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Validity and reliability of personal Innovativeness as moderating variable in context of Intention to adopt IoT-enabled smart home systems in Shenzhen of China

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Abstract

The Internet of Things (IoT) is of the utmost importance in light of the rapid development of the global Internet because technological advancements have the potential to make life easier and more productive. In this paper, the Technology Acceptance Model (TAM) will be the main model of the study while personal innovativeness will serve as a moderating variable. The aim of this study is to examine the validity and reliability test on personal innovativeness as a moderating role between perceived usefulness, perceived security, perceived privacy, and perceived simplicity of use with the intent of adoption as the dependent variable. Content validity and construct validity will be used with the expertise (industrial and academic expertise), and the reliability test will focus on Internal Consistency Reliability, Convergent Validity, and Discriminant Validity. As this study will be applied in Shenzhen, China, some suggestions will be discussed, especially on the characteristics of inventive persons from a cultural and societal point of view. As a result, the measurement items of personal innovativeness will be improved and validated for the study.

Keywords: Intention to adopt, IoT-Enabled, Personal innovativeness, Smart Home, Technology acceptance model (TAM).

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1. Introduction

The emergence of Internet of Things (IoT) technology, combined with smart home technologies, signals the transition from home automation to the intelligent era. The Internet of Things refers to the linking of devices over a network. The future of the Internet of Things will include devices that can intelligently link and communicate at home [1]. The Internet of Things (IoT) is rapidly expanding due to ubiquitous high-speed network coverage and increased consumer adoption of smart gadgets [2].

The smart home system has evolved as a new type of Internet application entry point that may be used for a variety of applications, including whole-house intelligence, home security, and audiovisual entertainment. Smart home products are becoming increasingly popular in China. The Chinese smart home market was valued at 26.5 billion US dollars in 2020, rising 11.4% from the previous year, and is expected to reach 31 billion US dollars by 2022, according to NetEase Teams [3]. China has recently emerged as the world's largest IoT marketplace. China accounts for 960 million of the world's 1.5 billion cellular-connected devices. China will become the world's largest smart home consumption market, with a market share of 50-60%, and its profits will account for 20-30% of global market profits, according to the China Smart Home Innovation Association's "2020 China Smart Home Market Ecosystem Development White Paper "[4].

With the growth of science, the IoT has entered the new century. Because of its widespread applicability, the IoT is seen by the industry as having significant growth potential [5]. The McKinsey Global Institute [6] projects that the yearly growth rate of the Internet of Things would reach 11.1 trillion US dollars by 2025 [7]. A smart home system is a completely integrated home environment that can give occupants unprecedented control and comfort. For example, whereas just 12% to 16% of households in the United States use smart home system products that support the IoT, there are many potential purchasers [7]. According to some estimates, around two-thirds of worldwide consumers will acquire smart home IoT devices by 2022 [7]. Furthermore, the McKinsey Global Institute [6] research claims that the IoT is a component of most smart cities, with an annual potential economic value ranging from 3.9 trillion US dollars (3.4 trillion euros) to 11.1 trillion US dollars (9.9 trillion euros) in 2025 [7].

People's living conditions have risen dramatically as a result of China's rapid economic development and ongoing scientific and technological advancements. The "smart home" is a key new industry that is expanding at an incredible rate. Major traditional furniture and home appliance manufacturers, as well as emerging technology companies, are actively preparing to capitalize on this trend. The IoT is becoming increasingly important in a wide range of applications. Smart homes are currently being used extensively in a number of home products, such as curtains, lighting, doors, and televisions. These devices incorporate intelligence, humanization, and the capacity to be controlled and operated remotely [8]. Honeywell, Siemens, and Schneider door locks are three well-known global suppliers of smart home goods in China. Furthermore, by 2022, Xiaomi's Mi Ecosystem is expected to be the most popular smart home brand in China. This is followed by Huawei's HarmonyOS, Midea Home Furnishing, and Tmall Genie, among other brands [8]. A family from the United States of America first invented the notion of informatization and integration of construction equipment in the 1990s while working on an engineering project. This was the first "intelligent building" in history. The awareness and concept of smart houses were also introduced for the first time, ushering in a new chapter in the history of smart homes worldwide [9].

