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Factors Influencing Intention To Use Smart Home Technology in Chengdu-Chongqing Economic Circle, China

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Abstract

Purpose: This study aims to explore the influencing factors of residents' behavioral intention to use smart home technology in Chengdu Chongqing economic circle, China. The conceptual framework contains perceived usefulness, perceived ease of use, personal innovativeness, trust, hedonic motivation, social influence, price value and intention to use. **Research design, data, and methodology:** The user's target population is 500 smart home users in the Chengdu-Chongqing economic circle of China. Before distributing the questionnaire, Item-Objective Congruence (IOC) and a pilot test of Cronbach's Alpha were adopted to test the content validity and reliability. Data was analyzed by utilizing Confirmatory Factor Analysis (CFA) and Structural Equation Modeling (SEM) to validate the model's goodness of fit and confirm the causal relationship among variables for hypothesis testing. **Results:** All hypotheses were supported. Perceived usefulness, perceived ease of use, personal innovativeness, trust, hedonic motivation, social influence and price value significantly influence intention to use. Additionally, perceived ease of use has a significant influence on perceived usefulness. **Conclusions:** This study suggested that developers of smart homes and management of users should focus on improving the quality factors of smart home technology for users to perceive the system as useful and would further formulate favorable attitudes and behavioral intentions toward using smart homes.

Keywords : Hedonic Motivation, Social Influence, Price Value, Intention to Use, Smart Home Technology

JEL Classification Code: E44, F31, F37, G15

1. Introduction

More innovative applications will emerge with the rise of the Internet of Things, big data, cloud computing, and the acceleration of 5G network deployment. People are exploring the need for more comfortable, convenient, and intelligent living and the business opportunities that come with it. The tremendous development in the last decade within smartphones, wearable devices, and broadband has created new ways to connect individual devices in the home (Hubert et al., 2017; Jeong et al., 2016; Wilson et al., 2017).

The smart home is based on artificial intelligence and Internet of Things technology, taking individual, family, or enterprise residence as the platform, integrating a variety of technologies into home living equipment (smart home appliances, smart security, smart audio and video equipment, etc.), and realizing overall control by building an efficient management system of residential facilities and family schedule affairs. At the same time, smart homes can provide users with personalized life services by collecting and analyzing user behavior data to form an intelligent, efficient, and comfortable home ecosystem (Qasim & Abu-Shanab, 2015).

A smart home is a residential setting incorporating ICT to enable the seamless interaction and integration of various household products and services. The study describes a dwelling with state-of-the-art technology capable of monitoring the unique requirements of its inhabitants and

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autonomously delivering services based on their demands. Robles and Kim (2010) define home automation as the amalgamation of technological advancements and service provision, wherein the home system is regulated through the utilization of the home network, ultimately enhancing the overall quality of life. This integration enables users to control their home environment completely (Cook, 2012).

According to Balta-Ozkan et al. (2014), there has been significant growth in the market for home security systems and smart home services. Many smart city and smart building projects have also begun to be launched nationwide. Nevertheless, the Internet of Thing (IoT) is an emerging sector on a global scale, and China has diverse challenges in expanding its presence in this field. Despite ongoing funding and support from China for developmental research in the IOT field, this technology's applications still need to be improved and constrained. Additionally, concerns persist regarding protecting information about IoT (Atzori et al., 2010).

Regarding research gap, technology has existed for a considerable period. Nevertheless, its adoption and utilization have yet to reach a global scale, resulting in underestimating its potential (Nikou, 2019). Therefore, this study aims to explore the influencing factors of residents' behavioral intention to use smart home technology in Chengdu Chongqing economic circle, China. It is imperative to examine and comprehend consumers' viewpoints and actions about the adoption of smart homes to facilitate the expansion of services offered by providers.

2. Literature Review

2.1 Perceived Usefulness

Perceived usefulness refers to an individual's subjective perception regarding the potential enhancement of their productivity or provision of support in their daily work through a particular system (Davis et al., 1989). Perceived utility pertains to the degree to which a user holds the view that adopting smart homes will enhance the overall quality of their life. The concept of perceived utility primarily concerns the degree to which individuals believe that adopting smart home technologies would improve their overall quality of life (Shuhaiber & Mashal, 2019). The concept of Perceived usefulness pertains to the extent to which users believe that utilizing a specific system would enhance their work performance (Nikou, 2019).

Davis (1989) initially established the notion of perceived utility within the theoretical framework of the TAM. Perceived usefulness pertains to how users can improve their performance by effectively utilizing an upgraded system. This term signifies the user's inclination to embrace and incorporate the system. The findings indicate that the perceived usefulness of smart home technology is a significant factor in its adoption, as evidenced by prior research conducted by Nikou (2019). Thus, this study set a hypothesis:

H1: Perceived usefulness has a significant influence on intention to use.

2.2 Perceived Ease of Use

Perceived ease of use refers to the convenience of utilizing a specific system (Venkatesh et al., 2003). Perceived ease of use refers to the user's view that the system can be employed with low exertion (Venkatesh & Davis, 2000). Perceived ease of use refers to the degree to which individuals view a system as readily navigable and demanding minimum cognitive and physical exertion (Davis, 1989). To facilitate efficient operation and management by individuals with limited technical expertise, the system must exhibit user-friendliness, simplicity, and accessibility.

