of smart home technology is significantly influenced by this variable. While having a high income can boost one's ability to purchase and adopt new technology, having a high level of education can increase one's comprehension of and appreciation for the benefits of smart home technology.

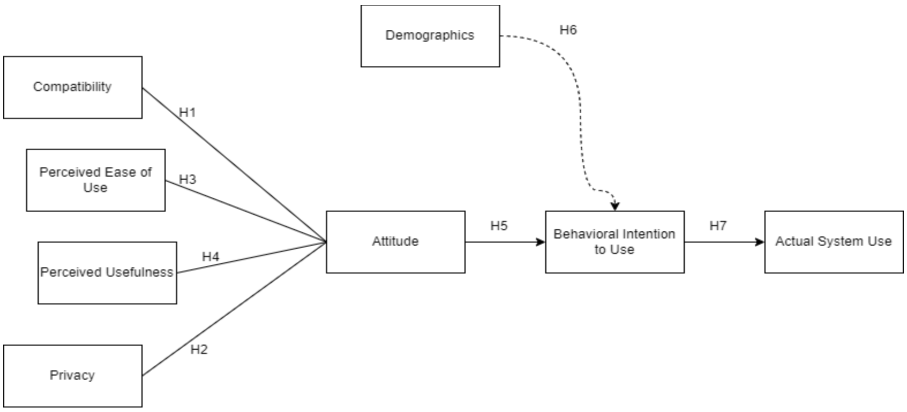

Figure 1. Research Model

This study analyzes the factors that influence user intention to adopt IoT technology in the context of Smart Home. There are eight variables measuring the level of adoption of IoT technology in the context of Smart Home, the hypothesis is as follows:

H1: Compatibility has a positive effect on attitude towards using product users.
H2: Privacy has a positive effect on attitude towards using product users
H3: Perceived Ease of Use has a positive effect on product user attitude
H4: Perceived usefulness has a positive effect on product user attitude
H5: Attitude has a positive effect on user intention to use the product
H6: The interaction between moderating variables and Attitude Toward Using has an effect on behavioral intention to use
H7: Intention to use has a positive effect on actual system use

B. Sampling

Based on [16] The sample is a subset of the population from which data is collected for the study, where the population represents the entire set of attributes possessed by the population. Sampling is essential since it is almost always impractical to investigate every individual in a group [21]. This study utilizes a sampling method called nonprobability sampling, specifically employing a purposive sampling methodology. Nonprobability sampling is a sampling approach that does not ensure that every element or member of the population has an equal chance of being selected as a sample [16], [22]. The study employed purposive sampling to guarantee that the sample could offer comprehensive and pertinent connections to the research. Purposive sampling bias, however, may cause the results to not be representative of the larger population, which could result in some groups being over- or underrepresented, as the sample was chosen based on the researcher's subjective assessment. Thus, bias was reduced in this study by making sure that different demographics were represented and by expanding the sample size. In this study, the number of samples is determined by looking at the unknown population of smart home users in Indonesia, thus the number of samples can be found using the following formula:

$$n = \frac{z^2 . P . (1 - P)}{d^2}$$

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$$n = \frac{3.8416 \times 0.5 \times 0.5}{0.5^2}$$

$$n = \frac{0.9604}{0.0025}$$

$$n = 384{,}16 = 400$$

The required sample size for this research was 400 participants. The criteria for respondents include individuals who utilize smart home services, such as smart TVs, smart lighting, smart doors, and smart CCTV. It is required that they possess at least two smart home devices and reside in Indonesia.

C. Research Instrument

A closed questionnaire was used to collect the data for this study, and it was shared over a number of platforms, including Instagram, Telegram, and WhatsApp. A pilot test of the questionnaire was carried out to make sure the instrument can measure the intended components. The first step in this process was creating an initial questionnaire based on the theoretical framework and the components that needed to be measured, including privacy, compatibility, perceived usefulness, and simplicity of use. Experts then evaluated the questionnaire to make sure the questions were pertinent and understandable. Subsequently, a limited sample was used to test the questionnaire in order to identify any potential issues, such unclear questions. Respondent input was used to refine the questionnaire prior to data analysis to assess validity and reliability. The questionnaire is then modified to increase validity and reliability based on the analysis's findings and comments received. This may involve adding, removing, or clarifying any unclear or inappropriate parts. In order to answer the series of questions, participants were given a five-point Likert scale that included the response options of "Strongly Disagree" to "Strongly Agree" [23]. Then the data that has been collected is processed using the SmartPLS 3.0 application.