More than 500 Chinese towns have begun to establish smart home projects in response to the rise of IR4.0 and the Internet of Things [10]. According to the "2020 White Paper on the Development of China's Smart Home Market Ecosystem" released by China Smart Home Innovation Association, China will become the world's largest smart domestic consumer market, with a 50-60% market share, and China's profits will account for 20-30% of the global market's total profit [11].

Shenzhen, as one of China's fastest-growing cities, is also developing smart home technology at a rapid pace. According to NetEase Teams [3], Shenzhen has the highest number of smart home systems deployed in China. Meanwhile, Shenzhen, one of China's fastest-growing cities, is known as the country's Silicon Valley and has the greatest proportion of young people [12]. Shenzhen's high-tech industry generates more than 35% of the city's GDP. Shenzhen has the highest number of patent applications and authorizations of any first-tier city. According to the report, Shenzhen's complete advantages, which include a strong economy, strong innovation capabilities, the convergence of advanced and high-tech manufacturing, and policy support, serve as a solid basis for the development of technology enterprises [13].

2. Literature Review of IoT-Enable Smart Home System

Smart home, sometimes referred to as home automation, intelligent building, or integrated smart home system, has emerged as a result of scientific and technical advancements, becoming prominent in customers' awareness and purchasing preferences in recent decades. The term "Smart Home" denotes the comprehensive utilization of network wiring, communication, and control systems to integrate and manage previously isolated household appliances. This facilitates information exchange and power management among users and devices, thereby creating a safer, more convenient, comfortable, and environmentally sustainable living environment [14].

IoT facilitates device communication and resource sharing via the Internet as a wireless medium. In a smart home context, IoT enables homeowners to remotely manage their residences online. The functionality and usability of home automation systems contribute to their increasing popularity. Many individuals require home automation systems to enhance the convenience and comfort of their appliances, particularly benefiting those with physical disabilities and the elderly [15]. In the absence of a physical switch, a smart home can autonomously control lighting and adjust fan settings based on ambient light intensity and temperature. Furthermore, users can monitor their living environments through mobile devices or networks.

Home automation involves utilizing one or more computer systems to autonomously and remotely manage fundamental household functions. An automated home, commonly termed a "smart home," possesses the capability to receive and analyze environmental inputs to provide favorable outcomes without human intervention, as noted by Agarwal and Mishra [16]. The distinctive attributes of a smart home enable the automated management of technological gadgets. A homeowner who is away can completely automate fundamental home tasks, including monitoring and regulating the security system, temperature settings, and the operation of electrical appliances, all without physical interaction with the hardware. A smart house is realized when electrical appliances can be remotely controlled and monitored. Asadullah and Raza [17] assert that home automation has gained significant popularity in recent decades due to its enhancement of quality of life [17]. Smartphone applications, microcontrollers, sensors, and various connectivity technologies are extensively utilized in most home automation systems. Individuals with physical disabilities and the elderly encounter challenges in executing basic household duties, such as activating lights or operating fans. A home automation system capable of remotely monitoring and regulating electrical devices can fulfil all of these requirements. The deployment of a smart home system significantly reduces the time required to manage household appliances remotely, as noted by [16].

The "Made in China 2025" initiative was introduced by the Chinese government in 2015, aiming to integrate production with the Internet of Things and attain manufacturing that is more sustainable, intelligent, and economically efficient. China Mobile, China Unicom, and China Telecom constitute the three predominant mobile operators in China. All share the same objective: to enhance the value chain through services pertaining to connection management and system integration. China Unicom has collaborated with Huawei Technologies Co., Ltd. to create products for the smart home sector. Xiaomi has entered the smart home industry by leveraging its vast smartphone user base. Following its acquisition of numerous newly established technology firms, it has rapidly introduced various smart devices and released the smart module termed "Mi Home." Integrating this module onto their products is an opportunity for partners with existing affiliations with Xiaomi. Transform into a product for the smart home and enhance the interoperability of Xiaomi's diverse devices [18].