The research findings indicate that the perceived level of simplicity in utilizing smart home technologies is a significant factor in shaping and influencing their adoption. According to Nikou (2019), the perceived simplicity of use is a significant factor in shaping customers' inclination to engage in behavior and their view of the IoT, particularly about furniture technology. Hence, two hypotheses are developed:

H2: Perceived ease of use has a significant influence on intention to use.

H3: Perceived ease of use has a significant influence on perceived usefulness.

2.3 Personal Innovativeness

Personal innovativeness refers to individuals' inclination and ability to adapt and utilize innovative technologies (Agarwal & Prasad, 1998). Consumer perception of innovation refers to how customers perceive a specific product and its subsequent influence on their inclination to adopt and utilize this technology. This concept pertains to an individual's inclination to explore and experiment with novel technologies, as well as the degree to which they are inclined to adopt these technologies before others (Sánchez-Franco et al., 2009).

According to the findings of Ahn et al. (2016), there exists a positive association between the construct of innovation and the intention to use sustainable housing. According to Schweitzer and Van den Hende (2016), personal innovativeness significantly influences consumers' intention of smart products. Slade et al. (2015) have emphasized using mobile phone location services and long-distance mobile payment. Therefore, this study concludes that:

H4: Personal innovativeness has a significant influence on intention to use.

2.4 Trust

The notion of trust exhibits variations across different fields. However, it is a state characterized by confident and positive expectations regarding another individual's intentions towards oneself in situations involving potential risks (Siau & Shen, 2003). Trust can be conceptualized as a significant predictive indication of individuals' behavioral intention to adopt and utilize technology. The trust-building measure represents how trustworthy an individual feels smart home technology is when performing a certain activity (El-Masri & Tarhini, 2017). For the smart home industry, the trust of service providers is also a big problem (Yang et al., 2017).

Empirical research shows that the degree of trust of users to service providers is a major factor influencing users' willingness to use (Yang et al., 2017). The incorporation of trust within the framework of the technology acceptance model (TAM) holds significant importance in the context of risk mitigation and promotion of the adoption of usage patterns. Gao and Bai (2014) posited a mutual correlation between trust and the inclination to participate in the use of IoT. To bolster consumer trust in smart home devices, manufacturers prioritize advancing superior products that provide practical and extraordinary functionalities. Thereby, this researcher refers a hypothesis:

H5: Trust has a significant influence on intention to use.

2.5 Hedonic Motivation

Hedonic motivation pertains to the subjective sensation of pleasure or satisfaction humans derive from engaging with technology. The research undertaken by Brown and Venkatesh (2005) has provided evidence that hedonic motivation represents an individual's interest and satisfaction, which is obtained primarily using technology (Thi-Hong-Linh et al., 2018). Specific consumer behavior and information systems studies both theorize the discovery of various structures associated with hedonic motivation that play an important role in consumer products and technology (Venkatesh & Davis, 2000).

Wu and Liu (2007) have presented empirical evidence supporting a possible correlation between individuals' participation in online gaming activities and their subjective perception of pleasure. According to Venkatesh et al. (2012), the term denotes refers to the satisfaction experienced by individuals when using smart home technologies. The concept of "hedonic motivation" can be utilized to characterize the satisfaction or sense of fulfillment that individuals derive from using technology. Venkatesh et al. (2012) conducted a study that revealed a substantial and noteworthy association between hedonic motivation and the behavioral intention to adopt technology, indicating a direct and positive correlation. Consequently, a hypothesis is set:

H6: Hedonic motivation has a significant influence on intention to use.

2.6 Social Influence

According to Venkatesh and Davis (2000), the social influence paradigm significantly influences adopting a new technology. The structure of the SI construct exhibits similarities to the subjective norm construct as posited in the theory of reasoned action or TRA (Fan et al., 2021; Venkatesh et al., 2003). SI can be defined as the extent to which an individual's cognitive processes, emotional experiences, and behavioral patterns are influenced by the presence and conduct of others within a given social environment. Has the belief that their significant other should accept and utilize a new system (Venkatesh et al., 2003).

Lee et al. (2012) conducted a study that examined the various factors influencing the adoption of smartphones among college students, including peer influence and family dynamics. Nevertheless, consumers' adoption and integration of IoT are also subject to the effect of several supplementary factors, including the perspectives of prominent personalities within the domain. The research conducted by Venkatesh et al. (2012) examines the topic of social influence. The influence of the social environment plays a substantial role in the decision-making process, led to intention to use a technology (Hsu & Lu, 2004). Therefore, this study hypothesizes that:

H7: Social influence has a significant influence on intention to use.

2.7 Price Value

According to Dodds et al. (1991), pricing value can be seen as a cognitive decision-making process where individuals weigh the perceived benefits obtained from using a product or service against the monetary costs incurred. The study by Xu et al. (2017) investigated the extent of adoption of mobile Internet services through a survey. The concept of price value pertains to assessing and balancing expenses incurred by utilizing a certain technology against the perceived advantages derived from its utilization.

The research conducted by Wang et al. (2018) suggests that the acceptability of electric vehicles could be influenced by the price value. Furthermore, the study by Gao and Bai (2014) provided evidence that price value exerts a direct, positive, and statistically significant impact on consumers' propensity to adopt wearable technology, specifically in

fitness-related applications.
H8: Price value has a significant influence on intention to use.