D. Data Analysis

The primary methods for data analysis in the study were descriptive and inferential statistical analysis. Descriptive statistical analysis is a technique that involves the detailed description of the data that has been obtained, including its age, gender, maximum level of education, and monthly income [24]. To describe the overall population of respondents, this technique involves basic statistical calculations such as mean, frequency distribution, standard deviation, and percentage. Inferential statistical analysis is a testing technique used to analyze data that has been collected [24]. This test consists of testing the outer model, inner model and hypothesis testing. In this study the collected data was then processed using the SmartPLS 3 application. In the outer model, reliability was assessed using Cronbach's Alpha and Composite Reliability, while construct validity was investigated using methods like convergent validity and discriminant validity. Path analysis, which prioritizes path coefficients, R-Square (R2) values to pinpoint explained variability, and Predictive Relevance (Q2) to gauge the model's predictive power, are other methods used to assess the inner model. Moderation analysis is a hypothesis testing technique used in the Technology Acceptance Model (TAM) model to assess how moderating variables, including income and education, affect the connection between the independent and dependent variables. P-value and t-statistics are also used in significance testing.

SmartPLS is a software application that is used to perform Partial Least Squares (PLS) analysis within the context of Structural Equation Modelling (SEM). The objective of this research is to conduct a Partial Least Squares Structural Equation Modelling (PLS-SEM) analysis using SmartPLS. PLS-SEM is a versatile methodology that is well-suited for exploratory and predictive research. It is particularly useful when dealing with complex models, relatively small sample sizes, and data distribution abnormalities [25]. SmartPLS was chosen for this study due to its ability to analyze complex structural models and its flexibility in conducting exploratory analysis, especially in situations where sample size is limited or data does not meet all normality assumptions as well as being a PLS-SEM enabled software that allows testing the relationship between latent and moderating variables. This is seen in the TAM model, where income and education are considered as moderating variables. In addition, SmartPLS is well suited for this study as it has tools for a thorough evaluation of the validity and reliability of the model. PLS-SEM is a versatile methodology that is well suited for exploratory and predictive research. It is particularly useful when dealing with complex models, relatively small sample sizes, and non-normality of data distribution.

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III. RESULT AND DISCUSSION

A. Respondent's Demographic Profile

In this study, 427 respondents have been collected who have met the criteria, namely users of smart home IoT services and devices and domiciled in Indonesia. Table 1 shows the demographic profile of the respondents.

TABLE I.
RESPONDENT'S DEMOGRAPHIC

Age		
	Frequency	Percent
18-29	329	77%
30-44	82	19.2%
45-59	16	3.7%
Gender		
	Frequency	Percent
Male	313	26.7%
Female	114	73.7%
Level Education		
	Frequency	Percent
Junior High school	2	0.5%
Senior High School	169	39.66%
Diploma/Bachelor	229	53.6%
Graduate	25	5.9%
Postgraduate	2	0.5%
Income		
	Frequency	Percent
<1.000.000	83	19%
1.000.000-3.000.000	137	32.2%
3.500.000-5.000.000	115	27%
6.000.000-10.000.000	62	14.6%
>10.000.000	30	7%

from the data that has been collected, 77% of respondents are aged 18-29 years with the majority 73.3% being female. the highest level of education is at the bachelor degree level as much as 53.6% and the highest monthly income level is in the range of 1.000.000-3.000.000 with a percentage of 32.2%.

B. Outer Model

In the outer model analysis, validity and reliability testing is carried out. Validity testing consists of Convergent Validity test and Discriminant Validity test, while reliability testing consists of Cronbach Alpha and Composite Reliability. value of validity seen from the outer loading value of > 0.70 although values between 0.6 and 0.7 are acceptable in certain situations and the Average Variance Extracted (AVE) value > 0.50 [26]. These two assessments are used to ensure that latent constructs measured by multiple indicators have sufficient validity and reliability in the structural model. Reliability test is a test conducted to measure the extent to which the data generated from measurements using the same instrument is consistent and reliable. The assessment criteria for this test are seen through the Cronbach's alpha value> 0.7, but in some studies, the Cronbach's alpha value > 0.6 is still acceptable [26]. Apart from Cronbach's alpha, the reliability test is also seen in the composite reliability value which is declared valid if it has a value of > 0.7.