3. Personal Innovativeness as a Moderating Variable

This study seeks to examine the moderating effect of personal innovativeness on the acceptability of smart home technology by assessing users with prior experience in its utilization. Numerous studies indicate that prior experience with a specific technology is a crucial determinant in assessing technological acceptance, as noted by Venkatesh et al. [19] and Ristola and Kesti [20]. This illustrates that an individual's acceptance of technology is influenced by their personal innovativeness regarding it. Consequently, familiarity with the relevant technology will forecast technology acceptance, while personal innovativeness will ascertain the technology's usefulness and ease of use. Conversely, those with limited personal innovativeness, understanding, and engagement with the new technology tend to disregard its impact on job accomplishment.

Xu and Gupta [21] discovered that individuals exhibiting higher levels of innovation are more inclined to adopt new innovations than their counterparts. This affirms that an innovative individual is more adept at fostering positive attitudes towards the perceptions of utilizing the innovation than a less innovative individual. The results of this comprehensive model will enhance the understanding of user acceptability of smart home technology. This study's results underscore the personal innovativeness associated with smart home utilization [21].

3.1. The Influence of Personal Innovativeness on the Adoption of IoT Smart Homes

A number of research studies, including Agarwal and Prasad [22] and Dabholkar and Bagozzi [23], have demonstrated that risk and uncertainty are associated with any innovation. These findings have been supported by their research. For instance, Xu and Gupta [21] held the belief that "personal innovativeness is a characteristic that distinguishes certain individuals from others in terms of their propensity to take risks [21]." Nevertheless, we are of the opinion that there are some dangers associated with the use of smart home technology, particularly in relation to the personal data of users, which may be made accessible to third parties without those users' permission. More informed users are more likely to confront higher privacy threats in a manner that will impact the perception of the service provider. This is because there is a larger possibility that more knowledgeable users will face lower privacy threats. Therefore, the influence of privacy on the behavioral intention of using the smart home system is likely to be more noticeable to persons who are more innovative in comparison to those who are less innovative.

Many researchers have concluded that personal innovativeness can influence conception through the use of new technology as mention by Wu and Wang [24]. The work of Agarwal and Prasad [22] and Dabholkar and Bagozzi [23] suggested that in the IT sense, personal innovativeness may play the role of a moderating variable on the factors which form the perception to adopt a specific technology, and they concluded that there is a need for further studies to examine the personal innovativeness as a moderator with different samples and innovations. As Wu and Wang [24] point out, numerous investigations have arrived at the conclusion that there is a correlation between human innovativeness and conception through the utilization of new technology. The research conducted by Agarwal and Prasad [22] and Dabholkar and Bagozzi [23] suggested that in the context of information technology, personal innovativeness may play the role of a moderating variable on the factors that form the perception to adopt a particular technology. They came to the conclusion that additional research is required to investigate the role of personal innovativeness as a moderator using a variety of samples and innovations.

4. Development of Conceptual Model

The concept of "intelligence" is commonly used in a variety of contexts, such as in the context of smart homes, smart televisions, and electronic devices. Even if there are some subtle differences between the notions, they can be understood in a general sense as less advanced kinds of artificial intelligence. In spite of this, there is still a substantial amount of controversy concerning the extent to which this idea might serve as a comprehensive substitute for the cognitive and decision-making processes that are associated with humans. It is common for people to be hesitant about delegating all decision-making to computers because of the dynamic and nuanced structure of human cognition, which creates a great deal of uncertainty. The level of intelligence that smart gadgets possess will also have an effect on the requirements of individuals. An example of this would be a situation in which artificial intelligence surpasses humans in the game of Go. This could lead to certain individuals developing an unfavorable image of artificial intelligence. The potential for artificial intelligence to exert control over human activity or to place constraints on human behavior is a source of concern. Therefore, the "intelligence" that humans are looking for must have a scope that is controllable [25]. In recent years, there has been a rise in the amount of research that is centered on user acceptability. This rise is a direct result of the increasing popularity of intelligent services. After conducting an investigation into the mobile smart home environment, Jiang et al. [26] discovered that compatibility and security are two of the elements that influence the acceptance of mobile smart houses [26]. As a result of variables such as ease of use, perceived usefulness, security, innovation, and privacy issues, Park and Kim [27] predicted that the acceptance of smart home technology through the Internet of Things will increase in the future [27]. Furthermore, research highlights the fact that individuals' acceptance of smart home technology is influenced by the levels of security and privacy presented by the technology. According to Ji and Chan [28], smart devices have the potential to learn on their own, which enables them to comprehend the behaviors and requirements of users, which in turn makes it possible for them to implement control techniques that are more convenient. Taiwan, which is located in China, held a research study by Ji and Chan [28]. In this study, the determinants of innovation diffusion were integrated with the Technology Acceptance Model (TAM) in order to develop a conceptual framework for the purpose of studying consumer adoption behaviors in relation to smart homes [29].