2.8 Intention to Use

The utilization of intention is based on the theoretical construct of behavioral intention presented by Fishbein and Ajzen (1975). Behavioral intent refers to the determination an individual demonstrates to engage in a specific behavior. The perceived utility and perceived ese of use characteristics substantially impact an individual's propensity to engage in a specific behavior. Behavioral use intent pertains to the degree to which an individual possesses a deliberate purpose to participate in or abstain from specific future behaviors (Brezavšček et al., 2014). Gao and Bai (2014) conducted a study utilizing an integrated model to examine the various aspects that influence users' propensity to embrace IOT technology. The experiment conducted by the researchers demonstrated that perceived usefulness was the primary and influential factor in individuals' inclination to accept and utilize the technology in question.

3. Research Methods and Materials

3.1 Research Framework

Establishing the theoretical framework for this research was based on examining eight factors. The research combines three separate variables: the independent variable, the mediator variable, and the dependent variable. As shown in Figure 1, three previuos studies were investigated to construct a research model, including Nikou (2019), Shuhaiber and Mashal (2019), and Baudier et al. (2020).

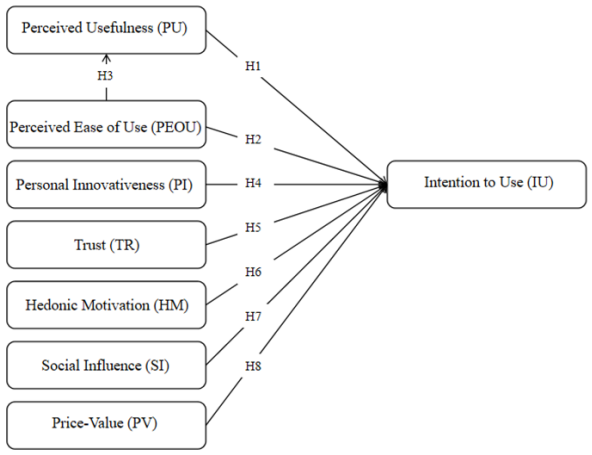

Figure 1: Conceptual Framework

H1: Perceived usefulness has a significant influence on intention to use.
H2: Perceived ease of use has a significant influence on intention to use.
H3: Perceived ease of use has a significant influence on perceived usefulness.
H4: Personal innovativeness has a significant influence on intention to use.
H5: Trust has a significant influence on intention to use.
H6: Hedonic motivation has a significant influence on intention to use.
H7: Social influence has a significant influence on intention to use.
H8: Price value has a significant influence on intention to use.

3.2 Research Methodology

This study, conducted using quantitative methods, presents a conceptual framework based on previous studies with eight variables and eight hypotheses. In addition, deeply thought-out and standardized questionnaires were designed, and screening questions, demographic questions, and measurement items were included. In addition, the researcher does preliminary internal tests before administering the questionnaire to the intended audience. Data was analyzed by utilizing Confirmatory Factor Analysis (CFA) and Structural Equation Modeling (SEM) to validate the model's goodness of fit and confirm the causal relationship among variables for hypothesis testing.

Before the data collection, tests involve assessing the content validity of the research instrument using the Item-Objective Consistency Index (IOC). The researchers then used pilot tests (n=50) to test the reliability of each construct based on the improved research instrument. This study obtained IOC ratings from three experts related to the context of the study. Five of the 32 scale items did not reach the minimum criteria of 0.6 for the inter-item correlation (IOC) and were subsequently excluded from further analysis. For reliability of pilot testing, Straub (1989) proposed that a Cronbach's alpha value larger than 0.7 is the threshold for acceptability.

3.3 Population and Sample Size

The target population is smart home users in the Chengdu-Chongqing economic circle of China. According to Soper (2023), it is recommended to have a minimum sample size of 444 for optimal results. Consequently, the sample size for this study is 500, which is suitable for implementing the statistical method known as SEM.

3.4 Sampling Technique

Sampling is a method employed to select a subset of a larger population to investigate and analyze the features of the full population (Zikmund, 2003). First, purposive sampling is employed to select smart home users in the Chengdu-Chongqing economic circle of China. Next, stratified random sampling is the method of dividing the entire population into many subgroups, as calculated in Table 1. Convenience sampling is a sampling strategy that involves picking respondents based on availability. Therefore, this study uses online survey as a data collecting tools.

Table 1: Sample Units and Sample Size

Smart Communities	Population Size	Proportional Sample Size
Pure Water Bank Smart Community (Chengdu)	18480	274
Tazi Mountain No. 1 Smart Community (Chengdu)	5424	81
Shangyue City Smart Community (Chongqing)	9744	145
Total	**33648**	**500**

Source: Constructed by author

4. Results and Discussion

4.1 Demographic Information

Based on the provided demographic information in Table 2, we can draw several key insights: The gender distribution shows a slight majority of females, comprising 54.4% of the sample, while males make up 45.6%. This suggests a relatively balanced gender representation in the data. The age distribution shows that the largest age group falls within the 41-60 years old category, accounting for 44.1% of the sample. The next most significant age group is 21-40 years old, making up 41% of the sample. The 18-20 years old category has the smallest representation at just 1%. This data suggests that the population sampled is skewed towards middle-aged individuals.

In summary, the provided data reveals a balanced gender distribution with a slight female majority. It also indicates that the middle-aged population (41-60 years old) is the most represented age group in the sample, followed by individuals aged 21-40. Understanding these demographic trends can be valuable for tailoring products, services, or marketing strategies to the specific demographics represented in the data.