TABLE II.
VALIDITY AND RELIABILITY

Variables	Indicators	Code	Outer Loading	AVE	CA	CR	Information
Perceived Ease of Use (PE)	Ease of Use	PE1	0.712	0.589	0.653	0.811	Valid & Reliable
		PE2	0.828				
	Easy to Learn	PE4	0.758				
Perceived Usefulness (PU)	Efficiency	PU2	0.712	0.584	0.649	0.808	Valid & Reliable
	Useful	PU4	0.766				
	Effective	PU5	0.812				
Attitude Towards Using (A)	Attitude	A2	1.000	1.000	1.000	1.000	Valid & Reliable
Behavioral Intention to Use (BI)	Planning to Use	BI3	0.884	0.736	0.643	0.848	Valid & Reliable
		BI4	0.830				
Compatibility (C)	User Needs Preferences	C1	1.000	1.000	1.000	1.000	Valid & Reliable
Privacy (P)	Confident	P1	0.764	0.577		0.845	

	Policy	P2	0.759		0.757		Valid & Reliable
		P3	0.747				
		P4	0.770				
Demographic (M)	Income	M2	0.763	0.553	0.611	0.787	Valid & Reliable
	Education	M3	0.744				
		M4	0.723				
Actual System Use (ASU)	Recommendation	ASU1	0.718	0.538	0.714	0.823	Valid & Reliable
		ASU2	0.747				
	Satisfaction	ASU3	0.715				
		ASU4	0.752				

The table above illustrates that the outer loading value of multiple variable statement items is greater than 0.7, and the Average Variance Extract (AVE) value is greater than 0.5. This suggests that the assertion is accurate. The reliability test results for the research variables are presented in the table, which includes both Cronbach's alpha and composite reliability values. All variables in the table have a value greater than 0.6, which is deemed acceptable, and 0.7, which is the threshold for a satisfactory Cronbach's alpha and composite reliability. Hence, all the variable values included in this study exhibit commendable consistency in research measures and are deemed to be credible.

C. Inner Model

In this analysis, several criteria are used to determine the relationship between latent variables in the research model [24]. Model fit, R square, Q square, and F square are the evaluation metrics that are incorporated into the inner model. The R square, or coefficient of determination, quantifies the influence of exogenous variables on endogenous variables in a research endeavor. The respective provisions for these values are 0.67, 0.33, and 0.19, indicating the strength of their magnitudes as strong, moderate, and weak [26].

TABLE III.
R SQUARE

	R Square
ASU	0.345
A	0.250
BI	0.307

The table shows that the ASU variable has a R Square value of 0.345, indicating that the BI variable may explain 34.5% of the ASU variable, while the remaining 65.5% is influenced by other variables not included in the study and falls within the moderate range. Variable A is classified as weak, as indicated by its R Square value of 0.250. This suggests that variables C, PE, PU, and P have the potential to impact variable A by around 0.25%, while the remaining 75% of the impact is influenced by other variables. The variable A explains 30.7% of the BI variable, whereas other factors not considered in the study explain the remaining 69.3%. The BI variable's R Square value of 0.307 indicates that it is feeble. The blindfolding procedure is then used to generate the observation value, and a test is conducted to demonstrate its effectiveness. The Q square value is used as a reference. When the Q square value exceeds zero, the model is deemed to possess predictive significance. In contrast, the observation value is considered to have a lower predictive significance when the Q square value is less than zero [26].

TABLE IV.
Q SQUARE

Variable	Q Square
ASU	0.182
BI	0.227
A	0.217

The ASU variable has a Q Square value of 0.182, the BI variable has a Q Square value of 0.227, and the A variable has a Q Square value of 0.217, as indicated by the table. The predictive significance of this study model can be inferred from the fact that the Q Square value of the three variables is greater than 0. Subsequently, model fit testing is implemented to evaluate the model's suitability with respect to the available data. The Normed Fit Index (NFI) and Standardized Root Mean Square Residual (SRMR) values can be used to ascertain the fit model's assessment criteria. According to [26] a suitable model is a model that has an SRMR value <0.08 or 0.1 and an NFI value> 0.90 or close to 1.00 so that it can be said to be a research model that has a good fit model.