4.1. Technology Acceptance Model as Underpinning Theory

The TAM approach has been utilized in a variety of contexts with the purpose of researching a broader range of information technologies [30]. It is possible to extend both the Theory of Rational Behavior (TRA) and the Theory of Planned Behavior (TPB) through the use of the Technology Acceptance Model (TAM). The Technology Acceptance Model, sometimes known as TAM, is one of the frameworks that researchers in the field of information systems use the most frequently. According to Agarwal and Prasad [22], the appeal of the TAM model among researchers can be attributed to the fact that it has a higher empirical basis and rigorous research procedures [22]. The Technology Acceptance Model proposes that the primary factors that influence user adoption are perceived usefulness and perceived ease of use of the technology. The validity of this paradigm has been established by a considerable body of research on user adoption. Venkatesh and Davis [31]; Venkatesh and Davis [32]; Venkatesh and Brown [33]; Venkatesh et al. [34]; Mathieson [35] and Taylor and Todd [36]. Due to the fact that it improves the dimensions of perceived usefulness and perceived ease of use, the TAM model is an efficient method for doing research on smart homes. The model that is proposed in this research is described in the following manner:

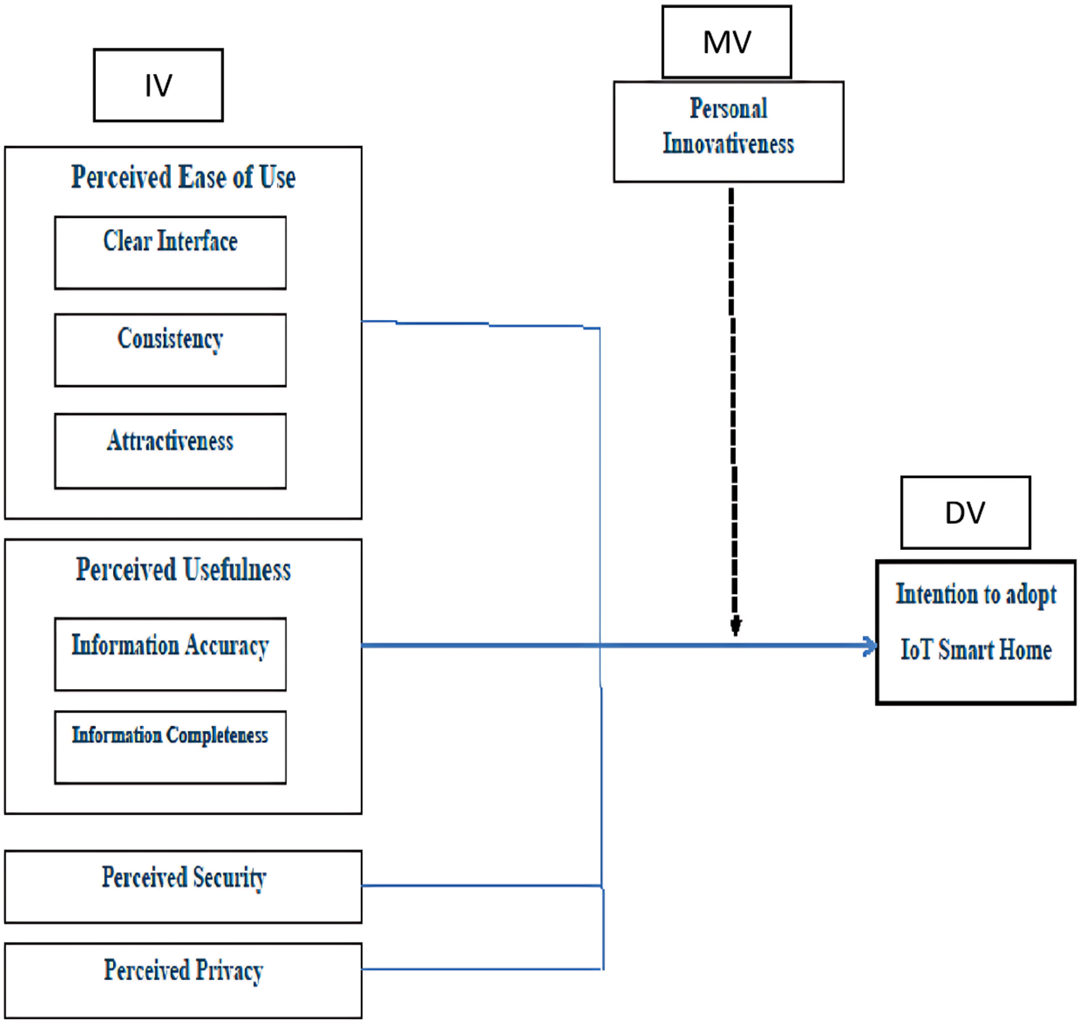

Figure 1.
Proposed Conceptual Model.

4.2. Perceived Ease of Use

According to Davis [37], the level of system simplicity that users anticipate is what people mean when they talk about perceived ease of use [37]. As stated by the Technology Acceptance Model (TAM), one of the primary factors that influences the adoption intentions of customers is the perceived usability of the product or service. In the context of this investigation, perceived usefulness consists of three components: a clear interface, consistency, and attractiveness.

4.2.1. Clear Interface

"Clear interface" is a word that is used to describe a system interface that is uncomplicated, easy to comprehend, and simple to operate. Due to the fact that this can greatly reduce the amount of time that individuals need to spend becoming comfortable with and using interfaces, it is imperative that all interfaces have clear meanings. In order to research one of the factors that influence customers' adoption of smart home systems, this study conducted an investigation using a clear interface. This is because a clear interface will make users more comfortable and convenient.

4.2.2. Consistency