Table 2: Demographic Profile

Demographic and General Data (N=500)		Frequency	Percentage
Gender	Male	228	45.6%
	Female	272	54.4%
Age	18- 20 years old	5	1%
	21-40 years old	245	41%
	41-60 years old	285	44.1%
	Above 60	215	13.9%

Source: Constructed by author.

4.2 Confirmatory Factor Analysis (CFA)

In CFA, The CA method validates the reliability of this study. In the first data set of this study, they ranged between 0.807 and 0.885. These values indicate the internal consistency of the structure with the reliability tests for each objective, and values above 0.70 imply acceptability (Nunnally, 1978). Convergent validity encompasses an additional assessment of the reliability and consistency of scale items, as indicated by the CR and AVE measures, as posited by Peterson and Kim (2013). Fornell and Larcker (1981) established that values equal to or greater than 0.6 for composite reliability CR and 0.4 for AVE are acceptable. Within the initial group, the factor loadings for each construct in the present investigation had values over 0.7, ranging from 0.734 to 0.860. The collective CR values exhibited a range of 0.819 to 0.886. The AVE exhibited a range of 0.583 to 0.662, all of which exceeded the threshold of 0.5. According to the content analysis, the constructs examined in this study had satisfactory internal consistency and were deemed acceptable.

Table 3: Confirmatory Factor Analysis Result, Composite Reliability (CR) and Average Variance Extracted (AVE)

Variables	Source of Questionnaire (Measurement Indicator)	No. of Item	Cronbach's Alpha	Factors Loading	CR	AVE
Perceived Usefulness (PU)	Nikou (2019)	4	0.857	0.745-0.829	0.858	0.603
Perceived Ease of Use (PEOU)	Nikou (2019)	4	0.885	0.771-0.860	0.886	0.662
Personal Innovativeness (PI)	Nikou (2019)	3	0.840	0.789-0.816	0.842	0.639
Trust (TR)	Shuhaiber and Mashal (2019)	4	0.862	0.734-0.818	0.862	0.611
Hedonic Motivation (HM)	Baudier et al. (2020)	3	0.807	0.751-0.770	0.808	0.583
Social Influence (SI)	Baudier et al. (2020)	3	0.828	0.758-0.836	0.829	0.618
Price Value (PV)	Baudier et al. (2020)	3	0.827	0.757-0.823	0.829	0.618
Intention to Use (IU)	Baudier et al. (2020)	3	0.819	0.754-0.791	0.819	0.602

In the researcher's statistical analysis, the data displayed by the initial model all met the acceptable thresholds, which were consistent with the results of the validated factor analysis (CFA). Therefore, no modifications to the model were required. Table 4 lists all the parameters displayed by the initial model within the acceptable thresholds, including CMIN/DF = 1.258, GFI = 0.948, AGFI = 0.934, NFI = 0.943, CFI = 0.988, TLI = 0.985, RMSEA = 0. 023.

Table 4: Goodness of Fit for Measurement Model

Fit Index	Acceptable Criteria	Statistical Values
CMIN/DF	< 3.00 (Al-Mamary & Shamsuddin, 2015; Awang, 2012)	372.472/296 or 1.258
GFI	≥ 0.85 (Sica & Ghisi , 2007)	0.948
AGFI	≥ 0.80 (Sica & Ghisi, 2007)	0.934
NFI	≥ 0.80 (Wu & Wang, 2006)	0.943
CFI	≥ 0.80 (Bentler, 1990)	0.988
TLI	≥ 0.80 (Sharma et al., 2005)	0.985
RMSEA	< 0.08 (Pedroso et al., 2016)	0.023
Model Summary		**In harmony with empirical data**

Remark: CMIN/DF = The ratio of the chi-square value to degree of freedom, GFI = goodness-of-fit index, AGFI = adjusted goodness-of-fit index, NFI = normalized fit index, CFI = comparative fit index, TLI = Tucker-Lewis index, and RMSEA = root mean square error of approximation

Fornell and Larcker (1981) proposed that the validity of a construct can be deemed acceptable if the coefficients of the linked constructs are lower than the square root of the AVE. The diagonal of Table 5 displays each construct's square root of the AVE. These values are observed to be higher than the correlation coefficients between the various constructs. This finding suggests that the discriminant validity is satisfactory. Hence, the findings of this study provide empirical support for the sound discriminant validity of the structural framework.

Table 5: Discriminant Validity

	PU	PEOU	PI	TR	HM	SI	PV	IU
PU	**0.777**							
PEOU	0.183	**0.814**						
PI	0.086	0.200	**0.799**					
TR	0.133	0.332	0.251	**0.782**				
HM	0.192	0.137	0.123	0.220	**0.764**			
SI	0.213	0.168	0.242	0.199	0.139	**0.786**		
PV	0.172	0.161	0.161	0.152	0.165	0.159	**0.786**	
IU	0.355	0.386	0.426	0.400	0.334	0.366	0.327	**0.776**

Note: The diagonally listed value is the AVE square roots of the variables

Source: Created by the author.