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TABEL V.
MODEL FIT

	Saturated Model	Estimated Model
SRMR	0.069	0.173
NFI	0.675	0.609

Based on the table above, the SRMR value is 0.069, this shows that the value is below 0.08, indicating that the model used is a suitable model. The resulting NFI value is 0.675, which means close to 1.000. It can be concluded that the model used in this study is in accordance with the requirements and is included in the marginal fit.

Overall, the model used in this study's validity and reliability are strongly supported by the R square, Q square, SRMR, and NFI values. Positive Q square values show that the model has strong predictive power, while high R square values show that the model successfully explains the majority of the variability in the data. The model fits well, as evidenced by the low SRMR and NFI values, suggesting that the model is suitable. As a result, these numbers collectively guarantee that the study's findings are accurate and valid for elucidating and forecasting IoT usage in smart homes, particularly when wealth and education are taken into account.

D. Hypothesis Testing and Discussion

Hypothesis testing is used to determine the presence or absence of a link between variables. Hypothesis testing in SmartPLS 3 software employs bootstrapping. The T-Statistic and P Value values are observed in this test. In this inquiry, a significance level of 0.05 is employed. The hypothesis is considered acceptable if both the t-statistic value and the P Value exceed 1.96.

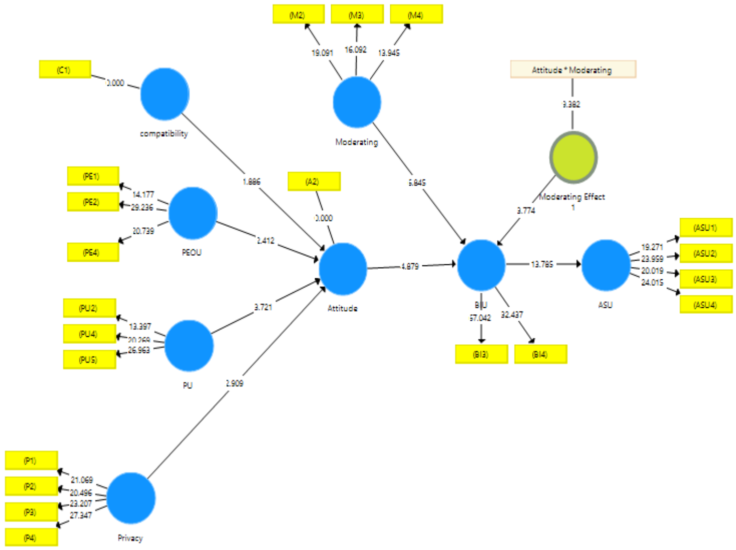

Figure 2. Hypothesis Testing

Analysis of the path coefficient data in figure 2 and table 5 reveals that nearly all the variables examined in this study exhibit a substantial impact, as indicated by the t-statistic value exceeding 1.96 and significance at the 0.05 level. The association between compatibility and attitude is statistically insignificant, as indicated by a t-statistic value below 1.96 and a P value over 0.05, leading to the rejection of this hypothesis.

TABLE VI.
HYPOTHESIS TESTING

Hypothesis	Origin Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T-Statistic (|O/STDEV|)	P value	Information
A -> BI	0.228	0.226	0.047	4.879	0.000	Accepted
BI -> ASU	0.588	0.587	0.043	13.785	0.000	Accepted
M -> BI	0.355	0.358	0.052	6.845	0.000	Accepted
A*M-> BI	-0.120	-0.118	0.032	3.772	0.000	Accepted
PE -> A	0.136	0.143	0.056	2.412	0.0016	Accepted
PU -> A	0.219	0.214	0.059	3.721	0.000	Accepted
P -> A	0.175	0.178	0.060	2.909	0.002	Accepted
C -> A	0.103	0.098	0.055	1.886	0.060	Rejected