The term "consistency" relates to the manner in which software programs should share characteristics that are comparable to one another. These elements include names, formats, important locations, languages, and iconography. The findings of this study indicate that the smart home system can be managed and monitored through the use of smartphone applications that encompass a variety of modules or functions. When it comes to determining whether or not a user will utilize an application, consistency and usability are two crucial factors that play a significant role. Users are going to take into consideration the consistency of the system display approach when determining how user-friendly the smart home system is going to be.

4.2.3. Attractiveness

When we talk about the attractiveness of a system, we are referring to the fact that the style of the system interface and look, in addition to the features that are used, all have the potential to readily attract and adopt people. This statement is made in reference to the fact that the system is appealing. Besides being uncomplicated and easy to run, a good system is also capable of catching the attention of a bigger number of users due to the fact that it is both aesthetically pleasing and functional. This is because a good system is both practical and aesthetically pleasing. It is really difficult to overestimate the significance of this. Consideration should be given to the initial impression as an important component. When referring to the visuals, colors, light, contrast, and texture that are exhibited on the screen of the system, the term "attractiveness" is used [19].

4.3. Perceived Usefulness

Users' opinion that the system is favorable and has the ability to boost their productivity while they are at work is referred to as "perceived usefulness" [37]. This is the phrase that is used to describe the concept. According to the findings of this investigation, the two aspects that make up the perceived utility of the information are the completeness of the information and the accuracy of the information.

4.3.1. Information Accuracy

The phrase "information accuracy" refers to the situation in which the data presented by the system is identical to the data that actually exists in the world. The findings of this study indicate that the information displayed on the system must be precise and accurate, and it must be equivalent to or identical to the information displayed on smart home devices. In addition, the system must be able to display the information in a standard manner. Take, for instance, the temperature displayed by the air conditioner and the temperature displayed by the gadgets that are part of the smart home. According to the findings of this study, customers may be guided to operate smart home devices in an exact and precise manner by the system's correct information. This discovery was made possible by the researchers.