4.3 Structural Equation Model (SEM)

The researchers observed the fitting findings of two sets of SEM. In the initial dataset, the fit metrics obtained were as follows: the CMIN/DF was 1.950, the GFI was 0.908, the AGFI was 0.890, the NFI was 0.906, the CFI was 0.951, the TLI was 0.946, and the RMSEA was 0.044. Hence, the findings of this study suggest that the model demonstrates a good fit, as evidenced by the satisfactory values of several indices, such as CMIN/DF, GFI, AGFI, NFI, CFI, TLI, and RMSEA, which fall within acceptable ranges. The data is comprehensively summarized by the researchers in Table 6.

Table 6: Goodness of Fit for Structural Model

Index	Acceptable	Statistical Values
CMIN/DF	< 3.00 (Al-Mamary & Shamsuddin, 2015; Awang, 2012)	616.308 / 316 or 1.950
GFI	≥ 0.85 (Sica & Ghisi , 2007)	0.908
AGFI	≥ 0.80 (Sica & Ghisi, 2007)	0.890
NFI	≥ 0.80 (Wu & Wang, 2006)	0.906
CFI	≥ 0.80 (Bentler, 1990)	0.951
TLI	≥ 0.80 (Sharma et al., 2005)	0.946
RMSEA	< 0.08 (Pedroso et al., 2016)	0.044
Model Summary		**In harmony with empirical data**

Remark: CMIN/DF = The ratio of the chi-square value to degree of freedom, GFI = goodness-of-fit index, AGFI = adjusted goodness-of-fit index, NFI = normalized fit index, CFI = comparative fit index, TLI = Tucker-Lewis index, and RMSEA = root mean square error of approximation

4.4 Research Hypothesis Testing Result

The results of the Structural Equation Modeling (SEM) analysis provide strong support for the hypotheses that were tested. Each hypothesis examined the relationship between a specific factor and intention to use a particular product or service. Based on the results, all of these relationships were found to be statistically significant at a very high level of confidence ($p < 0.001$), indicating robust support for the proposed hypotheses.

Table 7: Hypothesis Results of the Structural Equation Modeling

Hypothesis	(β)	t-Value	Result
H1: Perceived usefulness has a significant influence on intention to use.	0.261	5.295***	Supported
H2: Perceived ease of use has a significant influence on intention to use.	0.226	4.723***	Supported

Hypothesis	(β)	t-Value	Result
H3: Perceived ease of use has a significant influence on perceived usefulness.	0.202	3.928***	Supported
H4: Personal innovativeness has a significant influence on intention to use.	0.351	7.001***	Supported
H5: Trust has a significant influence on intention to use.	0.239	5.004***	Supported
H6: Hedonic motivation has a significant influence on intention to use.	0.231	4.703***	Supported
H7: Social influence has a significant influence on intention to use.	0.228	4.732***	Supported
H8: Price value has a significant influence on intention to use.	0.212	4.409***	Supported

Note: *** p<0.001
Source: Created by the author

Here is a summary of the key findings:

H1: The analysis found a significant positive relationship (β = 0.261) between perceived usefulness and intention to use. This means that as perceived usefulness increases, the intention to use the product or service also increases, providing strong support for H1 (Nikou, 2019).

H2: There is a significant positive relationship (β = 0.226) between perceived ease of use and intention to use. This suggests that when individuals perceive a product or service as easy to use, they are more likely to have the intention to use it, supporting H2 (Venkatesh & Davis, 2000).

H3: The analysis found a significant positive relationship (β = 0.202) between perceived ease of use and perceived usefulness. This implies that when a product or service is perceived as easy to use, it is also seen as more useful, supporting H3 (Nikou, 2019).

H4: There is a significant positive relationship (β = 0.351) between personal innovativeness and intention to use. This indicates that individuals with a higher level of personal innovativeness are more likely to have the intention to use the product or service, confirming H4 (Schweitzer & Van den Hende, 2016).

H5: The analysis found a significant positive relationship (β = 0.239) between trust and intention to use. This suggests that trust in the product or service provider plays a crucial role in influencing intention to use, supporting H5 (Yang et al., 2017).

H6: There is a significant positive relationship (β = 0.231) between hedonic motivation and intention to use. This implies that when individuals are motivated by pleasure or enjoyment, they are more likely to intend to use the product or service, confirming H6 (Venkatesh et al., 2012).

H7: The analysis found a significant positive relationship (β = 0.228) between social influence and intention to use. This indicates that the influence of peers or social networks can positively affect intention to use, supporting H7 (Hsu & Lu, 2004).

H8: There is a significant positive relationship (β = 0.212) between price value and intention to use. This suggests that when individuals perceive a product or service as providing good value for its price, they are more likely to intend to use it, confirming H8 (Wang et al., 2018).

In conclusion, the results of the SEM analysis strongly support all of the proposed hypotheses. These findings provide valuable insights into the factors that influence individuals' intention to use a product or service and can guide decision-making and marketing strategies in promoting adoption and usage.

5. Conclusion and Recommendation

5.1 Conclusion and Discussion

The study aimed to explore the factors influencing residents' behavioral intention to use smart home technology in the Chengdu-Chongqing economic circle, China. The conceptual framework, which included perceived usefulness, perceived ease of use, personal innovativeness, trust, hedonic motivation, social influence, price value, and intention to use, was validated using Confirmatory Factor Analysis (CFA) and Structural Equation Modeling (SEM).

The study found that perceived usefulness and perceived ease of use significantly influence intention to use. This is in line with the Technology Acceptance Model (TAM), which posits that individuals are more likely to adopt technology if they perceive it as useful and easy to use. This suggests that residents in the Chengdu-Chongqing economic circle see smart home technology as beneficial and user-friendly.