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The intention to partake in a particular behavior is significantly and meaningfully influenced by an individual's attitude toward using. The hypothesis is accepted, as evidenced by the t-statistic value of 4.879 and a P value of 0.000, as well as the initial sample value of 0.228, which indicates positivity. The results of this study are consistent with previous research, suggesting that the intention to use is significantly and positively influenced by an individual's attitude toward using [1], [27], [28], [29]. While product innovation and technological elements have been highlighted in previous research to determine user attitudes, this study indicated that user attitudes are more influenced by social perceptions and personal convenience. In Indonesia, where technology usage is still relatively young, factors like privacy and data security can be more important. Nevertheless, this study did not specifically measure any of them. Positive user attitudes in using smart home devices are formed from perceived usefulness and perceived convenience which then contribute to improving good user experience. With a good experience in using smart home devices, it enables an increase in users' intention to use smart home devices continuously. Moreover, by highlighting the role of social perceptions and personal comfort, this study provides a basis for further research on how these factors can be integrated into a more holistic model of technology acceptance. This then helps in encouraging wider adoption of smart home technology.

The study found that there is a strong and positive relationship between the intention to use a system and the actual use of the system. Therefore, the hypothesis stating this relationship is accepted. The initial sample value of 0.588 indicates a positive impact, while the t-statistic value of 13.785 and P value of 0.000 indicate that this impact is highly statistically significant. These findings align with the results observed in earlier research [30], [31] . This study highlights certain distinctions from earlier research, even in spite of certain commonalities. The cultural and geographic setting of Indonesia, where this study was carried out, accounts for the distinction. It's possible that factors like privacy concerns and technology trust are less important in Indonesia than they are in other nations with more developed technological systems. The results indicate a positive correlation between the level of intention to utilize smart home devices and the likelihood of actually using them. The aforementioned calculation findings underscore the significance of enhancing user intention to utilize smart home gadgets. Enhancing the perceived utility, simplicity of use, and security of user information can indirectly boost user intention to utilize smart home devices. Therefore, it is anticipated that this will promote a greater rate of acceptance of smart home devices in Indonesia and effectively accomplish the intended objectives in the implementation of technology and digitalization.

In this scenario, the demographic variables of affluence and education serve as moderators and have a statistically significant and noteworthy effect on the behavioral intention to use, as indicated by the results of hypothesis testing in Table 6. The statistically significant and favorable impact of the income and education factors on the behavioral intention to use is demonstrated by the t-statistic value of 6,845 and a P value of 0.000. These results suggest that individuals with higher incomes and higher levels of educational attainment are more inclined to articulate a desire to integrate smart home devices into their daily routines. The adoption of smart home technology, which necessitates a deep comprehension and comes with a hefty price tag, significantly affects users. It is apparent that those with ample financial resources and a thorough understanding of the technology are more inclined to incorporate smart home gadgets into their living spaces. Hence, a segmented approach in marketing products and technologies, as well as the importance of supporting education and income generation to increase the adoption and satisfaction of smart home users in Indonesia.

Hypothesis H6 states that the interaction between demographic and attitude towards use has a significant effect on behavioral intention to use and is accepted, based on the analysis of the hypothesis test table. This hypothesis has a very small P value (0.000) indicating strong significance and a T statistic value of 4.053 indicating considerable strength of effect. This interaction affects intention to use with a sample origin (O) value of -0.120. Overall, these findings suggest that, despite the negative impact, the interaction between demographic variables and attitude towards use does affect behavioral intention to use. This means that when demographic variables interact with attitude toward use, the propensity to use tends to decrease. These results suggest the existence of factors, which are important to consider when developing and implementing IoT technologies or systems in the context of smart homes.

The attitude toward utilization is significantly and positively influenced by the perception of simplicity of use. In the initial sample, the result of 0.136 demonstrates the positive effect. The hypothesis is supported by the statistically significant effect of the p-value of 0.016, which is below the significance level of 0.05, and the t-statistic value of 2.412, which exceeds the critical value of 1.96. The results obtained were consistent with those of prior research [1], [28], [29]. Within the Indonesian setting, factors such as technological proficiency and cultural norms may impact perceived ease of use in a different way than in other nations. This means that if the product is easy to use and allows users to achieve goals efficiently, it has a positive impact on the attitude of product users. In addition, this also has an impact on increasing users' intention to continue using and recommending smart homes to other users. An easy-to-understand interface, easy navigation, and easily accessible features can increase perceived ease

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of use. To continuously improve product design, developers should conduct regular usability tests and collect user feedback.