4.3.2. Information Completeness

We argue that a system possesses accuracy in information when it is able to offer users with information that is not just correct but also pertinent to their needs. Another way of putting this is that the information that the system gives to the user needs to be able to adequately describe the particulars of the action that is currently being carried out. When a user wants to turn off the air conditioner in the living room, for instance, an intelligent system should provide the user with vital information about the air conditioner, including the virtual control panel for the air conditioner.

4.4. Perceived Security

In the context of data transmission and utilization, the term "perceived security" refers to the perception that consumers will not be subjected to any security-related uncertainties [38]. The level of security that is present during the transmission of information over a network is denoted by the term "security." The conditions for minimizing the realization of dangers and the conditions for minimizing the psychological threats encountered by users are two factors that might be researched in relation to security. According to one definition, the latter is referred to as "perceived security," which incorporates the feeling of being safe. In light of this, the findings from a previous study on felt security, which were described by Palanisamy and Shi [38] and confirmed by Wei et al. [39], serve as a foundation for this exploration.

4.5. Perceived Privacy

By the definition provided by Palanisamy and Shi [38], perceived privacy refers to the situation in which customers have the impression that their personal information is secure and free from any threats that are related to privacy. In light of the fact that the Internet is utilized for the purpose of information transfer and there exists a substantial possibility that the private information of users could be disclosed, privacy is an essential component of information technology, particularly smart home systems. It has been observed by Wei et al. [39] that corporations frequently collect user data, which includes communication via email. If businesses in the data economy want to handle data privacy, it means granting users greater permissions. This includes obtaining users' consent before processing data, protecting data from being abused, and allowing users to manage their own data independently. Biometric information and phone numbers are examples of the types of information that fall under this category. Numerous organizations are required by law to protect the confidentiality of their customers' personal information, as stipulated by regulations such as the General Data Protection Regulation (GDPR). Even in the absence of a legal data privacy protection statute, businesses can nevertheless reap benefits while safeguarding the personal information of their customers. Aside from protecting the privacy of individuals, protecting sensitive data and systems from hacker attacks is also possible [38].

4.6. Personal Innovativeness

According to previous discussion, creativity is an essential component in the process of developing smart home systems. Numerous studies have demonstrated that the level of familiarity that a user has with a certain technology is one of the most important factors that determines how well it is received [19]. In this context, it is evident that the consumers' unique ability for invention plays a role in determining whether or not they would accept the Internet of Things smart home system. As a result, the user's knowledge with the anticipated or linked systems will have an impact on the adoption of the Internet of Things smart home system, while the user's own ingenuity will define the system's utility and usability. In accordance with the findings of research conducted by Xu and Gupta [21] creative individuals are more inclined than other individuals to welcome and accept fresh ideas. It may be deduced from this that individuals who possess higher levels of personal innovativeness are more capable of creating a positive attitude towards the implementation of innovation than those who possess lower levels of innovative ability. Users will be able to better appreciate the adoption of smart home technology from their point of view according to the findings of this expanded model study. Additionally, the findings of the study highlight the personal ingenuity that is required in order to make use of smart homes.

5. Items of Measurement of Personal Innovativeness

The majority of the research methodologies that are utilized in this work are quantitative research methodologies. The construction of a questionnaire survey method was completed by utilizing the information collected from the previous research on the TAM model as well as the investigation into the utilization of Internet of Things smart home technology. This study specifically chooses personal innovativeness as the moderating variable in the conceptual model of this research in order to analyze the influence and link that exists between personal innovativeness and each variable. This choice was made as a consequence of the research that was discussed above. As a consequence of this, the following sources have been utilized in the development of this research project:

Table 1.
Constructs and Item of Measurement about Personal Innovativeness.