Personal innovativeness was found to significantly influence intention to use. This finding indicates that individuals who are more open to adopting new and innovative technologies are more likely to embrace smart

home technology. This underscores the importance of targeting early adopters and innovators in smart home technology marketing efforts.

Trust was identified as a significant factor influencing intention to use. Trust in the technology and the service providers is crucial for residents to feel comfortable using smart home solutions. Building and maintaining trust should be a priority for companies operating in this sector.

Hedonic motivation, or the pleasure and enjoyment derived from using smart home technology, was found to significantly influence intention to use. This suggests that beyond practical utility, the emotional appeal and satisfaction from using these technologies are important drivers of adoption.

Social influence, such as recommendations from peers or family members, was another significant factor impacting intention to use. This highlights the role of social networks and word-of-mouth in shaping individuals' decisions regarding smart home technology adoption.

Price value, or the perception that smart home technology offers good value for the price, was also identified as a significant influencer of intention to use. This indicates that cost-effectiveness plays a pivotal role in the adoption decision.

In conclusion, this study provides valuable insights into the factors influencing residents' intention to use smart home technology in the Chengdu-Chongqing economic circle, China. The findings confirm that perceived usefulness, perceived ease of use, personal innovativeness, trust, hedonic motivation, social influence, and price value all contribute significantly to the intention to use these technologies.

The study's results have practical implications for companies operating in the smart home technology sector. To encourage adoption, it is essential to focus on enhancing the perceived usefulness and ease of use of their products, building trust with consumers, creating enjoyable user experiences, leveraging social influence, and offering competitive pricing.

Furthermore, as smart home technology continues to evolve, understanding these influencing factors and incorporating them into marketing and product development strategies will be essential for driving broader adoption and realizing the potential benefits of these technologies for both consumers and businesses in the Chengdu-Chongqing economic circle and beyond.

5.2 Recommendation

Smart home technology has witnessed rapid advancements and is poised to transform the way residents in the Chengdu-Chongqing economic circle interact with their living spaces. However, the adoption of this innovative technology hinges on various factors. This essay presents a set of recommendations based on empirical findings to enhance the adoption of smart home technology in the region.

One crucial factor in the successful adoption of smart home technology is user proficiency and confidence. Therefore, it is recommended to develop comprehensive and user-friendly educational materials and training programs. These resources should empower users with the necessary knowledge and skills to operate smart home devices effectively. By improving perceived ease of use through education, we can enhance the overall user experience.

A seamless and enjoyable user experience is pivotal in fostering technology adoption. To achieve this, companies must invest in product design and user experience (UX). Employing user-centered design principles and conducting usability testing can lead to the creation of intuitive and enjoyable smart home products. This will positively influence perceived ease of use and increase the appeal of these technologies.

Trust is a cornerstone of smart home technology adoption. Companies should prioritize building and maintaining trust with consumers. This entails implementing robust security measures, transparently communicating data protection practices, and ensuring timely software updates to mitigate vulnerabilities. Trustworthy technology and service providers are more likely to gain widespread acceptance.

Social influence, often driven by recommendations from friends and family, plays a substantial role in technology adoption. Companies should encourage word-of-mouth marketing by establishing referral programs and online communities where satisfied users can share their experiences and insights. Leveraging social influence can significantly expand the adoption of smart home technology.

The affordability of smart home technology is a pivotal consideration for many potential users. To broaden adoption, it is recommended that companies innovate continuously to reduce costs. Emphasizing the long-term value and cost savings associated with these technologies will reinforce their affordability and appeal.

Identifying and targeting early adopters and innovators is an effective strategy for technology companies. These individuals are more inclined to embrace new technology. Tailoring marketing strategies to engage this segment is essential, as early adopters often influence broader adoption trends.

Recognizing regional and cultural variations within the Chengdu-Chongqing economic circle is essential. Companies should customize marketing campaigns and customer support to align with local values and address unique needs effectively. This localized approach can resonate more deeply with potential users.

Leveraging data analytics to personalize the smart home experience is recommended. Understanding user preferences

and behaviors enables companies to deliver customized solutions that align with specific requirements, enhancing user satisfaction and adoption rates.

Highlighting the environmental advantages of smart home technology, such as energy conservation and reduced carbon emissions, can be compelling. Incorporating green and sustainable features into product offerings underscores their environmental benefits, appealing to environmentally conscious consumers.

Compliance with local and national regulations, particularly those related to data privacy and security, is paramount. Demonstrating adherence to legal standards not only fosters trust but also mitigates potential legal issues that can impede adoption.

Companies must allocate resources to continuous research and development efforts to stay at the forefront of technology trends. Regularly assessing consumer preferences and adapting products and services accordingly ensures that offerings remain relevant and appealing.

Implementing robust feedback mechanisms to gather user input and suggestions for product improvement is essential. Demonstrating that user opinions are valued and that feedback drives product enhancements fosters a sense of ownership and commitment among users.

Collaborative opportunities with other companies and industries should be explored to establish integrated smart home ecosystems. Seamless integration with other smart devices and services enhances the overall user experience, making adoption more attractive.

Finally, a commitment to providing long-term support and regular software updates for smart home products is crucial. Ensuring the ongoing security and functionality of these technologies instills confidence in users, reinforcing their commitment to the technology.