The observed effect is statistically significant, as evidenced by the P value of 0.000 and the t-statistic value of 3.721, which surpasses the critical threshold of 1.96. Therefore, we adopt the hypothesis that the Attitude Toward Using consumers of this product are positively influenced by the perceived utility. This illustrates the consistency of the results of previous research [1], [28], [29]. In addition, the study emphasizes that producers should make sure their products provide customers with measurable benefits in order to promote broader and more lasting adoption. Studies conducted in nations where technology usage is high may not necessarily raise serious concerns about this. Overall, the results show the importance of perceived usefulness on users' positive attitudes towards using smart home devices. In order to increase the perceived utility of a product and promote its wider acceptance and continuous use, smart home device manufacturers must ensure that their products offer unambiguous benefits and usability to their users.

The mindset of users of smart home devices is significantly and favorably impacted by privacy. The initial sample value of 0.175, a t-statistic value of 2.909, and a p-value of 0.002 all serve as evidence of a robust influence. The hypothesis is accepted as a result of the significant impact that these values suggest. These results are in line with previous research conducted by [9] This demonstrates that privacy has a substantial and beneficial impact on users' attitudes towards utilizing a product. This study highlights the significance of privacy in the Indonesian market, where worries about privacy can be higher than in other countries. Though it's possible that earlier research ignored this variability or concentrated more on the technical features of the technology, this study highlights the impact privacy has on user perceptions in the local market. The correlation between privacy and user attitudes indicates that when users perceive their privacy to be adequately safeguarded, they tend to exhibit a favorable disposition towards the utilization of smart home devices. The presence of this optimistic mindset significantly influences the consumers' inclination to utilize smart home technology, hence fostering the broader acceptance and implementation of such technology.

The p-value of 0.060, which exceeds the significance level of 0.05, was determined after undertaking hypothesis testing on the research model. Furthermore, the critical value of 1.96 is exceeded by the t-statistic value of 1.886. Consequently, it is possible to deduce that compatibility does not have a substantial and beneficial impact on one's attitude toward utilizing the product. As a result, we reject this hypothesis [29]. Compatibility relates to the fit of the technology with the user's lifestyle, needs and preferences. The insignificant compatibility hypothesis (H1) suggests that the correlation between smart home technology and users' lifestyles may have less influence on the adoption of this technology. Some of the reasons that influence this include other factors that are more influential such as factors of comfort, safety, perceived benefits and so on. In addition, another reason is the influence of diverse user backgrounds so that user perceptions of compatibility are more varied and cause this factor not to consistently influence user attitudes. Other factors that can affect users include social influence, technological illiteracy, prices and limitations, and privacy and security concerns. Furthermore, the most crucial elements might be things like infrastructure accessibility, prior user experience, societal standards, and the rate of technology development. To increase the acceptance of smart homes, more research on these topics is necessary, and product designs and marketing tactics should be changed.

IV. Conclusion

The objective of this research was to evaluate the factors that influence the adoption of IoT technology in the context of smart households in Indonesia. The results of the research suggest that the majority of the criteria examined have a significant influence on the intention to use and the actual usage of IoT technology in smart Homes. The user's willingness to integrate this technology into their household can be improved by cultivating a positive attitude toward the utilization of this Internet of Things (IoT)-based smart home system. This is due to the fact that research has shown that the attitude factor has a substantial and favorable impact on the intention to use the system. In the context of a smart home, both attitude and behavioral intention to utilize IoT technology are positively influenced by other factors, including perceived simplicity of use, perceived utility, and privacy, in addition to attitude. Although the compatibility variable does not exhibit a substantial impact on user attitudes, this indicates that there are other variables that are more pertinent and exert a robust influence on user attitudes and intents. The findings further emphasize the significance of moderating factors in the association between views and intentions to utilize smart home technologies. The presence of a moderating impact suggests that there are multiple elements that can diminish user intentions.

The results are anticipated to provide a substantial contribution to comprehending the elements that impact the acceptance of IoT technology in the Indonesian smart home setting. By utilizing the findings of this study, service providers can enhance their effectiveness in promoting the widespread use of IoT technology in everyday life. This, in turn, can enhance the overall quality of life and facilitate the total digitization of Indonesia. Considering the constraints of the conducted research, recommendations for future studies pertain to the inclusion of additional factors, such as perceived trust, alongside the existing variables employed in the study. Moreover, conducting additional research can enhance the specificity of the study by considering factors such as the precise type of smart home technology utilized and the geographical region from which the respondent population is drawn.

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