PI1 the Internet of Things Smart Home system provides critical input toward a new idea.	Walley, et al. [40]
PI2 the Internet of Things Smart Home system counted on to find a new use for existing equipment	
PI3 the Internet of Things Smart Home system develop contacts with experts outside my home.	
PI4 the Internet of Things Smart Home system be able to set aside resources for the pursuit of a risky project.	
PI5 the Internet of Things Smart Home system be counted on to find a new use for existing methods or equipment	
PI6 the Internet of Things Smart Home system has demonstrate originality of innovative.	
PI7 Personal Innovativeness plays role in influencing the adoption of the Internet of Things Smart Home system.	
PI8 I'm willing to try emerging smart home products	Agarwal and Prasad [22]
PI9 I want to recommend emerging smart home products to others.	
PI10 I hope smart home products can be updated quickly	

6. Methodology

Content validity and construct validity will be used the expertise (industrial and academic expertise). In detail, the un-structure interview will be applied, by using 7 expertise' in the area of IoT Smart Home, which 3 persons for industrial expertise opinion and 4 persons for academia expertise opinion. According to Sekaran and Bougie [41] content validity refers to the agreement among the professionals that the items are designed accurately and adequately measure the variable [41]. Meanwhile, construct validity refers to the degree to which the items have been operationalised consistent with the underlying theory.

This expertise will review the items of measurement of personal innovativeness, and provide their examination on each item, based on the scale of “Yes” and “No”.

Sekaran and Bougie [41] mentioned that reliability is a test of how consistently a measuring instrument measures whatever concept it is measuring. Indicates the extent to which it is without bias and hence ensures consistent measurement across time (stability) and across the various items in the instrument (internal consistency). Reliability tests are also applied in this study, by taking Internal Consistency Reliability, Convergent Validity, and Discriminant Validity [41].

7. Results & Discussion

Table 2 shows the result of the study. The majority of experts agree with the items of measurement, except for Items PI3, PI4, and PI10. Item PI3, "the Internet of Things Smart Home system develops contacts with experts outside my home," has been disagreed with by experts 3 and 4 due to concerns about the "experts outside my home." Item PI4, "the Internet of Things Smart Home system is able to set aside resources for the pursuit of a risky project," has been disagreed with by experts 4 and 5, who suggest replacing the term "risky project" with a more suitable phrase. Item PI10, "I hope smart home products can be updated quickly," has been disagreed with by experts 6 and 7, who are prepared to replace the phrase "updated quickly" with "automatically updated."

Table 2.
Results of Review on Constructs and Item of Measurement about Personal Innovativeness.

Item of measurement	Expertise 1	Expertise 2	Expertise 3	Expertise 4	Expertise 5	Expertise 6	Expertise 7
PI1 The Internet of Things Smart Home system provides critical input toward a new idea.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
PI2 The Internet of Things Smart Home system counted on to find a new use for existing equipment	Yes	Yes	Yes	Yes	Yes	Yes	Yes
PI3 The Internet of Things Smart Home system develop contacts with experts outside my home.	Yes	Yes	No	No	Yes	Yes	Yes
PI4 The Internet of Things Smart Home system be able to set aside resources for the pursuit of a risky project.	Yes	Yes	Yes	No	No	Yes	Yes
PI5 The Internet of Things Smart Home system be counted on to find a new use for existing methods or equipment	Yes	Yes	Yes	Yes	Yes	Yes	Yes
PI6 The Internet of Things Smart Home system has demonstrate originality of innovative.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
PI7 Personal Innovativeness plays role in influencing the adoption of the Internet of Things Smart Home system.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
PI8 I'm willing to try emerging smart home products	Yes	Yes	Yes	Yes	Yes	Yes	Yes
PI9 I want to recommend emerging smart home products to others.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
PI10 I hope smart home products can be updated quickly	Yes	Yes	Yes	Yes	Yes	No	No

The results of the reliability test (Internal Consistency Reliability, Convergent Validity and Discriminant Validity) are shows in Table 3, Internal Consistency Reliability; Table 3, Convergent Validity; and Table 5, Discriminant Validity.