The adoption of smart home technology in the Chengdu-Chongqing economic circle is poised to revolutionize the way residents interact with their living spaces. However, this transformation hinges on addressing various factors that influence adoption. By implementing the recommendations outlined in this essay, companies can enhance user education, trust, and overall satisfaction, ultimately fostering greater acceptance of smart home technology and reaping its myriad benefits.

5.3 Limitation and Further Study

Identifying the limitations of the study is crucial for providing direction for future research. Here are some limitations that could guide further investigation in the field of smart home technology adoption in the Chengdu-Chongqing economic circle. First, the study may have had limitations regarding sample size and representativeness. Future research could consider larger and more diverse samples to ensure a broader perspective on the factors influencing adoption, particularly in diverse demographic and geographic segments of the Chengdu-Chongqing economic circle. Second, the study did not delve deeply into cross-cultural variations within the Chengdu-Chongqing economic circle. Further research could explore how cultural factors influence technology adoption, considering the diversity within this region. Last, while the study employed quantitative methods, qualitative research approaches such as in-depth interviews or focus groups could provide richer insights into the motivations, barriers, and experiences of smart home technology users in the Chengdu-Chongqing economic circle.

References

Agarwal, R., & Prasad, J. (1998). A conceptual and operational definition of personal innovativeness in the domain of information technology. *Information Systems Research, 9*(2), 204-215.

Ahn, M., Kang, J., & Hustvedt, G. (2016). A model of sustainable household technology acceptance. *International Journal of Consumer Studies, 40*(1), 83-91.

Al-Mamary, Y. H., & Shamsuddin, A. (2015). Adoption of Management Information Systems in Context of Yemeni Organizations: A Structural Equation Modeling Approach. *Journal of Digital Information Management, 13*(6), 429-444.

Atzori, L., Iera, A., & Morabito, G. (2010). The Internet of Things: A Survey. *Computer Networks, 54*(15), 2787-2805. https://doi.org/10.1016/j.comnet.2010.05.010

Awang, Z. (2012). *A Handbook on SEM Structural Equation Modelling: SEM Using AMOS Graphic* (5th ed.). Universiti Teknologi Mara Kelantan.

Balta-Ozkan, N., Amerighi, O., & Boteler, B. (2014). A comparison of consumer perceptions towards smart homes in the UK, Germany and Italy: reflections for policy and future research. *Technology Analysis and Strategic Management, 26*(10), 1-20. https://doi.org/10.1080/09537325.2014.975788

Baudier, P., Ammi, C., & Deboeuf-Rouchon, M. (2020). Smart home: Highly-educated students' acceptance. *Technological Forecasting and Social Change 153*, 119355.

Bentler, P. M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin, 107*(2), 238-246. https://doi.org/10.1037/0033-2909.107.2.238

Brezavšček, A., Šparl, P., & Žnidaršič, A. (2014). Extended technology acceptance model for SPSS acceptance among Slovenian students of social sciences. *Organizacija, 47*(2), 116-127. https://doi.org/10.2478/orga-2014-0009

Brown, S. A., & Venkatesh, V. (2005). Model of adoption of technology in the household: A baseline model test and extension incorporating household life cycle. *MIS Quarterly, 29*(4), 399-426.

Cook, D. J. (2012). How smart is your home?. *Science, 335*, 1579-1581.

Davis, F. D. (1989). Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. *MIS Quarterly, 13*(3), 319-340. https://doi.org/10.2307/249008

Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User acceptance of computer technology: A comparison of two theoretical models. *Management Science, 35*(8), 982-1003.

Dodds, W. B., Monroe, K. B., & Grewal, D. (1991). Effects of price, brand, and store information on buyers. *Journal of Marketing Research, 28*(3), 307-319.

El-Masri, M., & Tarhini, A. (2017). Factors influencing the adoption of e-learning systems in Qatar and USA: Extending the unified theory of acceptance and use of technology 2 (UTAUT2). *Educational Technology Research and Development, 65*(3), 743-763.

Fan, X., Duangekanong, S., & Xu, M. (2021). Factors Affecting College Students' Intention to Use English U-learning in Sichuan, China. *AU-GSB E-JOURNAL, 14*(2), 118-129. https://doi.org/10.14456/augsbejr.2021.20

Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention and behavior: An introduction to theory and research*. Addison-Wesley.

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research, 18*(1), 39-50. https://doi.org/10.1177/002224378101800104

Gao, L., & Bai, X. (2014). A unified perspective on the factors influencing consumer acceptance of internet of things technology. *Asia Pacific Journal of Marketing and Logistics, 26*(2), 211-231. https://doi.org/10.1108/APJML-06-2013-0061

Hsu, C.-L., & Lu, H.-P. (2004). Why do people play on-line games? An extended TAM with social influences and flow experience. *Information & Management, 41*(7), 853-868.

Hubert, M., Blut, M., Brock, C., Backhaus, C., & Eberhardt, T. (2017). Acceptance of smartphone-based mobile shopping: mobile benefits, customer characteristics, perceived risks, and the influence of application context. *Psychology & Marketing, 34*(2), 175-194.