Reliability analysis, or dependability analysis, assesses the stability, consistency, and reliability of measurement outcomes. Prior to analysis, it is essential to conduct a reliability analysis of the valid data in the questionnaire to ensure the accuracy of measurement results. The Cronbach α coefficient is presently utilized for analysis in social science research. According to Borges et al. [42], a reliability coefficient over 0.9 signifies outstanding reliability; 0.8 to 0.9 denotes very good reliability; 0.7 to 0.8 reflects acceptable reliability; 0.6 to 0.7 suggests acceptability; and a coefficient below 0.6 indicates a requirement for revision [42]. The subsequent Table 3 displays the item totals for each dimension in detail:

Table 3.
Reliability Analysis Result.

Variables	Items	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
PI	PI1	0.756	0.861
	PI2	0.719	0.861
	PI3	0.732	0.854
	PI4	0.688	0.868
	PI5	0.731	0.876
	PI6	0.742	0.854
	PI7	0.758	0.849
	PI8	0.736	0.867
	PI9	0.719	0.869
	PI10	0.713	0.871

Composite Reliability (CR) serves as a criterion for evaluating the internal quality of a model, indicating the extent to which all measurement items within each latent variable consistently elucidate the hidden variable, according to Borges et al. [42]. Table 3 demonstrates that all CR values above 0.7, signifying that every measurement item within each latent variable consistently elucidates the latent variable. The convergent validity of each dimension is indicated by the Average Variance Extracted (AVE), commonly employed to assess the convergent validity of a scale. The AVE value directly indicates the proportion of variation attributed to the latent variable that arises from measurement error: a higher AVE signifies a greater percentage of variation in the measured variables accounted for by the latent variable, and a reduced relative measurement error. A number exceeding 0.5 is required. Table 4 indicates that all AVE values are above 0.5, and all CR values surpass 0.7. This signifies that the structural model of the questionnaire demonstrates strong convergent validity.

Table 4.
Convergent Validity.

Factor	Title	Factor loadings	CR	AVE
PI	PI1	0.811		
	PI2	0.812		
	PI3	0.801		
	PI4	0.791		
	PI5	0.802		
	PI6	0.831		
	PI7	0.812	0.891	0.682
	PI8	0.821		
	PI9	0.817		
	PI10	0.819		

Discriminant validity denotes the extent to which a particular latent construct is experimentally differentiated from other latent constructs, as mentioned by Borges et al. [42]. Discriminant validity is established when the square root of the Average Variance Extracted (AVE) exceeds the correlations of other latent variables. Table 5 demonstrates that the square roots of all average variances recovered exceed the correlations among latent variables, signifying adequate discriminant validity as mentioned by [42].

Table 5.
Discriminant Validity.

	PI1	PI2	PI3	PI4	PI5	PI6	PI7	PI8	PI9	PI10
PI1	0.801									
PI1	0.523	0.807								
PI3	0.578	0.397	0.867							
PI4	0.549	0.3.78	0.299	0.871						
PI5	0.479	0.614	0.526	0.479	0.867					
PI6	0.575	0.491	0.551	0.491	0.485	0.725				
PI7	0.497	0.501	0.513	0.329	0.201	0.371	0.829			
PI8	0.525	0.421	0.436	0.419	0.289	0.397	0.473	0.878		
PI9	0.531	0.278	0.472	0.349	0.386	0.475	0.464	0.378	0.878	
PI10	0.541	0.278	0.459	0.339	0.286	0.475	0.374	0.358	0.811	0.814

8. Conclusion

In conclusion, examining the validity and reliability tests on personal innovativeness as a moderating role between perceived usefulness, perceived security, perceived privacy, and perceived simplicity of use, with the intent of adoption as the dependent variable, is important as preparation for the model before the real study is conducted in the future. Content validity and construct validity used in this study utilize expertise (industrial and academic expertise) that indicates the goodness of the variables and items of measurement. Meanwhile, the reliability test focused on Internal Consistency Reliability, *Convergent Validity*, and *Discriminant Validity* will provide a better understanding of the suitability of the variables and items of measurement as a whole model. As this study will be applied in Shenzhen, China, it is suggested that the items of measurement be translated into Mandarin. Back-to-back translation is possible to be applied as the next step of the research.

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