Jeong, S.-H., Kim, H. J., Yum, J.-Y., & Hwang, Y. (2016). What type of content are smartphone users addicted to?: SNS vs. games. *Computers in Human Behavior, 54*(2), 10-17. https://doi.org/10.1016/j.chb.2015.07.035

Lee, Y.-K., Park, J.-H., Chung, N., & Blakeney, A. (2012). A unified perspective on the factors influencing usage intention toward mobile financial services. *Journal of Business Research, 65*(1), 1590-1599

Nikou, S. (2019). Factors driving the adoption of SHT: An empirical assessment. *Telematics and Informatics, 45*, 1-10. https://doi.org/10.1016/j.tele.2019.101283

Nunnally, J. C. (1978). *Psychometric theory* (2nd ed.). McGraw-Hill.

Pedroso, R., Zanetello, L., Guimaraes, L., Pettenon, M., Goncalves, V., Scherer, J., Kessler, F., & Pechansky, F. (2016). Confirmatory factor analysis (CFA) of the crack use relapse scale (CURS). *Archives of Clinical Psychiatry, 43*(3), 37-40. https://doi.org/10.1590/0101-60830000000081

Peterson, R. A., & Kim, Y. (2013). On the relationship between coefficient alpha and composite reliability. *Journal of Applied Psychology, 98*(1), 194-198. https://doi.org/10.1037/a0030767

Qasim, A., & Abu-Shanab, E. (2015). Drivers of mobile payment acceptance: The impact of network externalities. *Information Systems Frontiers, 18*(5), 1021-1034. https://doi.org/10.1007/s10796-015-9598-6

Robles, R., & Kim, T.-H. (2010). Applications, Systems and Methods in Smart Home Technology: A Review. *International Journal of Advanced Science and Technology, 15*, 37-48.

Sánchez-Franco, M. J., Villarejo-Ramos, Á., & Martín-Velicia, F. (2009). The moderating effect of gender on relationship quality and loyalty toward Internet service providers. *Information & Management, 46*(3), 196-202. https://doi.org 10.1016/j.im.2009.02.001

Schweitzer, F., & Van den Hende, E. A. (2016). To be or not to be in thrall to the march of smart products. *Psychology & Marketing, 33*(10), 830-842.

Sharma, S., Pradhan, K., Satya, S., & Vasudevan, P. (2005). Potentiality of earthworms for waste management and in other uses- a review. *Journal of American Science, 1*(1), 4-16.

Shuhaiber, A., & Mashal, I. (2019). Understanding users' acceptance of smart home. *Technology in Society, 58*, 101110.

Siau, K., & Shen, Z. (2003). Building customer trust in mobile commerce. *Communications of the ACM, 46*(4), 91-94.

Sica, C., & Ghisi, M. (2007). The Italian versions of the Beck Anxiety Inventory and the Beck Depression Inventory-II: Psychometric properties and discriminant power. In M. A. Lange (Ed.), *Leading-edge psychological tests and testing research* (pp. 27-50). Nova Science Publishers.

Slade, E. L., Dwivedi, Y. K., Piercy, N. C., & Williams, M. D. (2015). Modeling consumers' adoption intentions of remote mobile payments in the United Kingdom: Extending UTAUT with innovativeness, risk, and trust. *Psychology & Marketing, 32*(8), 860-873.

Soper, D. (2023). *Calculator: A-priori Sample Size for Structural Equation Models. Daniel Soper.* https://www.danielsoper.com/statcalc/calculator.aspx?id=89

Straub, D. W. (1989). Validating instruments in MIS research. *MIS Quarterly, 13*(2), 147-169. https://doi.org/10.2307/248922

Thi-Hong-Linh, N., Minh-Hung, D., Hai-Dang, N., Dang-HongNgan, V., DuyPhuong-Trinh, V., & Hoanh-Su, L. (2018). Key determinants for users' intention to use smarthome devices in Vietnam. *Journal of Multimedia Information System, 5*(4), 283-290. http://dx.doi.org/10.9717/ JMIS.2018.5.4.283

Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management Science, 46*(2), 186-204.

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly, 27*(3), 425-478.

Venkatesh, V., Thong, J., & Xu, X. (2012). Consumer acceptance and use of information technology: Extending the unified theory of acceptance and use of technology. *MIS Quarterly, 36*(1), 157-178.

Wang, N., Tang, L., & Pan, H. (2018). Analysis of public acceptance of electric vehicles: An empirical study in Shanghai. *Technological. Forecasting and. Social Change, 126,* 284-291.

Wilson, C., Hargreaves, T., & Hauxwell-Baldwin, R. (2017). Benefits and risks of smart home technologies. *Energy Policy, 103*, 72-83.

Wu, J. H., & Wang, Y. M. (2006). Measuring KMS Success: A Respecification of the DeLone and McLean's Model. *Journal of Information & Management, 43*(6), 728-739. http://dx.doi.org/10.1016/j.im.2006.05.002

Wu, J., & Liu, D. (2007). The effect of trust and enjoyment on intention to play online games. *Journal of Electric Commerce Research, 26*(2), 211-231.

Xu, X., Thong, J., & Tam, K. (2017). Winning back technology disadopters: Testing a technology readoption model in the context of mobile internet services. *Journal of Management Information Systems, 34*(1), 102-140.

Yang, H., Lee, H., & Zo, H. (2017). User acceptance of smart home services: an extension of the theory of planned behavior. *Industrial Management & Data Systems, 117*(1), 68-89. https://doi.org/10.1108/IMDS-01-2016-0017

Zikmund, W. G. (2003). *Business research methods* (7th ed.). Thomson/ South-Western.